sustainability

MDPI

Article

Interest Equilibrium and Path Choice in the Development of Construction Land Decrement: A Theoretical Analysis Based on the Multi-Agent Game Model

Zhifa Jiang [1,2], Qiang Li [3], Wei Gao [3], Huiyue Su [1,2] and Yuansuo Zhang [4,*]

[1] School of Management, Fujian University of Technology, Fuzhou 350118, China
[2] Technology Innovation Center of Monitoring and Restoration Engineering in Southeast Ecologically Fragile Areas of the Ministry of Natural Resources, Fuzhou 350108, China
[3] School of Urban Economics and Public Administration, Capital University of Economics and Business, Beijing 100070, China
[4] College of Applied Arts and Science, Beijing Union University, Beijing 100191, China
* Correspondence: yuansuo@buu.edu.cn; Tel.: +86-010-6200-4530

Abstract: High-quality development is a new-era requirement for modern urban construction. The implementation of construction land decrement has become an inevitable choice to solve the urban land use dilemma and achieve high-quality social and economic development. It is a game process for stakeholders. Based on the multi-agent game model, this research analyzes the game relationship and strategy selection between governments, government and farmers, government and developers, and developers and farmers and examines the balance of interests among multiple subjects. From the perspective of space dimension, index dimension, use dimension and time dimension, a game path is constructed for construction land decrement. The research shows the following: There is a clear relationship between the supervision cost of the higher-level government and the intensity of rewards and punishments for the lower-level government and the implementation of the decrement. The district (county) government's compensation plan and farmers' perceptions of the success of the boycott will affect the strategic choices of both parties. Governments at all levels play a direct role in restraining development behavior and supervising rent-seeking behavior after developers intervene in volume reduction. It also proposes optimizing the ratio of game factors such as costs, benefits, rewards, verification and punishment to achieve the game equilibrium of the expression of the interests of village residents, developers and governments at all levels. Based on the path planning and coupling of response, the multi-scheme dynamic path selection for the development of construction land decrement is realized.

Keywords: construction land decrement; path choice; benefit balance; multi-agent game

Citation: Jiang, Z.; Li, Q.; Gao, W.; Su, H.; Zhang, Y. Interest Equilibrium and Path Choice in the Development of Construction Land Decrement: A Theoretical Analysis Based on the Multi-Agent Game Model. *Sustainability* **2023**, *15*, 4734. https://doi.org/10.3390/su15064734

Academic Editors: Jurgita Antuchevičienė and Chunlu Liu

Received: 19 January 2023
Revised: 14 February 2023
Accepted: 27 February 2023
Published: 7 March 2023

1. Introduction

Since the reform and opening up, while China's economy has achieved rapid growth, it has also driven the continuous expansion of the scale of construction land [1–3]. The contradiction between the growth of construction land demand and the limited supply of land resources has become increasingly acute [4]. With the transformation of China's speed-based development to regulatory development, the government's policy objectives have also shifted from a single pursuit of economic development to the harmonious development of the economy and society [5]. Under the requirements of the era of urban planning and construction to promote high-quality development with new development concepts, land use methods have also shown a process of change from incremental expansion and stock planning to reduced development [6–8].

In the process of rapid economic growth and rapid urbanization, the scale of urban construction land is also expanding, facing the multiple pressures of population, resources

and environment. In particular, the land development intensity of economically developed areas and some megacities has exceeded 40%, which is close to the carrying limit of resources and the environment [9–11]. The traditional model of incremental development is difficult to sustain. In addition, the problem of unreasonable land use structure and low efficiency of industrial land within the city is becoming more and more prominent. The development model of incremental planning is incompatible with the new concept of urban construction with high-quality development in the new era [12,13]. The contradiction between the realistic characteristics of the urban–rural dual land system and the coordinated development of urban and rural areas is also more prominent between collective and state-owned construction land. The lack of endogenous motivation for the optimization of land use structure also seriously restricts the improvement of urban land use efficiency [12,14]. The reduction space of rural construction land is great, and it is of great practical significance because it is related to the realization of the goal of urban and rural integration. Therefore, tapping the potential of stock land and controlling the disorderly expansion of construction land have become the focus of urban land regulation [15]. Under the premise of ensuring the reasonable structure of production, living and ecological land, strictly controlling the total amount of construction land and improving land use efficiency have become the new direction of current land use change. The implementation of construction land decrement development has become an inevitable choice to solve the dilemma of urban land use and achieve high-quality social and economic development [16].

In practice, Shenzhen took the lead in proposing the "reduction growth" of construction land, gradually reducing new construction land and reducing the growth rate of construction land; Shanghai, with the goal of locking the total construction land, linked the implementation of construction land increase and decrease [17]; Beijing, in the "reduction and quality" strategic requirements, focused on collective construction land scale control adjustment [18]. As the first municipality directly under the central government to carry out a reduction policy in the whole region, Shanghai initially established a reduction index transfer and trading mechanism [19] and formed an industrial adjustment and interest balance mode, a government innovation mode and other promotion modes in the reduction promotion [20]. However, in the process of promoting the implementation of "198" regional reduction, it still faces difficulties such as capital investment, interest balance and contradiction resolution [21]. In the process of reduction promotion, the policy orientation of the municipal government is in contradiction with the demands of regional development. When the index transfer income and the potential income of land appreciation are high, the enthusiasm of the government and farmers to promote reduction will be affected. For a series of questions about "how much, where, when, how to reduce and how to use the land after reduction" in construction land reduction, the paper puts forward the implementation path framework of construction land decrement in Beijing [22]. It can be seen that the path planning and benefit balance of construction land decrement become the basic guarantee to promote the implementation of construction land decrement.

The implementation construction land decrement is a process of redistribution of interests of multiple subjects. Determining how to balance contradictions among all parties and reduce conflicts of interest plays an important role in promoting reduction. The idea and model of game theory play an important role in solving the problem of the multi-party behavior selection process and direction in land problems. The purpose of game theory is to realize the balance of subject decision-making by studying the behavior characteristics and strategy selection of all parties in the game [23–25]. A game experiment was used to reveal the influence of higher government intervention on the land acquisition game between farmers and local governments, and the farmers and village committees were analyzed using an evolutionary game in the process of land acquisition [26]. In the study of subject behavior in land use [27], the game choice between government and people is analyzed emphatically. There are also many positive studies on the game relationship and system design of stakeholders [28,29], which provide guidance for exploring the game process and relationship from the perspective of multiple subjects, but the research conclusions

are quite different due to different observation perspectives. Therefore, there is an urgent need to study the development of construction land decrement by properly coordinating the interest demands of multiple subjects, clarifying the game relationship of competition and cooperation among governments, farmers and developers at all levels, exploring the optimal strategic choices of different stakeholders, and constructing the interest balance mechanism of relevant subjects in the implementation of construction land decrement.

Based on the above analysis, this study analyzes the game relationships between governments, governments and farmers, governments and developers, and developers and farmers based on the multi-agent game model; designs the game path of construction land decrement implementation from the spatial dimension, index dimension, use dimension and time dimension; and explores the optimal strategy selection of the multiple agents in the implementation of construction land decrement. It provides a reference for clarifying the strategic direction, path planning and priority order of the implementation of construction land decrement. It provides theoretical guidance for the multiple agents to achieve a balance of interests and determine the optimal strategy selection in the process of reduction, so as to ensure the scientific and orderly implementation of construction land decrement. Further, it promotes the quality change, efficiency change and power change of urban land use and promotes the high-quality development of the social economy.

2. Theoretical Basis and Research Hypothesis

2.1. Foundations of Game Theory and Research Applicability Analysis

Game theory is a science that studies how multiple decision-makers make decisions in a given environment to maximize their own utility and how to achieve equilibrium among different decision-makers [30,31]. According to whether there is a strong agreement in the game process, the games can be divided into cooperative games and non-cooperative games. Determining how to distribute the interests of multiple subjects in cooperation is a common problem in society. A cooperative game is one of the important theoretical methods for solving the distribution of interests in cooperation. However, many cooperative game solutions were concentrated, and all solutions cannot take into account individual rationality, collective rationality, existence and uniqueness. A cooperative game also lacks a general concept such as Nash equilibrium (if any participant's strategy is determined by all other participants, the participant's chosen strategy is optimal) in a non-cooperative game [32].

The development of construction land decrement is a game process for stakeholders, and the benefit distribution of multiple subjects is one of its essences [24]. In the implementation, some participants have the unknown information of other participants; for example, the government has the right to control the information of the implementation measures of construction land decrement planning and benefit compensation, making this an incomplete information game. The implementation of reduction requires multiple agents to reach an effective agreement, and there is the Nash equilibrium of the strategic game model. At the same time, the order of action and information asymmetry exist among governments at all levels in the construction land decrement; the government, collectives, farmers and developers have cooperative and non-cooperative game and market economic equilibria.

In the implementation of construction land decrement development, governments at all levels, developers and farmers all pursue their own different target interests from their own interests, among which local governments have the dual role prototype of agents and self-interested people [33]. As far as each subject itself is concerned, each subject must take into account the behavior of the other party and make the best decision for itself according to its behavior. Only by starting from the whole and balancing the interests of all parties can the construction land decrement be promoted in an orderly manner, which also makes the game research necessary and feasible.

2.2. Analysis of Construction Land Decrement Connotation and Subject Behavior

For the definition of the connotation of construction land decrement, the existing research starts from the means of reduction implementation and proposes that construc-

tion land decrement is accomplished through land remediation work, and the inefficient construction land that does not meet the requirements of the overall land use planning is reclaimed into agricultural land or ecological land [33]; for the purpose of reduction, construction land decrement is proposed to promote land conservation and intensive and efficient use by limiting land use types to control the disorderly spread of the city in order to optimize the structure of urban land to achieve the smart growth of the city [19]. According to the requirements of the new development concept, the connotation of construction land decrement is reflected in the following four dimensions: (1) spatial dimension: focusing on the spatial location of construction land decrement and the key areas of intensive efficiency; (2) index dimension: focusing on the quantitative relationship between the reduction of construction land scale and the improvement of construction land use efficiency; (3) usage dimension: focusing on land use classification before decrement and use planning after decrement; (4) time dimension: timing of reduction implementation.

Based on the analysis of the connotation of construction land decrement development [21], it can be seen that the construction land decrement is completed jointly with the participation of multiple stakeholders. The municipal government needs to determine the overall reduction target of construction land and issue the construction land decrement index to the district (county) government, the district (county) government shall be responsible for formulating the implementation plan for construction land and determining the key areas of reduction, the township government mainly coordinates district (county) arrangements and reduction project coordination and the village committee is responsible for implementing the reduction task. In the process of reduction, the government needs to compensate and resettle the farmers. In order to obtain more benefits, developers intervene in the implementation of reduction projects through capital. The main stakeholders involved in the whole process are governments at all levels, farmers and developers (Table 1).

Table 1. Interest Demands of Multiple Subjects in the Process of Construction Land Decrement.

Main Unit	Primary Target	Interest Demands
Municipal government	Achieve high-quality regional development	Improve the quality and efficiency of land
District (county) government	Increase fiscal revenue	Obtain more decrement indicators
Township government	Transfer tasks, supervise and evaluate reduction implementation	Promote the implementation of decrement projects
Village committee	The development of rural economy	Gain more economic benefits
Farmer (resident)	Improve the quality of life	Obtain more compensation
Developer	Promote the development of enterprises	Profits and costs

As the initiator of construction land decrement, the municipal government is focused on how to control land expansion and realize efficient land use while ensuring urban economic development. However, the policy objectives and interests of different levels of government and other participants are gradually specific [34,35]. The municipal government focuses on the overall interests and long-term interests of the region, while the district (county) government focuses on the benefits brought by the replacement of the reduction index. The village committee, as a real interest recipient and direct executor, is interested in obtaining more development appeals and economic compensation benefits; as the main body of the market, developers participate in the process of reduction in the form of capital. The profit-driven nature of the developer's capital leads to its provision of financial support, but also may damage the interests of other entities in the absence of effective constraints, resulting in externalities. The farmers are the realistic stakeholders in construction land decrement. Their goal is mainly to obtain more benefit compensation and pay more attention to their own interests.

2.3. Game Subject Behavior Hypothesis and Parameter Determination

The relationship between multiple subjects in the implementation of construction land decrement is complex and diverse. In order to facilitate the optimization of the implementation path of construction land decrement and the scientific analysis of the game relationship between multiple subjects, based on the basic assumptions of game theory, and according to the behavior characteristics and commonness of multiple subjects in the process of reducing construction land, this study proposes the following assumptions about the game subjects and their behaviors involved in the implementation of construction land decrement, and it sets the relevant elements of the participants and the implementation of construction land decrement (Table 2).

Hypothesis 1. *The goal of each subject is to maximize their own interests as the starting point and to implement the best behavior from their own point of view; in this process, the subject may damage the interests of other participants.*

Hypothesis 2. *The same type of subject in the face of the same environment will make the same decision in the process of construction land decrement because there is only one municipal government, so there is no subject behavior consistency problem, but there are many district (county) government, farmers and developers, so this study assumes that the same type of subject at the same level in the face of the same environment will make the same decision.*

Hypothesis 3. *In the process of reduction, the township government mainly implements the reduction will of the district (county) government and transmits information. This study assumes that the township government does not directly participate in the reduction game.*

Hypothesis 4. *It is assumed that the policies and plans for the development of construction land decrement are fully information-publicized, the channels for obtaining reduction information and policies are smooth, and the information between the subjects is completely symmetrical.*

Table 2. The symbol setting and description of multiple subjects and game elements.

Multiple Subjects and Game Elements		Symbols and Meanings	Variable Declaration
Multiple subjects	Municipal Government	G_M (Municipal Government)	Urban construction land decrement targets and policymakers
	District (County) Government	G_D (District Government)	Municipal target implementers and specific reduction program makers
	Township Government	G_T (Town Government)	Channels represented by reduction initiators and reduction principals
	Village Committee	G_V (Village Committee)	Representative of the main object of decrement (collective land)
	Farmer or Resident	F (Farmer or Resident)	Direct natural person involved in construction land decrement
	Developer	D (Developer)	Development or investor of construction land decrement project
Process factors	Cost	C (Cost)	The input factors of each subject in the process of decrement implementation
	Award	A (Award)	Supervisor's positive incentive to executor's behavior in game
	Revenue	R (Revenue)	The benefits obtained by each subject in the process of decrement implementation are collectively referred to as revenue
	Punishment	P (Punishment)	Negative constraints on the behavior of supervisors or executors in game relations
	Expected Revenue	E (Expected revenue)	Expected expression under different strategy combinations
Game strategy	Strategy Sets	S (Strategy Sets)	A collection of all action plans that the subject may take

3. Benefit Equilibrium Analysis Based on Multi-Agent Game Model

3.1. Game Analysis between Governments

(1) Game analysis between municipal government and district (county) government.

Based on the path planning of construction land decrement in the space, index, use and time dimensions, the game strategy of the municipal government is SG_M = {punishment, non-punishment}, and the strategy of the district (county) government is SG_D = {normal declaration, false declaration}. The probability of municipal government punishment is P_A, and the probability of non-punishment is $(1 - P_A)$; the probability of normal declaration index of district (county) government is P_B, and the probability of false declaration is $(1 - P_B)$, forming a game model between the municipal government and district (county) government (Figure 1a).

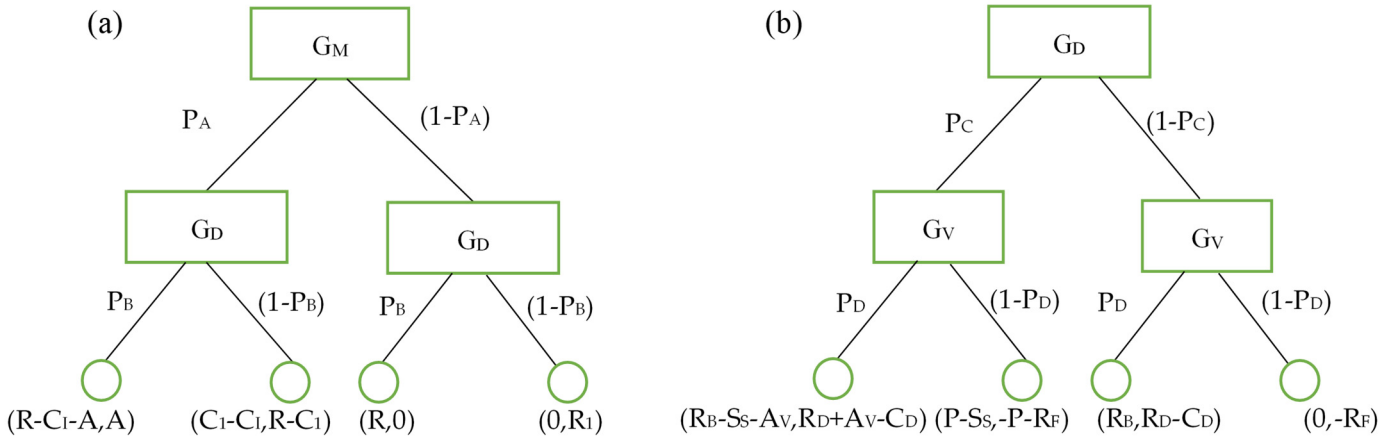

Figure 1. Intergovernmental game analysis model of construction land decrement. (**a**) Game model between municipal government and district (county) government; (**b**) game model between district (county) government and village committee.

A game function is constructed according to the status of intergovernmental verification and declaration (Table 3).

Table 3. Game function between municipal government and district (county) government.

Game Function	Build the Foundation	Relationship Analysis	Total Revenue
S = {G_M1, G_D1}	Municipal government verification, district (county) government normal declaration	Verification cost of municipal government C_I, to give the district (county) government declaring normal indicators reward A, normal declaration of cost savings R; district (county) government costs 0, revenue is municipal government ward A	$(R - C_I - A, A)$
S = {G_M1, G_D2}	Municipal government verification, district (county) government false declaration	Verification cost of municipal government C_I, proceeds as punishment for district (county) government's falsely high declaration index C_1; costs of district (county) governments C_1, gains are additional gains from false indicators R_1	$(C_1 - C_I, R_1 - C_1)$
S = {G_M2, G_D1}	Municipal governments do not verify, district (county) government normal declaration	The cost of municipal government is 0, and the income is R; district (county) government costs and benefits are 0	(R, 0)
S = {G_M2, G_D2}	Municipal government does not verify, district (county) government false high declaration	The cost and benefit of the municipal government are 0; district (county) government costs 0, revenue R_1	$(0, R_1)$

The mathematical expectation of the district (county) government choosing the normal declaration is $E_B = P_A \times A$, and the mathematical expectation of the false high declaration index is $E_B = (R_1 - C_1) \times P_A + (1 - P_A) \times R_1$; when the mathematical expectations of the normal declaration and the false high declaration of the district (county) government are equal, $P_A = R_1/(-C_1 - A)$ can be obtained.

The mathematical expectation of the municipal government choosing verification is $E_A = (R - C_I - A) \times P_B + (1 - P_B) \times (C_1 - C_I)$, and the mathematical expectation of the non-verification index is $E_A = R \times P_B$; by making the mathematical expectation of municipal governments choosing verification equal to that of non-verification, $P_B = (C_I - C_1)/(-2C_I - A + C_1)$ can be obtained.

Based on the cost–benefit analysis of the game subject, when the district (county) government's false high declaration index is punished, the greater the probability of the district (county) government's normal declaration, the smaller the probability of municipal government's inspection; when the district (county) government has normal declaration indicators as a result of a greater reward leading to a greater probability of district (county) government normal declaration, the municipal government can have a smaller probability of inspection; the greater the supervision cost of the municipal government, the smaller the probability of the district (county) government declaring normally; when the district (county) government's normal declaration brings greater invisible income to the municipal government, the probability of the municipal government choosing to inspect increases.

(2) Game analysis between district (county) government and village committee.

The district (county) government's game strategy is SG_D = {strong supervision, neglect supervision}, and the village committee's strategy is SG_V = {active promotion, negative response}. The probability of strong supervision of the district (county) government is P_C, and the probability of weak supervision is $(1 - P_C)$; the probability of active promotion of the village committee is P_D, and the probability of negative response is $(1 - P_D)$. The game model between the district (county) government and the village committee is constructed (Figure 1b).

According to the different supervision statuses of the district (county) government for the implementation of construction land reduction and the implementation attitude of the village committee, the game function is constructed (Table 4).

Table 4. Game function between district (county) government and village committee.

Game Function	Build the Foundation	Relationship Analysis	Total Revenue
$S = \{G_D1, G_V1\}$	District (county) government strong supervision, the village committee actively promotes	Supervision cost of district (county) government S_S, awards to village committees A_V, reduction benefit R_B; implementation cost of village committee C_D, reduced earnings R_D	$(R_B - S_S - A_V, R_D + A_V - C_D)$
$S = \{G_D1, G_V2\}$	District (county) government strong supervision, the village committee negative response	Supervision cost of district (county) government S_S, proceeds as punishment for village committee's negative response P; potential loss caused by village committee's negative response R_F, profit is $-P$	$(P - S_S, -P - R_F)$
$S = \{G_D2, G_V1\}$	District (county) government oversight, the village committee actively promotes	Benefits of district (county) government revenue for reduction R_B, cost is 0; implementation cost of village committee C_D, benefits of promoting reduction R_D	$(R_B, R_D - C_D)$
$S = \{G_D2, G_V2\}$	District (county) government lax supervision, village committee negative response	The income and cost of the district (county) government are both 0; the cost of the village committee is $-R_F$	$(0, -R_F)$

The mathematical expectation for the active promotion on the part of the village committee is $E_D = P_C \times (R_D + A_V - C_D) + (1 - P_C) \times (R_D - C_D)$, and the mathematical expectation of negative coping is $E_D = P_C \times (-P - R_F) + (1 - P_C) \times (-R_F)$; by making the

mathematical expectation of the village committee choosing a positive response equal to that of negative response, $P_C = C_D - R_F - R_D/(A_V + P)$ can be obtained.

The mathematical expectation of a district (county) government choosing strong supervision is $E_C = P_D \times (R_B - S_C - A_V) + (1 - P_D) \times (P - S_S)$, and the mathematical expectation of non-supervision is $E_C = P_D \times R_B$. Let the mathematical expectation of the district (county) government's strong supervision be equal to that of weak supervision; then, $P_D = S_S - P/-(A_V + P)$.

According to the cost–benefit analysis of the game subject, the lower the supervision cost of the district (county) government, the greater the probability that the village committee will actively promote the reduction; when the punishment of the negative response of the village committee is greater, the probability of actively promoting the reduction is greater; the greater the reward received by the village committee for actively promoting the reduction, the greater the probability of actively promoting; when the cost of implementing the reduction by the district (county) government is higher, the probability of implementing strong supervision to restrain the behavior of the village committee is greater; the smaller the loss when the village committee takes a negative response, the lower the probability of strong supervision by the district (county) government; when the direct benefits of the village committee's active promotion of the reduction are greater, the probability of the district (county) government taking supervision action is smaller.

3.2. Game Analysis between District (County) Government and Farmers

The district (county) government's game strategy SG_D = {low price compensation scheme, market price compensation scheme}, and villagers' game strategy is SF = {accept, resist}. The probability of a district (county) government low price compensation scheme is P_E, and the probability of a market price compensation scheme is $(1 - P_E)$; the probability of villagers choosing to accept is P_F, and the probability of choosing to resist is $(1 - P_F)$; when the farmers choose to boycott, the probability of success is PG, and the probability of failure is $(1 - P_G)$. The game model between the district (county) government and farmers (residents) is constructed (Figure 2).

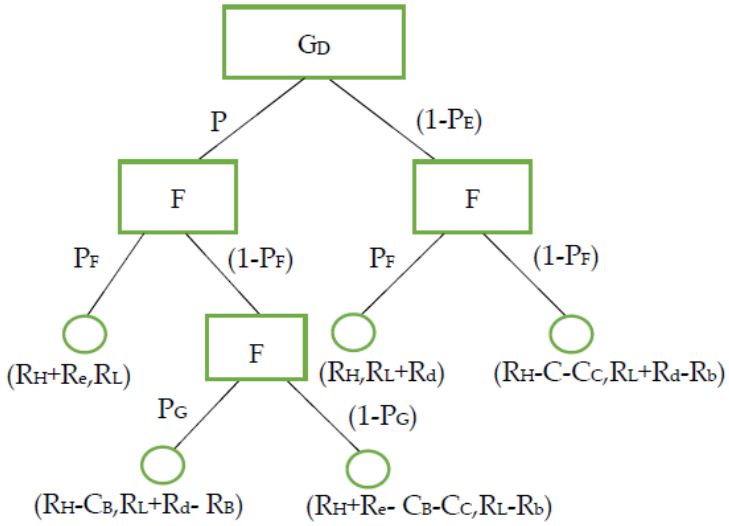

Figure 2. Game model between district (county) government and farmers (residents).

According to the standard of compensation from the district (county) government to the farmer (resident) and the acceptance degree of the farmer (resident), a series of game functions are constructed (Table 5).

Table 5. Game function between district (county) government and farmers (residents).

Game Function	Build the Foundation	Relationship Analysis	Total Revenue
S = {G_D1, F1}	District (county) government adopts low-cost compensation, farmers accept the compensation scheme	Income obtained by market compensation R_H, extraneous earnings R_e, cost is 0; income from farmers' low-cost compensation R_L, cost is 0	($R_H + R_e$, R_L)
S = {G_D1, F2, G_D3}	District (county) government adopts low price compensation, farmers choose to resist and obtain market price compensation	Income obtained by market compensation R_H, the cost of resisting farmers' conflict C_B; income from farmers' low-cost compensation R_L, extraneous earnings R_d, resistance costs R_b	($R_H - C_B$, $R_L + R_d - R_b$)
S = {G_D1, F2, G_D4}	District (county) government adopts low-cost compensation, farmers choose to resist and resistance fails	Income obtained by market compensation R_H, extraneous earnings R_e, the cost of resisting farmers' conflict C_B, enforcement costs C_C; low compensation income R_L, resistance costs R_b	($R_H + R_e - C_B - C_C$, $R_L - R_b$)
S = {G_D2, F1}	District (county) government market price compensation scheme, accepted by farmers	Income obtained by market compensation R_H, cost is 0; income from farmers' low-cost compensation R_L, sum of extraneous earnings R_d, cost is 0	(R_H, $R_L + R_d$)
S = {G_D2, F2, G_D3}	District (county) government market price compensation, farmers boycott, district (county) government implements compulsory implementation	Income obtained by market compensation R_H, the cost of resisting farmers' conflict C_B, enforcement costs C_C; income from farmers' low-cost compensation R_L, extraneous earnings R_d, resistance costs R_b	($R_H - C_B - C_C$, $R_L + R_d - R_b$)

According to the cost–benefit analysis of the game between the district (county) government and farmers (residents), whether the district (county) government chooses the market price compensation scheme mainly depends on the probability that the farmers choose to resist ($1 - P_A$) and the possibility of successful resistance (P_B). When the probability of boycott success is smaller, the possibility of taking a low-cost compensation scheme is greater; when the cost of enforcement by the district (county) government is smaller, the district (county) government is more inclined to low-cost compensation programs. Farmers choose whether to boycott mainly based on the government's compensation plan, the probability of success (P_B) and the benefits of success. When the farmers' successful boycott brings greater benefits, the farmers are more inclined to adopt boycott strategies; when the district (county) government is a strong government and the probability of success of the farmers' resistance is low, the probability of farmers choosing to resist will be low.

3.3. Game Analysis between Government and Developers

(1) Game analysis between district (county) government and developers.

In the implementation process of construction land decrement, developers, as project construction units and investment entities, hope to gain profits by intervening in construction land decrement. If the risks involved are too large, developers choose not to intervene. The game strategy of the district (county) government is SG_D = {provide policy, not provide policy}, and the strategy of the developer is SD = {intervene, not intervene}. The probability of the district (county) government providing a policy is P_H, and the probability of not providing a policy is ($1 - P_H$); the probability that the developer chooses to intervene is PI, and the probability of choosing not to intervene is ($1 - P_I$). The game model between the district (county) government and developers is built (Figure 3a).

According to the district (county) government's policy support for developers and the response of developers, the game function is built (Table 6).

The mathematical expectation of the district (county) government choosing to provide policy is $E_H = P_I \times (R_A - C_T + R_S) + (1 - P_I) \times (R_A - C_R - C_T)$, and the mathematical

expectation for the policy not being provided is $E_H = P_I \times R_A + (1 - P_I) \times (R_A - C_R)$; let the mathematical expectation of the district (county) government choosing to provide policy be equal to that of not providing policy, and $P_I = C_R/R_S$ can be obtained.

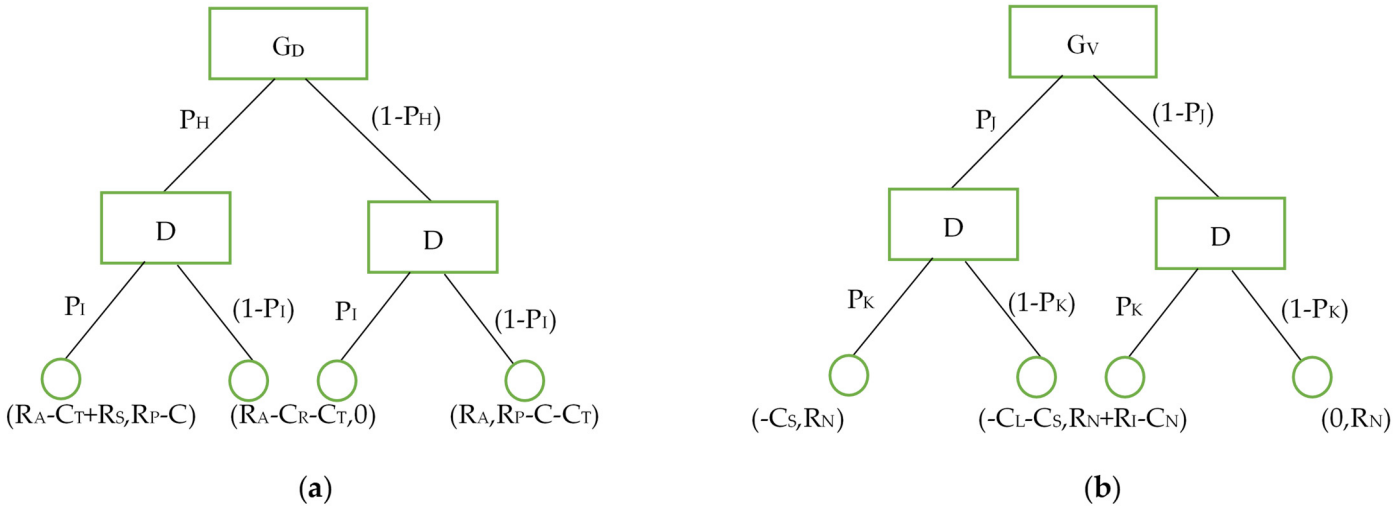

Figure 3. Game model between government and developers. (**a**) Game model between county government and developers; (**b**) game model between village committee and developers.

The mathematical expectation that developers choose to intervene is $E_I = P_H \times (R_P - C) + (1 - P_H) \times (R_P - C - C_T)$, and the mathematical expectation without intervention is $E_I = 0$; let the developer choose to intervene and not to intervene with the same mathematical expectations, and $P_H = C_T + C - R_P/C_T$ can be obtained.

Table 6. Game function between district (county) government and developers.

Game Function	Build the Foundation	Relationship Analysis	Total Revenue
S = {G_D1, D1}	Government provides policy support, developers intervene	Preferential policy cost C_T, district (county) government earnings after reduction R_A, rapidly advancing hidden benefits R_S; costs paid by developers C, developer revenue R_P	$(R_A - C_T + R_S, R_P - C)$
S = {G_D1, D2}	Government provides policy support, developers do not intervene	District (county) government pays more cost C_R, cost of preferential policies C_T, gains obtained by district (county) governments after reduction R_A; developer revenue is 0	$(R_A - C_R - C_T, 0)$
S = {G_D2, D1}	Government does not provide policy support, developers intervene	District (county) government cost 0, gains from reductions R_A, costs paid by developers C, cost of preferential policies C_T, developer revenue R_P	$(R_A, R_P - C - C_T)$
S = {G_D2, D2}	Government does not provide policy support, developers do not intervene	District (county) government pays more cost C_R, district (county) government cost 0, gains from reductions R_A; developer revenue is 0	$(R_A - C_R, 0)$

According to the cost–benefit analysis between the district (county) government and the developer, the more cost the district (county) government has to pay when the developer does not intervene in the reduction, the greater the probability that the district (county) government will provide policy; the greater the hidden benefits brought by developers' intervention, the greater the probability that the district (county) government will provide policy; the greater the preferential policy provided by the district (county) government, the greater the probability that developers intervene; the greater the cost of developers involved in reduction, the greater the probability of the district (county) government pro-

viding preferential policies; the greater the benefits obtained by developers involved in the reduction, the smaller the probability that the government provides preferential policies.

(2) Game analysis between village committee and developers.

When the developer chooses to intervene in the construction land reduction project, the village committee as the executor of the reduction project will choose whether to supervise or not. Accordingly, the village committee's game strategy is SG_D = {supervised, not supervised}, and the developer's strategy is SD = {formal development, informal development}. The probability of supervision by the village committee is P_J, and the probability of non-supervision is $(1 - P_J)$; the probability of developers choosing formal development is P_K, and the probability of choosing informal development is $(1 - P_K)$. The game model between the village committee and developers is shown in Figure 3b.

According to whether the village committee supervises and the developer's response, the game function is constructed (Table 7).

Table 7. Game function between village committee and developers.

Game Function	Build the Foundation	Relationship Analysis	Total Revenue
S = {G_D1, D1}	Village committee supervises, developer develops formally	Village committee income is 0, village committee supervision cost C_S; gains from regular developer development R_N, cost is 0	$(-C_S, R_N)$
S = {G_D1, D2}	Village committee supervises, developer develops informally	Village committee income is 0, losses from informal development C_L, village committee supervision cost C_S, gains from regular developer development R_N, additional benefits of informal development R_I, negative costs C_N	$(-C_L - C_S, R_N + R_I - C_N)$
S = {G_D2, D1}	Village committee does not supervise, developer develops formally	Village committee income and cost are 0; gains from regular developer development R_N, cost is 0	$(0, R_N)$
S = {G_D2, D2}	Village committee does not supervise, developer develops informally	Losses from informal development C_L, cost is 0; gains from regular developer development R_N, additional benefits of informal development R_I, cost is 0	$(C_L, R_N + R_I)$

The mathematical expectation of formal development is $E_K = R_N \times P_J + R_N \times (1 - P_J)$, and the mathematical expectation of informal development is $E_K = (R_N + R_I - C_N) \times P_J + (R_N + R_I) \times (1 - P_J)$. Let developers choose formal development and informal development of equal mathematical expectations, and $P_J = R_I/C_N$ can be obtained.

When the village committee chooses to supervise, the mathematical expectation is $E_J = (-C_S) \times P_K + (-C_L - C_S) \times (1 - P_K)$, and the mathematical expectation when the village committee chooses not to supervise is $E_J = C_L \times (1 - P_K)$; when the mathematical expectations of the village committee choosing supervision and non-supervision are equal, $P_K = (2C_L - C_S)/2C_L$ can be obtained.

According to the cost–benefit analysis of the game between the village committee and the developer, when the developer brings more benefits through informal development, the probability of village committee supervision is greater; when the negative cost of developers' informal development is greater, the village committee will be less likely to supervise; when the supervision cost of the village committee is higher, the supervision cost of the village committee is higher, and the probability that the developer chooses formal development is lower. At the same time, when the developer develops informally, the greater the loss of the village committee, the greater the probability that the developer develops formally.

3.4. Game Analysis between Developers and Farmers (Residents)

For developers, there is no need to negotiate the resettlement costs directly with the farmers. This process is a consultation between the government and the farmers. However, in the implementation process, in order to obtain more profits and save costs, developers also have a game relationship with the villagers. The game strategy of the developers is SD = {legal construction, illegal construction}, and the strategy of the villagers is SF = {accept, resist}. The probability of legal construction by developers is P_L, and the probability of illegal construction is $(1 - P_L)$. The probability of farmers choosing to accept is PM, and the probability of choosing to resist is $(1 - P_M)$. The game model between developers and farmers is constructed (Figure 4).

According to the implementation status of developers in construction land reduction and the response of farmers, the game function is constructed (Table 8).

Table 8. Game function between developers and farmers (residents).

Game Function	Build the Foundation	Relationship Analysis	Total Revenue
S = {D1, F1}	Developers choose legal construction, farmers choose acceptance	Hidden loss of legal construction R_2, proceeds of lawful construction R_1; the cost of farmers is 0, income of farmers R_4, implicit loss of compliance construction by developers R_2	$(R_1 - R_2, R_4 + R_2)$
S = {D1, F2}	Developers choose legal construction, farmers choose resistance	Hidden loss of legal construction R_2, proceeds of lawful construction R_1; resistance cost of farmers C_b, income of farmers R_4, hidden loss of compliance construction R_2	$(R_1 - R_2, R_4 + R_2 - C_b)$
S = {D2, F1}	Developers choose illegal construction, farmers choose to accept	Proceeds of lawful construction R_1, additional gains from irregular construction R_3, the cost of farmers is 0, income of farmers R_4, farmers' loss during illegal construction R_5	$(R_1 + R_3, R_4 - R_5)$
S = {D2, F2}	Developers choose illegal construction, villagers choose to resist	Punishment for illegal construction P_1, proceeds of lawful construction R_1, additional gains from irregular construction R_3, resistance cost of farmers C_b, income of farmers R_4, farmers' loss during illegal construction R_5	$(R_1 + R_3 - P_1, R_4 - R_5 - C_b)$

The mathematical expectation when farmers choose to accept is $E_M = P_L \times (R_4 + R_2) + (1 - P_L) \times (R_4 - R_5)$; the mathematical expectation of resistance is $E_M = P_L \times (R_4 + R_2 - C_b) + (1 - P_L) \times (R_4 - R_5 - C_b)$; let the farmers' mathematical expectations of acceptance and resistance be equal, and $P_L = R_4 - R_5/2C_b$ can be obtained.

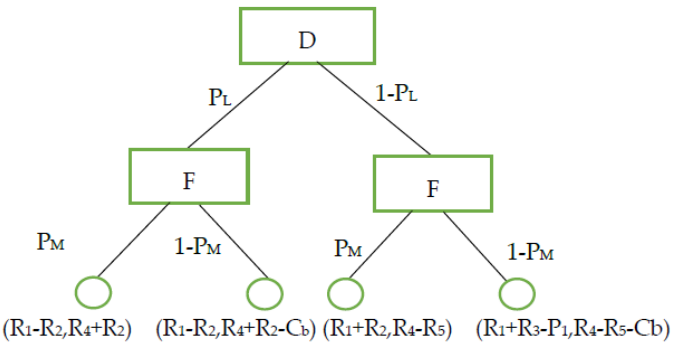

Figure 4. Game model between developers and farmers.

The mathematical expectation of legitimate construction is $E_L = P_M \times (R_1 - R_2) + (1 - P_M) \times (R_1 - R_2)$, and the mathematical expectation of illegal construction is $E_L = P_M \times (R_1 + R_3) + (1 - P_M) \times (R_1 + R_3 - P_1)$. By making the mathematical expectations of the

developer's choice between legal and illegal construction equal, $P_M = (P_1 - R_2 - R_3)/P_1$ can be obtained.

According to the cost–benefit analysis of the game between the developer and the farmer (resident), when the developer chooses the legal construction, the greater the income of the farmers or the smaller the loss of the farmers when the construction is illegal, the greater the probability of choosing the legal construction; the greater the punishment for developers' illegal construction, the greater the probability that farmers choose to accept; the more benefits for villagers when developers choose to build in compliance, the greater the probability of acceptance.

3.5. Interest Conflicts Formed by Games between Different Subjects and Coordination Methods

Through the analysis of the interest balance of the multi-agent game model, in order to form a reasonable choice direction, the interest conflicts and coordination methods formed by the game between different agents are summarized.

Between the municipal government and the district (county) government, the municipal government realizes high-quality development from an intensive perspective, mainly considering the overall interests of the region, while the district (county) government aims to obtain more reduction targets and promote the reduction of construction land in its own district (county). The coordination method between the two parties can be that the municipal government can adjust the verification frequency, scientifically calculate the benefits, costs and rewards of all parties and actively guide the district (county) government to declare the decrement targets normally.

Between the district (county) government and the village committee, the main purpose of the district (county) government is to increase fiscal revenue, while that of the village committee is to obtain more economic benefits. The coordination method is mainly that the district (county) government reduces the cost of supervision and uses income feedback to guide the village committee to actively promote the implementation of relevant measures to achieve the stability of both sides' income.

For the district (county) government and the farmer (resident) people, the district (county) government obtains more financial revenue through reducing development, while the farmers' starting point is to directly obtain more compensation and improve their quality of life. The coordination method is that when the district (county) government formulates the compensation standard for the farmer (residents), it fully considers the acceptance of the farmer (residents) and realizes the reasonable distribution of income between the two parties.

Between the district (county) government and the developer, the district (county) government aims to achieve economic and social benefits in the development of reduction, while the developer aims to obtain more profits and reduce costs. The coordination method is that the district (county) government provides certain preferential policies for developers from the perspective of reducing costs, which not only realizes the profits of developers, but also ensures the stability of the fiscal revenue of the district (county) government.

Between developers and farmers (residents), developers obtain profits from construction for economic benefits, while farmers (residents) hope to obtain certain economic compensation by reducing development. The coordination method can be to reduce the extra income of developers' illegal construction, increase the cost of resistance, guide developers and farmers to accept legal construction and ensure reasonable income for both sides.

4. Game Path Choice of Construction Land Reduction Development

4.1. Game Path Relationship in the Development of Construction Land Decrement

The development of construction land decrement is the process of land resource reallocation. Its goal is to realize the social, economic, ecological and sustainable benefits of land use. Based on the embodiment of land resources in the dimensions of space, index, use and time, it faces the game balance between different levels and different interest-oriented subjects, and it realizes the maximization of differentiated multi-subject interests,

which becomes the dynamic mechanism of land resource reallocation in the development of construction land decrement, that is, the game path basis of the development of construction land decrement.

The analysis of the game path relationship in the development of construction land decrement is composed of two systems. One is the responsibility relationship and interest appeal composed of stakeholders such as the municipal government, district (county) government, township streets, village committees, farmers (residents) and developers. The other is the implementation tasks and game elements of construction land decrement and corresponding multiple subjects in the four dimensions of space, index, use and time. The two systems intertwine to form the game path relationship of construction land decrement development (Figure 5).

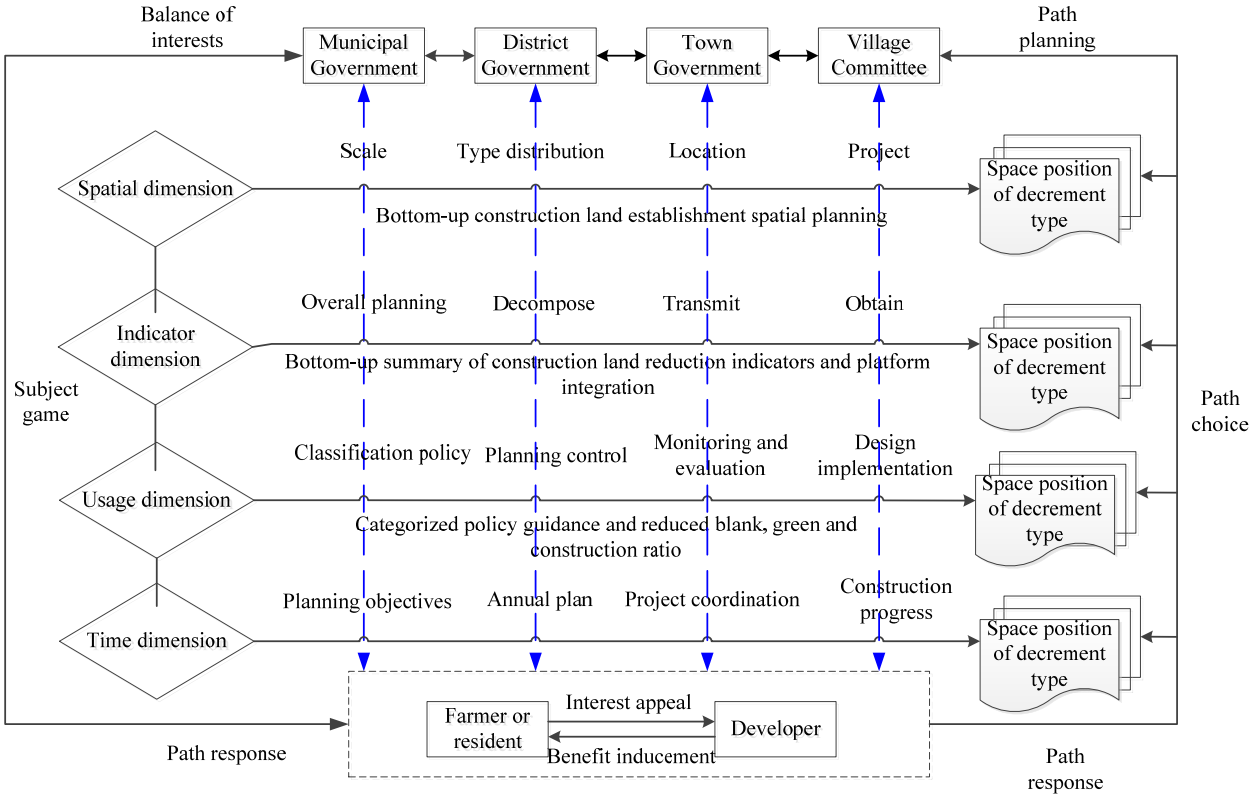

Figure 5. Game elements and path relationship of construction land decrement implementation subject.

4.2. Game Path Analysis in the Development of Construction Land Decrement

The game path of construction land decrement development is from the four dimensions of space, index, use and time, combined with the implementation tasks and game elements of various multiple subjects, forming a game matrix of construction land decrement development and determining the path arrangement and goal of multiple subjects in the development of construction land decrement. The corresponding game path can be divided into three levels:

(1) Balance of interests and path planning among governments at all levels. It mainly refers to the optimal game strategy of interest balance among the municipal government, district (county) government, township (sub-district) government and village committee. Based on this, the development path planning of construction land decrement is established to clarify specific plans in the types and spatial locations of construction land decrement, index trading platform and trading mechanism, planning and control of reduction use, and timing arrangement of decrement implementation.

(2) The balance of interests between farmers (residents) and developers as independent subjects and its response to the path planning of construction land decrement. It mainly refers to the game equilibrium between the interests of the farmers and the interests of

the developers in the implementation of the reduction; under the established construction land decrement path planning, the game relationship between governments at all levels and farmers (residents) and the game relationship between governments at all levels and developers are reflected in the following aspects: the feedback of independent subjects (farmers (residents) and developers) to the municipal government in terms of reduction scale, index coordination platform and transaction mechanism, use control policy and overall goal of reduction, the response to the county government in terms of reduction type delineation, index decomposition, zoning use control and annual implementation plan, and the recognition of township and sub-district governments in terms of spatial positioning, index transmission, use supervision and evaluation and project timing coordination. In addition, the village committee, in the specific project consultation, index acquisition and upload, project design and implementation and construction schedule communication consensus, forms the construction land decrement development game matrix, a comprehensive formation of the game path planning response.

(3) The above two levels of game coupling complete the path choice. It refers to the policy supervision of independent subjects (farmers and developers) by governments at all levels and the interest balance mechanism coordinated by the corresponding independent subjects (farmers and developers) in relation to the interests of governments at all levels. Through the optimization of game elements such as cost, reward, income, verification and punishment, the game equilibrium is realized. Through the cooperative coupling of path planning and path response, the multi-scheme dynamic path selection of construction land decrement development is defined.

5. Conclusions and Discussion

Promoting high-quality development with the new development concept has become a new-era requirement of China's social economy. Construction land decrement is an important measure to break the bottleneck of land use restriction in urban development. The win-win cooperation of multiple subjects in the implementation process is the basic premise to promote the implementation of reduction. How should the development path of construction land decrement be planned, the benefits brought by cooperation be distributed and the optimal strategy be obtained? A complete information dynamic cooperative game is an important method to promote the development of construction land decrement.

This paper constructs a game matrix through the relationship between the elements of construction land decrement development in the dimensions of space, index, use and time and the stakeholders such as the government, district (county) government, township streets, village committees, farmers (residents) and developers. Based on the optimization of game elements such as cost, reward, income, verification and punishment, the game equilibrium is realized, and the multi-program dynamic path choice of construction land decrement development is formed on the basis of the coordinated coupling of path planning and path response.

On the basis of the scientific hypotheses, the game relationship among five stakeholders, namely the municipal government, district (county) government, village committee, developer and farmers, is implemented in the development of construction land decrement. The game models among multiple subjects are established, the cost–benefit relationship of each subject under different strategic choices is analyzed and the optimal game strategy in the corresponding subject game is clarified.

5.1. Conclusions

The results show that the formulation of the reduction policy can not only start from the interests of one party, but also fully consider the balance of interests among the various subjects to maximize the interests of all parties, and the reduction can be carried out smoothly. The system of construction land decrement is gradually improved through the game and balance among the various subjects. In the intergovernmental game, there is a clear relationship between the supervision cost of the higher government and the

reward and punishment of the lower government and the intensity of the implementation of the reduction. Reasonable intergovernmental performance assessments and reward and punishment systems will affect intergovernmental behavior. In the game between the government and the farmers, the compensation plan of the district (county) government and the farmers' cognition of the success of the boycott will affect the strategic choice of both sides. In this process, a reasonable resettlement plan is particularly important. In the game between the government and the developer, when the developer intervenes in the reduction to obtain more benefits, the developer will choose to intervene. In this process, the village committee will choose to supervise the developer's behavior in order to restrain the developer's behavior and avoid the developer's rent-seeking behavior. Therefore, appropriate policy preferences and reasonable institutional constraints are effective measures to reduce conflicts between the two parties. In addition, the government's punishment and its own benefits will affect the behavior of the developer in the implementation process. Therefore, the necessary institutional constraints can protect the interests of the farmers.

5.2. Discussion

This paper has formed a mature multi-agent game theory and framework in the process of construction land decrement, which can provide a reference for the distribution, regulation and guidance of interests among governments at all levels, developers and farmers in the actual operation process of construction land decrement. In future research, we should pay attention to the case analysis of construction land decrement from the multi-game perspective to enrich the practical connotation and value of this theoretical research. At the same time, this study also provides some direction guidance for land use planning. On the basis of the existing planning experience and paradigm, land use planning should pay more attention to the game relationship of the main body in planning and consider the implementation path and effect of planning in the space, index, use and time dimensions. Moreover, in future research, the problem of asymmetric power owned by each agent should be included in the analysis, and the research on construction land decrement based on multivariate game analysis should be further refined.

According to the conclusions and discussion of this paper, some policy suggestions are put forward for the formation of construction land decrement and development. The first is to balance the interests of all parties and form a joint force of policy and behavior choice. The second is to improve the top-level design, rationally divide the financial powers of the central and local construction land reduction, and lay a material foundation for the distribution of interests of all parties. The third is to follow the market rules and introduce market forces to improve the efficiency of construction land decrement and development.

Author Contributions: Conceptualization, Z.J., Q.L. and Y.Z.; Methodology, Z.J. and Y.Z.; Software, W.G. and H.S.; Validation, Z.J., Q.L. and Y.Z.; Formal analysis, W.G., H.S. and Y.Z.; Investigation, Z.J., W.G. and H.S.; Resources, Z.J. and Y.Z.; Data curation, Q.L., W.G. and Y.Z.; Writing—original draft, Z.J. and Y.Z.; Writing—review & editing, Z.J., Q.L. and Y.Z.; Visualization, Z.J. and H.S.; Supervision, Z.J., Q.L. and Y.Z.; Project administration, Z.J.; Funding acquisition, Q.L. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the special fund for basic scientific research business expenses of Beijing Municipal Colleges and Universities in Capital University of Economics Business (No. QNTD202209), Fujian Provincial Science and Technology Innovation Project Funding (KY-010000-04-2022-004), and Fujian Science and Technology Economic Integration Service Platform of Digital Urban-Rural Integration Development. The authors would like to express their appreciation to the anonymous reviewers and the editors.

Data Availability Statement: Data cannot be disclosed due to the signing of confidentiality agreement.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Peng, J.; Liu, Y.; Li, T.; Wu, J. Regional ecosystem health response to rural land use change: A case study in Lijiang City, China. *Ecol. Indic.* **2017**, *72*, 399–410. [CrossRef]
2. Peng, J.; Wang, Y.; Wu, J.; Zhang, Y. Evaluation for regional ecosystem health: Methodology and research progress. *Acta Ecol. Sin.* **2007**, *27*, 4877–4885. [CrossRef]
3. Kong, W.; Guo, J.; Ou, M.H.; Zhang, F. Study on Constructed Land Intensive Use Change and Regional Differentiated Control in China. *China Land Sci.* **2016**, *30*, 13–20.
4. Xue, L.; Chen, L. Institutional Inertia and Policy Distortion: The Challenges of Transition for Practicing the Scientific Outlook on Development. *China Acad. J. Electron. Publ. House* **2010**, *8*, 7–9.
5. Bai, X.; Shi, P.; Liu, Y. Society: Realizing China's urban dream. *Nature* **2014**, *509*, 158–160. [CrossRef]
6. Grimm, N.B.; Faeth, S.H.; Golubiewski, N.E.; Redman, C.L.; Wu, J.; Bai, X.; Briggs, J.M. Global change and the ecology of cities. *Science* **2008**, *319*, 756–760. [CrossRef]
7. Wu, J.; Li, X.; Luo, Y.; Zhang, D. Spatiotemporal effects of urban sprawl on habitat quality in the Pearl River Delta from 1990 to 2018. *Sci. Rep.* **2021**, *11*, 13981. [CrossRef] [PubMed]
8. Gauquelin, T.; Michon, G.; Joffre, R.; Duponnois, R.; Génin, D.; Fady, B.; Dagher-Kharrat, M.B.; Derridj, A.; Slimani, S.; Badri, W.; et al. Mediterranean forests, land use and climate change: A social-ecological perspective. *Reg. Environ. Chang.* **2018**, *18*, 623–636. [CrossRef]
9. Kumpula, T.; Pajunen, A.; Kaarlejärvi, E.; Forbes, B.C.; Stammler, F. Land use and land cover change in arctic Russia: Ecological and social implications of industrial development. *Glob. Environ. Chang.* **2011**, *21*, 550–562. [CrossRef]
10. Hualin, X.; Peng, W.; Hongsheng, H. Ecological risk assessment of land use change in the Poyang lake eco-economic zone, China. *Int. J. Environ. Res. Public Health* **2013**, *10*, 328–346.
11. Li, J.; Zhou, K.; Xie, B.; Xiao, J. Impact of landscape pattern change on water-related ecosystem services: Comprehensive analysis based on heterogeneity perspective. *Ecol. Indic.* **2020**, *133*, 108372. [CrossRef]
12. Fons, V.; Eric, A.; Markus, F.; Alt, F.; Arndt, H.; Binkenstein, J.; Blaser, S.; Blüthgen, N.; Böhm, S.; Hölzel, N.; et al. Towards the development of general rules describing landscape heterogeneity-multifunctionality relationships. *J. Appl. Ecol.* **2018**, *56*, 160–178.
13. Shi, W.; Zou, B.; Jin, Z.; Shi, X.; Ding, C.; Wang, K.; Zhao, Y.; Zhen, H.; Lin, J.; Shi, N. Master Plan Targeted at Stock and Decrement. *City Plan. Rev.* **2014**, *8*, 16–21.
14. Estoque, R.; Murayama, Y. Landscape pattern and ecosystem service value changes: Implications for environmental sustainability planning for the rapidly urbanizing summer capital of the Philippines. *Landsc. Urban Plan* **2013**, *116*, 60–72. [CrossRef]
15. Wu, J. The key research topics in landscape ecology. *Acta Ecol. Sin.* **2004**, *24*, 2074–2076.
16. Dong, Z.J. 'Super Increase and Decrease Linkage': Exploring the Road of Construction Land Reduction Implementation—Shanghai Songjiang Practice. *China Land* **2015**, *11*, 12–16.
17. Lin, J. Promote the reduction and upgrading of collective construction land in Beijing through overall planning. *Qianxian* **2018**, *4*, 88–90.
18. Wang, K.Q.; Ma, K.X.; Liu, H.M. Study on the Operating Mechanism of Construction Land Reduction Shanghai City. *China Land Sci.* **2016**, *30*, 3–12.
19. Wang, P.; Song, Q.; Jiang, H.M.; Zhou, Q.L.; Zhang, S. Research on the Constructive Land Reduction Implementation in Shanghai. *Sci. Dev.* **2016**, *3*, 56–65.
20. Guo, S.B.; Ding, Y.; Wang, H.Y. Policy Design and Exploration of the Reduction of Construction Land in Shanghai "198" Region. *China Land* **2015**, *11*, 17–20.
21. Li, Q.; Wang, Z.X.; Wang, H.Y.; Sun, Q.Q. Study on the Implementation Path and Model of Construction Land Decrement Development in Beijing. *Geogr. Geo-Inf. Sci.* **2018**, *34*, 86–91.
22. Kopf, D.A.; Hsu, M.K. Game Theory, Tourism and Land Ethics. *Sustainability* **2021**, *13*, 8515. [CrossRef]
23. Alvarez, X.; Gomez-Rua, M.; Vidal-Puga, J. River flooding risk prevention: A cooperative game theory approach. *J. Environ. Manag.* **2019**, *248*, 109284.1–109284.8. [CrossRef] [PubMed]
24. Jana, A.; Basu, R.; Mukherjee, C. A game theoretic approach to optimize multi-stakeholder utilities for land acquisition negotiations with informality. *Socio-Econ. Plan. Sci.* **2020**, *69*, 100717.1–100717.10. [CrossRef]
25. Jiang, H.; Li, W.X.; Lei, H.; Xu, Y.D.; Zhang, Q.Q. Effects of the Upper-level Governments' Intervention on Land Acquisition Transaction Costs: An Analysis based on the Game Experiment. *China Land Sci.* **2018**, *32*, 36–43.
26. Zhang, L.F.; Lv, Z. An Analysis of the Game Behavior between the Central and Local Governments in the Process of Non-agricultural Land Conversion in China. *Agric. Econ. Issues* **2012**, *33*, 51–56.
27. Patterson, A.L. Agricultural policy reform in the European Community: A three-level game analysis. *Int. Organ.* **1997**, *51*, 135–165. [CrossRef]
28. Li, Q.X.; Bao, H.J.; Peng, Y.; Wang, H.W.; Zhang, X.L. The Collective Strategies of Major Stakeholders in Land Expropriation: A Tripartite Game Analysis of Central Government, Local Governments, and Land-Lost Farmers. *Sustainability* **2017**, *9*, 648. [CrossRef]
29. Hu, S.Q. How to distribute benefits in social cooperation—The "lineage solution" of cooperative game beyond Shapley value. *Manag. World* **2018**, *34*, 83–93.
30. Zhou, X.G.; Lian, H. Bureaucratic Bargaining in the Chinese Government: The Case of Environmental Policy Implementation. *Soc. Sci. China* **2011**, *191*, 80–96+221.

31. Shi, X.H.; Cai, Y.H. Cooperative Game Model for the Balance of Interests and its Application in Social Order Stability in China. *J. Beijing Norm. Univ. (Soc. Sci.)* **2020**, *280*, 143–150.
32. Zhao, J.; Chen, L.; Xue, L. Role prototype, interest choice and behavior difference of local government: A local government theory based on policy process research. *Manag. World* **2013**, *29*, 90–106.
33. Liu, H.M.; Meng, P.; Ma, K.X.; Wang, K.Q.; Zhang, B.S. Study on Reduction of Construction Land in the Developed Area:Reviews of the Workshop on "Land Use Pattern Changing and Construction Land Reductionin the New Normal". *China Land Sci.* **2015**, *29*, 11–17.
34. Wei, C.J.; Zhang, S.N. The Evolutionary Game Analysis of Interests Bodies During the Transfer of Rural Land in China. *Econ. Surv.* **2017**, *34*, 49–55.
35. Nie, Y.; Nie, X.Y. The Game Analysis on the Distribution of Value—Added Income from the Rural Land Transfer. *J. Agrotech. Econ.* **2018**, *275*, 122–132.