

Research on Stakeholder Participation Behavior of Rental Housing with Collective Construction Land: Taking Wuhan City as an Example

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Abstract: In August 2017, The Ministry of Land and Resources and the Ministry of Housing and Urban-Rural Development jointly issued the Pilot Program for Building and Rental Housing with Collective Construction Land, 13 reform pilot cities began to carry out practical exploration actively. Taking Wuhan City as an example, the research team investigate five pilot areas of Wuhan and the results shows that the key to get the expected results of the pilot reforms is to deal with the interests of the participating entities. This paper discuss the interests of the four stakeholder groups during the process of constructing rental housings by using collective construction land and constructs a model to analyze the interests of all parties in order to explore the balance of the interests. The paper also puts forward policy recommendations to coordinate the interests of all relevant entities and promote the sustainable development of constructing rental housing by using collective construction land.

1. Introduction

Large Numbers of people flowing into cities make the supply and demand of housing tighter, Local governments explore diversified land supply models which promote the construction and development of rental housing [1][7]. The Ministry of Land and Resources and the Ministry of Housing and Urban-Rural Development has released a series of policy documents. From 2017 "About the Population Flow into the Large and Medium-sized Cities to Speed Up the Development of the Housing Rental Market of Notice, the Use of Collective Construction Land Rental Housing Construction Pilot Program", and in 2018 to General Office of the Ministry of Land and Resources, General office of the Ministry of Housing and Urban-Rural Development's comment letter about Shenyang and 11 other cities will use collective construction land to build rental housing on a trial basis. The collective construction land is not only a land system reform of Building a Unified Construction Land Market in Urban and Rural Areas", but also a new measure of housing system reform of Building a Housing System of Both Purchase and Rent [2].

2. Analysis of Interest Demands of Stakeholders

2.1 Identification of Stakeholders

Wuhan has five area began to pilot, Wuhan Future Science and Technology City of Donghu High-tech Development Zone, Xiaoli Village of Jiangxia District, Shekou Village of Huangpi District, Manao Village of Caidian Economic Development Zone and Maan Village of Xinzhou District. Shekou and Xiaoli village has been respectively with two state-owned cooperation, joint venture, is expected to start construction project 2019, other three areas, also in succession in the completion of the demolition and planning tasks.

In the planning and construction process of the collective construction land construction rental housing project, the government departments assume the role of organization, guidance, coordination, supervision, etc., and play a leading role. The development enterprise undertakes the function of providing fund and organizing construction, and obtains stable income from it; The use of collective construction land is directly related to the interests of local village collectives and

villagers, who are also direct beneficiaries of land supply and construction cooperation. During the operation of the project, the needs of the surrounding tenants are closely related to the planning of the project, and they are the final audience of the project. Therefore, local governments, development enterprises, collective economic organizations and tenants are regarded as direct stakeholders in the project [3-4].

2.2 Analysis of Interest Demands of Stakeholders

According to the results of field interviews and referring to relevant literature, the functions and interest demands of stakeholders are summarized, as shown in table 1.

Table 1 Interest Demand Analysis Table of the Stakeholders of Collective Construction Land Construction Leasing Housing

Stakeholders	Character	Function	Interest Demands
Government Departments	The monetary policymaker	Provide policy support and intellectual support	Protect the ecological environment, promote economic growth and maintain social stability
Development Enterprise	The implementer of the policy	Undertake direct construction tasks including development, operation and maintenance	Get economic remuneration, improve the reputation of the industry ^[5]
Collective Economic Organization	The policy facilitator	Participate in project construction, undertake the task of land supply	Obtain economic compensation, obtain follow-up development opportunity
Tenant Groups	The policy recipients	Final audience	In a reasonable level of payment, to meet the living requirements ^[6]

3. Analysis of Stakeholders' Benefit Conflicition

3.1 Conflict of Interest Between Government Departments and Collective Economic Organizations and Development Enterprises

In the collective construction land construction rental housing project, the government department has the diversification interest goal. First, we will ensure social benefits, maintain social equity and stability, and ensure the steady and orderly development of the real estate market. Second, environmental benefits, the use of land resources economically and intensively, the protection of the ecological environment. Third, economic benefits, increase local employment opportunities and promote economic growth. The construction of projects cannot be separated from the cooperation between collective economic organizations and development enterprises. The interests of the collective and enterprises may be in conflict with the needs of social and environmental benefits. Therefore, in order to maximize their own interests, there will be certain conflicts of interests.

3.1.1 Government Departments and Collective Economic Organizations

The conflict of interest between the government and the collective is mainly about the incentive mechanism. Collective economic organizations interests focus on whether can obtain economic compensation, can bring economic benefits for the collective, to promote the development of local economy, contribute to the ecological environment influence is not attention, this has to do with the government's social, economic and environmental benefits balance demands may lead to conflict. Therefore, how to take appropriate incentive measures to attract collective economic organizations to actively participate in the construction has become the focus of policy formulation.

3.1.2 Government Departments and Development Enterprises

The conflict of interest between the government and development enterprises is mainly on the issue of profit distribution. Development enterprises consider whether the project will gain greater than the previous input costs, maximize profit and capture more market share in order to achieve this goal, may be at the expense of the damage to the environment, with the government's social, economic and environmental benefits balance demands also may lead to conflict. On the premise of fairness and rationality, how to ensure the realization of the profit target of enterprises should also become the focus of government departments.

3.2 Conflict of Interest Between Development Enterprises and Collective Economic Organizations and Tenant Groups

3.2.1 Develop Enterprises and Collective Economic Organizations

The conflict of interest between the development enterprise and the collective is mainly on the issue of cost input. Collective economic organizations in the process of the construction of the whole project, focuses on economic and environmental benefits, the development enterprise to be involved in the process, the construction must be taking into account the interests of the collective economic organization demands, namely in the process of project operation to ensure that can provide employment opportunities for the villagers, and intensive use of land resources saving, maintain stable ecological environment. However, no matter what kind of interest appeal is, it will increase the upfront investment and cost of the development enterprise. For example, in order not to increase the burden on the local ecological environment, the development enterprise should increase the use of environmental protection materials, reasonably plan the green area and reduce the environmental pollution in the construction process. These inputs will generate certain pressure on the cost of the development enterprise.

3.2.2 Develop Enterprises and Tenant Groups

The tenant is the ultimate audience of the project, and its main interest demands include realistic needs and economic conditions. Realistic needs mean that the project must meet the living requirements of the tenant group in terms of functions, security, infrastructure and other external environment related contents. Economic conditions for the project to bear the rent can not exceed the maximum affordable, can not be higher than the existing level of payment. Rental housing is a project with a long return period and a low short-term return. If the return on investment continues to be at a low level, the capital chain of the development enterprise will face a huge test.

There are conflicts of interests among stakeholders of collective construction land to build leased housing. Therefore, relevant constraints must be established in the process of game among stakeholders, and interests of all parties should be balanced by signing effective implementation agreements. This is a process of cooperative game.

4. Gaming Relationship of Stakeholders

Interest is a driving force of stakeholder cooperation, multiple stakeholders main body under the condition of meet the individual rationality constraint, the pursuit of collective interests, finally get stakeholder cooperation of equilibrium solution, and the interests of the subject of collective construction land to build rental housing to participate in the distribution structure, to promote the interests related subject effective coordination, achieve the goal of win-win cooperation.

In collective construction land to build rental housing project, the government, the development of enterprises, collective economic organizations and tenant group stakeholders such as the main body in the process of mutual cooperation, to achieve the ultimate goal of collective construction land to build rental housing, namely the guarantee the fairness and efficiency under the premise of give attention to two or morethings, to satisfy the interests of the parties to the reasonable demands.

4.1 The Definition of Cooperative Game

Game theory is a systematic theory, which belongs to the branches of applied science, operational research and mathematics. It emphasizes that two or more parties in competition or cooperation choose the decision theory that is beneficial to maximize their own interests. According to the behavior of participants, game classification can be divided into cooperative game and non-cooperative game. Cooperative game theory points out that in order to maximize long-term benefits, the parties to the conflict have the possibility of long-term coexistence and long-term cooperation, which provides the theoretical basis of methodology for game players to seek win-win or multi-win.

4.2 Basic Elements

4.2.1 The Players

The process of game, that is, players, as rational decision makers, compete for their own purposes. In the collective construction land construction rental housing project, there are four parties: the government, development enterprises, collective economic organizations and tenants.

4.2.2 The Strategy

In the game process, each player will choose the action strategy that can maximize his own interests. In the collective construction land construction rental housing project, there are two strategies: to participate in the project construction, not to participate in the project construction.

4.2.3 Order of Behavior

Behavior order refers to the behavior order in which each player participates in the game decision-making process. Game results will be different with different order of behavior. The system design of collective construction land for building rental housing is the top-level design of land management and real estate management. Secondly, the collective economic organizations will choose whether to participate in the action, then the development enterprises will join in according to their economic goals, and finally the tenants will choose whether to rent according to their own needs.

4.2.4 The Equilibrium

Equilibrium, as a state, represents the result of maximizing the interests of each stakeholder after the game. In the context of cooperative game, it is expected to establish a game model of stakeholders to realize the balanced result of interests of all parties under the overall benefit maximization.

4.3 Hypothesis

In order to better attract the government, village collectives, villagers and tenants to participate in the construction of collective construction land for housing leasing projects, the interests of the three parties must be balanced. In order to achieve a balance of interests, we make the following assumptions:

First, the total revenue obtained by the government using collective construction land to build rental housing must be greater than the total expenditure of government-led collective construction land to build rental housing.

Second, the net profit obtained by the development enterprise by using the collective construction land to build rental housing must be greater than the total cost of participating in the construction, and the possible profit of not participating in the construction of the project but carrying out the construction of other projects.

Thirdly, the economic benefits obtained by collective economic organizations by using collective construction land to build rental housing must be greater than the economic benefits before construction.

Fourthly, the rent expenditure of tenants in the project of renting housing with collective

construction land must be less than the previous rent expenditure.

4.4 Game Model

Based on the above constraints, the following game model is constructed:

$$\begin{cases} X_1 > Y_1 \\ X_2 > Y_2 + Y_3 \\ X_3 > Y_4 \\ X_4 \geq Y_5 \end{cases} \quad (1)$$

X_1 is the total income of the government-led collective construction land for housing leasing.

Y_1 is the total expenditure of leasing housing on the collective construction land led by government departments.

X_2 is the net income obtained by the development enterprise using collective construction land to build rental housing.

Y_2 is the total cost of the development enterprise participating in the construction.

Y_3 is the possible benefit of the development enterprise not participating in the construction of the project but carrying out the construction of other projects.

X_3 is the economic income of collective economic organizations using collective construction land to build rental housing.

Y_4 is the economic profit of collective economic organizations before they use collective construction land to build rental houses; X_4 is the current living expenses of the tenant group.

Y_5 represents the future living expenses of the tenant group.

4.4.1 Balanced Analysis of Interests of Government Departments

The total revenue of government-led collective construction land for housing leasing = the rental income in the later period + the operating management income in the later period = the total land area \times plot ratio \times monthly rent + the operating income in the later period

$$X_1 = x_0 x_1 y_0 + y_1 \quad (2)$$

x_0 is the total land area; x_1 is the plot ratio.

y_0 is the monthly rent; y_1 is the sharing of operating income in the later period.

The total expenditure of the government-led collective construction land for housing leasing = the planning expenses in the early stage + the expected input of the land in the future

$$Y_1 = x_2 + y_2 \quad (3)$$

x_2 is the preliminary planning expense;

y_2 is the expected input of future land.

At this time, according to the game model and the above functional relationship, the following equilibrium equation can be obtained:

$$X_1 - Y_1 = x_0 x_1 y_0 + y_1 - x_2 - y_2 > 0 \quad (4)$$

In this capital balance equation, x_1 and y_0 are variables, while other parameters are constants, and there is a positive correlation between independent variables and dependent variables. Based on the investigation and interview results in Wuhan, the following conclusions are drawn:

For the government-guided collective construction land to build rental housing projects, the government has the motivation to carry out construction only when the revenue the government can obtain exceeds the expenditure;

The income from collective construction land building rental housing is positively correlated with the land area x_0 , plot ratio x_1 and monthly rent y_0 of the project. Therefore, it is the key for the government to guide collective construction land building rental housing to benefit from rational planning of plot ratio and appropriate rent.

The government pays far less attention to Y_1 and y_1 than to social and environmental benefits.

4.4.2 Balanced Analysis of Interests of Development Enterprise

The net income obtained by the development enterprise from the use of collective construction land to build rental housing = late-stage rent sharing + operating management income sharing + implicit brand value = total land area \times plot ratio \times monthly rent + late-stage operating income sharing + implicit brand value

$$X_2 = x_0 x_1 y_0 + y_1 + \alpha_0 \quad (5)$$

α_0 is the implicit brand value.

The total cost of development enterprises participating in construction = total land area \times plot ratio \times unit construction area cost + other construction expenses

$$Y_2 = x_0 x_1 x_3 + \alpha_1 \quad (6)$$

x_3 is the unit construction area cost.

α_1 is other construction expenses.

Y_3 is the possible benefit of the development enterprise not participating in the construction of the project but carrying out the construction of other projects, which is also a constant. Thus, it can be obtained.

$$X_2 - Y_2 = x_0 x_1 y_0 + y_1 + \alpha_0 - x_0 x_1 x_3 - \alpha_1 = x_0 x_1 (y_0 - y_3) + y_1 + \alpha_0 - \alpha_1 > 0 \quad (7)$$

In this capital balance equation, except x_0 , x_1 and y_0 , all other variables are predictable constants, and the following conclusions can be drawn:

When the net profit obtained by the development enterprise from the use of collective construction land to build rental housing is greater than the sum of its development cost and the average industry profit gained by participating in other projects, the development enterprise will actively participate in the development of the project.

Develop enterprises' participation in project construction to obtain implicit brand value, such as social reputation, government support, etc., which can positively promote enterprises' participation

The income of development enterprises participating in project construction is highly correlated with variable unit area cost and plot ratio. Appropriately increasing plot ratio and reducing unit cost can effectively improve the income of construction units.

4.4.3 Balanced Analysis of Interests of Collective Economic Organization

Economic benefits of collective economic organizations using collective construction land to build rental housing = rental income sharing in the later period + operating management income sharing in the later period + employment expectation = total land area \times plot ratio \times monthly rent + operating income sharing in the later period + employment expectation

$$X_3 = x_0 x_1 y_0 + y_1 + \alpha_2 \quad (8)$$

α_2 is employment expectation.

Economic income before collective economic organizations use collective construction land to build houses = agricultural planting income + rental income before

$$Y_4 = x_4 + y_3 \quad (9)$$

x_4 is the income from agricultural planting.

y_3 is the rental income before.

According to the above equation, the following fund balance relationship can be obtained:

$$X_3 - Y_4 = x_0 x_1 y_0 + y_1 - \alpha_2 - x_4 - y_3 > 0 \quad (10)$$

In this capital balance formula, except for the rent sharing in the later period and the operation and management income in the later period, all the others are constant. The following conclusions are drawn from the analysis:

For collective economic organizations, the maximization of benefits is the main factor driving them to participate in project decision-making.

Employment expectation is a key influencing factor. In the process of housing rental operation,

the establishment of property management company can increase the employment opportunities of villagers and bring stable income.

There is a positive correlation between the income brought by the late construction of the project and the construction area and rent pricing.

4.4.4 Balanced Analysis of Interests of Tenant Groups

Current living expenses of the tenant group = monthly rent + living expenses + transportation expenses

$$X_4 = y_4 + \theta_0 + \theta_1 \quad (11)$$

y_4 is the current monthly rent.

θ_0 is the current living expenses.

θ_1 is current transportation costs.

The future living expenses of the tenant group = monthly rent + living expenses + transportation expenses

$$Y_5 = y_5 + \beta_0 + \beta_1 \quad (12)$$

y_5 is the expected monthly rent in the future.

β_0 is expected living expenses in the future.

β_1 is the expected transportation cost in the future.

According to the above relationship formula, the financial balance formula of the tenant group can be obtained as follows:

$$X_4 - Y_5 = (y_4 + \theta_0 + \theta_1) - (y_5 + \beta_0 + \beta_1) \geq 0 \quad (13)$$

It can be found from the analysis of this capital balance formula that if the income level remains unchanged, if the same or even better rental housing can be obtained, the tenant group will be more willing to participate in the project. As for the tenant group, the research group conducted a survey in the form of questionnaire, and came to the following conclusions:

Monthly rent is the biggest concern of tenants, so the income level of the target customer group should be fully considered in the rent formulation, that is, the rent pricing should be based on the ability to pay.

The expected transportation cost is the content that tenants pay more attention to, so the project site selection should emphasize the convenience of transportation, such as the proximity of subway entrance and bus station.

Expected living expenses are what tenants pay more attention to. Therefore, the site selection and construction of the project should take into consideration that the surrounding areas should have perfect living facilities to attract more tenants.

4.5 Game Result

From the above game process, in the collective construction land construction rental housing project, the most concerned issues of all stakeholders focus on the economic benefits. The key factors that determine the level of economic benefits are as follows:

4.5.1 The Plot Ratio

The plot ratio determines the proportion of land price cost in the project development investment. The development enterprise and village collective hope that the higher the plot ratio is, the better. However, for the tenant group, too high the plot ratio will reduce the comfort of living. Therefore, reasonable plot ratio must be set in the planning and construction of the project, so as to not only save and intensively use the land, but also provide good living experience for tenants.

4.5.2 The Rent Level

The rent level affects the recovery of the input cost of enterprises, the profit sharing of government departments and collective economic organizations, and whether they can attract more

tenants. Take Wuhan as an example, the income level of the five districts is different. For example, the project plot of Donghu high-tech development zone is located in the cluster of high-tech enterprises, where the economic income level of tenants is relatively high, and the rent level can be increased accordingly. However, Xiaoli village of Jiangxia is dominated by migrant workers and farmers, with a low level of economic income, and the rent level should be appropriately reduced.

4.5.3 Late Operation Management

Rental housing project is not a short-term can obtain intuitive benefits of the project, more return from the later stable operation and management. For example, in Manao village of Caidian district, surrounding villagers are concerned about whether the project can provide corresponding jobs for the villagers after the completion of the project, and other surrounding tenants have requirements on whether the project can bring complete supporting facilities and property services, which belong to the operation and management of the later stage of the project. This shows that good operation and management in the later stage is of great significance to the collective construction land construction rental housing project.

5. Conclusion

5.1 Government Departments Should Formulate Policies Scientifically to Ensure the Balanced Interests of All Parties

In the collective construction land in Wuhan to build rental housing project in the process of the visit of the five boroughs, geographical environment, population characteristics, economic level of each block are different. For such situation, government departments consider the characteristics of the pilot area, that is, one is to have reasonable planning policies; Second, we should have a reasonable rent pricing policy to ensure reasonable rent and attract more people to rent. Third, there should be a sound cooperation system, such as providing certain jobs to attract village collectives and villagers to participate in the project construction; therefore, from planning to construction to later operation, scientific policies should be formulated to ensure that the active participation of all stakeholders can be promoted and the interests of all parties can be balanced.

5.2 The Development Enterprise Should Make Reasonable Rent and Accurate Product Positioning

According to the above game process, rent and operating income in the later stage are the sources to realize the benefits of all stakeholders. In order to make reasonable rent, first, the project rent must be controlled within the acceptable range of tenant; secondly, controlling other leasing projects that cannot be higher than those with the same conditions in the region; thirdly, having a sound rent pricing mechanism to ensure that rents can not only meet the income level of the region, but also realize the reasonable maximization of profits of stakeholders; fourthly, carefully studying the needs of target customer groups and accurately locate products. Only when the products meet the needs of tenants can the project be smoothly promoted.

5.3 Collective Economic Organizations Should Improve Service Facilities and Create a Green Cultural Environment

According to the current situation of collective construction land in Wuhan, the environment and planning emphases of the five regions are different, and the development status of each region should be considered comprehensively in the process of planning and construction. How to maintain rural landscape, how to highlight rural traditional characteristics, rural simplicity, how to show the real advantages, this should be in the planning, construction, operation process of serious thinking. Village collective one is to improve the supporting life, to ensure that the project around the convenience of life; Secondly, transportation facilities should be improved. The convenience of transportation is not only related to the life and work of the tenants in the project, but also related to the regional economic development. Thirdly, the living environment should be improved. The greening rate of living quarters, the supporting facilities of cultural and sports facilities, and the

friendly and simple atmosphere of living quarters can provide good living experience for future tenants and surrounding villagers.

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