A Game Analysis of Farmland Expropriation Conflict in China under Multi-Dimensional Preference: Cooperation or Resistance?

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Abstract: The process of urbanization in China has been accompanied by the conflict of land expropriation, which is not conducive to social stability. Different from the previous angles and methods of studying the conflict of agricultural land expropriation, this study puts forward a new behavioral perspective on the basis of game theory, and constructs an evolutionary game model of the conflict of agricultural land expropriation in China from the perspective of multi-dimensional preference. It also discusses the impact of different preference combinations on the conflict input, net income and utility of various stakeholders in agricultural land expropriation. The results show that under the influence of complete self-interest preference, the degree of protection of farmers’ land rights and interests affects the probability of conflicts in compensation for agricultural land expropriation. However, under the influence of multi-dimensional preference combination, agricultural land expropriation can be carried out smoothly only when the reciprocal altruism preference of local government and farmers is strong and the loss aversion preference is weak. These insights have implications for the sustainable development of land, including government involvement and farmers participation, particularly in the context of developing countries.

Keywords: land acquisition; multidimensional preference; urbanization; evolutionary game theory

1. Introduction

Land resources are the most basic support of national urbanization, and the rapid process of urbanization and the transformation of social structure are the root causes of the conflict of land expropriation and demolition [1]. In China, the expropriation of agricultural land involves many stakeholders, and the local government plays a leading role in the process of agricultural land expropriation. China’s socialist system and top-down administrative system are quite different from other capitalist countries, and land expropriation adopts a two-track land ownership system. The particularity of these systems makes the local government play a leading role in the process of land expropriation [2], while the residents are in a weak position [3]. The “unequal dialogue between the two sides” has led to more frequent conflicts between local governments and expropriated farmers, and has also led to problems such as the lack of fairness in compensation for land expropriation, threats to sustainable livelihoods such as expropriated farmers, and so on [4–7].

The conflict of land expropriation is the result of the joint action of many factors, such as economy, society, politics, systems, and social culture [8–10]. The uncoordinated relationship between government officials and farmers, regional economic differences, radical land reform, definition of land ownership, social culture and so on, will lead to frequent conflicts in land expropriation [11–13]. In the process of land expropriation, the larger the area of land occupied and the more stakeholders involved, the greater the possibility of conflict [14,15]. The economic situation and human capital level (education and health status of residents) in rural areas are far lower than those in cities, which further aggravates...
the land conflict [16]. Therefore, strengthening cooperation among different stakeholders and determining common interests has become a key issue affecting the stability of China’s rural areas.

However, few scholars pay attention to the behavioral decision-making preferences of different stakeholders in the conflict of land expropriation, or pay attention to the interaction between stakeholders and their multi-dimensional behavior preferences such as fairness aversion, loss aversion, and reciprocal altruism [17,18].

In view of the important role of the conflict of land expropriation in the sustainable and stable development of China’s rural areas, the purpose of this study is to determine how different behavioral preferences and different combinations of preferences of stakeholders affect decision-making and to determine how to promote cooperation among stakeholders in the process of agricultural land expropriation [19,20]. Based on this, three key issues are put forward. In the process of agricultural land expropriation, how do stakeholders interact, and what are the reasons for their conflict? What logic does their decision follow and what is its internal mechanism? What is the influence of different behavior preferences on the game equilibrium that leads to conflict?

Scholars’ research on the causes of conflict in agricultural land expropriation mainly focuses on imperfect legal system, unclear definition of public interest, uneven distribution of land income, imbalance of power and so on. There are some defects in the current land laws and regulations, such as the vague property right of agricultural land, the incomplete right of contract, the unclear boundary of agricultural land and so on, which is the root cause of the conflict of compensation for agricultural land expropriation [21]. However, the government does not include the expected increment and ecological value of the land in the provisions on the scope of compensation for land expropriation, the compensation standard is not in line with the fair market value of the land, and the compensation received by farmers is seriously low, resulting in fundamental conflicts of interests between the two sides [22]. The outdated standard of compensation for expropriation and the vague definition of the scope of public interest make the conflict of agricultural land expropriation more frequent [23]. The core of the conflict of land expropriation is the conflict of interest, because it is difficult to distribute the value-added income of the land reasonably among the local government, the requisitioned residents and the village committee [24]. Under the current distribution mode, the gap between farmers’ compensation and theoretical distribution income is too large, especially in economically developed areas [25]. This mode of distribution is unfair to the farmers who have lost their land, and the standard of compensation for land expropriation should be raised [26]. There are great differences in farmers’ and local governments’ perception of the fairness of the distribution of land value-added benefits, which is mainly reflected in the fairness of procedure and result of income distribution [27].

The government plays a leading role in the distribution of land value-added benefits, and is not only a stakeholder, but also a distributor of interests [28]. In the benefit distribution of land, farmers often face unfair results, and finally they choose to resist, which also leads to the intensification of land contradictions [29]. The reason why local governments choose this unfair way of benefit distribution is that Chinese local governments rely too much on land finance, and they need to rely on land expropriation to get more revenue [30]. For this reason, once there is a temporary institutional vacuum in the land market, it will be more difficult to supervise the stakeholders in land expropriation, which will also make conflicts more frequent [31].

Conflicts often occur when the interests of the government and the residents of the expropriated land are not compatible and seek to achieve different results [32]. Power is an important influencing factor of strategic interaction and belief interaction among stakeholders [33]: it determines the distribution of benefits. In fact, the distribution of benefits is always accompanied by an imbalance of power [34]. Power generally rests with the elite, who replace a significant majority (local residents) [35,36].
In reality, the game subjects in the conflict of agricultural land expropriation all have strong learning ability, and they will adjust the strategy of the complex situation according to the past experience, which makes the strategy adjustment of the game subject a gradual process. The speed of strategy adjustment can be described by evolutionary game theory. The analytical framework of evolutionary game theory was originally proposed by Smith and Price (1973) [37]. It is widely used in the study of group events, ecological compensation, environmental pollution and other fields; it uses the method of evolutionary game to analyze the behavior of game subjects in different periods of conflict [38–41]. Cheng constructed an evolutionary game model between farmers and local governments, analyzed their game behavior, discussed the final evolutionary stability strategy and carried out simulation analysis [42]. Zhao and Luo used evolutionary game theory to analyze the contradiction of interest between local government and land-lost farmers in the conflict of land expropriation [43,44]. Liu analyzed the evolution of the strategic behavior of residents and the government, and believe that the imperfect legal system affects the strategic evolution path of expropriation-related subjects, resulting in the conflict of land expropriation [45]. Han analyzed the decision-making behavior between local government and farmers, as well as between farmers and central government, and combed the evolutionary game relationship of multiple stakeholders [46]. Hong studied the influence of participants' emotion on land expropriation conflict through the RDEU (Rank-Dependent Expected Utility Theory) evolutionary game model [47]. Liu divided different demolition scenarios according to different confrontation costs, and analyzed the evolution path of conflict strategies between expropriated residents and local governments under different scenarios [48].

In the context of this introduction, this study will review the literature on behavioral preferences and land expropriation conflicts. It discusses the main behavioral preferences involved in the current land conflicts, especially how they evolve in land expropriation disputes and land expropriation conflicts. Then, this study uses the analysis method of game theory to analyze these problems from the perspective of behavior preference. The authors hope that these findings can provide some reference for the policy direction in the conflict management of land expropriation.

2. Theoretical Basis—Behavioral Preference Theory

According to the traditional economic theory, people generally have self-interest preference, and all the rules are the principle of maximizing economic interests. Self-interest preference originated from Adam Smith’s hypothesis of “economic man”, and later became the basic hypothesis in the study of people’s behavior and decision-making. The behavior preference theory is based on the limited theoretical hypothesis of the behavior subject, combined with the relevant theories of psychology and sociology, using game theory as the basic analysis tool, and gives rise to the concept of behavior game.

Williamson found that benefit distribution is affected by behavior preference in 1981 [49]. The research on subjective social preference appeared earlier in the studies of Economiste, Duesenberry, Leibenstein and Pollak [50–53]. Behavioral economist Camerer pointed out that people’s attention and psychological tendency to the interests and behavior of others is shown as social preference [54]. Human preferences are complex and diverse. It is found that the main preferences include reciprocal altruism preference, loss aversion preference and so on.

2.1. Reciprocal Altruistic Preference

Reciprocal altruism comes from the research of Rabin (1993) [55], who believes that people are unkind to others when they increase their own interests, and that they are willing to sacrifice their own interests to increase others’ interests, which is friendly to others. When players make decisions under the influence of reciprocal altruistic preferences, they will consider each other’s motives (friendly or unfriendly). Reciprocal altruism is
a kind of conditional altruism, which includes “self-harm” with return conditions, and excludes pure “harm to others and harm to oneself” and pure altruism.

Blount was the first to show that the altruistic motivation of collaborators has an impact on decision-making [56]. Nelson and Falk found that people not only pay attention to their own benefits, but also pay more attention to the psychological motivation of others in the ultimatum experiment. The psychological preference of others has an impact on the decision-making of the subject itself [57]. Fehr and Gachter designed a reciprocal cooperation experiment and found that reciprocal motivation between subjects can promote the generation of cooperative behavior [58,59]. Sutter examined the behavior of participants of different ages in behavioral economics experiments, and found that more mature participants showed greater concern for others [60]. In the design of the theoretical model of preference, Rabin designs a decision-making model including the reciprocal motivation of the subject, which describes the role of the preference and motivation of the subject in the game process. Dufwenberg and Kirchsteiger (2004) overcome the limitations of a two-agent, static game and the complete information hypothesis in the Rabin model, and extend it to a situation closer to reality [61]. Falk and Fischbacher (2006) increase the variables of the model to describe the reciprocal altruistic motivation of the subject, and apply it to the asymmetric game model [62]; we later compare the model of Korth (2009) with the Rabin model, and determine that the equilibrium result of the former is more consistent with the reality [63].

2.2. Loss Aversion Preference

Kahneman and Tversky (1979) put forward the concept of loss aversion in 1979 [64]. Loss aversion is common in the field of risk, which means that the negative effect of loss is greater than the positive effect of the same value income. Foreign countries began to study the preference of loss aversion earlier. Kahneman proposed a reference dependence theory in 1997, which holds that people care more about losses and disadvantages than benefits and advantages, so loss aversion preference affects people’s economic decisions. Bruce draws lessons from the reference dependence model of Kahneman and Tversky to study consumers’ choice of brands under multi-attribute reference. The results show that consumers are more likely to refer to losses rather than gains of the same size, which reflects the preference of loss aversion [65]. Through experiments to study the impact of loss aversion preference on risk acceptance attitude, it is concluded that investors who show short-sighted loss aversion will be more willing to accept risk if they do not evaluate their investments frequently; if all the returns are increased enough to eliminate losses, investors will accept more risks. In the loss aversion game model, the loss aversion utility function model defines two kinds of loss aversion equilibrium: myopia and non-myopia, and defines a special loss aversion function of players, which combines the material payment function of other players to obtain the loss aversion equilibrium Nash bargaining solution of Shalev [66,67].

In a game G, the pure strategy space of player i is Si. For each pure strategy combination s ∈ Si, the payment function of player i is xi, utility and ui(s). The loss aversion psychological reference point of the player affects the basic utility value ui(s). The model includes the loss aversion coefficient of the players, the loss aversion coefficient of player i is λi, 0 ≤ λi < 1, the greater the λi, the stronger the preference for loss aversion. λ = 0 means that there is no additional loss of psychological utility, and the expected utility reaches the maximum. When the reference point ri and the basic utility values of xi are given, the loss aversion utility of player i is:

$$U_i = \begin{cases} x_i, & x_i \geq r_i \\ x_i - \lambda_i(r_i - x_i), & x_i < r_i \end{cases}$$

(1)
It can be seen that when the subject’s payment value \( x_i \) is less than the reference point \( r_i \), the final utility loss is greater than the difference between the actual payment value and the psychological reference point. This reflects that when facing the loss again, people’s preference for loss aversion affects people’s evaluation of the final income.

Under the influence of complex social relations and the limited rationality of the behavior subject, the behavior of both parties in the process of expropriation and compensation is affected not only by self-interest preference, but also by reciprocal altruism preference, loss avoidance preference and so on. Qing used the endowment effect in the loss aversion theory to deeply analyze the different psychological cognition of different subjects to the conflict events in the conflict of land expropriation and demolition, as well as the institutional causes of different psychological cognition [68]. At the same time, two game models are constructed to compare and analyze the behavior decisions of the government and expropriation project developers from the perspective of traditional self-interest and fairness and reciprocity, respectively. Liu discussed the contract equilibrium of land expropriation compensation based on the reciprocity preference of the subject of expropriation compensation, and suggested that the idea of fairness and justice should be carried out in the whole process of real estate expropriation compensation [69]. Hong considered the influence of his preference perspective on the conflict of agricultural land expropriation compensation, constructed the corresponding altruistic preference evolution game model, and believed that as long as both sides of the expropriation compensation game could participate in the expropriation compensation activities with an altruistic attitude, the conflict would not happen [70]. Zhao, based on the theory of psychological endowment effect under the preference of loss aversion, uses the framework of dynamic game method to analyze the conflict of compensation for land expropriation and demolition in the process of urbanization in China, and thinks that building an equal and democratic game subject can alleviate the conflict of land expropriation by promoting market-oriented development [71].

So far, although many studies have used the method of game theory to explore the conflict and cooperation in land expropriation under a single preference, they seldom consider the impact of preference on the subject strategy from the perspective of multi-dimensional preference combinations. In view of this, this study attempts to analyze the strategies and behaviors of both parties in the conflict of agricultural land expropriation compensation conflict, and study the impact of different subject preferences and multi-dimensional preference combinations on the actor’s strategy choice, so as to provide practical guidance for the resolution of the conflict. This is of vital importance to the stable and sustainable development of China’s rural areas [72].

3. An Evolutionary Game Model of Agricultural Land Expropriation Conflict under Multi-Dimensional Preference

The occurrence of the conflict of compensation for agricultural land expropriation is an evolution process from accumulation to intensification and then to mitigation, and the behavior strategy of the game subject of expropriation and compensation is also stable in the dynamic evolution. Therefore, an evolutionary game model is needed to analyze the interest–game relationship among subjects in the conflict of compensation for agricultural land expropriation under the influence of various preferences. Considering that in real life, the behavior subject is affected by many kinds of preferences, such as reciprocal altruism, loss aversion, self-interest and so on, this chapter attempts to construct a dynamic evolution game model of farmland expropriation compensation conflict under multi-dimensional preference combinations. This paper analyzes the strategy choice of the game subject from the perspective of preference combination. Firstly, the evolutionary game model of farmland expropriation compensation conflict under complete self-interest preference is analyzed. Secondly, combined with the actual situation of the conflict of compensation for
agricultural land expropriation, this paper constructs the dynamic evolution model of the conflict of compensation for agricultural land expropriation under the combination of self-interest preference, reciprocal altruism preference and loss aversion preference. This paper focuses on the strategic choice of the stakeholders in agricultural land expropriation under the combination of multi-dimensional preferences. Then, under the multi-dimensional preference combination, the stability strategy combinations of the two sides in the conflict game of farmland expropriation and compensation are numerically simulated and analyzed. Finally, combined with the case of compensation for agricultural land expropriation in reality, this paper makes a realistic analysis of different evolutionary equilibrium states, so as to make the evolution results of the model more realistic and persuasive, so as to provide a corresponding realistic path for resolving the conflict of compensation for agricultural land expropriation.

3.1. Evolutionary Game Model of Compensation Conflict for Agricultural Land Expropriation under Complete Self-Interest Preference

The game subject is completely self-interested. Local governments have two strategies: reasonable expropriation and unreasonable expropriation. Reasonable expropriation refers to the local government’s strict implementation of the compensation policy for land expropriation, respect for the interests of farmers, transparent and legal expropriation procedures, etc.; unreasonable expropriation means that the local government does not strictly follow the compensation policy for land expropriation, unreasonable compensation, infringement of farmers’ land rights and interests and so on. There are two strategies for farmers: cooperation and boycott. When the government collects reasonably and farmers cooperate, the income of local government is $G$ and the income of farmers is $F$. When the local government collects unreasonably and the farmers choose the cooperation strategy, the local government will get additional local benefits and unreasonable benefits, and the cost will be faced with the punishment of the higher government, the loss of government reputation and so on. However, on the whole, the local government will still get extra income when the unreasonable expropriation strategy is accepted by farmers. This extra income is recorded as $I_1$, and the loss suffered by farmers at this time is $L_2$. When local governments choose reasonable expropriation and farmers choose boycott strategy, farmers will receive a high compensation when they pay the cost of boycott (for example, extra money, energy, time). On the whole, the extra compensation is $I_2$. At this time, the loss suffered by the government as a result of farmers’ boycott is $L_1$. When the local government chooses unreasonable expropriation and the farmers choose the boycott strategy, the cost spent by the local government $H_1$, including the punishment that the government may suffer from the central government and the losses suffered as a result of farmers’ boycott (including the loss of government reputation), which will also be greater than the losses caused by reasonable government expropriation and farmers’ boycott, that is, $H_1 > L_1$. The cost spent by farmers is $H_2$, including the time and energy cost of resisting the government, which is generally greater than the loss when accepting unreasonable expropriation by the government, that is, $H_2 > L_2$.

Relevant parameters can be described in Table 1. Under the strategy combination of unreasonable expropriation and boycott, the losses of both sides are the greatest, and lead to the conflict of expropriation and compensation, and greatly reduce the social welfare. The local government and farmers choose the dynamic game payment matrix as shown in Figure 1.
Table 1. Model Parameter Description.

| Parameter | Parameter Meaning |
|-----------|-------------------|
| $G$       | Local government revenue |
| $F$       | Farmers’ income |
| $I_1$     | The additional revenue the government receives when farmers accept unreasonable expropriation tactics from the local government |
| $I_2$     | Negotiated additional compensation for farmers who resist reasonable levies by local governments |
| $L_1$     | Losses suffered by the government when farmers resisted reasonable levies by the local government |
| $L_2$     | The cost of resistance borne by farmers when they accept unreasonable expropriation strategies from local governments |
| $H_1$     | Losses suffered by the local government when farmers resist the unreasonable expropriation (including the decline of government credibility and punishment by the superior government) |
| $H_2$     | When farmers resist the local government’s reasonable levy, farmers bear the boycott cost (including the cost of missing work and legal aid consultation fees) |
| $x$       | Probability of local government choosing reasonable collection strategy |
| $1 - x$   | The probability of local government choosing unreasonable expropriation strategy |
| $y$       | The probability that farmers choose to accept the expropriation strategy |
| $1 - y$   | Probability of farmers choosing to resist expropriation strategies |

![Figure 1. Dynamic game payment matrix of land expropriation conflict under complete self-interest preference.](image)

3.2. An Evolutionary Game Model for the Conflict of Farmland Expropriation

According to the game payment matrix, the evolutionary game model of agricultural land expropriation conflict can be constructed. Assuming that $x$ is the probability that the local government chooses a reasonable expropriation strategy, the probability of choosing an unreasonable expropriation strategy is $1 - x$. When $x$ equals 1, the local government chooses to levy it reasonably. Suppose $y$ is the probability of choosing cooperation strategy...
for farmers, then the probability of choosing boycott strategy is \(1 - y\). The expected return of the local government choosing the reasonable expropriation strategy is \(U_{G1}\), the expected return of the unreasonable expropriation strategy is \(U_{G2}\), and the average expected return is \(\overline{U_G}\). The calculated results are as follows:

\[
U_{G1} = yG + (1 - y)(G - L_1) \tag{2}
\]

\[
U_{G2} = y(G + I_1) + (1 - y)(G - H_1) \tag{3}
\]

\[
\overline{U_G} = xU_{G1} + (1 - x)U_{G2} \tag{4}
\]

The expected income of farmers choosing cooperation strategy is \(U_{F1}\), the expected return of choosing boycott strategy is \(U_{F2}\) and the average expected income is \(U_F\), and can be calculated as follows:

\[
U_{F1} = xF + (1 - x)(F - L_2) \tag{5}
\]

\[
U_{F2} = x(F + I_2) + (1 - x)(F - H_2) \tag{6}
\]

\[
\overline{U_F} = yU_{F1} + (1 - y)U_{F2} \tag{7}
\]

According to formulas (2) and (4), the replication dynamic equation of reasonable expropriation strategy adopted by local government is as follows:

\[
F(x) = \frac{dx}{dt} = x(U_{G1} - \overline{U_G}) = x(1 - x)[(1 - y)(H_1 - L_1) - yI_1] \tag{8}
\]

The replication dynamic equation of cooperative strategy adopted by farmers can be obtained from Equations (5) and (7):

\[
F(y) = \frac{dy}{dt} = y(U_{F1} - \overline{U_F}) = y(1 - y)[(1 - x)(H_2 - L_2) - xI_2] \tag{9}
\]

When \(F(x) = 0\), we can get the results of \(x = 0\) and \(y = 0\), \(y^* = \frac{L_1 - H_1}{L_1 - H_1 - I_1}\). When \(F(y) = 0\), we can get the results of \(y = 0\) and \(y = 1\), \(x^* = \frac{L_2 - H_2}{L_2 - H_2 - I_2}\). There are five local equilibrium points in the evolutionary dynamic system of the game between the local government and the land-expropriated farmers, which are \(A(0, 0), B(0, 1), C(1, 0), D(1, 1), E(x^*, y^*)\). When the local equilibrium point satisfies the evolutionary stability condition under different values of variables, it becomes the evolutionary stable point (ESS). The following is the evolutionary stability analysis of the strategy.

3.3. Evolutionary Stability Analysis

According to the stability analysis method of the local equilibrium point of the Jacobian matrix, the Jacobian matrix is established and the local stability analysis is carried out. The Jacobian matrix corresponding to the dynamic Equations (8) and (9) is:

\[
J = \begin{bmatrix}
\frac{\partial F(x)}{\partial x} & \frac{\partial F(x)}{\partial y} \\
\frac{\partial F(y)}{\partial x} & \frac{\partial F(y)}{\partial y}
\end{bmatrix}
= \begin{bmatrix}
a_{11} & a_{12} \\
a_{13} & a_{14}
\end{bmatrix}
\tag{10}
\]

The calculated results are as follows:

\[
J = \begin{bmatrix}
(1 - 2x)[(1 - y)(H_1 - L_1) - yI_1] & x(1 - x)(L_1 - H_1 - I_1) \\
y(1 - y)(L_2 - H_2 - I_2) & (1 - 2y)[(1 - x)(H_2 - L_2) - xI_2]
\end{bmatrix}
\tag{11}
\]

The following two conditions are required for the local equilibrium point to become an evolutionary stability strategy (ESS):
Condition 1:  
\[ \text{det} J = \begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix} = a_{11}a_{22} - a_{12}a_{21} > 0 \]  
(12)

Condition 2:  
\[ \text{tr} J = a_{11} + a_{22} < 0 \]  
(13)

The values at the five local equilibrium points are calculated, and the results are shown in Table 2.

**Table 2. Values at the local equilibrium point.**

| Equilibrium Point | \( a_{11} \) | \( a_{12} \) | \( a_{21} \) | \( a_{22} \) |
|-------------------|-------------|-------------|-------------|-------------|
| A(0,0)            | \( H_1 - L_1 \) | 0           | 0           | \( H_1 - L_1 \) |
| B(0,1)            | \(-1 \)     | 0           | 0           | \(-H_2 - L_2 \) |
| C(1,0)            | \(- (H_1 - L_1) \) | 0           | 0           | \(- I_1 \) |
| D(1,1)            | \( I_1 \)   | 0           | 0           | \( L_2 \) |
| E(\( x^* y^* \))  | 0           | \( P \)    | \( Q \)    | 0           |

The expressions of \( P \) and \( Q \) in Table 1 are as follows:

\[
P = x^*(1 - x^*)(L_1 - H_1 - I_1) \\
Q = y^*(1 - y^*)(L_2 - H_2 - I_2)
\]

(14)

According to the observation, it can be seen that the condition of evolutionarily stability strategy is not satisfied at \((x^* y^*)\), \( a_{11} + a_{22} = 0 \). According to the (ESS) calculation of the evolutionary stability strategy condition, it is known that only at \( B(0,1) \) and \( C(1,0) \), it is satisfied \( \text{det} J > 0, \text{tr} J < 0 \).

It is possible to achieve evolutionarily stable equilibrium under the combination of unreasonable expropriation/cooperation and reasonable expropriation/boycott strategies. Under the combination of these two equilibrium strategies, although the conflict of expropriation and compensation does not break out directly, it has the possibility of potential occurrence. \( B(0,1) \) represents the unreasonable expropriation taken by the local government, and the farmers are forced to accept it. In fact, because the government has more resources and power, it is in a relatively advantageous position in the process of compensation for land expropriation. In order to obtain local and personal interests in the process of compensation for land expropriation, local governments and some officials adopt unreasonable means of expropriation on farmers. In addition, the relevant systems and regulations of farmland expropriation compensation and farmland management in China are not perfect, which is less restrictive to the government expropriation work. Because of their relatively weak position, asymmetric information, blocked channels for safeguarding their rights and other factors, Chinese farmers are finally forced to accept the expropriation and compensation arrangements of the local government.

\( C(1,0) \) represents the scenario of a reasonable expropriation strategy adopted by government, with farmers choosing to resist. In the process of compensation for agricultural land expropriation, self-interested farmers will ask for compensation from the government as much as possible, and take illegal acts such as refusing to sign contracts, starting land prices and even obstructing the normal expropriation order. On the other hand, local governments may give high compensation to rebellious farmers out of their preference for social stability. Whether it is point \( B \) or point \( C \), there is a situation of unfairness and disharmony, and the social welfare cannot reach the Pareto optimal state. There is a potential conflict between the two sides at this time.
4. Conflict Evolutionary Game Model of Agricultural Land Expropriation under Multi-Dimensional Preference

4.1. Problem Description and Model Hypothesis

In the process of compensation for agricultural land expropriation, it is assumed that both the local government and the expropriated farmers are bounded, rational, and the behavior of the subject has the influence of reciprocal altruistic preference and loss aversion preference. Specifically, reciprocal altruistic preference is under the premise that both parties can obtain reasonable income distribution, and the income improvement of one side can become the source of the increase in psychological utility for the other. As far as farmers are concerned, under the condition of reasonable expropriation and compensation, the government’s expropriation of agricultural land represents the reasonable exercise of public power, and the social benefits will be greatly increased. Farmers recognize the reasonableness and legitimacy of the government’s land expropriation benefits, and farmers’ sense of identity with the government increases, which leads to an increase in psychological effectiveness. As far as the government is concerned, the government collects reasonably and farmers choose to cooperate to accept the performance that can establish a good image of the government. When farmers are satisfied with the benefits of land expropriation compensation, the land expropriation work of the local government will be carried out harmoniously, which not only avoids the outbreak of land expropriation conflicts, but also brings stability to the society, and enhances the reputation and image of the government. This result is a “win-win” performance for both sides, but it can only be achieved on the premise of cooperation between both sides. Loss aversion preference is mainly reflected in the subject’s perception of loss.

Suppose the reciprocal altruism preference coefficient of local government is \( \delta_2 \), and that of farmers is \( \delta_1 \), and \( \delta_1, \delta_2 > 0 \) \( (i = 1, 2) \). Then, under the strategy combination (reasonable collection, cooperation), the utility function of local government is \( G + \delta_1 F \), and that of farmers is \( F + \delta_1 G \).

Suppose the local government’s loss aversion preference coefficient is \( \lambda_1 \), and the farmers’ loss aversion preference coefficient is \( \lambda_2 \). \( \delta_1 \), \( \delta_2 > 0 \) \( (i = 1, 2) \). Under the combination of the strategy that the local government chooses unreasonable expropriation and the farmers choose cooperation, the local government will have additional income \( I_1 \) and the cost will be \( C_1 \), \( I_1 > C_1 \). The loss suffered by farmers is \( L_2 \), in addition to an additional psychological utility loss, which is related to the additional income seized by the government as a result of unreasonable collection, which is recorded as \( \lambda_2 I_1 \). The greater the unreasonable income obtained by the government, the greater the value of farmers’ psychological loss. By the same token, under the strategic combination of reasonable expropriation by local governments and boycott by farmers, farmers will have additional income \( I_2 \) and the boycott cost will be \( C_2 \), \( I_2 > C_2 \). The local government will suffer certain losses as a result of the farmers’ boycott or the punishment of the higher government, which will be recorded as \( L_1 \). In addition, there will be an additional loss of psychological value \( \lambda_1 I_2 \), which includes the loss of psychological value caused by extra compensation to farmers, the condemnation of public opinion due to farmers’ boycott, and the loss of government image and reputation. The greater the extra compensation, the greater the psychological utility loss of the government. Therefore, under the strategy combination of unreasonable expropriation and cooperation, the utility of local government is \( G + I_1 - C_1 \), and the utility of farmers is \( F - L_2 - \lambda_1 I_2 \) and \( F + L_2 - C_2 \). Under the strategy combination of unreasonable expropriation and boycott, the utility of local government is \( G - L_1 - C_1 \), and the utility of farmers is \( F - L_2 - C_2 \). In this case, both sides have paid a certain cost and suffered certain losses; without any additional benefits, land expropriation compensation conflict is imminent. According to the above analysis, the local government and farmers choose the dynamic game payment matrix as shown in Figure 2.
4.2. Model Building

Assuming that the land x is the probability that the local government chooses the reasonable expropriation strategy, the probability of choosing the unreasonable expropriation strategy is 1−x. When x = 1, all the local governments chose to levy it reasonably. Suppose y is the probability of choosing cooperation strategy for farmers, then the probability of choosing boycott strategy is 1−y. The strategies of both sides will eventually reach a stable state through continuous evolution and adjustment. The expected income of the local government in choosing a reasonable expropriation strategy is U_G1, the expected return of the unreasonable expropriation strategy is U_G2, and the average expected return is U_G. The calculated results are as follows:

\[ U_{G1} = y(\delta_1 F + L_1 + \lambda_1 I_2) + G - L_1 - \lambda_1 I_2 \]  
\[ U_{G2} = y(I_1 + L_1) + G - L_1 - C_1 \]  
\[ \bar{U}_G = xU_{G1} + (1-x)U_{G2} \]

The expected return of farmers choosing cooperation strategy is U_F1, the expected return of choosing boycott strategy is U_F2, and the average expected return is \( \bar{U}_F \). The calculated results are as follows:

\[ U_{F1} = x(\delta_2 G + L_2 + \lambda_2 I_1) + F - L_2 - \lambda_2 I_1 \]  
\[ U_{F2} = x(I_2 + L_2) + F - L_2 - C_2 \]  
\[ \bar{U}_F = yU_{F1} + (1-y)U_{F2} \]

The replication dynamic equation of reasonable expropriation strategy adopted by local government can be obtained from Formulas (13) and (14) as follows:

\[ F(x) = \frac{dx}{dt} = x(U_{G1} - \bar{U}_G) = x(1-x)[y(\delta_1 F + \lambda_1 I_2 - I_1) - \lambda_1 I_2 + C_1] \]
The replication dynamic equation of cooperative strategy adopted by farmers can be obtained from Formulas (10) and (11) as follows:

\[
F(y) = \frac{dy}{dt} = y(U_{F1} - U_F) = y(1 - y)[x(\delta_2 G + \lambda_2 I_1 - I_2) - \lambda_2 I_1 + C_2] \tag{22}
\]

If we let \( F(x) = 0 \), we can get \( x = 0 \).

When \( F(x) = 0 \), we can get the results of \( x = 0 \) and \( x = 0 \), \( y^* = \frac{\lambda_1 I_2 - C_1}{\delta_1 F + \lambda_1 I_2 - I_1} \). When \( F(x) = 0 \), we can get the results of \( y = 0 \) and \( y = 0 \), \( x^* = \frac{\lambda_1 I_2 - C_1}{\delta_1 F + \lambda_1 I_2 - I_1} \). There are five local equilibrium points in the evolutionary dynamic system of the game between the local government and the land-expropriated farmers, which are \( A(0,0), B(0,1), C(1,0), D(1,1), E(x^*, y^*) \). When the local equilibrium point satisfies the evolutionary stability condition under different values of variables, it becomes the evolutionary stable point (ESS). Then, the evolutionary stability of the strategy is analyzed.

4.3. Evolutionary Stability Analysis

According to the stability analysis method of the local equilibrium point of the Jacobian matrix, the Jacobian matrix is established and the local stability analysis is carried out. The corresponding Jacobian matrix of the evolution system is:

\[
J = \begin{bmatrix}
adF(x) \quad adF(y) \\
\frac{dx}{dy} \quad \frac{dy}{dy}
\end{bmatrix} = \begin{bmatrix}
a_{11} & a_{12} \\
a_{21} & a_{22}
\end{bmatrix} \tag{23}
\]

The calculated results are as follows:

\[
\begin{align*}
a_{11} &= (1 - 2x)\{y(\delta_1 F + \lambda_1 I_2 - I_1) - \lambda_1 I_2 + C_1\} \\
a_{12} &= x(1 - x)(\delta_1 F + \lambda_1 I_2 - I_1) \\
a_{21} &= y(1 - y)(\delta_2 G + \lambda_2 L_1 - I_2) \\
a_{22} &= (1 - 2y)[x(\delta_2 G + \lambda_2 L_1 - I_2) - \lambda_2 I_1 + C_2]
\end{align*} \tag{24}
\]

The local equilibrium point becomes the evolutionary stability strategy (ESS) and must satisfy the following two conditions at the same time:

Condition 1:

\[
\det J = \begin{vmatrix}
a_{11} & a_{12} \\
a_{21} & a_{22}
\end{vmatrix} = a_{11}a_{22} - a_{12}a_{21} > 0 \tag{25}
\]

Condition 2:

\[
tr J = a_{11} + a_{22} < 0 \tag{26}
\]

Specific values are taken at the five local equilibrium points, as shown in Table 3.

| Equilibrium Point | \( a_{11} \) | \( a_{12} \) | \( a_{21} \) | \( a_{22} \) |
|-------------------|-------------|-------------|-------------|-------------|
| \( A(0,0) \)     | \( -\lambda_1 I_2 + C_1 \) | 0           | 0           | \( -\lambda_2 I_1 + C_2 \) |
| \( B(0,1) \)     | \( \delta_1 F - I_1 + C_1 \) | 0           | 0           | \( \lambda_2 I_1 - C_2 \) |
| \( C(1,0) \)     | \( \lambda_1 I_2 - C_1 \)   | 0           | 0           | \( \delta_2 G - I_2 + C_2 \) |
| \( D(1,1) \)     | \( -\delta_1 F + I_1 + C_1 \)| 0           | 0           | \( -\delta_2 G - I_2 + C_2 \) |
| \( E(x^*, y^*) \)| 0           | \( P \)     | \( Q \)     | 0           |
The expressions of P and Q in Table 2 are as follows: 

\[ P = x^*(1 - x^*)(\delta_1 F + \lambda_1 I_2 - I_1) \]

\[ Q = y^*(1 - y^*)(\delta_2 G + \lambda_2 I_1 - I_2) \]

At \( E(x^*, y^*) \), \( a_{11} + a_{22} = 0 \), does not meet the evolutionary stability condition 2, so it is excluded from the combination of evolutionary stability strategies.

According to the results of different evolutionary stability, it is discussed in three cases.

• (1) Scenario 1: conflict outbreak

When \( \lambda_1 > \frac{C_1}{I_2} \), \( \lambda_2 > \frac{C_2}{I_1} \), \( \delta_1 < \frac{I_1 - C_1}{F} \), \( \delta_2 < \frac{I_2 - C_2}{G} \), the results of the evolutionary stability analysis of the equilibrium point are shown in Table 4. It can be seen that \( A(0, 0) \) (unreasonable expropriation, boycott) is the combination of evolutionary and stable strategies. At this time, the conflict of agricultural land expropriation broke out.

Table 4. Stable equilibrium analysis in scenario 1.

| Equilibrium Point | \( det J \) | \( tr J \) | Stability Analysis |
|-------------------|------------|----------|-------------------|
| A(0, 0)           | +          | −        | ESS (Evolutionarily stable strategy) |
| B(0, 1)           | −          | Uncertain | Saddle point |
| C(1, 0)           | −          | Uncertain | Saddle point |
| D(1, 1)           | +          | +        | Unstable |

When \( \lambda_1 > \frac{C_1}{I_2} \) and \( \lambda_2 > \frac{C_2}{I_1} \), this means that the government’s loss aversion preference coefficient is greater than the cost paid by unreasonable expropriation to the extra compensation that farmers get to resist unreasonable expropriation. At the same time, when the coefficient of farmers’ preference for loss avoidance is greater than the ratio of the cost of resisting unreasonable expropriation to the additional benefits obtained by the government, both sides have a strong preference for loss avoidance. This shows that both sides are more sensitive to the extra benefits brought by each other’s non-cooperation, so they are more sensitive to the loss of psychological utility when they adopt cooperation strategies, so they tend to adopt non-cooperation strategies. When \( \delta_1 < \frac{I_1 - C_1}{F} \) and \( \delta_2 < \frac{I_2 - C_2}{G} \), this means that when the government’s reciprocal altruism preference is less than the ratio of the additional net income obtained by unreasonable expropriation to the farmers’ income, and the farmers’ reciprocal altruistic preference is less than the ratio of the additional net income obtained by resisting expropriation to the government income, both sides’ reciprocal altruistic preference is weak, that is, they are not sensitive to the value perception of each other’s income. Therefore, it is not sensitive to the psychological value of reciprocity and altruism obtained by adopting cooperation strategies, so it is not inclined to take cooperation strategies. Therefore, the unreasonable expropriation/boycott strategy becomes an evolutionarily stable equilibrium. In reality, the local government unreasonable expropriation must reduce the standard of compensation for farmers, in order to obtain more land expropriation benefits. The stronger the farmers’ preference for loss aversion, the greater their perception of the value of the unreasonable benefits obtained by the government, thus the greater their own perception of the value of loss, and the easier it is to adopt resistance strategies. At the same time, the reciprocal altruistic preference of both sides is weak, and the psychological utility of cooperative behavior is not great. As a result, the local government adopts the unreasonable expropriation strategy, the farmers adopt the boycott strategy, the land expropriation compensation conflict breaks out, the income of both sides cannot reach the optimal value, “Both lose and hurt”, and the overall social welfare will decline as a result.
(2) Scenario 2: potential conflict situation

When \( \lambda_1 > \frac{C_1}{I_2} \), \( \lambda_2 < \frac{C_2}{I_1} \), \( \delta_1 < \frac{l_1-C_1}{I_1} \), \( \delta_2 > \frac{l_2-C_2}{I_2} \), the stability analysis of the four local equilibrium points is shown in Table 5. Point \( B (0, 1) \) is the evolutionary stable strategy point (ESS) at this time. Unreasonable expropriation/cooperation is a combination of evolutionary and stable strategies.

### Table 5. Stable equilibrium analysis in scenario 2.

| Equilibrium Point | \( det J \) | \( tr J \) | Stability Analysis |
|------------------|---------|---------|------------------|
| \( A (0, 0) \)   | –       | Uncertain | Saddle point     |
| \( B (0, 1) \)   | +       | –       | ESS              |
| \( C (1, 0) \)   | +       | +       | Unstable         |
| \( D (1, 1) \)   | –       | Uncertain | Saddle point     |

When \( \lambda_1 > \frac{C_1}{I_2} \) and \( \delta_1 < \frac{I_l - C_1}{I_1} \), this means that the government’s loss aversion preference coefficient is greater than the ratio of the cost paid by unreasonable expropriation to the extra compensation that farmers get to resist unreasonable expropriation, and the government’s reciprocal altruistic preference is less than the ratio of the extra net income obtained by unreasonable expropriation to the income of farmers, when the government’s stable strategy is unreasonable expropriation. In reality, when the government’s preference for loss aversion is strong and reciprocal altruism is weak, the government is more sensitive to the loss of psychological utility when farmers resist and adopt reasonable expropriation strategies. They are not sensitive to the increase in psychological utility brought about by the increase in farmers’ income, so they tend to adopt unreasonable collection policies.

When \( \lambda_1 < \frac{C_1}{I_2} \), \( \lambda_2 > \frac{C_2}{I_1} \), \( \delta_1 > \frac{I_l - C_1}{I_1} \), \( \delta_2 < \frac{I_l - C_2}{I_2} \), the stability analysis of the four local equilibrium points is shown in Table 6. The point \( C (1, 0) \) is the evolutionary stability strategy point, and reasonable expropriation/resistance is the evolutionary stability strategy combination.

### Table 6. Stable equilibrium analysis in scenario 2.

| Equilibrium Point | \( det J \) | \( tr J \) | Stability Analysis |
|------------------|---------|---------|------------------|
| \( A (0, 0) \)   | –       | Uncertain | Saddle point     |
| \( B (0, 1) \)   | +       | +       | Unstable         |
| \( C (1, 0) \)   | +       | –       | ESS              |
| \( D (1, 1) \)   | –       | Uncertain | Saddle point     |
When \( \lambda_1 < \frac{C_1}{I_2} \) and \( \delta_1 > \frac{I_1 - C_1}{F} \), this means that the government’s loss aversion preference coefficient is less than the ratio of the cost paid by unreasonable expropriation to the additional compensation obtained by farmers resisting unreasonable expropriation; the government’s reciprocal altruistic preference is greater than the ratio of the extra net income obtained by unreasonable expropriation to the income of farmers, when the government’s stable strategy is reasonable expropriation. In reality, when the government’s preference for loss aversion is weak and the preference for reciprocity and altruism is strong, the government is less sensitive to the loss of psychological utility caused by farmers’ boycott, and is more sensitive to the increase in psychological utility brought about by the increase in farmers’ income. Therefore, we tend to adopt reasonable collection measures. When \( \lambda_2 < \frac{C_2}{I_1} \) and \( \delta_2 > \frac{I_2 - C_2}{G} \), this means that when the coefficient of farmers’ preference for loss aversion is less than the ratio of the cost of resisting unreasonable expropriation to the additional income obtained by the government, and when the farmers’ reciprocal altruistic preference is greater than the ratio of the extra net income obtained by resisting expropriation to the government’s income, the stable strategy of farmers is to resist expropriation. In reality, when farmers’ preference for loss aversion is strong and reciprocal altruism is weak, farmers are more sensitive to the loss of their own psychological utility caused by the government’s unreasonable expropriation and are less sensitive to the increase in psychological utility brought about by the increase in government revenue. As a result, they tend to adopt resistance strategies. In the case of legal and reasonable expropriation compensation by the local government, when the landless farmers take illegal measures (such as gathering people to cause conflict or obstructing the construction of the expropriation project) to ask for high compensation, it will not only affect the administrative efficiency of the local government, social harmony and fairness, but may also have a negative impact on economic and social development.

(3) Scenario 3: harmonious expropriation

When \( \lambda_1 < \frac{C_1}{I_2} \), \( \lambda_2 < \frac{C_2}{I_1} \), \( \delta_1 > \frac{I_1 - C_1}{F} \), \( \delta_2 > \frac{I_2 - C_2}{G} \), the stability analysis of the four local equilibrium points is shown in Table 7. Point D (1,1) is the evolutionary stability strategy point, and the strategy (reasonable expropriation, resistance) is the combination of evolutionary stability strategies, which is also expressed as harmonious expropriation.

Table 7. Stable equilibrium analysis in scenario 3.

| Equilibrium point | \( det J \) | \( tr J \) | Stability Analysis |
|-------------------|-------------|-------------|-------------------|
| A (0, 0)          | –           | Uncertain   | Saddle point      |
| B (0, 1)          | –           | Uncertain   | Saddle point      |
| C (1, 0)          | +           | +           | Unstable          |
| D (1, 1)          | +           | –           | ESS               |

When \( \lambda_1 < \frac{C_1}{I_2} \), \( \delta_1 > \frac{I_1 - C_1}{F} \), this means that the government’s loss aversion preference coefficient is less than the ratio of the cost paid by unreasonable expropriation to the additional compensation obtained by farmers resisting unreasonable expropriation; the government’s reciprocal altruistic preference is greater than the ratio of the extra net income obtained by unreasonable expropriation to the income of farmers, when the government’s stable strategy is reasonable expropriation. In reality, when the government’s preference for loss aversion is weak and the preference for reciprocity and altruism is strong, the government is less sensitive to the loss of its own psychological utility when farmers boycott, and is more sensitive to the increase in psychological utility brought about by the increase in farmers’ income. Therefore, we tend to take reasonable collection measures. When \( \lambda_2 < \frac{C_2}{I_1} \), \( \delta_2 > \frac{I_2 - C_2}{G} \), this means that when the coefficient of farmers’ preference for loss avoidance is less than the ratio of the cost of resisting unreasonable expropriation to the additional income obtained by the government, and when the farmers’ reciprocal altruistic preference is greater than the ratio of the extra net income obtained by resisting expropriation to the government’s income, the stable strategy of farmers is to resist expropriation to the government’s income, the stable strategy of farmers is to resist expropriation.
priation. In reality, it can be explained that when farmers have a weak preference for loss aversion and a strong preference for reciprocity and altruism, farmers are less sensitive to the loss of their own psychological utility caused by the government’s unreasonable expropriation, and are more sensitive to the increase in psychological utility brought about by the increase in government income, that is, farmers support government policies and cooperative farmland expropriation, so they tend to adopt cooperative strategies. In this case, the government and land-lost farmers have reached a state of mutual understanding and mutual trust, the compensation work of agricultural land expropriation can be carried out smoothly, and the social welfare is optimal.

5. Simulation Analysis on the Evolution of Conflict Behavior of Agricultural Land Expropriation under Multi-Dimensional Preference

In order to better explore the influence of reciprocal altruism preference and loss aversion preference on the evolution of game subject behavior strategy in the conflict evolution game model of agricultural land expropriation under multi-dimensional preference combinations, this paper makes an evolutionary simulation analysis of the three evolutionary stable equilibrium cases analyzed above.

According to the actual situation, under the strategy combination that the local government chooses reasonable collection and the farmers choose cooperation, the income obtained by the local government is $G$, and the income obtained by farmers is generally greater than that of $F$. Under the strategy combination of reasonable expropriation by local government and boycott by farmers, the extra compensation income $I_2$ is greater than the cost $C_2$ of resisting expropriation. Under the strategy combination of local government choosing illegal expropriation and farmers choosing cooperative expropriation, the extra income $I_1$ obtained by local government is greater than the illegal expropriation cost $C_2$. In general, $C > I_1 > C_1, F > I_2 > C_2$.

According to Xu’s calculation of the city value of agricultural land in Anhui Province in 2014 [73], the market value of the requisitioned agricultural land is about CNY 120,000 per mu (1 mu = 666 square meters), while the actual compensation received by farmers is about CNY 100,000 per mu. According to Xiong’s compensation case of land expropriation conflict in China’s Shanxi Province in 2015 [74], there are an average of three people in each household, when the local government chooses the strategy combination of unreasonable expropriation and farmers choose to cooperate, each household will bring additional income to the local government of about CNY 50,000, and the cost to the local government is about CNY 30,000 (mainly for collecting the salary of the staff in the project). When the local government chose the strategy of reasonable expropriation and farmers chose to boycott, farmers petitioned the central government and the media to expose that each household received about CNY 60,000 in additional compensation, and the cost per household to boycott the levy was about CNY 40,000 (the cost for farmers to boycott agricultural land expropriation mainly includes additional transportation, accommodation, overtime and legal consulting fees). As the compensation given to farmers by the local government in the expropriation of agricultural land is too low, there is a huge gap between the market value of cultivated land and the actual amount of compensation, which can easily lead to conflicts between farmers and the local government. Therefore, in this article, the parameters are specified as follows: $G = 120,000, F = 10,000, I_1 = 50,000, I_2 = 60,000, C_1 = 30,000, C_2 = 40,000$ (unit: CNY). It is assumed that the whole simulation system $(x, y)$ is executed under the initial value $(0.5, 0.5)$, which means that the probability of both sides of the game to choose any strategy in the initial stage of evolution is 0.5.

5.1. Conflict Outbreak Situation

The situation is subject to the following conditions: $\lambda_1 > \frac{C_1}{I_2}, \lambda_2 > \frac{C_2}{I_1}, \delta_1 < \frac{I_2-C_1}{G}, \delta_2 < \frac{I_1-C_2}{F}$. 
In this situation, make \( \lambda_1 = 0.8, \delta = 0.15, \lambda_2 = 1.1, \delta_2 = 0.15 \). As shown in Figure 3, the initial value of \((x, y)\) is \((0.5,0.5)\). It shows that in the initial stage, both local governments and farmers have a probability of 50% to choose reasonable expropriation strategy and cooperation strategy, or both parties have a probability of 50% to choose reasonable expropriation strategy or cooperation strategy. The horizontal axis represents the evolution time, and the vertical axis represents the proportion of cooperative strategy choices. When satisfying situation 1, that is, when the intensity of reciprocal altruism preference of local government is lower, the preference of loss aversion is higher, and the intensity of reciprocal altruism preference of farmers is lower, and the preference of loss aversion is higher, the strategic choice of local government evolves into unreasonable expropriation; farmers evolve to resist expropriation. In this case, the conflict of compensation for land expropriation is on the verge of outbreak. The explanation in the realistic process of compensation for agricultural land expropriation is that under the stimulation of land value-added interests, local governments and officials often damage the welfare of land-lost farmers in order to seek local interests and personal illegal interests. This may include taking unreasonable expropriation actions such as withholding compensation and illegal expropriation. When farmers are faced with land expropriation compensation, they may have the idea of obtaining more compensation benefits, and do not hesitate to obtain high land expropriation compensation benefits through illegal ways such as planting and construction before expropriation, gathering crowds to make trouble, obstructing expropriation work and so on. When both sides try their best to fight for their own interests, conflicts are inevitable.

![Figure 3](image-url)

**Figure 3. Evolution of strategic choice between local governments and farmers in the event of conflict.**

### 5.2. Potential Conflict Situation

Potential conflict situations are discussed in two situations:

1. \( \lambda_1 > \frac{C_1}{H}, \lambda_2 < \frac{C_2}{H}, \delta_1 < \frac{L_1 - G_1}{T}, \delta_2 > \frac{L_2 - G_2}{T} \). This situation is the case of strong expropriation by the government. Make \( \lambda_1 = 0.8, \delta_1 = 0.15, \lambda_2 = 0.5, \delta_2 = 0.3 \). As shown in Figure 4, when the intensity of reciprocity altruism preference of local government is low, the intensity of loss avoidance preference is high, but the intensity of farmers’ reciprocity altruism preference is high, and the intensity of loss avoidance preference is low, the final
strategy choice of local government evolves into unreasonable expropriation; farmers’ strategy choice evolves into cooperative expropriation. In this case, farmers are in a weak position in the process of land expropriation compensation, and there are potential conflicts in farmland expropriation. In the actual compensation for agricultural land expropriation, local governments and officials, under the stimulation of land value-added interests, in order to seek local interests and personal illegal interests, often damage the welfare of land-lost farmers and take illegal expropriation actions such as withholding compensation and illegal demolition. Out of trust in the government, farmers do not want to make trouble, so they choose to accept the expropriation and compensation strategy of the local government, and finally evolve the unreasonable expropriation of the local government and the cooperation of farmers. It can be predicted that at this time, farmers do not get the optimal benefits of land compensation, and the conflict of compensation for agricultural land expropriation has the potential to occur.

Figure 4. Evolution of strategic choices for local governments and farmers under potential conflict situations (I).

\[
\begin{align*}
\lambda_1 < \frac{C_1}{I}, \quad &\lambda_2 > \frac{C_2}{I}, \quad \delta_1 > \frac{I-C_1}{I}, \quad \delta_2 < \frac{I-C_2}{I}, \\
\lambda_1 = 0.3, \quad &\delta_1 = 0.4, \quad \lambda_2 = 1.1, \quad \delta_2 = 0.15 \text{ are satisfied. As shown in} \\
\text{Figure 5, when the intensity of reciprocity altruism preference of local government is high, the intensity of loss avoidance preference is low, but the intensity of farmers’ reciprocity altruism preference is low, and the intensity of loss avoidance preference is high, the local government strategy evolves to reasonable expropriation; farmers evolve to resist expropriation. In this case, the government is in a weak position in the process of compensation for land expropriation, and there is a potential conflict of compensation for land expropriation. Understandably, in the actual compensation for agricultural land expropriation, the local government pays great attention to the improvement of farmers’ social welfare, shows the idea of giving benefits to the people, views the improvement of people’s livelihood as its own responsibility, and gives farmers reasonable compensation for land expropriation. However, in order to win more extra compensation for themselves, farmers resist the reasonable compensation strategy of the local government at any cost, such as illegally.}
\end{align*}
\]
building houses and planting trees before land expropriation, delaying the signing of contracts on the grounds of increasing compensation, and finally evolve the situation of reasonable expropriation by the local government. In the case of farmers’ boycott, the efficiency of compensation for land expropriation is greatly reduced, the administrative cost of the government is huge, and the conflict of agricultural land expropriation also has the potential to occur.

The situation is subject to the following conditions: $\lambda_1 < \frac{C_2}{T_2}$, $\lambda_2 < \frac{C_2}{T_2}$, $\delta_1 > \frac{h-C_1}{T}$, $\delta_2 > \frac{h-C_2}{T}$. In this situation, $\lambda_1 = 0.3$, $\delta_1 = 0.4$, $\lambda_2 = 1.1$, $\delta_2 = 0.15$ are satisfied. As shown in Figure 6, when the intensity of reciprocity altruism preference of local government is high, the intensity of loss avoidance preference is low, and the intensity of farmers’ reciprocity altruism preference is high, and the intensity of loss avoidance preference is low, the stable strategy choice of local government evolves into reasonable expropriation; the strategy chosen by farmers finally evolves into cooperative expropriation. In this case, the local government and farmers form a harmonious expropriation situation, and the conflict of land expropriation is avoided. Understandably, in the actual expropriation of agricultural land, both the government and farmers have good faith in each other and pay attention to the improvement of each other’s income, regardless of the losses caused by each other’s non-cooperative behavior, and will finally choose to cooperate. In this case, the local government is very concerned about the improvement of farmers’ welfare, at the same time, farmers are also willing to cooperate with the government’s agricultural land expropriation, agricultural land expropriation work is carried out harmoniously and smoothly, and social welfare has been better improved.

Figure 5. Evolution of strategic choices for local governments and farmers under potential conflict situations (2).

5.3. Harmonious Expropriation Situation

The situation is subject to the following conditions: $\lambda_1 < \frac{C_2}{T_2}$, $\lambda_2 < \frac{C_2}{T_2}$, $\delta_1 > \frac{h-C_1}{T}$, $\delta_2 > \frac{h-C_2}{T}$. In this situation, $\lambda_1 = 0.3$, $\delta_1 = 0.4$, $\lambda_2 = 1.1$, $\delta_2 = 0.15$ are satisfied. As shown in Figure 6, when the intensity of reciprocity altruism preference of local government is high, the intensity of loss avoidance preference is low, and the intensity of farmers’ reciprocity altruism preference is high, and the intensity of loss avoidance preference is low, the stable strategy choice of local government evolves into reasonable expropriation; the strategy chosen by farmers finally evolves into cooperative expropriation. In this case, the local government and farmers form a harmonious expropriation situation, and the conflict of land expropriation is avoided. Understandably, in the actual expropriation of agricultural land, both the government and farmers have good faith in each other and pay attention to the improvement of each other’s income, regardless of the losses caused by each other’s non-cooperative behavior, and will finally choose to cooperate. In this case, the local government is very concerned about the improvement of farmers’ welfare, at the same time, farmers are also willing to cooperate with the government’s agricultural land expropriation, agricultural land expropriation work is carried out harmoniously and smoothly, and social welfare has been better improved.
6. A Realistic Case

In order to verify the conclusion of the game model of conflict of farmland expropriation and provide a realistic explanation for the choice of behavior strategy of interest subjects in farmland expropriation, this section selects corresponding real cases according to the results of evolution and stability in different situations to conduct a realistic analysis of the behavior of conflict in farmland expropriation under multi-dimensional preferences.

6.1. Conflict Outbreak Situation

When the local government and farmers’ collective altruism preference is relatively small and the loss aversion preference is relatively large, the goodwill and trust between the two sides are relatively small, and the suspicion and resistance attitude is relatively strong. In this case, the conflict of expropriation compensation is most likely to occur. The following is an example of land compensation conflict in Jining, Yunnan Province to analyze this situation.

The mass incidents of land compensation in Jining originated from the Pan-Asia Industrial Goods Trade and Logistics Center project, which caused great controversy in the local area. The project involves three villages, within 1787.3105 mu of Fu Village. According to the province, the municipal government levy is CNY 115,000, provided by the Jin town government organization for the implementation of land expropriation. According to Jin town government, records show that the town government appropriated a total of CNY 2,055,540,707.5 for the project land, payment of collective mobile land, atavis, shed fees, green seedlings compensation fees, the per capita equivalent of CNY 430,403. Under the total land expropriation area, only CNY 53,619,315 of compensation was paid, and the difference of more than CNY 25 million between the total amount of compensation for land expropriation and the actual amount paid was not disclosed to the villagers. Many of the villagers in Fu village refused when they heard the compensation was only CNY 43,000 per person. On 14 October 2014, more than 100 villagers of Fufu Village rushed into the construction site and fought with the construction party of the project, causing heavy casualties, including 8 people killed and 18 people injured, causing a bad social impact. Shortly after, in addition to the public security organization for the
21 suspects involved in the brawl in accordance with the law of detention or residential surveillance, and other compulsory measures, Kunming city commission for disciplinary inspection of Jinning county, the county government-related units and including Jinning county magistrate, politics and law committee secretary, vice secretary of the county, and the town party secretary, 16 persons are responsible for accountability and investigation processing.

In the case of violent land acquisition in Jinning, the local government operated according to the compensation standard of CNY 43,000 per person, resulting in a compensation of only CNY 100,000 per household, which was a one-time buyout compensation offer. According to A. Rong (pseudonym), a villager in Fu Village, if his family were compensated at CNY 115,000 per mu for the 7 mu of land contracted by his family, his family should have received CNY 805,000 in compensation for land expropriation, while according to CNY 43,000 per capita, A. Rong’s family of four would have received only CNY 172,000. The low standard of compensation offered by the government won more than 25 million excess interest I₁, and after more compensation for the difference was found as CNY 2500, the local government at the time and did not receive the government at a higher level of accountability and punishment, but explained that the farmer collective majority receive CNY 43,000 per capita compensation as standard; the villagers, without knowing it, were forced to accept CNY 43,000 as a low standard of compensation. The cost of local governments’ unreasonable compensation, such as stability maintenance fee, C₁ is small. In this process, the government of Jinning, as the expropriation party, was bent on seeking its own partial interests and showed few reciprocal altruistic behaviors to the villagers. The adoption of one-time buyout compensation, rather than more social security compensation based on the life security of the land-lost villagers in the second half of their lives, shows the sensitivity to the expenditure of additional compensation, and to some extent reflects the greater loss avoidance behavior (λ₁ > 2c₁). As the recipient of expropriation, the wealthy villagers also showed less reciprocal altruism and greater loss avoidance after seeing the behavior of the government, so as to strive for a high standard of compensation amount. It is understood that most of the villagers in the village rely on farming or contracting vegetable plots to make a living, and many families have no source of income after the loss of land. Participating in the conflict, the Li Mou home contracted seven acres of vegetable land on this income to maintain daily life, sending children to school and allowing the elderly to see a doctor. The whole family has less than CNY 200,000 of compensation making it difficult to maintain the life of a family of six. Faced with the prospect of a difficult life and the frustration of repeated negotiations, the villagers may have no choice but to protect their rights violently. In Jinning land conflict, the government deliberately reduced the compensation standard; open and transparent principles of failure, the lack of timely and relevant government department regulation, loss of farmers rights, and so on are the causes of conflict. However, in the end, the main cause is that the local government did not show goodwill towards the people and ignored the safeguarding of villagers’ lives, causing the landless farmers to lose their kindness and trust towards the government, eventually leading to violent conflict.

6.2. Potential Conflict Situation

Due to the improvement of the legal system and the standardization of compensation procedures for land expropriation, the incidence of violent conflicts related to compensation for land expropriation has gradually decreased. However, there are more potential conflict situations, specifically two main situations. One is that the local government takes unreasonable compensation with its strong position, which makes it difficult for farmers to protect their rights, forcing them to accept the compensation directly. The other is that the local government makes compensation completely legally and reasonably, but some farmers take this opportunity to demand higher compensation due to various reasons, disrupting the normal order of expropriation and compensation. The former situation, known
as the farmers’ weak situation, also known as the government rent-seeking situation, is the most common situation. The latter is called the farmer’s excessive claim situation.

First, we will analyze the government’s strong expropriation situation. Taking the conflict of land expropriation and demolition in Jinning City as an example, the Jinning County government, which organized the expropriation and compensation work, decided to pay compensation according to the compensation standard of CNY 43,000 per person, apparently ignoring the villagers’ land rights and interests (after the case of “October 14” in Jinning, the director of the village committee of Fu Village was found to have accepted bribes and was placed on file for investigation). On 15 February 2012, the government of Jinning County released a plan for land expropriation and compensation for the village, which states that “with the consent of the majority of people, the land expropriation money will be distributed among the 11 groups in the village on an per capita basis”. However, A. Rong (not his real name), a villager from Fu Village, said he did not know where the “majority consent” came from and that his family was not asked for advice, but was forced to accept. In this process, the local government basically shows no reciprocal altruistic behavior toward the villagers (\( \delta_1 \ll \frac{I_1 - C_1 F}{I_1} \)), and at the same time, it is worried about not getting excessive local benefits, which reflects a large “loss avoidance” preference. However, although the villagers represented by A. Rong were not altruistic toward the local government, they had nothing to do with the compensation difference of more than CNY 25 million (\( I_1 \)), that is, they were not sensitive to the expropriation party obtaining excess benefits and had little preference for loss avoidance, so they could only “be forced to accept”. In this situation, the villagers who are forced to accept the compensation deal are angry. Those from good families who have other sources of income may not have much problem, but the villagers who depend on the land and greenhouses for their livelihood will lose their source of income and livelihood, and the violence is breeding.

The following is an analysis of farmers excessive claims. Under the premise of legitimate and reasonable expropriation and compensation by the government, farmers who lost their land still do not meet the current standards, and take actions such as gathering people to make trouble, looting plants and designing construction to disrupt the administrative order. Such actions are excessive and may seriously turn into illegal acts. In March 2010, Harbin City’s first case of defrauding the state compensation for land expropriation was announced. From September to November 2008, in the Harbin development zone for the new Le Ping village land expropriation before the disassembly process, there were 11 farmer households found stealing planted saplings and more than 200 were suspected of fraud in the national land acquisition compensation scheme; for half a year, the public security organization investigated and captured 16 people as criminal suspects, retrieving CNY 120,000, more than the rest of the criminal suspects unaccounted for. In this case, 11 farmers did not establish reciprocal altruism belief (\( \delta_2 \ll \frac{I_2 - C_2 G}{I_2} \)), with their laws and regulations and the administrative order, stealing planted saplings and defrauding state compensation, with the purpose of obtaining excess cash compensation (\( I_2 \)); the perception of more sensitive land expropriation compensation, in line with “countries don’t make white don’t earn money” psychology, reflects the larger loss aversion preference (\( \lambda_2 > \frac{C_2}{I_2} \)). In addition, when the land was expropriated and compensated in 2008, the supervision of relevant departments was insufficient, which led to the success of 11 households in claiming fraudulent compensation. It was not until April 2009, when villagers reported the case, that the public security organs began to file a case for investigation.

6.3. Harmonious Expropriation Situation

When both the expropriator and the expropriated have a strong reciprocal altruistic preference and a weak loss avoidance preference, the goodwill belief between the two parties is highlighted, and there is no illegal profit phenomenon of either party, so the loss avoidance mentality will not occur naturally. In this case, as the two sides trust each other and engage in mutual cooperation, agricultural land expropriation compensation work can be carried out smoothly.
Take land expropriation in Anyuan County, Jiangxi province as an example. From 8 October 2014 to 10 November, 328 households in five villages signed contracts for land and housing expropriation and compensation within 33 days, more than a month ahead of the scheduled schedule, achieving a “win-win situation” that satisfied the public and the government adequately. At the very beginning of the collection and compensation work, the government of Anyuan County extensively absorbed the opinions and suggestions of the people, and held seminars at the grassroots level to fully listen to the opinions of the people. This was insisted on in accordance with the law on the basis of providing the villagers of the county with maximum benefits, according to the demand, adopting the mode of land resettlement and monetary compensation. Reasonable compensation was made standard with compensation of CNY 810 per square of land given for each square building (CNY 1289 calculated on mixed turned houses) that signed up within the prescribed time; with rewards of CNY 100 per square of land, and other attachments to the compensation on the ground, the average compensation per square of land can reach CNY 5000, plus housing land resettlement, which can improve the original living standards of land acquisition farmers. When the work encountered resistance, the collection working group went to the village many times to do ideological work, and made full use of various media to carry out all-round, three-dimensional policy publicity. In the compensation resettlement, strict compliance with the first agreement after the demolition of the order, does not encourage favoritism, or engaging in black box operations. The discipline inspection and supervision department of Anyuan County supervised the whole process of the expropriation work in this area, and severely investigated and punished illegal acts such as “disorderly opening of mouth” and black box operation. In the whole process of expropriation and compensation in the new urban district of Anyuan County, the local government has shown a strong belief in reciprocity and altruism in all aspects from the establishment of compensation standards for expropriation, policy publicity, to the implementation and supervision of compensation and resettlement, and has sent a signal of goodwill to the expropriated farmers. The expropriated farmers also show the goodwill of mutual benefit and altruism. They actively cooperate with the government’s land expropriation compensation work and sign the contract actively. Some farmers even volunteered to do promotional work for their relatives and neighbors after signing the contract, helping the government to promote the collection and compensation work smoothly. At the same time, both the local government and the farmers’ behavior is legal and compliant, and they will not feel the loss of psychological utility due to the additional profit of the other party or the loss of their own interests. Both sides show a small loss avoidance preference. In conclusion, both sides choose Pareto optimal strategy in the game process of agricultural land expropriation compensation, that is, the government makes reasonable compensation and farmers actively cooperate. The expropriation and compensation of the whole new city went smoothly, and the welfare of both sides was improved.

7. Conclusions and Policy Implications

7.1. Conclusions

From the perspective of behavior preference theory, combined with game theory, this study considers the impact of multi-dimensional preference on the strategic behavior of relevant stakeholders in the conflict of agricultural land expropriation. Firstly, combined with the “cost-benefit” characteristics of the conflict behavior of land expropriation, the reciprocal altruism preference and loss aversion preference of the subjects of land expropriation conflict are combined, and then from the perspective of multi-dimensional preference combinations, this paper constructs the dynamic evolution model of farmland expropriation conflict under the combination of self-interest preference, reciprocity altruism preference and loss avoidance preference, and discusses the strategic choice of land expropriation stakeholders in the case of preference combination. The main conclusion of this paper lies in the influence of different behavior preferences and combinations of behavior preferences on the behavior of compensation participants in agricultural land expropriation, and obtains
the mechanism of behavior preference on inducing and resolving conflicts in agricultural land expropriation. The conclusions of this paper can be summarized as follows.

First, under the influence of complete self-interest preference, the degree of protection of farmers’ land rights and interests affects the occurrence of conflicts in agricultural land expropriation. According to the results of the game analysis of the conflict of agricultural land expropriation, in the absence of other behavioral preferences, the more adequate the protection of farmers’ land rights and interests, the less resources both sides of expropriation and compensation put into the conflict, and the conflict of agricultural land expropriation is less likely to occur. The protection of farmers’ land rights and interests is reflected in two aspects: the value of expropriated farmland and the standard of farmland compensation. Only when the ratio between the standard of farmland compensation and the value of expropriated land is greater, the degree of protection of farmers’ land rights and interests will be higher. Therefore, improving the standard of farmland compensation is one of the effective ways to indirectly resolve the conflict of agricultural land expropriation.

Second, the reciprocal altruistic preference of the subject promotes the increase in the utility of both sides, which plays a positive role in resolving the conflict of agricultural land expropriation. According to the results of the game, reciprocal altruistic behavior can not only increase the utility of oneself, but may also provide the other party with an increase in utility. Especially as a local government with a strong position, the marginal utility brought by goodwill behavior is greater than that brought by farmers’ goodwill behavior, and improving the compensation behavior of local government in farmland expropriation is more conducive to social harmony. In the compensation for agricultural land expropriation, the well-intentioned reciprocal altruistic behavior of both parties can reduce the conflict investment and reduce the risk of conflict.

Third, the subject’s preference for loss aversion affects the conflict input and utility between themself and the other party. In the game, the stakeholders take their own conflict input as the reference point, and when other conditions remain unchanged, the stronger the loss aversion preference is, the smaller the conflict investment is, and the conflict of expropriation and compensation is less likely to occur. The stronger the preference for loss aversion, the more unwilling the subject is to take risks to participate in the conflict. If one party’s preference for loss aversion is stronger than the other, when the other party’s preference for loss aversion increases, the conflict investment of one party will be greater. Only when both parties have the same preference for loss aversion, the conflict investment of both parties will not be affected by the preference for loss aversion. This shows that in the compensation for agricultural land expropriation, both local governments and farmers need to have strict codes of conduct and punishment mechanisms to increase the cost of the conflict, increase the willingness of the subject to avoid losses, and reduce the risk of conflict.

Fourth, under the influence of multi-dimensional preference combination, the conflict of agricultural land expropriation can be avoided under certain conditions. Taking the behavior and income of each other as the reference point, only when the reciprocal altruism preference of local government and farmers is strong and the loss aversion preference is weak, can the reasonable expropriation of local government and the harmonious expropriation under the cooperation of farmers be realized. When one party has a strong reciprocal altruism preference and a weak loss aversion preference while the other party is the opposite, the strong reciprocal altruistic preference party will fall into weakness, while the other party will have an advantage in the distribution of benefits. In the evolutionary game analysis of land expropriation conflict from the perspective of the multi-dimensional combination of interactive fairness preference and loss aversion preference, only when the local government and farmers have strong reciprocal altruism preference and weak loss aversion preference will the two sides establish a goodwill belief of mutual benefit and fairness, reduce mutual suspicion and mistrust, so as to reduce the possibility of adopting non-cooperative means and promote the smooth progress of expropriation compensa-
tion. This is in order to achieve reasonable expropriation by local governments and fair expropriation under the cooperation of farmers.

In addition, in the process of studying the conflicts of farmland expropriation under multi-dimension preferences, this article still has some problems to be perfected, and further research can be done in the following aspects: first, this article only considers local governments and farmers’ collectives. For these two legal game subjects, the actual farmland expropriation compensation may involve farmers, village committees, local governments, land developers and other subjects. Other game subjects can be introduced to make the game model better simulate reality. Second, in addition to reciprocal altruistic preferences and loss aversion preferences, the actor may also have other behavioral preferences such as fairness preferences. Other social preferences that affect the conflicts of expropriation compensation can be further introduced, as can the behavioral strategies of the subjects of agricultural land expropriation compensation under multi-dimensional preferences. Third, through psychological experiments, we can design situational experiments on farmland expropriation compensation conflicts to examine the psychological reflection of the behavior preferences of the expropriation parties during the expropriation and compensation process, and provide corresponding data sources for numerical simulation analysis.

7.2. Policy Implications

According to the game conclusion of the conflict of agricultural land expropriation, combined with the actual situation, this paper puts forward the following countermeasures and suggestions for the way to resolve the conflict of agricultural land expropriation in China.

First, improve the land management and expropriation compensation system, and strengthen the protection of the rights and interests of land-lost farmers. The conclusion of the study shows that for both sides of self-interested expropriation and compensation, the more adequate the protection of farmers’ land rights and interests, that is, the smaller the value gap between farmers’ compensation and expropriated land, the smaller the willingness to engage in conflict between the expropriation and expropriation parties. To strengthen the protection of farmers’ land rights and interests, we should first ensure the ownership of land property rights of the members of rural collective economic organizations clarify the scope of expropriation and compensation, strengthen the protection of farmers’ legitimate land property rights, and strengthen the rectification of the chaotic ownership of property rights and form the corresponding institutional mechanism. Secondly, we should improve the formulation mechanism of compensation standards for agricultural land expropriation and form a market-oriented, differentiated and rational standard compensation system, combined with the level of regional development, the market value of expropriated land, land value-added income, the living standards of land-lost farmers and other factors, comprehensively determine the corresponding compensation standards, and explore diversified compensation mechanisms, in addition to monetary compensation, property rights replacement and other factors. Farmers can be included in the distribution of land value-added income in the form of dividend, mortgage, lease and so on. Finally, to establish a long-term social security mechanism for land-lost farmers, for farmers who rely heavily on land for survival, in addition to one-off compensation and placement, we can form a long-term mechanism of living security for land-lost farmers through the support of housing resettlement funds, re-employment training, innovation of social security mechanisms for land-lost farmers and so on.

Second, strengthen the positive guidance to shape the goodwill behavior of the related subjects of compensation for agricultural land expropriation. According to the analysis of the influence of reciprocal altruistic preference on the conflict behavior of agricultural land expropriation, as long as both sides of the game can feel goodwill from each other, the possibility of conflict will be reduced, and for the government, as a party with relatively dominant power and resources, its goodwill beliefs and acts of goodwill will have a greater
impact on the avoidance and resolution of the conflict of expropriation and compensation. As the expropriator of farmland expropriation compensation and the spokesperson of public interest, the local government should insist on serving the people in the process of expropriation compensation. Before the work of expropriation and compensation begins, we should publish relevant documents and information to farmers, attach importance to their opinions, increase their participation in land expropriation compensation through hearings and other forms, and formulate a more scientific, democratic and reasonable compensation plan; in the work of expropriation and demolition, we should strictly implement relevant procedures and implement relevant policies. After the completion of the expropriation and compensation, we should pay attention to the follow-up policy concern for the land-lost farmers and strengthen the living security of the land-lost farmers, especially the people in need. In addition, farmers should also trust and understand the government’s legal and reasonable expropriation policy, abide by the relevant systems and regulations of expropriation and compensation, strengthen the concept of the legal system, and affirm and support the work of the government on the basis of resolutely safeguarding their own rights and interests.

Third, improve the corresponding reward and punishment mechanism and adjust the preferences of related subjects. When the subject is more sensitive to the cost perception of participating in the conflict, the stronger the loss aversion preference is, the fewer people dare to participate in the conflict; when the subject is more sensitive to the other party’s income perception, the smaller the loss aversion preference is, the smaller the psychological utility loss is and the possibility of harmonious behavior becomes higher. Therefore, it is necessary to establish and improve the corresponding reward and punishment mechanism, improve the illegal cost of the subject of expropriation and compensation, adjust the gap in the distribution of interests between the two sides, and guide the agreement of both parties. For the government, it is necessary to establish a strict supervision, management and punishment system for expropriation and compensation, strengthen the multi-channel supervision channels of third-party regulatory departments, news media and the general public, improve the supervision mechanism, make clear provisions on the behavior of the government to collect compensation, and strictly restrain the behavior of the government. We should increase the intensity of punishment, severely crack down on acts such as private interception of compensation money, non-standard collection process, opaque information disclosure, illegal compulsory expropriation and demolition, and carry out accountability checks and corresponding penalties for illegal personal gains of collection units and staff. Local governments with reasonable collection, satisfaction of the masses, and positive results should also be rewarded and publicized to set up a positive example of expropriation. It is also necessary to have strict norms and management mechanisms for the behavior of land-expropriated farmers, severely crack down on illegal obstruction of normal expropriation order in the process of expropriation, and at the same time strengthen publicity and education for farmers, improve the awareness of the rule of law and the ability of self-management, and guide them to establish a correct and legal concept of safeguarding their rights. Appropriate material rewards should also be given to farmers who actively cooperate and to the corresponding government that collects compensation.

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