

Game-Theoretical Analysis of Governance Dilemmas of Village Rules and Conventions and Suggestions for Institutional Design: A Case Study of Fangli Village in Liyang City

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Abstract: Village rules and customs offer support for rural governance. However, they often have weak enforcement and lack credibility in actual operation. Fangli Village in Liyang City, Jiangsu Province, is taken as the research case, and four typical game models are derived from the governance dilemmas through game theory: the collective-action dilemma under the Tragedy of the Commons, selective enforcement in the Chicken Game, path dependence in the Coordination Game, and trust deficit in the Signaling Game. Based on the above analysis, the root cause of the governance problem is incentive incompatibility and a failure of constraint mechanisms in the original game rules. Therefore, this paper puts forward four institutional design proposals: introducing selective incentives to address the collective-action problem, strengthening third-party enforcement and supervision to curb selective enforcement, promoting focal events and demonstration effects to break path dependence, and building a transparent information transmission mechanism to remedy trust deficits. Provide theoretical support and a practical path for changing village rules from written documents to living, effective norms.

Keywords: Village Rules and Conventions; Game Theory; Rural Governance; Institutional Design; Fangli Village

1. Introduction

In the context of rural revitalisation and the modernisation of grassroots governance, village rules and customs serve as important informal institutions in the system of villager self-governance. They perform integrated governance functions of autonomy and virtue-based governance. However, in many rural areas, these rules have been reduced to words on paper and

are not effectively implemented, thus losing the public's trust. How to effectively implement the village's rules and norms has become a popular subject of academic research on grassroots governance.

1.1 Literature Review

Many scholarly works have been published on village rules and customs. Gao [1]. explore the customary-law attributes and practical governance functions of village rules and conventions. Tang Ming and Zhu Kexin [2] analyzed different concepts of the "village".

Chen et al. [3] have studied how village rules and customs have changed under the state's rule. Zhou Jiaming and Liu [4] explain the function-mechanism of such rules in an element-based way. Song and Liu [5] reveal that structural barriers hinder the effective operation of village rules and conventions. Chen and Gao [6] analyzed the process by which village rules and conventions unfold progressively across different hierarchical levels. Other scholars have focused on practical problems, such as judicial connection and defects in the enforcement mechanism of village rules and conventions.

A small body of existing literature has introduced game theory to interpret collective-action problems in rural areas. Nonetheless, most of these studies prioritize theoretical deduction. Few empirical studies have used multiple game models in real-world rural governance scenarios based on specific village cases. Most previous studies have presented descriptive phenomena and large-scale countermeasures, but little attention has been paid to exploring the micro-level behavioural reasons for dilemmas among villagers and village cadres.

1.2 Research Methods and Case Profile

This paper will use both case studies and game theory. Fangli Village in the Kunlun Sub-district of Liyang City will be selected as the research

case. Administratively under Kunlun Sub-district, Liyang City, Changzhou City, and located in the northwest corner of Jiangsu Zhongguancun Science and Industrial Park, Fangli Village has an administrative area of 3.5 square kilometres, governs eight natural villages and fifteen villager groups, and has a total cultivated land area of 2568 mu. As an old village with a history of more than 500 years, it has a unique historical and cultural atmosphere created by the Chinese character-"Tong"-shaped water system excavated under the direction of Shi Ji during the Ming-Qing Jiaping period. It was added to the 7th batch of Jiangsu Province's characteristic idyllic villages in 2021. Local governments have conducted all-weather systematic construction in Fangli Village for ecological restoration, cultivation of cultural-tourism industry and public-facility upgrading. Village rules and conventions are expected to coordinate various governance matters, such as public-environment management, collective-asset operation, and constraints on villagers' behaviour.

However, in the course of building a beautiful countryside, Fangli Village has also had serious implementation problems with village rules and norms. Free-riding occurs in public-environment maintenance; some violations cannot be effectively controlled; disputes arise between villagers and the village collective over the division of collective-asset benefits and the disclosure of village-affair information. As a result, the governance effect of the village rules and conventions has not been fully realised. Fangli Village has rich historical and cultural heritage, government-led project construction, and tangible governance contradictions; it is a typical case for observing the operating problems of village rules and conventions in the new era.

Based on game theory, the four game models representing the governance problems in Fangli Village are constructed here. Based on the formal analysis of the participants, strategy space and payoff structure, the internal formation mechanism of the dilemma is exposed, and target institutional design schemes are proposed.

This paper explores the reasons for the governance problems of local village rules and norms. It finds that the ineffectiveness of village rules and conventions is not due to defects in the provisions themselves, but rather to incentive incompatibility and malfunctioning constraint mechanisms under the original game rules. Targeted institutional design can adjust the cost-

benefit relationship of all parties to promote multi-party cooperation and effective rural governance. Theoretically, this paper applies game models to explore the actual problems of village rules and customs, adding new content and extending the scope of game-theoretic analysis. In practice, the conclusions offer feasible references for activating the governance performance of village rules and conventions and promoting the modernisation of grassroots governance across rural China [7].

2. Governance Dilemmas in Fangli Village

Village rules and customs are contractual norms established by villagers for self-management, self-service, self-education and self-supervision in accordance with the Organic Law of the Villagers' Committees of the People's Republic of China. In other words, from a game-theoretic perspective, they are a set of game rules that coordinate the behaviour of villagers, reduce transaction costs and promote cooperation.

Ideally, village rules and customs should motivate the villagers to avoid the Prisoner's Dilemma driven by short-term self-interest and reach a cooperative equilibrium that benefits the community in the long run. However, as shown by the practice in Fangli Village, there are many problems with achieving such ideal results. The four representative game models of the practical governance conditions are introduced below.

2.1 Dilemma 1: Tragedy of the Commons and Collective-Action Problem

2.1.1 Game scenario

Public environmental sanitation, water-conservancy-facility maintenance and collective fish-pond management in Fangli Village are typical public-good supply scenarios. Such goods are non-excludable and non-rivalrous; individual contributors bear all the costs, but the benefits are shared by all villagers [8].

2.1.2 Game analysis

All villagers are players in this game. Each villager has two choices: cooperate by investing labour or capital in maintaining public goods, or defect and free-ride. The Payoff Structure has the following attributes. First, if all villagers cooperate, public goods are maintained at a high level and collective benefits reach the maximum. Second, a single defector incurs personal costs but can still enjoy the benefits of others' cooperation. Third, if most villagers choose to defect, public-good supply becomes severely

insufficient and all villagers suffer substantial welfare losses.

Rational self-interest leads to the choice of defection. Therefore, public resources are either overused or scarce; thus, a Nash equilibrium of universal non-cooperation, known as the Tragedy of the Commons, is reached.

Practical manifestations in Fangli Village: (1) Garbage-sorting provisions are barely enforced. The mindset of "my non-compliance will not be addressed" has taken hold, and as a result, public spaces have become dirty. (2) Water-saving facilities, public green belts, village roads and streetlights are all constructed and maintained by higher-level governments.

2.2 Dilemma 2: Chicken Game in Rule Enforcement and Selective Implementation

2.2.1 Game scenario

Supervision and punishment for violations of village rules and customs, such as unauthorised construction and encroachment on communal land, are selected as the objects of this case study.

2.2.2 Game analysis

Game participants are village cadres (rule enforcers) and violating villagers. Village cadres can choose to enforce strictly or leniently; the violating villagers may choose to comply or resist. Strictly enforcing the rules will increase the costs for village cadres, such as interpersonal-relationship pressure and potential conflicts; otherwise, there will be no rule of law and fairness. The guilty villagers will be held responsible for the damages caused by the construction of the new community and forced to pay for cleanup.

This is the Chicken Game, and the first party to yield will suffer a loss. Because of kinship network issues and the fear of conflict, village cadres are unwilling to handle difficult villagers but strictly enforce rules for compliant villagers, resulting in selective enforcement [9].

Practical manifestations in Fangli Village: One household built auxiliary buildings on the collective road and engaged in aquaculture in the public river channel. Repeatedly, the village cadres negotiated but achieved no results, and the case was eventually dropped. Thus, the authority of the village rules and customs was severely damaged. Other villagers followed suit, further invalidating formal rules.

2.3 Dilemma 3: Coordination Game in Rule Revision and Path Dependence

2.3.1 Game scenario

This case is about the revision and renewal of village rules and customs. Societal Changes have made some old norms outmoded. The new regulatory requirements are difficult to implement; for example, there are restrictions on ridge reclamation in high-standard farmland, controls on household livestock breeding and random construction around residences, and unified management of residential-facade styles.

2.3.2 Game analysis

The players are from different village groups and include older and younger people. In a Coordination Game, the best choice for an individual depends on what others do. Aligning one's behaviour with that of most others offers coordination benefits; leading by example may violate existing norms and incur social pressure or marginalisation costs. The three kinds of pay-off are: First, if most villagers follow the new norms, a new behavioural convention will be formed that benefits individuals. Second, if most people still follow the old customs, the early adopters of the new norms will face social disapproval and low returns. Third, to change the old equilibrium into a new one, behavioural changes must occur simultaneously among a considerable number of actors; otherwise, institutional change cannot be realised.

Practical manifestations in Fangli Village: The main subjects of unauthorised henhouse construction and random land reclamation are elderly villagers who show little willingness to comply with the new norms. Young villagers rarely participate in small-scale planting and breeding and generally support the new regulations. Nevertheless, older residents still have significant discourse power and demonstration effects in village public life. The new norms are stuck in a coordination dilemma; although most villagers are rational, no single group is willing to lead the change in behaviour.

2.4 Dilemma 4: Signaling Game under Information Asymmetry and Trust Deficit

2.4.1 Game scenario

This case covers information interactions between village cadres (the information-advantaged party) and ordinary villagers (the information-disadvantaged party) in village-affair disclosure and collective-asset-income distribution.

2.4.2 Game analysis

Village cadres may choose truthful disclosure or

withholding information. Based on the limited observed information, the villagers are either trusting or distrusting the cadres. The village cadres' frankness has created long-standing trust but may also have revealed administrative deficiencies; otherwise, they would not have faced a credibility crisis upon discovery. Villagers with limited information are risk-averse and thus distrust others; even baseless suspicion results in only minor personal losses, whereas blind trust may lead to the risk of collective-interest expropriation [10].

Practical manifestations in Fangli Village: Resettled villagers who were victims of demolition collectively demanded the distribution of public-welfare provident funds allocated to the village collective from land expropriation, showing public distrust in collective-asset-distribution decisions. Some villagers suspected irregularities in the village's finances, requested specific account disclosures, and submitted petitions or complaints through government hotlines, thus increasing the conflict between cadres and villagers.

3. Institutional-Design Proposals for Resolving Governance Dilemmas

Based on the above game-theoretic analysis, the core of institutional design is to change the pay-off structure (incentives and constraints) so that cooperation is a rational choice for both villagers and village cadres. Concrete suggestions are presented below.

3.1 Refine Rules and Introduce Selective Incentives to Alleviate the Tragedy of the Commons

3.1.1 Quantified points system

Convert obligations such as public-environment protection and participation in collective labour into quantifiable points. Fangli Village may launch a "Green Account" and set up a "villager integrity file", for example. Compliance with village rules and customs shall be linked to collective-income distribution (e.g., rental dividends from youth apartments) and priority access to public services (e.g., welfare-activity quotas). Long-term compliant residents accumulate integrity points redeemable for material rewards or honorary commendations; violators have points deducted and corresponding collective-welfare entitlements restricted. Cooperation motivation is increased by discounting of future benefits.

3.1.2 Linked reward-and-punishment mechanism
Points will be directly linked to year-end collective dividends and welfare benefits, such as priority access to collective-provided low-interest loans or free physical examination quotas. Free-riders bear the economic costs; cooperators enjoy the extra benefits and are selected for participation, as suggested by Mancur Olson.

3.2 Strengthen Third-Party Enforcement and Supervision to Address the Chicken-Game Predicament

3.2.1 Establish an independent supervision and enforcement panel for village rules and conventions

Panel members will be chosen from among the village's representatives and well-respected local figures, independent of the villagers' committee. The board receives the complaint, investigates it, and then issues a disposal plan.

3.2.2 Introduce external authoritative forces

Build cooperative links with township judicial offices and grassroots courts. For persistent violators, judicial confirmation procedures may be used to give the village rules and conventions stronger legal binding force and enforcement guarantees. Violators will be punished by village cadres and, at the same time, by the formal legal system.

3.2.3 Performance assessment for enforcers (village cadres)

Add the implementation effectiveness of village rules and norms to the performance appraisal system for township-level cadres to motivate them to actively promote enforcement.

3.3 Stimulate Focal Events and Demonstration Effects to Overcome Coordination-Game-Induced Path Dependence

3.3.1 Identify focal points for institutional change
Trigger normative changes by using key events. The village two-level committees in Fangli Village may organise selection activities, such as "Most Beautiful Families", and publicise the selected households as models for new local customs.

3.3.2 Build positive feedback mechanisms

Households that proactively learn the new norms (e.g., actively participating in large-scale beautiful-countryside activities) will be given public praise and material rewards, such as tourist vouchers or consumption coupons. Positive signals that promote model compliance will gradually change the collective behaviour

norm.

3.4 Construct a Transparent Information-Transmission Mechanism to Repair Trust Deficits in the Signaling Game

3.4.1 Digitalized whole-process disclosure

Make full use of WeChat groups, village official public accounts and digital-rural platforms. Show the final results and also present the whole working process. For example, for collective-fish-pond contracting, land subleasing and project tendering, release of information, bidding, bid opening, contract conclusion and rent receipt shall all be documented and published with texts and pictures.

3.4.2 Establish villager inquiry and interrogation mechanisms

Ensure the villagers' right to access collective-account information at any time. Organise quarterly village-affair interrogation sessions and have the village cadres answer the villagers' questions directly. Openly disclose the relevant information to restore the trust of the public.

4. Summary

The governance problems of the village rules and conventions in Fangli Village, Liyang City, stem from incentive incompatibility and constraint-mechanism failure in the original game rules. Pure moral exhortation or textual modification cannot address the root cause. Game-theoretic analysis shows that institutions can be designed strategically to alter the cost-benefit relationship for all parties involved. Jointly, selected incentives, strengthened external supervision, added demonstration-oriented focal events, and ensured information transparency to change the village's rules and conventions from static written documents into dynamic living norms. Therefore, Fangli Village can move towards a good governance model of multi-party win-win cooperation. The analytical framework and institutional proposals developed in this paper also provide a general reference for promoting grassroots-governance modernisation in rural China.

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