Rural construction land redevelopment in contemporary China: Governance fit and performance diversity

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Abstract: In recent years, rural construction land redevelopment has become a vital rural development strategy in China to enhance rural vitality and to increase rural wealth. Given the institutional environment of China, both rural construction land and the revenue generated from redevelopment, which are the common pool resource, result in the inefficiency of rural construction land redevelopment as well as the inequity of revenue distribution. Therefore, various governance structures have been taken to counter the dilemma in the quest for efficiency and equity of rural construction land redevelopment. However, the performance of governance structures differs. Thus, the objective of this study is to present the rural construction land redevelopment practice in China and to illuminate the determinants on governance fit and performance diversity. An analytical framework i.e., Institutional Analysis and Development (*IAD*), and a comparative analysis of two cases i.e., government-led rural construction land redevelopment in H Village, Zhejiang Province and self-organized rural construction land redevelopment in S Village, Sichuan Province, are employed for this purpose. The paper finds that conditions of rural construction land resource, attributes of rural community, rules-in-use, properties of action situations and characteristics of participants comprehensively account for the governance fit and performance diversity. At last, the paper puts forward the policy recommendations.

Keywords: rural construction land; land redevelopment; institutional analysis; governance structure; China

1 Introduction

For a long term, rural construction land use in China is featured as extensive and inefficient (Tang and Tan, 2013). From 2000 to 2011, the rural population in China declined by about 0.13 billion, while the area of rural residential land increased by

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around 30.45 million m^2. The area of construction land for per person in rural sector was up to 230 m^2, exceeding the national standard (150 m^2 per person) (Cai et al., 2014； NDRC, 2014). The experience of urban development in China suggests that realizing the potential value of land resource through land development can make land well play its roles in asset and capital and ultimately facilitate socio-economic prosperity (Cao et al., 2008; Ding and Lichtenberg, 2011; Lin and Yi, 2013). In light of this, both central and local authorities in China have reached a consensus that rural construction land redevelopment would be an effective way to increase rural land use efficiency, to add rural income, to accumulate wealth for rural area, and to accelerate rural development. In recent years, rural construction land redevelopment has been propelled nationwide, including villages-in-the-city regeneration, rural land consolidation, the linkage between urban land taking and rural land giving (*LUTRG*) and rural residential land consolidation (Hao et al., 2011; Long et al., 2010; Tang et al., 2015; Liu et al., 2014).

Abundant literature has discussed rural construction land redevelopment in China. Some literature elaborated the diverse governance structures for rural construction land redevelopment, such as centralized governance, decentralized governance, public-private governance, public-collective-private governance, collective-private governance, self governance and interactive governance (Lin and Meulder., 2012; Lin et al., 2015). Some research assessed the performance of rural construction land redevelopment, such as upgrading rural living environment, promoting rural industrialization, and creating job opportunities and transforming rural lifestyle (Li et al., 2014; Shui et al., 2014; Wang et al., 2014). Further, some other research explored the various determinants on mode selection and performance in regard to rural construction land redevelopment. The literature not only revealed the micro-level factors containing the endowments of rural households and villages, coalitions among stakeholders and economic-led developmental mode but also referred to the macro-level reasons containing hierarchical administrative system and the distinctive political, economic, social and cultural context of China (Hin and Xin, 2011; Zhou, 2014; Fang et al., 2016; Long et al., 2012). Also, several research presented the severe challenges China's rural construction land redevelopment confronted with. For instance, the unwillingness of participation from rural households (Gao and Ma, 2015), the hold-out problem during the redevelopment (Tang et al. 2012; Long et al., 2012) and the ex-post interest conflicts incurred by revenue redistribution (Guo et al.,

2016).

Actually, the extant problems rural construction land redevelopment in China faced exactly show that both rural construction land and its revenue are the common pool resource (*CPR*) with the attributes of high subtractability and low excludability (Ostrom 1990, 2010). Given the natural status, all the actors are more apt to grab the limited revenue derived from redeveloping the limited amount of rural construction land in certain area since formal rules like property rights and laws are absent. In the context-specific conditions of China, collective-owned rural land property rights exaggerate such attributes of CPR (Ho, 2005; Cai, 2016). In other words, despite the finite rural construction land resource in a village, all the farmers in the village, no matter whether they participate in redevelopment or not, have access to the finite land revenue induced by redevelopment based on their collective memberships. As a result, a part or even most of farmers are reluctant to take part in the redevelopment and to afford the counterpart costs. Instead, they excessively compete for the incurred land revenue, normally leading to the social dilemmas such as free-riding and the tragedy of commons. The aforementioned phenomenon reflects the inefficiency of rural construction land redevelopment as well as the inequity of revenue distribution. Fortunately, a variety of governance modes have appeared to tackle the social dilemmas in practice. But to our limited knowledge, there is a lack of literature devoting to analyzing the governance of rural construction land redevelopment as well as its performance and determinants behind from the perspective of CPR attributes pertained to redevelopment.

Therefore, this study aims at answering the following questions: 1) from the perspective of CPR governance, why different modes of rural construction land redevelopment emerge? 2) what about the performance of different modes? 3) what are the factors further affecting the mode selection and its performance? To this end, taking two villages located in Zhejiang Province and Sichuan Province as examples, the paper intends to do comparative study by applying the Institutional Analysis and Development (*IAD*) framework (Ostrom, 2005). On the one hand, the study tries to explore the determinants of redevelopment mode selection to illustrate the logic of governance fit. On other hand, the study tries to assess the performance of different modes on governing CPR to exhibit the performance diversity, based on which the performance difference is to be further interpreted.

The remainder of the paper is organized as follows: section 2 applies the IAD

framework to analyze the practice of rural construction land redevelopment in China and to reason the governance fit and performance diversity in theory; section 3 introduces research methods, including methods for case selection and fieldwork; section 4 narrates two typical cases; section 5 illuminates the determinants of mode and performance differences through comparison between two cases to test the theoretical inferences; the last section puts forward conclusions and discussions.

2 An IAD analysis of rural construction land redevelopment

The IAD framework is intended to contain a cluster of variables that an institutional analyst may want to use to examine a diversity of institutional settings and to understand human interactions and outcomes across diverse settings. Each of variables can then be unpacked multiple depending on the question of immediate interest (Ostrom, 2005; Ostrom, 2010). In this paper, we try to apply the IAD framework to understanding the rural construction land redevelopment in contemporary China. That is to say, with the purpose of analyzing the governance fit and performance diversity of rural construction land redevelopment, the transaction costs theory and public goods/common-pool resource theory are applied to specify the working parts of the IAD framework (Figure 1).

2.1 External variables

As figure 1 shows, the exogenous variables contain biophysical/material conditions, attributes of community and rules. These exogenous variables directly exert impacts on the action arena and then influence the interactions and outcomes. Over time, the outcomes of interactions may also slowly affect some of the exogenous variables (Ostrom, 2005). But given the limited research span, we just focus on such unidirectional influence instead of the bidirectional one.

With regard to biophysical/material conditions, the object of rural construction land redevelopment is rural construction land resource, the conditions of which thereby become the overarching points. The conditions of rural construction land resource can be categorized into natural ones, such as the size or the quantity, and into social ones, including the extents of subtractability and excludability (Ostrom, 2010). In China, although the natural conditions (e.g., the size) of rural construction land resource differ, the social conditions, high subtractability and low excludability,

remain the same. Owing to such typical features of CPR, rural construction land redevelopment easily gets stuck in the social dilemmas of organization, implementation and distribution.

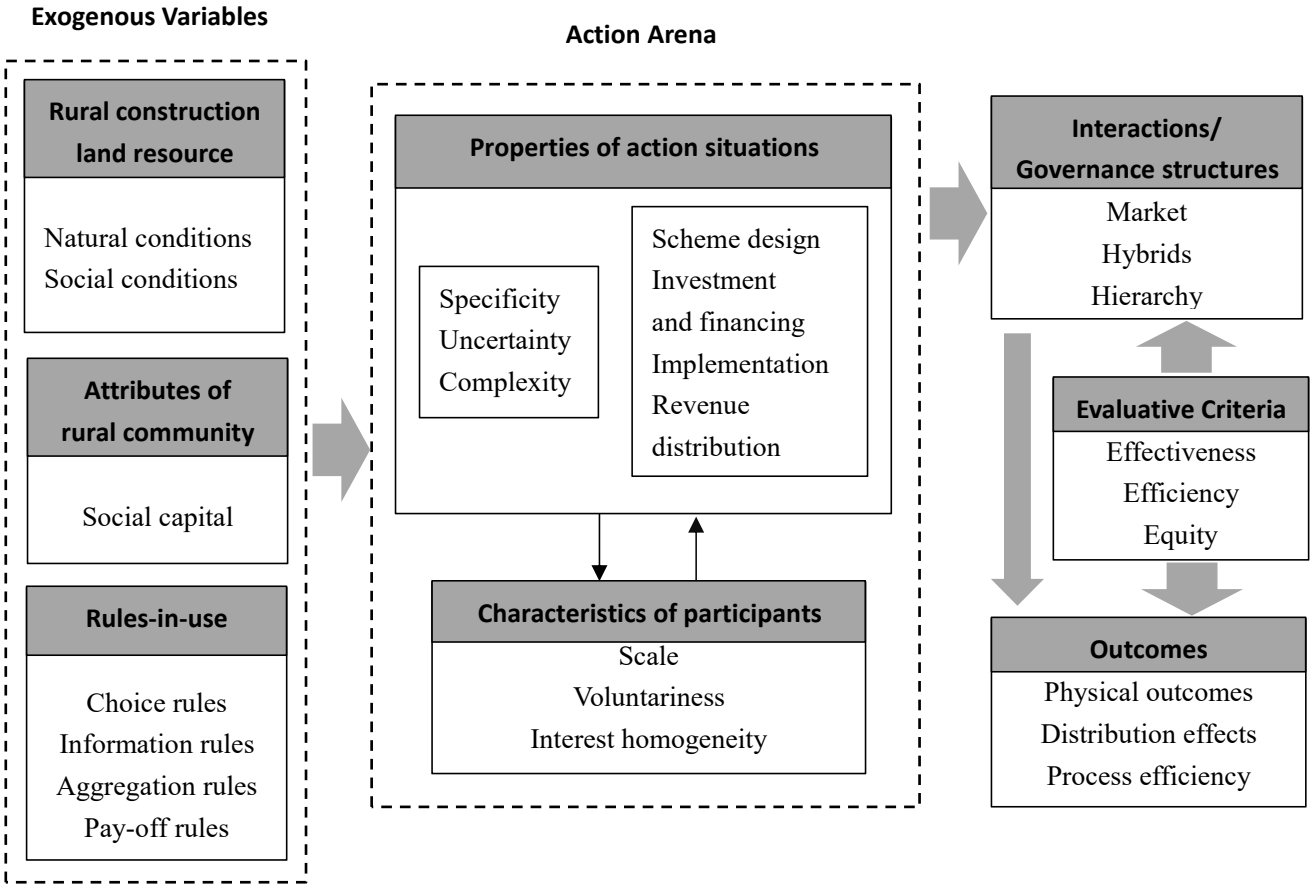

Figure 1 An IAD analysis of rural construction land redevelopment

As for attributes of community, the amount of social capital in rural community has an impact on rural construction land redevelopment. If a plenty of social capital has accumulated within the rural community to foster reciprocity and trust, the collective action of redevelopment incline to emerge. If otherwise, the costs of organization, coordination and implementation would be relatively high and then induces the dilemma of collective action (Ostrom, 2010). Besides, an array of rules disciplining action selection, decision making, information communication and revenue distribution are essential to rural construction land redevelopment. These rules inevitably affect both the process and outcomes of the redevelopment. In return, the process and outcomes usually indicate the concrete contents and functions of rules.

2.2 Action Arena

Action arena is the focal level for the framework, presenting as a spectrum of directly observed phenomena in reality. Action arena is consisted of participants and action situations that interact and are affected by various variables and then produce diverse outcomes (Ostrom, 2005). The process and outcomes of rural construction land redevelopment that can be directly observed in practice reflect the interactions among diverse variables. Hence, we recognize rural construction land redevelopment as an action arena.

2.2.1 Action situations

An action situation refers to the social space where participants with diverse preference interact, exchange goods and services, solve problems, dominate one another, or fight, etc. Whenever two or more individuals are faced with a set of potential actions that jointly produce outcomes, these individuals can be said to be in an action situation (Ostrom, 2005). Therefore, we can further decompose the entire process of rural construction land redevelopment into four action situations, which includes scheme design, investment and financing, implementation and revenue distribution (Figure 1).

(1) Scheme design. It is the first and one of the most important steps for rural construction land redevelopment. Rural construction land redevelopment is a systematic and comprehensive work. If the scheme is not scientific enough or stakeholders fail to make an agreement because some interests and demands are not taken into consideration, it would be hard to enforce the redevelopment and the performance may be impaired.

(2) Investment and financing. Both reconstructing old houses to build up new residential areas and transforming the traditional industry to a new and prosperous one are in need of adequate funds. When there is a lack of fund, even if all stakeholders are willing to attend, the project won't be implemented. Additionally, investment and financing determine the cost bearing and then affect the final interest structure as a distribution issue in essence.

(3) Implementation. During the redevelopment, a set of organization and management mechanisms is necessary for controlling and supervising the actions and avoiding free-riding and other opportunistic behavior so as to achieve the effective

use of funds and the accurate execution of scheme. If there is no such setting, the expected targets could not be accomplished and all the stakeholders' interest could finally be hampered.

(4) Revenue distribution. It is the last but another key step for rural construction land redevelopment. Revenue distribution shows the outcomes of redevelopment, considered as the directly observed evidence for performance assessment. For example, the physical and living conditions of village have ameliorated and farmers' income has increased.

From the theoretical perspective of transaction cost economy, the four action situations concerning rural construction land redevelopment can be regarded as four types of transactions with different properties. Properties of transactions cause the interdependence among actors, incurring the transaction costs. Williamson (1991) proposed three kinds of transaction properties, namely specificity, uncertainty and frequency. According to the physical conditions of natural resource, transaction properties were further extended, such as complexity, absence of separability, and irreversibility (Hagedorn, 2008).

As regards the scheme design, it not only involves land use structure adjustment and rural development path selection, but also takes different interests and demands from actors into account. Thus, complexity is a crucial property of scheme design. Further, the natural conditions of rural construction land resource, the size in particular, influence the level of complexity. For example, redeveloping larger size of rural construction land is supposed to exert more extensive and profound impact on social-ecological systems, requiring more diverse interest to be coordinated on the scheme design. Moreover, due to the bounded rationality and incomplete information, the scheme may not easily be consistent with the context-specific conditions. It presents another property of scheme design called uncertainty (I). Uncertainty (I) originates from the cognitive limitations (Ostrom, 2005). As for the investment and financing, rural construction normally acquires a long-period and large-amount of investment, resulting in the high opportunity cost and the "lock-in" effect. In other words, the asset occupied by rural construction land redevelopment is not able to shift to other alternative use for a relatively long time, reflecting the asset specificity (Alexander, 2001).

In regard to the implementation, rural construction land is usually redeveloped in rather large scale. It means that the redevelopment depends on the land with specific

location, exhibiting a kind of specificity. Put another way, land redevelopment incurs another type of "lock-in" effect, that is, if the investor fails to assemble all the land in the project area, the former investment for land assembly will suffer and even be in vain. Further, the size of rural construction land resource is also a determinant on the level of such specificity. In addition, actors are not able to predict either to what extent the redevelopment can be impelled in accordance with the scheme or the possibility the conflicts occur during the process, suggesting another property of implementation i.e., uncertainty (II). Uncertainty (II) characterizes a situation in which the probabilities of specific actions leading to outcomes are unknowable but the set of actions and the set of outcomes are still assumed to be finite and knowable (Ostrom, 2005). Likewise, uncertainty (II) is the property of revenue distribution, such as the unanticipated possibility of ex-post interest conflicts.

2.2.2 Participants

Participants are decision-making entities assigned to a position and capable of selecting actions from a set of alternatives made available at nodes in a decision process (Ostrom, 2005). Hence, the fulfillment of rural construction land redevelopment must rely on the participants' concrete actions.

In theory, there are a variety of characteristics of participants affecting the CPR governance (Olson 1965; Ostrom, 2005; Ostrom 2009), including the scale i.e., the quantity of farmers taking part in rural construction land redevelopment, the extent of interest homogeneity i.e., much mutual interest, little mutual interest, or even interest divergence, the extent of voluntariness i.e., whether the participants are compelled to attend redevelopment or not.

2.3 Interactions and outcomes

The above discussion on external variables and action arena of rural construction land redevelopment is a static analysis. Yet, rural construction land redevelopment is actually a dynamic process of interplay among diverse elements e.g., land, human, rules, community, etc. Such interaction presents as different redevelopment modes in reality, namely the differentiated governance structures. Governance is an effort to craft order, thereby to mitigate conflicts and to realize mutual gains (Williamson,

2000). Market, hierarchy and hybrids are the generic governance structures that have different costs and competence (Williamson, 1991; Ostrom, 2010). As for rural construction land redevelopment, the decentralized market mode can create incentive; the centralized hierarchy mode can exert control; and the self-organization (a kind of hybrids) with both centralized and decentralized features can combine coercive and incentive together.

On the one hand, different transaction properties of the action situations demand different governance because the governance structures should be aligned with the properties of transactions to economize the transaction costs and to achieve high process efficiency (Williamson, 1991). With regard to rural construction land redevelopment, the increasing specificity level exacerbates the difficulties of negotiation and cooperation as well as leads to the "lock-in" effect and opportunistic behavior like "hold-out" (Alexander, 2001). The rise of uncertainty (I) exaggerates the need for searching and processing information (Alexander, 2001), whilst the rise of uncertainty (II) adds the desire for handling diverse variations and may induce the hazard of maladapatation (Williamson, 1991). Furthermore, the higher level of complexity increases the necessity for coordinating the various interest relations among participants and the interactions among economy, society and ecology (Hagedorn, 2008). Accordingly, as for the situation of scheme design, high levels of complexity and uncertainty (I) demand the governance structures with decentralized features to provide a platform for coordinating multiple interests as well as to economize information costs. On the other three situations, high level of specificity and uncertainty (II) demand the governance structures with higher-powered control to facilitate immediate compromise and proper adaptation, coupled with preventing opportunistic behavior.

On the other hand, characteristics of participants and attributes of community determine the potential supply of governance structures. For example, larger scale of participants and lower extent of interest homogeneity may result in the greater temptation for free-riding and thereby may add the collective action costs (Olson, 1965). But the rural community with adequate social capital is more likely to foster the self-organized collective action (Ostrom, 2009). Therefore, the rural construction land redevelopment mode must match the transaction properties, participant characteristics and community attributes. This is the basic logic of governance fit. Put another way, different properties of action situations, characteristics of participants

and attributes of community together contribute to the diverse redevelopment modes.

Step further, the rural construction land redevelopment modes with different costs and competences that compose the differentiated interactions would lead to diverse outcomes. In other words, once the governance structure of land redevelopment is selected, the process efficiency and even the physical outcomes and distribution effects are roughly determined. From the perspective of normative criteria i.e., effectiveness, efficiency and equity, the interactions and outcomes of rural construction land redevelopment could be evaluated and elaborated. With regard to effectiveness, it mainly evaluates whether the specific governance mode can organize actors to fulfill the goals of redevelopment, such as improving land allocation efficiency and ameliorating rural living condition. As for efficiency, it focuses on the process efficiency (Buitelaar, 2004) i.e., whether the specific governance mode can perform redevelopment in a transaction costs economized way. And for equity, it notifies whether the specific mode can realize the reasonable revenue distribution.

Particularly, hierarchy with high-powered control can compel redevelopment from top to down to improve the effectiveness and efficiency (Williamson, 1991), while the upper level or central authority also dominate the revenue distribution, making the equity questionable. Besides, the asymmetric information among levels and bounded rationality of decision makers often lead to decision deficiencies that impede the governance performance (Furubotn and Richter 2005). Hybrids (e.g., self-organization) appropriately integrating centralization and decentralization may well cope with interest relations among participants and properly motivate and discipline actors to pool their resource so that all the participants can jointly create wealth and realize revenue sharing (Ménard, 2004). Apart from this, the outcomes of rural construction land redevelopment modes vary depending on the rules-in-use. For example, the high-powered control of hierarchy results from choice rules and aggregation rules, whilst its in-born shortage concerning asymmetric information is related to information rules. And reasonable pay-off rules are salient to a fair outcome under hybrids.

3 Research methods

The method of case study is used in this paper. At first, we will narrate the entire process of rural construction land redevelopment in each case in detail. Next,

according to the criteria i.e., effectiveness, efficiency and equity, we will assess the performance of different redevelopment modes against the directly observed phenomena. At last, we will reveal the determinants of governance fit and performance diversity via comparison between two cases based on the IAD framework.

3.1 Case selection

To date, rural construction land redevelopment in China can be categorized into two modes. One is the government-led mode. As the investor, organizer and implementer, local government completely manipulate the rural construction land redevelopment. Another is the self-organized mode. Led by village leaders and elites, farmers organize themselves to enforce rural construction land redevelopment to transform the rural development route, along with making full use of the local natural and socio-economic resources.

We selected two cases, one in each category, in light of the criteria for typical case selection (Gerring, 2007). The two cases are from H village at Jiashan County, Zhejiang Province and S village at Pi County, Sichuan Province. They belong to government-led and self-organized rural construction land redevelopment, respectively.

3.2 Survey method

We conducted fieldwork several times at Jiashan County, Zhejiang Province and at Pi County, Sichuan Province in 2012, 2013 and 2014. At first, we obtained general information about the rural construction land redevelopment in the region, such as the rules and procedures, from the county-level and township-level officials in charge of rural land affairs. Next, we separately had the semi-structure interviews in H village and S village. Before the interview, we selected the interviewees including village cadres, village elites, officials and villagers participating in or affected by rural construction land redevelopment by using the stakeholder-based approach (Vatn, 2005). The interviews among different actors also served for cross-check information. During the interview, we mainly focused on the information about scheme design, investment and financing, implementation and revenue distribution and inquired for

the comments on the redevelopment.

4 China's rural construction land redevelopment in practice: two cases

4.1 Government-led redevelopment: H village in Zhejiang Province

4.1.1 Background

H village is located at the northeastern part of Jiashan County, Zhejiang Province. Most of the houses in the village were built up last century and were all in bad conditions remaining to be renewed (Figure 2). Since the village is in vicinity of Shanghai City, more and more farmers have moved into the urban area for off-farm jobs. Step by step, more and more rural houses were under use or even no use. Yet, Jiashan County is experiencing a rapid economic development that triggered a large amount of land demand for urban construction. Apparently, rural-urban land use in the area should be optimized. Fortunately, the enactment of the linkage between urban land taking and rural land giving (*LUTRG*) policy provided an opportunity for such optimization (Tan and Beckmann, 2010; Tan et al., 2014).

According to the LUTRG policy, rural construction land is re-planned, consolidated and readjusted. Some part of the rural construction land is utilized in a rather intensive way, whilst the remainder of the land is restored back into cultivated land to generate extra land quotas for urban construction (i.e., LUTRG quotas). As such, the total amount of construction land does not increase and the total amount of cultivated land does not decrease for the sake of construction occupation. Consequently, both the construction land demand from economic development and the official requirement from preserving cultivated land are simultaneously fulfilled.

4.1.2 Process and outcomes

The local government monopolized the entire process of rural construction land redevelopment. At first, the local government made the project plan, designed the specific scheme for rural construction land redevelopment in H village, and submitted the relevant documents to the upper level for approval. According to the scheme, the

whole project covered 19.68 ha and 765 farmers were involved. The basic way of the redevelopment project was to restore the construction land for residences back to cultivated land and to relocate farmers in a newly-built, modernized and intensive residential area.

Figure 2 Before the land redevelopment

Figure 3 After the land redevelopment

Next, the local government actively took the responsibility for investment and financing. The total cost of the project was about 68.71 million Yuan[1], including nearly 51.58 million Yuan for compensating relocated farmers, 15.36 million Yuan for constructing new rural residential area and 1.77 million Yuan for restoring the construction land back to the cultivated land. The local government afforded all the costs with the finance source from the county-level public finance income and bank loan. But the farmers participating in the project must pay for the new houses to offset the cost of new residential area construction.

And then the local government established a set of administrative system from top to down, containing the leading group in the township level and the working group in the village level, to implement the rural construction land redevelopment. In particular, the township-level government mainly engaged in compensation, relocation, restoration and new residential area construction. The village cadres cooperated with the government to promote the redevelopment, such as persuading farmers to move out of their old houses. The farmers in H village were merely negative participants. Neither were they able to take part in the decision makings on project plan and compensation standard, nor did they have access to the concrete information about the redevelopment. The project started on December, 2012 and ended on December, 2013, with the total span of 1 year. Generally, the rural construction land redevelopment in H village was implemented smoothly. The farmers

[1] 1 USD approximately equals to 6.80 Yuan.

compromised without any conflicts.

Finally, as for revenue distribution, the local government benefited a lot. Based on the LUTRG policy, the redevelopment project succeeded in generating quotas, totally 8.71 ha, for newly-added construction land by restoring the rural construction land into agricultural use. As such, the pressure from the lack of construction land quotas was somewhat relieved, in accordance with the local government's desire for booming local economy. Also, the redevelopment made notable profits for the local government. According to the local average land price in urban primary land market of Jiashan County, if the government supplied land to secondary industry land users by using all the LUTRG quotas, it would earn approximately 39.20 million Yuan in total (4.50 million Yuan/ha). If the government supplied land to tertiary industry land users by using all the LUTRG quotas, it would earn up to 130.65 million Yuan in total (15 million Yuan/ha).

Obviously, the living condition and environment of H village was significantly improved (Figure 3). The farmers moved into the new apartments with modern style and well-organized layout. And the multi-storey buildings were equipped with elevators. The infrastructure in the new rural residential area was the same as that in urban area with roads, green space, garages and public space. Additionally, according to the officially-set compensation standard, the gross compensation each farmer got was around 67.42 thousand Yuan. After paying for the new houses (about 20.08 thousand Yuan per person), each farmer could still get more or less 47.34 thousand Yuan. However, it was hard to maintain the traditional way of production in that farmers lacked enough space like yards and pools for livestock breeding after moving into the new apartments. As a result, the farmers without substituted ways to earn a living faced increasingly uncertainty. Furthermore, some farmers complained about the change of living conventions since they were not accustomed to living in the apartments.

4.1.3 Summary

The rural construction land redevelopment practice in H village is a typical government-led mode. On the stage of scheme design, the government unilaterally made and approved the scheme. On the stage of investment and financing, the government played a role as investor and bore the major cost of redevelopment. On

the stage of implementation, the government enforced the project by the administrative commands. On the stage of revenue distribution, the government attained the distribution advantages.

4.2 Self-organized redevelopment: S village in Sichuan Province

4.2.1 Background

S village of Pi County is situated between the second and third layer of Chengdu City, the capital of Sichuan Province. Chinese chives planting is the main income source of the farmers in S village. For a long time, the physical condition of S village was inferior (Figure 4). The rural construction land, especially the rural residential land was utilized in a extensive and scattered form. S village also lacked the space for public activities and rural industry development. Obviously, the village confronted with a tough task on how to readjust rural construction land use in a more reasonable and efficient way so as to improve the physical condition, to upgrade living quality and to reinforce the industry development basis.

Figure 4 Before the redevelopment

Figure 5 After the redevelopment

It is noteworthy that the self governance system in S village was relatively completed and well-functioned. The village congress, the village committee and the supervision committee played the roles of decision making, executing and monitoring, respectively. Over time, an internal group mechanism has been set up in S village to foster coordination and cooperation. Hence, led by the village leaders, the farmers started conducting rural construction land redevelopment in turns.

4.2.2 Process and outcomes

The village leaders and farmers were the main actors of rural construction land redevelopment in S village. At first, the village leaders organized the representatives of farmers to visit the villages successful in rural construction land redevelopment. After learning from the well-done project, the village employed the professional agency to make the scheme. The scheme fully took the farmers' opinions into account. All the farmers had access to the relevant information and the scheme was approved by the village congress. According to the scheme, the redevelopment project would be implemented in turns. The first phase of project covered 3.29 ha and 235 farmers were involved. Based on the LUTRG policy, the way of redevelopment was to readjust and consolidate the extensive and scattered rural residential land, and then to utilize a small part of redeveloped land to construct new residences and the remainder of the land to be restored back to cultivated land to generate the LUTRG quotas that would be transferred to the local government to make profits. Meanwhile, the restored cultivated land would be used for Chinese chives planting.

The total cost of the first phase redevelopment in S village was about 16.38 million Yuan, including the costs of new residential area construction, infrastructure construction and land restoration. The finance source was from the LUTRG quotas trading and farmers' own investment. Based on the collective coordination and cost accounting, each farmer participating in the project should pay nearly 25.02 thousand Yuan. After the construction land was readjusted and consolidated by the employed engineering company, around 1.29 ha redeveloped land was used to build new residences in conformity to the collectively-made building plan by farmers themselves. And the village sold the LUTRG quotas generated from restoring the remainder land (2 ha) to the local government at the price of 5.25 million Yuan per ha. The project began in 2012 and took 1 year to complete. During the implementation, the farmers actively cooperated and no one withdrew or required additional economic interest. Meanwhile, the village leaders organized the so called "Chinese Chives Development Company" to forge a Chinese chives planting base. The farmers attending the redevelopment could become the shareholders of the company by investing the contractual management right towards the restored cultivated land.

As for the revenue distribution, in light of the decision made by the village congress, the farmers gained the quota trading revenue, with about 44.68 thousand for

each. The revenue covered most of the redevelopment cost. Moreover, the newly-built townhouses replaced the old houses. The infrastructure and public facilities, such as roads, water pumps, lights, green area and public space, were all renewed (Figure 5). Evidently, the physical condition and living quality in S village were notably improved. Besides, through the equal negotiation, every farmer who was the shareholder of Chinese Chives Development Company would obtain the “Double 350” bonus, that is, the shareholder would get 350 kg Chinese chives twice a year and all the Chinese chives would be converted to the cash against the instant market price. Furthermore, as a shareholder, the farmer would receive dividends. As a consequence, the farmers’ income was surely improved and their livelihoods were ensured after the redevelopment as well. Further, the existence of Chinese Chives Development Company facilitated the local agricultural production shifting from the disperse and small-scale one to a consolidated and large-scale one, which contributed to the rural industry transformation and upgrade.

4.2.3 Summary

The rural construction land redevelopment practice in S village is a typical self-organized mode. On the stage of scheme design, the redevelopment plan was made by consensus. On the stage of investment and financing, all the farmers attending the redevelopment collectively afforded the cost. On the stage of implementation, the farmers cooperatively propelled the project in consistency with the collectively made scheme. On the stage of revenue distribution, a revenue sharing outcome occurred. The farmers got the new residences and shared the land revenue induced by the redevelopment; the physical condition of the village was improved; and the level of agricultural industrialization increasingly raised.

5 Comparison between two cases: applying the IAD framework

In general, H village in Zhejiang Province and S village in Sichuan Province chose the quite different governance mode to enforce the rural construction land redevelopment, incurring differentiated performance. Based on the IAD framework, the comparative analysis between the two cases can reveal the logic of governance fit and performance diversity.

Table 1 Comparison between two cases

	H village	S village
1 External variables		
1.1 Biophysical/material conditions		
1.1.1 Nature condition (Size)	+	-
1.1.2 Social conditions	high subtractability low excludability	high subtractability low excludability
1.2 Attributes of community		
1.2.1 Social capital	-	+
1.3 Rules-in-use		
1.3.1 Choice rules	restrain farmers' actions	autonomy and self-determination
1.3.2 Information rules	lack transparency	transparency
1.3.3 Aggregation rules	arbitrary principle	unanimous principle
1.3.4 Pay-off rules	government's distributional advantages	revenue sharing
2 Properties of action situations		
2.1 Scheme design		
2.1.1 Complexity	++	+
2.1.2 Uncertainty（I）	+	+
2.2 Investment and financing		
2.2.1 Specificity	++	+
2.3 Implementation		
2.3.1 Specificity	++	+
2.3.2 Uncertainty（II）	+	+
2.4 Revenue distribution		
2.4.1 Uncertainty（II）	+	+
3 Characteristics of participants		
3.1 Scale	+	-
3.2 Voluntariness	-	+
3.3 Interest homogeneity	-	+
4 Governance structures	government-led mode	self-organized mode
5 Performance		
5.1 Physical outcomes	effectiveness	effectiveness
5.2 Distribution effects	inequity	equity
5.3 Process efficiency	high at first but lower later	high

Notes: - denotes small/weak; + denotes large/strong; ++ denotes stronger

5.1 Analysis on external variables

With respect to biophysical/material conditions, the size of rural construction land

involved in the project of H village was much larger than that of S village (Table 1). The area of rural construction land in H village's redevelopment was up to 19.68 ha, while in S village's redevelopment project, the gross area was merely 3.29 ha. In spite of this, the rural construction land and the revenue generated from the redevelopment in two cases were common pool resource (*CPR*). In both two cases, the amounts of rural construction land and its land revenue were finite rather than infinite, reflecting the high subtractability. Furthermore, as mentioned above, collective members all have access to the land resource and its revenue, reflecting the low excludability.

As for community attributes, more social capital accumulated in S village than that in H village (Table 1). A large number of farmers in H village have moved into the urban area for off-farm jobs. The interest of farmers tended to diversify and the traditional social network in rural community was weakened due to the industrial and commercial civilization in urban sector (Zhang et al., 2015). On the contrary, a well-developed convention of farmer autonomy occurred in S village. The farmers in S village trusted and were familiar with each other and gradually formed the reciprocity and cooperation during the long period of interaction.

Additionally, the rules-in-use of the two cases differed, including the choice rules, the information rules, the aggregation rules and the pay-off rules (Table 1). In H village, the choices of farmers were extremely limited and it was hard for the farmers to acquire the key information about the scheme design, the revenue distribution, etc. The local government, however, decided whether to initiate the redevelopment, unilaterally made the decisions on the size of project and the implementation routine, and configured the self-interest distribution pattern. By contrast, the farmers in S village had a more extensive choice set. They were able to not only decide whether to participate in the project or not, but also join the decision making process on the autonomy platforms like the villagers' congress. Accordingly, the farmers had access to the information about the redevelopment and the distribution pattern that fully considered farmers' interest was made through the collective negotiation.

5.2 Analysis on action arena

5.2.1 Properties of action situations

On the situation of scheme design, the complexity of the construction land

redevelopment in H village was stronger than that in S village (Table 1) because the size of rural construction land affected the complexity of redevelopment. The larger scale of rural construction land redevelopment in H village suggested that more economic, social and ecological relations had to be taken into account and therefore raised the complexity of scheme design. Also, the cognitive limitation of the designers in the two villages enhanced the uncertainty (I) of scheme design (Table 1), that is, it was difficult to ensure the appropriateness and feasibility of the redevelopment scheme.

On the situation of investment and financing, the extent of asset specificity in H village's redevelopment project was stronger than that in S village's (Table 1). The total investment of rural construction land in H village was more than 68 million Yuan, whilst it was only around 16 million Yuan for S village. As the aforementioned, the larger the scale of investment was, the more the opportunistic cost of redevelopment was, inducing the stronger lock-in effect and ultimately adding the asset specificity.

On the situation of implementation, the extent of land asset specificity in the construction land redevelopment of H village was as well stronger than that of S village (Table 1). The size of rural construction land resource directly determines the level of land asset specificity during the implementation. The rural construction land redevelopment in H village needed to acquire and assemble more plots of land than did in S village. As the scale of land assembly mounted, the investor increasingly relied on the land with the specific location (i.e., lock-in effect) and thereby was more likely to be the victim of opportunistic behavior. In particular, once the land owner resorted to hold-out, the investor who had assembled a large amount of land would suffer from the asset loss owing to the project delay. Hence, the dependency on the site-specific land resource leaded to the lock-in effect, suggesting the relatively high level of land asset specificity. The rural construction land redevelopment in the two villages faced pretty high level of uncertainty（II）(Table 1). The uncertainty（II）derived from the immeasurable possibilities that the scheme would be implemented accurately and that the interest conflicts of the implementation would appear. On the situation of revenue distribution, there also existed the high extent of uncertainty（II）(Table 1) in that the possibility of ex-post interest conflicts were unanticipated.

5.2.2 Characteristics of participants

Firstly, the scale of participants in S village was smaller than that in H village (Table 1).The rural construction land redevelopment in S village was divided into several relative small projects with limited number of farmers. The number of participants in S village's redevelopment project (i.e., the first phrase) was 235, merely taking up 1/3 of that in H village's. Secondly, the extent of participants' voluntariness in S Village was stronger than that in H Village (Table 1). The redevelopment in S village was proposed by the village leaders and got sound support from the villagers. And each farmer had the right to decide whether to attend the project. By contrast, the rural construction land redevelopment in H village was compelled by the local government relying on the administrative commands. For example, the local government solely made and approved the project scheme and established the leading and working groups to implement the project, whilst the farmers were the passive participants and what they could do was strictly restrained.

Thirdly, the extent of interest homogeneity of the redevelopment project in S village was stronger than that in H village (Table 1). A comprehensive self governance system has appeared in S village consisting of the village congress, the village committee and the supervision committee. The collective coordination and cooperation mechanism evolving during the farmer autonomy helped mitigate the interest divergence among the different participants (Ostrom, 1990).

5.3 Analysis on interactions and outcomes

With respect to the interactions, the rural construction land redevelopment in the two villages presented the distinct features of governance, leading to the diverse governance outcomes. The rural construction land redevelopment in H village exhibited a typical government-led mode (Table 1). In the case of H village, the specificity levels of the investment and financing and the implementation were higher, and the implementation and revenue distribution confronted with the high level of uncertainty (II). These properties of action situations desired for the governance structure with high-powered control to impel rural construction land redevelopment in a transaction costs economized way. Therefore, the local government set up the leading group and working group throughout the township level and village level. And the township government served as the main implementation agency that steered the whole process of redevelopment e.g., land assembly, demolishing, compensation,

relocation and reconstruction.

As a kind of hierarchy, the government-led mode is able to enhance control and to weaken incentive by means of administrative commands so as to force the participants to compromise. Thus, the process efficiency increased (Table 1). Despite the large scale and the heavy workload, the span of project in H village was almost the same as that in S village. Meanwhile, the redevelopment was implemented according to the scheme; the funds were used effectively; and the opportunistic behavior like “hold-out” and other conflicts didn’t occur. The government-led rural construction land redevelopment performed well in improving the living condition of H village. The farmers moved out of the shabby houses and then into the reasonably-designed and well-equipped modern new apartments. Evidently, the direct goals of rural construction land redevelopment were accomplished (Table 1).

But the local government also dominated the revenue distribution after the land redevelopment. On the one hand, the government was able to distribute the land revenue straightly by virtue of the unilaterally-made compensation standard for vacating rural residential land and demolishing old houses. On the other hand, the government could obtain the different sizes of economic revenue depending on its own demands through allocating the LUTRG quotas to the secondary and tertiary industry land supply. If the government deployed the LUTRG quotas to the tertiary industry land supply, it would earn up to 130.65 million Yuan, nearly twice as much as the total cost of the redevelopment. In the long term, the acceleration of local industrialization and urbanization as well as the boom of regional economy would benefit the local government in the form of tax income. By contrast, the farmers in H village only obtained the social wealth created by the redevelopment in the forms of compensation and new residences. Thereby, an unequal distribution outcome existed (Table 1). Besides, owing to the asymmetric information among the hierarchical levels, the scheme that the government made still had some deficiencies. For instance, the farmers couldn’t get used to the new life style and their livelihoods faced certain challenges. The farmers expressed their dissatisfaction about the issues in the interview. So, the government-led can not fit the complexity and uncertainty (I) of the scheme design and then the process efficiency loss inevitably appeared (Table 1).

Given the governance demand from the complexity and uncertainty (I), the farmers in S village chose the self-organized mode to facilitate the rural construction land redevelopment. Under the self-organization, the actors devise the redevelopment

scheme with local knowledge according to the context-specific conditions. And they well handled a variety of interest relations concerning the new residence plan, cost and revenue distribution, etc in advance through the collective coordination mechanism nested in the farmer autonomy. As a result, farmers' living convention and preference for single house were taken into consideration during the scheme design, accounting for the occurrence of the townhouses in the new residential area. The rural development path to construct Chinese chives planting base was suitable for the local conditions. Moreover, the issues such as interest conflicts that might be obstacles to the project implementation disappeared, and the farmers didn't express any dissatisfaction about the revenue distribution. All the phenomena showed the competence of self organization. The self-organized rural construction land redevelopment saved the information cost, avoided the decision deficiencies, and controlled the complexity and uncertainty (I) on the stage of scheme design. Such kind of governance finally achieved the direct goals of redevelopment i.e., improving the rural living condition and increasing the extant construction land use efficiency, in a high process efficiency way (Table 1). Although the extents of specificity on the situations of investment and financing and implementation were strong and the levels of uncertainty (II) on the situations of implementation and revenue distribution were as high as those in H village's redevelopment project, the internal group mechanism in S village did play a role of action control. Therefore, no "hold-out" happened and no farmers claimed any other interests during the process.

As regards the distribution effects, a revenue sharing outcome came into being in S village (Table 1). The farmers attending the project gained all the income of quota trading (5.25 million Yuan/ha), much higher than the local land acquisition compensation (0.26 million Yuan/ha). Apparently, the self organization gave priority to the farmers' interest when distributing the revenue of land redevelopment. The village utilized the newly restored cultivated land to plant Chinese chives and set up a company. The farmers not only obtained the income from Chinese chive planting (i.e., "Double 350", see Section 4.2.2), but got the dividends in consistency with their shares of the company as well. Consequently, the farmers' income rose up constantly, their livelihoods were ensured, and the village moved onto the new path of agricultural industry development.

Undoubtedly, the favorable characteristics of participants and the special attributes of community are critical for the emergence of self organization (Table 1).

Compared with the conditions in H village, the participants in S village's redevelopment project were fewer but had stronger extents of voluntariness and interest homogeneity, and more social capital has accumulated in S village. Firstly, due to the small scale and interest homogeneity, the coordination cost of collective action was controlled and no ex-ante long period bargaining occurred. Secondly, the voluntariness saved the extra cost of organizing collective action in a compulsive manner. Thirdly, the small scale was also favor of monitoring. Last, the tradition of farmer autonomy accumulated the adequate social capital to provide the informal rules for guarantee. It also explained why the self-organized rural construction land redevelopment was not challenged by the "hold-out" or other interest disputes. In brief, the characteristics of participants and the attributes of community were more likely to form collective action and to solve the initial supply of self organization.

Additionally, the two cases demonstrated that the salient rules-in-use had profound impacts on the performance of rural construction land redevelopment in conjunction with the specific governance structure (Table 1). In H village, the higher-powered control of the government-led mode reflected not only the action constraints on farmers set by the choice rules, but also the arbitrary decision right of the local government granted by the aggregation rules. While such choice and aggregation rules did help improve the process efficiency to fulfill the goals of redevelopment effectively, the shortcomings on the information rules reflected by the asymmetric information of the government-led mode made the faults on the scheme design come true together with the aggregation rules that supported the unilateral decision making. So, the process efficiency was hampered finally. Moreover, the unfair distribution outcomes indicated the disadvantages over the pay-off rules. In S village, the self-organized mode featured by the combination of decentralization and control capability suggested that the choice rules granted the appropriate decision-making right to farmers, the aggregation rules advocated the unanimity principle, and the information rules guaranteed farmers' rights to know and to participate. Consequently, the farmers in S village completed the redevelopment project in a transaction cost economized way. Moreover, the revenue sharing outcomes highlighted the equity of pay-off rules.

6 Conclusions and discussions

Based on the IAD framework and two typical cases, the paper explored the reasons for governance fit in regard to rural construction land redevelopment, assessed the physical outcomes, distribution effects and process efficiency, and revealed the determinants of performance diversity. The study indicated that conditions of rural construction land resource, attributes of rural community, properties of action situations, characteristics of participants and rules-in-use jointly determined the governance fit and performance diversity.

Given the high subtractability and low excludability of rural construction land resource and its revenue, first, the practice in H village demonstrated that the high levels of complexity and uncertainty (II) demanded the governance with high-powered control, such as hierarchy, to complete rural construction land redevelopment in a transaction cost economized way. But under the hierarchical governance, the actor leading the entire process, such as the local government, got the distribution advantages and caused an unfair interest structure. Moreover, the in-born shortages of hierarchy e.g., the asymmetric information resulted in the transaction costs for decision deficiencies, thus impeding the process efficiency. The practice in S village, however, gave the implication that the governance weakening the motivation of opportunistic behavior and controlling the actions is also able to fit the properties of complexity and uncertainty (II) so the hierarchy is not the inevitable optimal governance.

Second, the practice in S village indicated that the high levels of complexity and uncertainty (I) demanded the governance with decentralized features, such as self organization, to realize the targets of rural construction land redevelopment in a transaction cost economized way. The participants with small scale, voluntariness and interest homogeneity as well as the rural community with substantial social capital are more likely to enforce the redevelopment in a self-organized way to fit the above governance demand. Furthermore, the self organization would form the revenue sharing outcome after the redevelopment.

Last but not the least, both two cases suggested that superficially, the different governance structures led to the performance differences, while the rules-in-use were the underlying factors. In H village, the high-powered control of government-led mode and the local government's distribution advantages were originated from the choice rules restraining farmers' actions, the information rules reducing the information accessibility, and the pay-off rules limiting other participants' revenue.

Conversely, in S village, the decentralized features of self organization and the revenue sharing outcome were derived from the choice rules granting farmers right to self-determination, the information rules increasing the information transparency, and the pay-off rules optimizing the revenue distribution.

We can draw further policy implications from the above conclusions. First of all, the existing modes governing rural construction land redevelopment are not necessarily optimal and needed to be innovated. Likewise, the determinants of governance fit and performance diversity are the references and entry points for the institutional reform on rural construction land redevelopment. Second, as respects the government-led mode, the choice rules should be improved to give greater autonomy to other participants; the information rules should be completed, especially on the information transparency about scheme design, revenue distribution, etc; the pay-off rules should be optimized to take other participants' interest into account. It is supposed that such innovative efforts may promote public participation and democratic negotiation and make better use of the dispersed social knowledge, which enables the rural construction land redevelopment to fit the local conditions and to form a more reasonable distribution outcome. Third, the farmers and the villages with favorable conditions should be encourage to facilitate rural construction land redevelopment via self organization so as to realize an effective and efficient redevelopment as well as an equal distribution structure.

Generally speaking, the study 1) showed the practice of rural construction land redevelopment in contemporary China, providing the basic information for relevant research; 2) recognized rural construction land resource and its revenue generated by the redevelopment as a kind of common pool resource (*CPR*) and applied the IAD framework into rural construction land redevelopment, not only extending the framework's capability, but also giving a new theoretical insight into China's rural construction land redevelopment; 3) illuminated the governance fit and performance diversity regarding rural construction land redevelopment from the perspective of governing the commons, fulfilling the research gap to some extent. Further, the subsequent research may continuously focus on the modes, performance and determinants in terms of rural construction land redevelopment to provide more evidence for the logic of governance fit and performance diversity. Also, the later research may devote to governance innovations and come up with more recommendations to govern rural construction land resource in a sustainable way.

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