INVESTIGATION ON WHY THE PRACTICE OF RURAL RESIDENCE LAND EXCHANGE IS DIFFERENT UNDER DEVELOPMENT DRIVEN CONDITION AND DISASTER INDUCED CONDITION

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ABSTRACT

It is increasingly appreciated that concentrated settlement is an effective means to reduce land for residence and improve the effectiveness, which contributes to the mission of sustainable development. In China, the policy of rural residence land exchange is used as a measure to advocate concentrated rural settlement and promote new countryside construction. However, it is found that, under the development driven condition (DDC), the government usually pushes forward or forcibly implement this policy while the farmers are reluctant to accept this. By contrast, Dujiangyan, in the disaster induced condition (DIC), adopted this policy to raise funds for post-disaster reconstruction, which is accepted by the rural victims and gained great success. Therefore, the contrasted phenomenon inspires us to explore why the practices between the two conditions are different. Game theory was employed to explain the difference and three critical reasons were identified. The findings provide valuable reference for the practice of rural residence land exchange under DDC.

KEYWORDS

Concentrated rural settlement, development driven condition (DDC), disaster induced condition (DIC), post disaster reconstruction, game theory, China.

INTRODUCTION

Concentrated rural settlement is critical to achieve sustainable development without comprising the farmer's well-beings. Rural residential development should be close to settlements with human services/community facilities, linking into the functional hierarchy in order to maximize access to goods, services and opportunities, and reduce the need to travel (SEAP, 2011; Mulwaree Shire Council, 2003; Rural Issues Work Group, 2002; Turnock, 1991). It not only deals with the rural disadvantages, which alleviates the unbalance of welfare distribution between urban and rural areas, but also helps achieve sustainable urbanization. Concentrated settlement linking rural and urban areas serves as growth-engines and stabilizers of urbanization and economic growth, which is a tool for sustainable urbanization especially in the developing countries (Alaci, 2010). It is especially important as in-place population growth in rural areas of developing countries is more and more (Guest Editorial, 2004).

Many countries have been taken to achieve concentrated rural settlement. The development and renovation of rural settlement is controlled by the infrastructure carrying capacity in America. The infrastructure and public services are only affordable within certain boundary, and the settlements which are out of the boundary are considered illegal. England implemented a large-scale rural development planning between 1950s and 1970s, the aim of which was to concentrate the people within central villages. A set of comprehensive policies was formulated to guide investment in housing, infrastructure and public service facilities, and employment tilting to the central villages. However, the practices in Tanzania and Ireland imply that the poor planning system would hamper rural concentrated settlement (Lerise, 2000; Mcgrath, 1998). Moreover, the farmer's willingness affected by the economic and social problems is critical for the success of rural concentrated settlement as the experience of South Viet Nam in 1960s showed (Zasloff, 1962-1963).

In China, the policy of rural residence land exchange is used as a measure to advocate concentrated rural settlement and promote new countryside construction. However, in the normal condition, the local government

discretionarily expands the scale of rural residence land exchange or even pushed forward this policy forcibly. This illegal practice resulted in farmers' unwillingness and resistance. The phenomenon raised the fears of central government officers, e.g. Cheng Xiwen. After publicized by the media, the rural residence land exchange is stopped and supervised by the central government urgently in 2010 (Tencent news, 2010). By contrast, Tianma Town of Dujiangyan took this policy to raise funds for post-disaster reconstruction in 2008, which is accepted by 55% of the rural victims. The great success made other farmers still want to participate in even after the reconstruction is completed (Deng, 2010). The entirely different outcomes inspire the authors to why the practice between the two conditions is different.

RURAL RESIDENCE LAND EXCHANGE

With rapid economy development and urbanization, China faces a prominent conflict between protecting cultivated land and satisfying the demand of construction land (Ding, 2007). Urban construction land is relatively scarce while the use of rural construction land is disorder and inefficient (Zheng and Fu, 2007). Moreover, a lot of rural settlements are abandoned as the results of farmers' emigration to cities for better living environment, which causes land waste. As a result, the Ministry of Land and Resources of the People's Republic of China (MLR) introduced a regulation on "The practice of the balance between the increase of construction land in urban areas and the decrease of that in rural areas" in 2008 (MLR, 2008). According to the regulation, rural residence land in addition to other types of rural construction land can be reclaimed as cultivated land, the size of which is recognized based on the quality of the reclaimed cultivated land. After that, the same size of reclaimed cultivated land can be used as urban construction land in urban areas. The gross construction land and cultivated land remains unchanged while the distribution seems more reasonable than before.

Although other types of rural construction land is also involved, this research focuses on rural residence land. According to the common practices of rural residence land exchange, farmers are guided or required to live in concentrated settlements to save rural construction land. The saving of rural construction land is reclaimed as cultivated land in rural areas while the same size of cultivated land could be used as urban construction land in urban areas. Land ticket is used to achieve the transfer. The right to require specific area of rural residence land to be reclaimed and protected as cultivated land is land ticket. All the cost incurred in the process of rural residence land exchange is covered by the revenue from land ticket.

Different or even conflict interests for local government and farmers are involved in the process. As a result, different actions are taken. In normal circumstance, the local government usually pushes forward or even illegally implements this policy while the farmers are reluctant to abandon the former settlement with traditional life. Facing the power of local government, farmers are usually forced to move into the concentrated settlement (*bei shang lou*), which is against farmer's willingness and leads to negative social impacts. However, in post disaster reconstruction, the local government legally utilized this policy to raise fund for reconstruction and gained support from the rural victims. The great success makes it be one of the models of post-disaster reconstruction, which even attracts other farmers to participate in even reconstruction was completed. The interesting contrast encourages the authors to find out why local government and farmers take different actions and gain different social outcomes when implementing the policy of rural residence land exchange in normal circumstance and post disaster reconstruction. Bases on this, it further explores whether *disaster provides an opportunity of pushing forward rural residence land exchange*.

METHODOLOGY

Game theory is used in this research to help understand the actions taken by local governments and farmers in the process of rural residence land exchange in order to achieve their expected benefits. The theory has been widely applied to analyze the strategic actions of individual decision makers, where individual's success in making choices depends on the choices of others (Myerson, 1991). Player, strategy, and payoff are the three basic elements in the application of game theory. Player is the individual decision maker participating in the strategic game, who is assumed as a rational man to maximize his interest in the game. Strategy is the action available to the player. Payoff is the possible interest for each combination of strategies taken by the players. The payoffs to the players determine the actions taken in a strategic game. For a typical game analysis, the critical step is to specify these three basic elements and find out the solution to the game. Nash Equilibrium describes the stable game results, the actions taken by the players and the outcome of the game (Madani, 2010).

Game theory is able to simulate different aspects of conflict, embody various characteristics of the problem, and predict the possible resolutions in absence of quantitative payoff information. Herein, Game theory is better to explain the actions taken by local government and farmers, as the process of rural residence land exchange

involves different or even conflict interest. For local government, its strategy is to legally implement the policy or illegally implement the policy to maximize the interest. However, the farmer's strategy is to accept or refuse. The analysis for the actions taken in the process of rural residence land exchange can be conducted by using a payoff matrix, as shown in Figure 1. In this figure, G_{11}, G_{12}, G_{21}, and G_{22} represent the interest of local government in the corresponding combination of strategies while F_{11}, F_{21}, F_{12} and F_{22} represent the interest of the farmer in the corresponding combination of strategies.

		farmer	
		accept	refuse
local government	legally implement	G_{11}, F_{11}	G_{12}, F_{21}
	illegally implement	G_{21}, F_{12}	G_{22}, F_{22}

Figure 1 The general payoff matrix for local government and farmer in the process of rural residence land exchange

In order to fulfill the research aims, the payoff matrix analysis sets two scenarios: one is the rural residence land exchange in normal circumstance or development driven condition (DDC), and the other is the rural residence land exchange in post disaster reconstruction condition or disaster induced condition (DIC). The following section would analyze the payoff matrix in the two conditions in detail.

RURAL RESIDENCE LAND EXCHANGE MODEL UNDER THE DDC

For local government, the payoff mainly lies in economic aspect, including the revenue of land ticket, the cost of removal and reclamation, the compensation to the farmers, political aspect, and social aspect. For the farmers, the payoff mainly focuses on the current interest, including compensation, the value of old house, the cost of purchasing and decorating the concentrated settlement, the increased living cost, the cost of striving, and the long term interest, including the benefits of effective infrastructure and quality public services, and income, which is specified in Eq. (1).

$$
\begin{cases}
G_{11}^1 = LA_{11} - C_{r11} - C_{11} + P_{11} + S_{11} \quad F_{11}^1 = C_{11} - C_{nc} - \Delta L + I_{na} + B_c \\
G_{12}^1 = 0 \quad F_{21}^1 = V_0 - C_{s21} + I_a \\
G_{21}^1 = LA_{21} - C_{r21} - C_{21} + P_{21} + S_{21} \quad F_{12}^1 = C_{21} - C_{nc} - \Delta L + I_{na} + B_c \\
G_{22}^1 = LA_{22} - C_{r22} - C_{22} + P_{22} + S_{22} \quad F_{22}^1 = C_{22} - C_{nc} - \Delta L - C_{s22} + I_{na} + B_c
\end{cases}
\tag{1}
$$

Where L represents the unit revenue of land ticket; A_{11}, A_{21} and A_{22} denote the size of cultivated land that can be used as construction land in the process of rural residence land exchange under the combination of strategies; C_{r11}, C_{r21}, and C_{r22} stand for the cost of removing the old houses and reclaiming the rural residence land for cultivated land bore by the local government; C_{11}, C_{21}, and C_{22} represent the compensation given by the local government to the farmers under the combination of strategies; P_{11}, P_{21} and P_{22} stands for the political achievement; S_{11}, S_{21} and S_{22} stands for the social impact; V_o is the value of the old house perceived by the farmers; C_{nc} is the cost of purchasing and decorating the concentrated settlement; ΔL is the increased living cost, such as gas, water, and food; B_c is the benefits of concentrated settlement, such as effective infrastructure and quality public services; I_{na} is the income after concentrated settlement; I_a is the income before concentrated settlement; C_{s21} and C_{s22} stands for the cost of striving bored by the farmer taking the strategy 'refuse'.

(1) Assuming the farmer takes the strategy of 'accept'
The local government could only implement small scale of rural residence exchange, constrained by the provisional quota of construction occupying cultivated land and other regulations. In other words, the size of saved cultivated land A_{11} when local government legally implements the policy could be quite smaller than that A_{21} when local government illegally implements the policy. Meanwhile, the local government could bring down

the compensation to the farmers when it takes the strategy of 'illegally implement'. That's to say, C_{11} would be lager than C_{21}. Moreover the political achievement and social impact would be quite the same as the farmer takes 'accept' strategy and the central government has less chance to find out. It is evidenced with the fact none officials were punished due to 'illegally implement' this policy. Although the cost of removing the old houses and reclaiming the rural residence land would be larger if the scale of rural residence land exchange is larger, the benefits from land ticket for the larger scale of rural residence land exchange is large enough to cover the cost. Overall, following Eq. (2) is satisfied.

$$LA_{21} - C_{r21} - C_{21} + P_{21} + S_{21} > LA_{11} - C_{r11} - C_{11} + P_{11} + S_{11}, \text{or } G_{21}^1 > G_{11}^1 \qquad (2)$$

(2)Assuming the farmer takes the strategy 'refuse'
The local government could not push forward rural residence land exchange if the local government takes the strategy 'legally implement'. That's to say, the payoff of the local government is zero. By contrast, if the local government takes the strategy 'illegally implement', it would attain the big benefits from land granting, although it has to bear the cost of removal, reclamation, compensation and certain risk of political achievement and negative social impact. However, the practice shows that the risk of political achievement and negative social impact is still small, as none officials were punished for illegally implementing this policy and few serious social conflicts were incurred in the process. Overall, the following Eq. (3) comes into existence. The integration of Eq. (2) and (3) implies that the best strategy for the local government is to take 'illegally implement' no matter what the farmer choose.

$$LA_{22} - C_{r22} - C_{22} + P_{22} + S_{22} > 0, \text{or } G_{22}^1 > G_{12}^1 \qquad (3)$$

(3)Assuming the local government takes the strategy of 'legally implement'
If the farmer accepts the practice, he would attain compensation C_{11}, but should pay for purchasing and decorating the new house C_{nc}. It is found that the compensation usually could not afford the cost of new house, which has the same construction area as the old house. The survey conducted by Zhang and Wang (2008) as shown in Table 1 provides some evidence. In this sense, $C_{11}-C_{nc} <0$.

Table 1 Survey of compensation and cost of purchasing new house in Sheshan town Shanghai
(Source: Zhang and Wang, 2008)

Family	Removal construction area/ Compensation	Type of house/ Cost	Decoration cost	Balance
A	223m^2/430,000 RMB	T: 134m^2+83 m^2/ 390,000 RMB	100000+70000=170,000 RMB	-130,000 RMB
B	215 m^2/420,000 RMB	D: 188 m^2/ 410,000 RMB	120,000 RMB	-110,000 RMB
C	232 m^2/450,000 RMB	D: 202 m^2+T: 67 m^2/ 590,000 RMB	130000+60000=190,000 RMB	-330,000 RMB
D	218 m^2/460,000 RMB	M: 223 m^2/ 560,000 RMB	120,000 RMB	-220,000 RMB

Note: T stands for tier building, while D for duplex house, and M for multi-family housing

Table 2 The earning and living cost change for farmers in suburb of Changsha city
(Source: Xu et al., 2010)

	Annual earning per household (RMB)		Annual expenditure per household (RMB)		Construction areas per household (m^2)
	Total	From agriculture	Total	For food	
Before concentrated settlement	34, 500	850	18, 500	5, 400	335
After concentrated settlement	36, 000	220	21, 300	6, 600	220

Moreover, the living cost would obviously increase due to extra food expenditure, gas fee and property management fee (Lang, 2010). Herein, ΔL is definitely positive. Furthermore, the local governments are reluctant to take full responsibility in job arrangement as the pressure of labor markets is increasing with rising

population and urbanization (Ding, 2007). If no effective measures are taken, the farmer, especially the elder with few non-agricultural work skills, would even earn less than before. For the family members who have already worked in the urban areas, the earning even the long term income would not change largely due to concentrated settlement. Thereafter, in the current condition, $I_{na} - I_a - \Delta L < 0$. This is evidenced by the survey conducted by Xu et al. (2010) as shown in Table 2.

As for the long term benefit of concentrated settlement, the farmer would enjoy the benefit of effective infrastructure and quality public services, while he may also suffer from less social security, fuzzy self-identity and less landscape. Therefore the farmer's welfare would improve, but with little extent as shown in Table 3.

Table 3 The assessment of welfare in Jiangdu City
(Source: Jia et al., 2009)

	Overall	Economic condition	Social security	Living condition	Community life	Environment	Development chance	Psychology
Before	0.443	0.434	0.406	0.591	0.265	0.952	0.320	0.203
After	0.471	0.482	0.226	0.898	0.206	0.369	0.723	0.726

Comparatively, the farmer would perceive that the old house is much more valuable. It shall be even overpriced due to the endowment effect when losing the old house (Wu et al., 2008; Kahneman et al., 1991). It is also evidenced with the fact the farmer in the suburb is reluctant to abandon rural residence land since it appreciates rapidly (Zhang and Wang, 2008). As a result, the benefit gained from concentrated settlement is perceived as less than current settlement and life style. Moreover, the cost to show the 'refuse' attitude would be quit small or even none, as the local government takes strategy 'legally implement'. That's to say $B_c - V_o + C_{s21} < 0$. By summarizing, the following Eq. (4) is satisfied.

$$V_0 - C_{s21} + I_a > C_{11} - C_{nc} - \Delta L + B_c + I_{na}, \text{ or } F_{21}^1 > F_{11}^1 \tag{4}$$

(4)Assuming the local government takes the strategy of 'illegally implement'
If the farmer takes the strategy of 'refuse', he might argue for a higher compensation standard C_{22}, the extra compensation comparing to C_{21} is able to cover the cost of striving C_{s22}. That's to say $C_{22} - C_{21} - C_{s22} > 0$. Overall, the following Eq. (5) is true. The integration of Eq. (4) and (5) indicates that the best strategy for the farmer is to take 'refuse' no matter what the local government chooses.

$$C_{22} - C_{nc} - \Delta L - C_{s22} + B_c + I_{na} > C_{21} - C_{nc} - \Delta L + B_c + I_{na}, \text{ or } F_{22}^1 > F_{12}^1 \tag{5}$$

As a result, for the local government, the best strategy is 'illegally implement' while that for the farmer is "refuse". The Nash equilibrium of the complete information static game is the state (illegally implement, refuse). This is why illegal rural residence land exchange is popular in latest years. After publicized by the media, the rural residence land exchange is stopped and supervised by the central government urgently in 2010. However, the practice in the DIC is quite different.

RURAL RESIDENCE LAND EXCHANGE MODEL UNDER THE DIC

Under the disaster induced condition, the payoffs of local government and rural victims are similar with those under the DDC. However, after disaster, local government faces different surveillance environment and have enough matched policies at hand while the rural victims usually lost their existing house. No matter accept exchange or refuse, the rural victims need to rebuild the house. All the changes would affect the actions taken by the local government and rural victims. The payoff in the exchange process is specified in Eq. (6).

$$\begin{cases} G_{11}^2 = LA_{11} - C_{r11} - C_{11} + P_{11} + S_{11} \quad F_{11}^2 = C_{11} - C_{nc} - \Delta L + I_{na} + B_c \\ \qquad\qquad G_{12}^2 = 0 \quad F_{21}^2 = -C_{nr} - C_{s21} + I_a \\ G_{21}^2 = LA_{21} - C_{r21} - C_{21} + P_{21} + S_{21} \quad F_{12}^2 = C_{21} - C_{nc} - \Delta L + I_{na} + B_c \\ \qquad\qquad G_{22}^2 = P_{22} + S_{22} \quad F_{22}^2 = -C_{nr} - C_{s22} + I_a \end{cases} \tag{6}$$

Where C_{nr} is the cost of building a new house in the former rural residence land; all the other symbols have the same meaning as mentioned above.

(1) Assuming the farmer takes strategy 'accept'
The severity of disaster usually would bring the local government and rural victims to attention of the whole society and central government. If the local government takes the strategy 'illegally implement' attempting to

bring down the compensation to the rural victims, it would be rapidly exposed to the public and result in political punishment from the upper government, even if the farmer chooses 'accept'. It is evidenced with the strict audit from central government and punishment for the officers in the process of post disaster reconstruction. On the other hand, a series of land, industry and tax favorable policies were Eq.ted to promote post disaster reconstruction. The local government could implement the policy of rural residence land exchange on a comparatively large scale even through legal way. As a result, the risk of negative political achievement and social impact (P_{21} and S_{21}) is very high, which would even eat off the extra benefits of 'illegally implement'. That's to say, the following Eq. (7) is satisfied.

$$LA_{11} - C_{r11} - C_{11} + P_{11} + S_{11} > LA_{21} - C_{r21} - C_{21} + P_{21} + S_{21}, \text{ or } G_{11}^2 > G_{21}^2 \qquad (7)$$

(2) Assuming the farmer takes the strategy 'refuse'

If the local government takes the strategy 'legally implement', it would attain none payoff. However, if the local government takes the strategy 'illegally implement', which is against the rural victims' willingness, it would result in conflict and block the process of post-disaster reconstruction. Exposed to the society and central government, the local government could not push forward rural residence land exchange but would face the political punishment from the upper government. In other words, the risk of negative political achievement and social impact (P_{22} and S_{22}) is very high. Therefore, the following Eq. (8) is true. The integration of Eq. (7) and (8) implies that the best strategy for the local government is to take 'legally implement' no matter what the farmer choose under the disaster induced condition.

$$0 > P_{22} + S_{22}, \text{ or } G_{12}^2 > G_{22}^2 \qquad (8)$$

(3) Assuming the local government takes the strategy 'legally implement'

If the farmer accepts the practice, he would attain compensation C_{11} and enjoy the benefits of effective infrastructure and quality public services B_c. However, no matter accept exchange or refuse, the rural victims need to rebuild the house. In the urgent disaster condition, where finance and resources are scarce, the compensation C_{11} could help rebuild the settlement rapidly and the current interest C_{11} becomes very attractive to the rural victims. It is evidenced with the fact that many rural victims were willing to participate in rural residence land exchange in the process of post disaster reconstruction. For example, it was reported that the average cost of building a new house is 100,000 RMB while the central government only subsidizes 20,000 RMB per household in Tianma Town of Dujiangyan. However, if participating in rural residence land exchange, the victim family only spent 20,000~40,000 RMB. The left costs of housing and more cost infrastructures were from the revenue of rural residence land exchange. Therefore, 55% of the rural victims in Tianma Town of Dujiangyan took part in this practice (Wu, 2010).

Since it is usually in the developed areas, the cost of building a new house on the rural residence land is quite the same as that of concentrated settlement. That's to say, $C_{nc} - C_{nr} \approx 0$. Usually, post disaster reconstruction would implement a series of matched policies, improving the local industry, creating more opportunities for employment and expanding the source of income in the long term. Therefore, the income after the concentrated settlement would be greater than that before. For instance, in Tianma Town of Dujiangyan, the cultivated land was rent by Derui group corporate as green vegetable base. The rent revenue is about 1000 RMB per Mu[*] per year, which is more than the traditional agricultural revenue as 300~400 RMB per Mu per year. Meanwhile, the local farmers could work in the green vegetable base and earn about 600 RMB per month. Furthermore, rural village tour is developed and becomes another income source. All the measures are taken to make sure the farmer can bear the increased cost after concentrated settlement.

Although ΔL and C_{s21} is definitely positive, the current and long term benefits would cover the losses in other aspects and make the strategy 'accept' get ahead. That's to say Eq. (9) is satisfied.

$$C_{11} - C_{nc} - \Delta L + I_{na} + B_c > -C_{nr} - C_{s21} + I_a, \text{ or } F_{21}^2 > F_{11}^2 \qquad (9)$$

(4) Assuming the local government takes the strategy 'illegally implement'

If the farmer takes the strategy 'accept', he would attain the payoff F_{12}^2, although it is less than that the local government legally implement the policy. However, as discussed above, the surveillance from the public shall pressure the local government to improve the compensation and accept the punishment from the upper government. However, if the farmer chooses 'refuse', he would pay more to refuse the practice and lead to the practice stopped finally, which means he could not attain the urgent compensation and enjoy the benefits of

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[*] Mu is an area unit in China, where 1 Mu=666.67 m^2

concentrated settlement. In other words, the following Eq. (10) is satisfied. The integration of Eq. (9) and (10) implies that the best strategy for the farmer is to take 'accept' no matter what the local government chooses under the disaster induced condition.

$$C_{21} - C_{nc} - \Delta L + I_{na} + B_c > -C_{nr} - C_{s22} + I_a, \text{ or } F_{12}^2 > F_{22}^2 \qquad (10)$$

As a result, for the local government, the best strategy is 'legally implement' while that for the farmer is "accept". The Nash equilibrium of the complete information static game is the state (legally implement, accept), which is quit different from that under the DDC.

DISCUSSIONS AND CONCLUSIONS

Observing different results of implementing rural residence land exchange under the DDC and DIC in China, the paper aims to investigate why the practices under DDC and DICC are so different. Game theory was adopted to investigate the strategy for the local government and farmer in the two conditions. The Nash equilibrium under the DDC is (illegally implement, refuse) while that in DIC is (legally implement, accept). The change of Nash equilibrium in the two conditions is mainly caused by three reasons which can be found in the above discussion.

First, the concentrated surveillance from the public in post-disaster reconstruction makes the cost of 'illegally implement' too high to bear for the local government. Comparing to the DDC, the severity of disaster usually would bring the local government and rural victims to attention of the whole society and central government. If local government could not utilize the policy correctly and raise resistance from rural victims affecting the progress of post disaster reconstruction, it faces high risk of negative political achievement and social impact. Therefore, in the disaster induced condition, the local government has less incentive to 'illegally implement' the policy.

Secondly, the losses of rural settlement make the rural victims have to rebuild settlement no matter he accept or refuse the practice. In the DDC, the former rural residence should be purposely removed, which makes compensation seem insufficient. Therefore, the farmers usually tend to refuse exchange in the current term. However, in the post disaster reconstruction, as the former rural residence has already been destructed, the exchange would provide extra finance for reconstruction. The current interest of compensation could attract the rural victims and fuel the progress of housing reconstruction especially under the resources scarce condition.

Lastly, a series of matched favorable policies would be implemented in disaster induced condition. On the one hand, the favorable policy would provide the chance for the local government to do what could only be done through illegal way in the DDC. Therefore, this change would make 'illegally implement' less attractive for local government. On the other hand, the policies and reconstruction could create more chances of employment and expanding the source of income. It alleviates the worries of income after concentrated settlement in the long term. By contrast, under the DDC, the farmer has not been paid due attention to the income problems and make it less attractive in the long term. As a result, the farmer tends to refuse due to the decrease of income.

This research is helpful to understand why the practice of rural residence land exchange is different. Moreover, the identified reasons for the differences of practice under DDC and DIC can facilitate the central government to improve this policy in order to achieve positive results even under DDC. Measures should be taken to control the local government in order not to expand the scale of rural residence exchange arbitrarily. The compensation and long term interest like education, employment and income should be improved and strengthened in order to attract the farmers' participation under DDC. Future research can also be conducted to investigate whether disaster provides an opportunity for concentrated rural settlement and find out how to utilize this opportunity to achieve the aims under DIC.

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