Applied Mathematics and Nonlinear Sciences

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Study on the social impact Assessment of Primary Land Development: Empirical Analysis of Public Opinion Survey on New Town Development in Pinggu District of Beijing

Lei Gao[†]

School of Economics and Management, Institute of Disaster Prevention,
Sanhe, Hebei 065201, China

Submission Info

Communicated by Juan Luis García Guirao

Received September 13th 2020

Accepted December 2nd 2020

Available online February 3rd 2021

Abstract

This paper studies a land primary development project in Pinggu District as an example for analysis since the complete survey data and adequate data analysis are not available on the assessment of social impact from primary development projects of land. In this paper, we carry out regression analysis based on statistical analysis of survey data, explore the attitudes of stakeholders towards development projects, and find out the main factors and risk problems. Finally, the required policy changes based on the analysis are recommended and put forward to provide reference for impact assessment of social stability.

Keywords: Primary land development, social impact assessment, resettlement, policy recommendations

1 Introduction

Primary land development is a business of capital-intensity, characteristic of long periods of development and operation, high land acquisition and removal expenses, involving multilateral interest groups and many uncertain factors [1]. Hence, a long-term problem of social stability is inherent, risky problem in the primary land development process. For current construction projects, strengthening social impact assessment is the guarantee for the idea of sustainable and stable development along with harmony throughout the construction project [2]. According to *Notice on Interim Measures for Social Stability Risk Assessment of Major Fixed Asset Investment Projects of the National Development and Reform Commission* (Development and Reform Investment (2012) 2492) [3] laid down by the NDRC on September 2012, as well as requirements of *Notice on Printing and Distributing the Social Stability Risk Analysis Chapters and Evaluation Report Outline of the Major Fixed Asset*

[†]Corresponding author.

Email address: gaolei@cidp.edu.cn

Investment Projects (for trial) (NDRC Office Investment (2013) No. 428) [4], social impact focuses on the participation and interaction from the public and the social. In 2015, China's premier's government work report necessitated the implementation of a risk assessment mechanism for social stability in major decisions [5]. In the same year, *the opinion on strengthening the system of social security prevention and control* was issued to emphasise the implementation of a social stability risk assessment system for major decisions [6]. Subsequently, in 2019, the Chinese President further emphasised the need to assess social stability risks carefully in all major decisions involving the interests of the masses [7].

From the perspective of the actual project, now decision-makers of projects are getting realised that engineering projects are directly related to the critical interests of the masses [8], and the state of risks of stakeholders also plays an important part on the social stability influence [9]. But in actual projects, the quality and effectiveness of social stability assessment are affected due to issues such as ambiguous regulations on public participation in social impact assessment and low public participation [10]. From an international perspective, social impact assessment has drawn so much attention in the early stages of project planning and construction in developed countries [11, 12]. Just at the very time, Western scholars have analysed the benefits of social impact assessment in developing countries [13] and also have conducted social impact assessment research from the perspectives of conflict management [14], participation methods [15], project types [16] and simulation [17]. Nevertheless, as far as related projects of primary land development in China are concerned, the present social impact assessment is conducted directly using the most direct statistical analysis, that is, descriptive statistical analysis on some indicators such as housing conditions and removing attitudes; then identify potential risk factors of the project. The approach will become too simple and extensive for using the survey data, without establishing a correlation between the attributes and attitudes of relevant interest groups, and without fully exploring the value of survey data.

Risk factors in a primary development vary with different risk factors for each and every project. The common ones include obstacles to relocation by the elderly people, traffic congestion, and noise pollution and environmental pollution caused by construction works. This research is focussed on a primary land development project of some villages in Pinggu District, Beijing. At first, research data and direct opinions of relevant interest groups are obtained through field surveys and intuitive factors worthy of concerns are summarised. Then statistical analysis and regression analysis are employed to recognise the probable risks of such projects, and further analysed the factors that need to be focussed on. The project is comprised of all the key elements that may be involved in the primary development of the land and further, it also covers the demands of different kinds of residents. Therefore, it is an appropriate typical case to delve into the focal points of public opinion and underlying risks. This paper considers that the study methods and research contents can provide references for the social impact assessment of this kind and the policy recommendations are beneficial to policy decision-making.

2 Opinions of Stakeholders in Primary Land Development Projects

The primary land development project chosen in this study is located at the west side of Xincheng, Pinggu District, Beijing. The total land use for land bank in the early stage is 58.44 hectares, in which 32.60 hectares is for total land consolidation, and the rest 25.84 hectares for relocation and resettlement. The total construction area is 15.17 hectares, while the building area is 25 million square meters and the living construction area is 213,700 m².

Aiming for a better understanding the opinions and demands of stakeholders on the project, and for a more accurate social impact assessment of the project implementation, the situation and attitudes of villagers are obtained through questionnaires. The research data in this paper are extracted from a random sample survey of residents in a village in Pinggu District. A sum of 284 non-collective dwellers were visited, and 217 valid questionnaires were altogether withdrawn.

The survey falls into three parts: the first part gives an introduction to the basic situation of the villagers,

including gender, age and relationship with the householder, occupation, education level and sources of family income. The second includes the basic situation of the existing living conditions and living environment from the year of construction, the structure and the area of the house to the resident population, and whether they are satisfied with the existing living conditions or the existing living environment. The issues concerned with the implementation of this project comes the third. This section contains eight aspects such as house-removing concerns, requests for resettlement methods, opinions on current resettlement ways, compensations and other subsidies, opinions on present compensative standards, problems that may arise after relocation and rights protection methods that make waves. The statistic content and number of households in the third part are shown in Table 1.

It was finally found that 54% of the stakeholders were for the primary land development project, accounting for the largest proportion; 34% of villagers also gave conditional support; only 4% were against it; apart from that, 8% of the families did not express their attitudes towards this project.

Through direct surveys and statistical analysis of villagers' questionnaires, some important findings are needed to be highlighted:

First, the basic situation of the villagers is quite consistent. Most of them are middle-aged farmers or elderly people, whose main sources of income are from migrant working and pensions. Households are mostly concerned about pensions. For instance, some villagers support for the project, but it is suggested that the old-age care of the elderly should be resolved completely. Some villagers are opposed to the implementation of the project just because they believe that it is inconvenient for the elderly to live in high-rise buildings and hopes it will be properly resettled. Naturally, attention will be mostly paid to the issue of pensions in the relocation process.

Moreover, the villagers have been used to living here for a long time, and enjoy high satisfaction with the existing environment and living conditions. This may partly get in the way of dwellers' support for demolition.

Lastly, villagers do not have access to multiple sources of information and rely much on information dissemination from village committees and street offices. As a result, the project needs close communication with the village committee and the sub-district office to explain and publicise the project compensation standards and other issues so as to reduce the risks caused by the asymmetry of information.

Generally speaking, the direct survey tells that the villagers offer a high support for the project. Most stakeholders deem that the project will make a greater difference to local construction and development, but also hold different ideas on various issues. It can be seen from this point that there are only a few risk factors for implementation of this project.

3 Analysis of Related Factors

(1) In-depth Analysis on the Impact of Stakeholders on the Project

In line with the content of the survey, the dependent variable in this article is set in the degree of villagers' support for the primary land development project, that is, the overall attitude of the interviewed villagers to the proposed primary land development project. This survey investigated respondents' support rate *What is your overall attitude towards this project?* The answers *against, indifferent, conditional support, support and other* are assigned a value of 1, 2, 3, 4 and 5, respectively, as a quantitative measurement.

This study prescribes a limit to some related variables, which includes: gender, age, occupation, education, year of construction, population, living conditions, living environment, resettlement compensation method, resettlement satisfaction and compensative satisfaction. To clarify the relationship between varied variables, factor analysis, regression analysis and other methods are employed to further analyse the obtained data. There are descriptive statistics of some variables in Table 2.

In order to have effective control on variables, many factors such as gender, age, occupation are selected and factor analysis is used to eliminate some variables. The principle of factor analysis is to display fewer independent factors to reflect most of the information of the original variables. Suppose that there are p original

Table 1 Statistical table of stakeholders' concerns

Issues concerned House removal	Number of households	Compensation ways	Number of households	Problems after relocation (optional)	Number of households
Compensative standards and its reasonableness	100	Property right exchange plus monetary compensation	207	Pension problems	137
Implementation of compensation funds	48	Pure monetary compensation	10	Changes in living environment	86
Follow-up security issues of demolition	32	Other subsidies	Number of households	Employment issues	55
Openness and legality of removing information	37	Employment arrangement	88	Schooling problem of kids	43
Requests for Resettlement Methods	Number of households	Information of get-rich	47	Source of income	2
Resettlement nearby	140	Vocational skills training	43	No concerns	3
Relocation	49	Microloan discount	9	Rights protection ways that make waves (optional)	Number of households
Obedient to arrangements	28	Without requests on this item	30	Report to government	127
Opinions on current resettlement ways	Number of households	Opinions on present compensative standard	Number of households	Self-negotiation	63
Very satisfied	9	Very satisfied	9	Legal solution	56
Satisfied	37	Satisfied	37	Petition way	16
Almost satisfied	47	Almost satisfied	52	Keep silent	24
Unsatisfied	35	Unsatisfied	28	By means of media or network	12
Unknown	89	Unknown	91	Protest by Uniting neighbouring residents	6

Table 2 Statistical analysis on variable descriptions of stakeholders ($n = 217$)

Variables		Variable descriptions	Mean value	Standard deviation	Minimum	Maximum
Dependent variable	Overall attitude	1=objection, 2=indifference, 3=conditional support, 4=support, 5=and others	3.44	0.809	1	5
Control variables and independent variables	Sex	0= male, 1=female	0.65	0.478	0	1
	Age	1=30 off, 2=30~ 45, 3=45~ 60, 4=above 60	3.10	0.897	1	4
	Occupation	1= workers, 2=farmers, 3= commercial servicemen 4=civil servants, 5= the self-employed, 6=professionals, 7= enterprise and public institution staff, 8=students, 9=the retired, 10=others	5.32	3.538	1	10
	Education	1= high school or less, 2=college, 3=bachelor, 4=master and above	1.20	0.557	1	4
	Year of building	Numerical variables	1985.38	13.865	1903	2009
	Population	Numerical variables	4.13	2.467	0	11
	Living conditions	1= unsatisfied, 2= general, 3= satisfied	2.94	0.341	1	3
	Living environment	1= unsatisfied, 2=general, 3=satisfied	2.95	0.285	1	3
	Resettlement and compensative ways	1=monetary, 2= house property right exchange, 3=monetary combined with house property right	2.55	0.584	1	4
	Resettlement satisfaction	1=unsatisfied, 2= unknown, 3=almost satisfied, 4=obedient to arrangement, 5= satisfied, 6=very satisfied	2.75	1.428	1	6
	Compensation satisfaction	1=unsatisfied, 2= almost satisfied, 3=satisfied, 4= very satisfied	2.77	1.382	1	6

Table 3 Sampling moderation values and Bartlett's test

Kaiser-Meyer-Olkin metric of sampling sufficiency		0.726
Bartlett's test of sphericity	Approximate to chi-square	964.658
	df	66
	Sig.	0.000

variables, $x_1, x_2, \dots, x_p$, each with a mean value of 0 and a standard deviation of 1. Now each original variable is represented by a linear combination of factors, $f_1, f_2, \dots, f_k$, then

$$\begin{cases} x_1 = a_{11}f_1 + a_{12}f_2 + a_{13}f_3 + \dots + a_{1k}f_k + \varepsilon_1 \\ x_2 = a_{21}f_1 + a_{22}f_2 + a_{23}f_3 + \dots + a_{2k}f_k + \varepsilon_2 \\ \vdots \\ x_p = a_{p1}f_1 + a_{p2}f_2 + a_{p3}f_3 + \dots + a_{pk}f_k + \varepsilon_p \end{cases}$$

Prior to performing factor analysis, whether there is a certain linear relationship between the original variables and whether it is suitable to use factor analysis to extract factors are checked. This paper utilises the correlation coefficient matrix of variables, Bartlett's test of sphericity and KMO test to analyse.

Based on the correlation coefficient matrix test, it is found that most of the correlation coefficients are high, which implies strong linear relationship between the variables, and so the common factors can be extracted suitable for factor analysis. The corresponding probability value of the Bartlett sphericity test gets close to zero. If the significance level $\alpha = 0.05$ and the probability value is less than $\alpha = 0.05$, the null hypothesis is rejected and the correlation coefficient matrix is considered to be significantly varied from the identity matrix. At the same time, it can be derived that the original variables are proper for factor analysis based on the KMO test.

Based on results of Table 4, six components were extracted from the initial solution. Thus, the total variance of the original variable can merely explain six components only and the cumulative contribution rate is up to 74.79%.

Table 4 Explicatory analysis of total variance

Elements	Initial eigenvalue			Extract square and load			Rotate square and load		
	Total	Of variance	Cumulative	Total	Of variance	Cumulative	Total	Of variance	Cumulative
1	2.253	18.778	18.778	2.253	18.778	18.778	2.140	17.832	17.832
2	1.936	16.130	34.907	1.936	16.130	34.907	1.926	16.053	33.885
3	1.392	11.601	46.509	1.392	11.601	46.509	1.397	11.638	45.523
4	1.249	10.411	56.919	1.249	10.411	56.919	1.250	10.416	55.939
5	1.121	9.340	66.259	1.121	9.340	66.259	1.195	9.960	65.898
6	1.023	8.527	74.785	1.023	8.527	74.785	1.066	8.887	74.785
7	0.898	7.483	82.268						
8	0.760	6.331	88.599						
9	0.702	5.850	94.449						
10	0.503	4.192	98.641						
11	0.123	1.023	99.664						
12	0.040	0.336	100.000						

Extractive method: Principal component analysis.

Table 5 shows that the gender, age, occupation, education level of the villagers, the year of house built and the number of residents, which demonstrate remarkable correlations.

Therefore, the stakeholders of different gender, age, occupation, education level, the year of house construction and the number of residents give evident distinction on project attitudes. These factors can be used as the

Fig. 1 Lithograph of factor analysis.

basis for the following steps.

(2) Factors Related to Primary Land Development and Social Impact Assessment

For illustrating deeply the diversity of the influential factors such as gender, age, occupations, education levels, years of house construction and the number of residents on the attitude of the project among Baigezhuang villagers, the multiple linear regression analysis is performed on the data extracted by the above factor analysis. The multiple linear regression analysis is applied to disclose the linear relationship between the variables explained and many other explanatory variables. The mathematical model is

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_p x_p + \varepsilon$$

There are p revealing variables in the above formula, and ε is the random error. The results of multiple linear regression are shown in Table 6.

The outputs of multiple linear regression indicate that the observed value of the F -test statistic was 1.868, and the corresponding P -value was approximately 0. When the significant level is 0.05, the null hypothesis of the significance test of the regression equation should be rejected, since the probability P -value is less than the significance level. The variables explained and explanatory variables, which are regarded important in the analysis, are 'likely to establish a linear model.

Table 7 manifests and presents the regression equation between each variable and the degree of project support: approval rate = $0.184 * \text{gender} - 0.002 * \text{age} - 0.056 * \text{occupation} + 0.075 * \text{education level} - 0.026 * \text{year of house built} - 0.038 * \text{residential population}$.

Based on the obtained correlations between each variable and the project, the main six points of the study are concluded:

The important points are (1) women have higher support for the project than men; (2) the higher the education level is, the higher the support rate for the project; (3) occupations of different kinds are supporters for the project and to our surprise, workers and business servicemen give a higher supporting rate; (4) the longer

Table 5 Componential matrix^a of related variables

	Components					
	1	2	3	4	5	6
Gender	0.227	0.020	-0.145	-0.459	0.579	0.154
Age	-0.139	0.150	-0.764	-0.064	0.034	-0.338
Occupation	-0.027	-0.164	0.130	-0.200	-0.687	-0.019
Education level	0.181	0.069	0.776	-0.331	0.149	-0.052
Year of house built	-0.199	-0.111	-0.139	0.129	-0.085	0.908
Number of inhabitants	-0.172 +++++	0.144	0.040	0.689	0.277	0.023
Satisfaction of existing living conditions	-0.100	0.948	0.062	-0.068	-0.068	0.065
Satisfaction of current living environment	-0.133	0.947	0.057	-0.027	-0.038	0.071
Ways of compensation and resettlement	-0.034	-0.084	0.344	0.555	0.166	-0.182
Whether villagers are satisfied with methods and standards of compensation and resettlement	0.922	0.140	-0.089	0.191	-0.193	0.016
Whether the subsidy standard is satisfactory	0.920	0.144	-0.088	0.192	-0.177	0.044
Overall attitude	0.596	-0.068	-0.071	-0.085	0.324	0.110

Extraction method: Principal component analysis.

^aSix components have been extracted.

you live here and the older you are, the lower your support rate will be, because the older the villagers are, the more adaptive they are to the existing living environment and moreover the elder people's legs and feet may be growing less flexible as the time goes on; (5) the longer the time the house is built, the more its owner will support the project and during the investigation, many old houses collapsed severely, and some of them in bad condition that makes difficult to move in again. So, these housekeepers expressed support for the project for

Table 6 Anova^a

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	7.171	6	1.195	1.868	0.008 ^b
	Residual	134.359	210	0.640		
	Total	141.530	216			

^aDependent variables: Overall attitude.

^bPredictive variables: (constant), number of inhabitants, age, year of house construction, occupation, gender, education level.

Table 7 Coefficients^a of relevant social influence factors

Model		Non-standardised coefficients	Standard error	Standardised coefficients	t	Sig.
		B		Testing edition		
1	Constant	6.237	8.046		0.775	0.439
	Sex	0.311	0.116	0.184	2.679	0.008
	Age	-0.002	0.066	-0.002	-0.030	0.976
	Occupation	-0.013	0.016	-0.056	-0.822	0.412
	Education level	0.109	0.109	0.075	1.000	0.318
	Year of house construction	-0.002	0.004	-0.026	-0.376	0.708
	Residential population	-0.012	0.022	-0.038	-0.555	0.580

^aDependent variables: Overall attitude.

safety reasons; and (6) larger the number of residents is, the lower the support rate is, which is mostly because dwellers like these live here for a long time, and have been accustomed to the current living environment. 'More importantly, they are worried that due to the large population, housing resettlement after demolition cannot be successfully resolved; hence they do not approve the project. The first three points are mainly observed in different interest groups. The fourth point emphasis the much worry on the convenience of elder's life. The fifth point shows that the living environment can objectively promote the launching of this project. The last is ascribed to the problem of living habits and the distribution of family benefits. The three conclusions mentioned at the end require immediate information gathering and resolve them via good communication.

In summary, the main factors of the social impact assessment in the primary land development projects after thorough research are supposed to cover the issues of meeting the requirements of various groups, environmental adaptation and convenience for the elderly together with reasonable distribution of interests.

4 Policy Recommendations

Given the direct analysis of opinions from stakeholder groups and the study of major social influence factors, it can be noticed that the unimpeded flow of information and good communication are indispensable for

land-level development projects. Furthermore, the requirements of various stakeholders should be considered, especially the elderly, and ensuring the most reasonable distribution of benefits. Subsequently, the paper here comes up with the following three policy recommendations to government regulators:

Open information. As for the problem of inadequate risk communication among stakeholders in the social impact assessment of major public policies, risk communication may as well be acted as the kernel of social impact assessment and racing through the whole process of policy formulation and enforcement [18]. The public ‘concern on the elderly and the adjustment to the new environment can be dealt immediately by effective information spreading. We should keep eyes on the entire process of risk assessment and risk communication, strengthen the negotiation and dialogue among plural subjects, and give full play of the media and by publicly responding to negative comments. Relevant government departments also ought to treat the negative emotions of the minority specifically on basis of their own reasons. As soon as there are negative voices, quick responses and effective guidance should be given.

Diversity of subsidies. Studies have indicated that differences in the age, occupation, family background, and education of residents differentiated their demands also. Therefore, while ensuring openness, fairness and no violation of relevant rules and regulations, the government can take advantage of the available resources to meet the various needs of residents as much as possible. Diversified subsidy options for the public may be utilised to try to solve some family interests, disputes and other issues. Relevant government departments may also form a coordinating group for public disputes to drive the development of the project.

Democratisation of decision-making. In spite of paying more attention to the importance of citizen participating in the current practice of social impact assessment, the channels for citizens are still waiting to be widened. Continuous improvement of field participation is on the road, while netizens should be admitted to get more access to decision-making. Correspondingly, it should be clear that the role of the government in risk assessment should not be ‘parental’ to guide citizens in favour of an administrative decision, but to allow citizens to fully understand the decision-making information and the results of ‘stable evaluation’ from a neutral place. Determine whether the decision can be brought into force by the people themselves [19]. Procedural mechanisms such as prior investigations, public hearings, public participation, validity check, collective discussion and decisions, tracking decision-making effects, and error correction are the legal institutional basis for major administrative decision-making procedures [20].

The three policy measures mentioned above are all closely related to real interest rates for residents and scalable. All policy measures can be applied according to the characteristics of the project, and preference could be given to one or both of these measures. But for the current stable reviews on great decision-making projects, there are main steps to determine the project awaiting assessment, draw up an evaluation plan, fully give a hearing to opinions, make a comprehensively analytic demonstration, rank the risk level, set out precautionary measures, fix the evaluation report and use the evaluation results. Relevant government departments can take the forms of consulting documents, such as field surveys, questionnaires, opinion polls, interviews, internet public opinions, hearings, and public notices at the stage of hearing opinions and so on. Make sure that there are a variety of ways for residents to obtain information, and that the content of survey has a large amount of data and immediacy. The three types of policy recommendations above can be used in conjunction with existing processes.

5 Conclusion

The primary land development projects cannot be harmoniously and smoothly developed until risks and accidents get decreased or avoided in construction projects, accompanied by preventing and resolving project social impact and social conflicts. The foundation for the effective development of project is the social impact assessment, which is attributed to the close combination of theoretical analysis and practical application. This paper takes the primary land development project involved in a village in Pinggu District of Beijing as a backdrop, and extracts research data through questionnaire design and field survey. The opinions of stakehold-

ers are statistically and intuitively analysed, and then a profound study on potential risk factors of the project is undertaken by making use of regression analysis. On one hand, this research can provide a reference for the techniques of social impact assessment of such kind. On the other hand, the risk factors identified in the research conclusions are the focuses of opinion polls as well and so it can lend some insight into similar projects. In the meantime, this paper puts forward some corresponding policy suggestions, with a humble eagerness to furnish referential for the social impact assessment of primary land development projects and for correlated government decision-making.

Acknowledgements: This paper is supported by the Fundamental Research Funds for the Central Universities (No. 2017XS109).

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