



Poverty alleviation through land assetization and its implications for rural revitalization in China

Yuanzhi Guo^{a,b}, Yansui Liu^{a,b,c,*}

^a Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, China

^b Key Laboratory of Regional Sustainable Development Modelling, Chinese Academy of Sciences, Beijing 100101, China

^c University of Chinese Academy of Sciences, Beijing 100049, China

ARTICLE INFO

Keywords:

Land assetization
Poverty alleviation
Rural revitalization
Land system reform
Rural development
China

ABSTRACT

Land is the most important wealth of the poor and has the triple attributes of resource, asset and capital. However, the long-term neglect of the asset and capital attributes of land in rural China has limited the anti-poverty role of land, which restricts rural sustainable development. Here, we analyze the relationship between land and rural development, explore the mechanism of poverty alleviation through land assetization (PALA), and discuss the policy implications for China's rural revitalization in the new era. The results show that land promotes rural development through the combination of its production-living-ecological functions, and anti-poverty policies in rural China should pay more attention to land system reform since the insufficient quantity and poor quality of land are important causes of rural poverty. The deepening land tenure system reform has optimized rural production relations, activated land elements, realized the transformation of land from resource to asset, and effectively promoted poverty alleviation and development in rural China. Additionally, an interest connection and sharing mechanism is necessary to ensure the smooth progress of PALA. With the focus of rural China transforming from poverty alleviation to rural revitalization, further deepening land tenure system reform, improving the rural land market and perfecting the legal system of land circulation are of great significance in realizing the goals of strong agriculture, beautiful countryside and prosperous farmers.

1. Introduction

In classical economics, land is regarded as the foundation of wealth and plays a fundamental role in supporting regional economic growth. On the one hand, land is an important object of human activities, and its spatial heterogeneity plays a critical role in regional economic differentiation (Bromley, 1989; Liu et al., 2014). On the other hand, land provides a material basis and space carrier for human survival and development and restricts the depth and breadth of human activities through its bearing capacity (Markovchick-Nicholls et al., 2008; Siciliano, 2012; Guo et al., 2018). Rural areas are geographical spaces where people engage in agricultural production, which is highly dependent on the quantity and quality of land. Generally, the level of rural development is high in areas with rich and fertile lands, while problems such as poverty and backwardness are frequent in areas where land is short supply or/and barren (Rigg, 2006).

Asset is a term generally used in relation to capital and property to refers to resources owned or controlled by enterprises as a result of the

past events and expected to bring benefits to those enterprises (Scott and O'Brien, 1997). Following this concept, when land is occupied as a property, it becomes an asset. Therefore, land assetization is a process in which land participates in production and operation activities as a production factor and brings profits to the owners (Asami et al., 1993). Under the condition of a market economy, land assetization greatly promotes rural development through tapping the potential value of the land and activating land elements (Liu, 2018a; Ward and Swyngedouw, 2018). In this context, land assetization has become an important research topic of the social sciences, such as economics and management, which mainly focus on the paths and roles of land assetization. Becoming a shareholder at a fixed price, authorized operation and leasing are the main paths of land assetization (Clark et al., 1993; Huang and Wang, 2008; Chen, 2013). Regarding its roles in rural development, land assetization promotes modernization and large-scale of agricultural production by optimizing the allocation of land resources (Ye, 2015; Gong and Zhang, 2017), thus increasing farmers' income (Liu et al., 2008; Zhou et al., 2019a), improving the level of rural social security (Li,

* Correspondence to: 11A Datun Road, Chaoyang District, Beijing 100101, China.

E-mail address: liuys@igsnrr.ac.cn (Y. Liu).

2007; Wu et al., 2018), and narrowing the gaps between urban and rural areas (Chen and Long, 2019). In addition to the positive effects, land assetization causes the differentiation of strata in some rural areas due to individual differences in abilities and ideas (Zhu, 2016).

China is the most populous country in the world, and its rural development once faced severe poverty (Liu et al., 2017). In terms of endowment, there are rich land resources in rural China, but the critical antipoverty role of land cannot be fully played due to the lack of advanced factors such as talent and technology (Asadi et al., 2008; Collier and Dercon, 2014, Zhou et al., 2019a). To reverse this situation, great efforts have been made by the Chinese government, including land reform, the people's commune movement and the household responsibility system (HRS), which have continuously liberated and developed the productive forces and greatly alleviated poverty in rural areas (Liu 2018a; Zhou et al. 2018). Especially since the reform and opening up in 1978, China has actively deepened land tenure system reform, strengthened land asset management, and established an incentive mechanism of intensive and efficient land use (Ruan et al., 2013; Zhou et al., 2018). Through giving full play to the role of the market in resource allocation and implementing the paid-use system, it has not only highlighted the value of land assets but also realized the value maintenance and appreciation of land assets, thus providing a steady stream of financial support for the development of poverty-stricken areas. As a result, land assetization has become an important way to reduce rural poverty in China, and the poverty-stricken population has decreased rapidly with the continuous promotion of land system reform (Zhu and Chen, 2016; Liu and Li, 2017). In 2020, China successfully achieved the goal of eliminating poverty under the current standard, ten years ahead of schedule for the "no poverty" goal in the UN Sustainable Development Goals (SDGs) (Zhou et al., 2018; Guo et al., 2019a).

In the new era, the change of social principal contradiction in China has made the rural revitalization strategy the center of issues concerning agriculture, countryside and farmers (Liu, 2018b), and the goal of rural development in poor areas has transformed from antipoverty to revitalization (Dou and Ye, 2019; Guo et al., 2019b). Essentially, the process of rural antipoverty is a gradual process of rural revitalization (Guo et al., 2019b). Therefore, systematically investigating the mechanism of poverty alleviation through land assetization (PALA) and guiding the post-2020 implementation of rural revitalization strategy in China are of

great significance. This study first analyzes the relationship between land and rural development and explores the causes of rural poverty from the perspective of land. Then, it investigates the mechanism and practices of PALA based on reviewing land tenure system reform in China and discusses the resulting insights into rural revitalization. These findings will provide useful information for understanding the PALA model and guiding the policy making to achieve the goal of agricultural and rural modernization, thus contributing Chinese wisdom to global poverty alleviation and rural sustainable development.

2. Land and rural development

2.1. Relationship between land and rural development

China is a large agricultural country. Agriculture, rural areas and farmers are important components of national economic and social development and is directly related to the realization of the SDGs. The essence of rural development is the result of interactions between socioeconomic factors and resource-environmental variables in the rural regional system (Liu et al., 2010; Long et al., 2011). In this process, land is the core element and plays a fundamental role through its production-living-ecological functions (Tu et al., 2018). As a result, rural areas achieve either upward advancement or downward decline. In turn, rural development affects land, resulting in changes in land-use structure and form (Fig. 1).

First, land is the most basic production factor and is the foundation of agricultural development. The critical difference between land and other production factors is its production capacity (Meillassoux, 1972), which makes land the initial object of labor and determines the type and scale of agricultural production. To promote industrial development, various production facilities are also attached to the land. Second, people obtain living places based on the spatial attributes of the land, and the spatial heterogeneity of population aggregation forms different levels of urban-rural settlements (Pacione, 2013). In rural China, due to the imperfect social security system that has originated from the urban-rural dual structure, land also plays a role in maintaining the basic livelihood of farmers, thus alleviating the impact of the external environment on rural areas (Bai et al., 2014; Liu et al., 2014). In addition, soil is a complex natural ecosystem (Adhikari and Hartemink, 2016), and the ecological regulation and biological support of the land provide

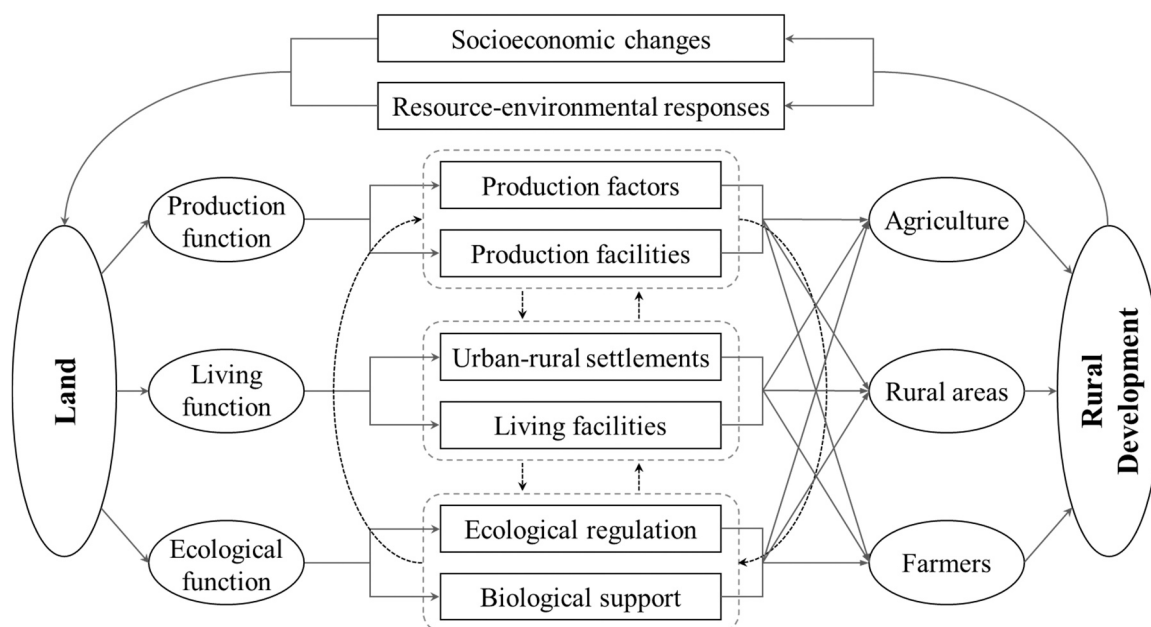


Fig. 1. The internal relationship between land and rural development.

an environmental basis for organism evolution and human development. The former includes water conservation, environmental purification, and microclimate regulation, and the latter mainly refers to protecting biological diversity and maintaining ecological balance. The basic support of the land and the interactions between the land and its attachments promote changes in agriculture, rural areas and farmers, ultimately promoting the evolution of the rural regional system. A reasonable land-use structure boosts rural development to a higher level, whereas an inadequate land-use structure impedes rural sustainable development. In turn, rural development leads to element changes, structural adjustment and functional transformation of rural regional system. A series of socioeconomic changes and resource-environmental responses further affect the land and cause the changes in land use.

The productivity of land determines its outstanding role in rural areas, and this role changes constantly with the evolution of productive forces and the law of contradictory movement between productive forces and production relations (Woods, 2004). In traditional society, land is one of the most important elements of agricultural production (Ash and Edmonds, 1998; Guo et al., 2018). Due to the low level of productive forces, the purpose of agricultural production in this stage is to meet farmers' basic needs (Bhutto and Bazmi, 2007). Therefore, the function of land features simplification. With the improvement of productive forces, agricultural production gradually gets rid of the constraints of land (Guo et al., 2018), and the diversification of human leads to new requirements for agricultural development. Thus, the function of land develops from single agricultural production to multiple functions, such as grain production, ecological protection and social security (Marsden and Sonnino, 2008). In this context, the influences of social and economic factors on the depth and breadth of rural development are increasingly significant and have gradually become the leading factors. However, it should be noted that although the role of land is declining, it is still an important guarantor of rural sustainable development, and its foundation-supporting effect is still remarkable.

2.2. Rural poverty: a land perspective

Rural poverty is a complex social and economic phenomenon caused by the mismatched element, unreasonable structure and imperfect function of rural regional system (Liu et al., 2017; Guo et al., 2018). Due to the dominant position of agriculture in rural areas, land is the core of rural development and deeply affects farmers' production mode and lifestyle. Therefore, deepening the recognition of land is of great significance for understanding rural poverty. In general, support for agricultural production is weak in areas with large populations but little land and a lack of reserve land, and outstanding human-land conflict leads to an unsound endogenous growth mechanism and a prominent poverty problem in rural areas. To meet the needs of an increasing population, land is exploited in a predatory way through practices such as deforestation, overgrazing and reclaiming farmland from lakes. These unreasonable land-use patterns cause great damages to ecology and the environment, resulting in problems such as soil erosion and grassland degradation (Swinton et al., 2003; Wang, 2004; Liu and Diamond, 2005), which aggravate rural poverty (Jahan and Umana, 2003). Excessive dependence on land increases the vulnerability of rural households, forming the environment-poverty trap (Dasgupta et al., 2005). Additionally, it plays an important role in the intergenerational transmission of poverty (Bolwig et al., 2010). In some areas, scrambling for land is an important catalyst of conflict and war, which hinder regional social and economic development and result in rural poverty. In addition, the function of land in rural areas is simple because of the imperfect land market and land system; thus, the advantage of land is not transformed into the advantage of rural development.

For a long time, poor populations in rural China were mainly distributed in deep-rock mountain areas, alpine cold regions and ecologically vulnerable areas, where human-environment conflict was prominent and the carrying capacity of resources and the environment

was weak (Liu et al., 2016, 2017). The lack and low quality of land were important causes of poverty (Zhou et al., 2018, 2019a). An analysis of the national poverty-stricken counties in 2015 showed that the proportion of counties constrained by land resources was 24.96%, mainly distributed in the south, especially in the Wumeng Mountain area and karst area, and the proportion of counties constrained by water and land resources was 8.5%, mainly distributed in the north of the Dabie Mountain area and the east of the Wuling Mountain area (Zhou and Wang, 2016).

3. Poverty alleviation through land assetization

In terms of quantity, the amount of land in a region is relatively limited. However, the urban-rural dual land-use system has made the problem of idle and inefficient use of rural land widespread, which seriously hinders poverty alleviation and development in rural China (Liu et al., 2014; Li et al., 2020). In this context, the key to antipoverty in rural China lies in deepening land system reform and realizing the transformation of rural land from single use to multiple use to establish a long-term mechanism to eliminate poverty among farmers.

3.1. Land tenure system in rural China

The land system is the basic economic system in rural China, and its core is the land tenure system (Geng and Shang, 2018). At the beginning of the People's Republic of China (PRC), the country had experienced a short period of the private land-ownership. Subsequently, the socialist transformation in 1956 promoted the transformation of the ownership of means of production from private to public. On this basis, China launched the Great Leap Forward and the People's Commune Movement. Although this institutional design accumulated original capital for industrial development, the neglect of the internal law of economic development seriously affected farmers' enthusiasm for production and restricted rural development. Therefore, problems such as inefficient land use and poverty become widespread in rural China, and most people were inadequately fed and clothed, which presented unprecedented challenges for national economic and social development (Guo et al., 2019a). To reverse this situation, the HRS was initiated in 1978 to realized the separation of land-ownership and contracted management right (Fig. 2), in which the former belonged to village collectives and the latter was given to rural households. This institutional design transformed the farmer from a single producer to a contractor and operator, which greatly promoted the development of rural productive forces and the sustained and stable growth of grain production. As a result, poverty in rural China has been greatly alleviated, and China has become the first developing country in the world which had successfully achieved the UN Millennium Development Goals (MDGs) of having the poverty-stricken population (Guo et al., 2018; Liu et al., 2018).

Under the principle of fairness, the HRS focused on the social welfare function of land, with less attention paid to the efficiency of land resource allocation (Cai, 2016). Driven by rapid industrialization and urbanization, this drawback has become increasingly prominent. First, the dispersion and fragmentation of land cause low efficiency of agricultural production and hinders the scale management of agriculture and the application of modern technology (Wan and Cheng, 2001; Tan et al., 2006). Second, the massive population outflow leads to widespread farmland abandonment, which further results in the distortion of the human-environment relationship and unreasonable resource allocation in rural areas (Long and Li, 2012). In addition, the "monopoly of property right" makes it difficult for farmers to obtain benefits through the marketization of land, which restricts the development of nonagricultural industries in rural areas (Parente and Prescott, 1999). Thus, the development of primary industry is slower than that of secondary and tertiary industries, and a large number of villages in central and western China are still in a state of poverty and backwardness.

To overcome these problems, China continued to advance land

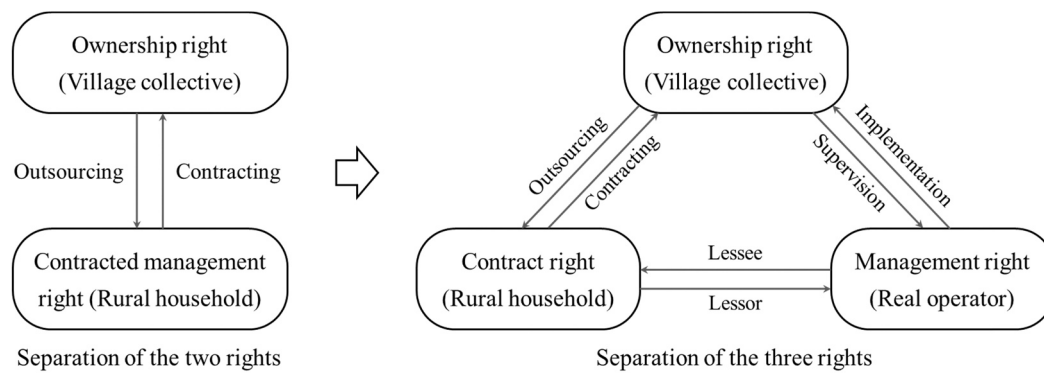


Fig. 2. The evolution of the structure of land property.
Note: Modified from Geng and Shang (2018).

tenure system reform in rural areas and divided the contracted management right into the contract right and management right in 2014, thus realizing the separation of the three rights of the land (STRL) (Fig. 2). Based on the collective ownership of rural land, STRL focuses on stabilizing the farmers' contract right and releasing the management right (Wilmsen, 2016; Wang and Zhang, 2017; Liu, 2018a). Meanwhile, it allocates land through the market mechanism to ensure that the farmers enjoy land rights and interests. On the one hand, STRL opens channels for the equal exchange of urban and rural lands through clearing property rights; on the other hand, it grants the land management right to various subjects who want to engage in agricultural production. Therefore, it effectively promotes agricultural production, improves farmers' abilities to increase their incomes, lays a solid foundation for rural sustainable development, and narrows the urban-rural gap. Furthermore, in view of the lack of capital for developing collective economy in poor areas, Document No. 1 of 2017 encouraged these areas to deepen rural system reform, which changed resources into assets, capital into shares and farmers into shareholders. The "three changes" reform greatly enhances rural collective economic strength and broadens the channels for farmers to increase their incomes and become prosperous. In general, the key to land system reform in rural China lies in promoting the market-oriented allocation of land resources and then boosting rural sustainable development by giving full play to the asset attribute of land to mobilize the enthusiasm of all stakeholders.

3.2. Mechanism of poverty alleviation through land assetization

Generally, there are three attributes of land, i.e., resource, asset and capital (Zhou et al., 2018). Among these, the resource attribute is first and is the foundation of the asset attribute, the asset attribute is the material manifestation of the capital attribute, and the greatest difference between the capital attribute and the other two lies in its dynamic and value-added nature. In traditional China, land plays an irreplaceable role in promoting regional development and alleviating rural poverty (Liu et al., 2017). However, more attention is paid to the resource attribute of the land while ignoring the asset and capital attributes. Meanwhile, the fairness-oriented resource allocation mode results in the low efficiency of agricultural production. These are important reasons for the low per capita disposable income of rural households (Yuan et al., 2014; Xie and Lu, 2017). With the advancement of land system reform, especially the separation of the land contract right and management right, the scale of farmland circulation among different subjects has continued to increase, promoting the optimal allocation of land and its transformation from resource to asset and finally realizing the goal of poverty alleviation.

On the basis of adhering to the collective ownership of rural land, the current land tenure system reform endows the management right with legal status and power, which expands development channels and activates the production factor of land in poverty-stricken areas (Xiao and

Liang, 2016). By means of land transfer, land subcontracts, land swaps, land shares and land leases, the management right owned by rural households circulates to the new-type agricultural business entities, such as large growers, family farms, cooperatives and agricultural companies, and can be transferred among different entities, which promotes the scale production, specialized management and market-oriented operation of agriculture. Thus, it effectively solves the contradiction between small production and a large market, protects the rights and interests of farmers, and improves the level of rural development. Specifically, scale production improves land-use efficiency and reduces the cost of agricultural production through developing various forms of moderate scale operation and forming a modern agricultural production system that integrates production, processing, sales and services. Specialized management is the inevitable result of the social division of labor and the development of a commodity economy that aims to use the concept of specialization to organize agricultural production and realize the effective use of natural, human and material resources and the improvement of labor productivity. Market-oriented operation adjusts the structure of agricultural production according to market demands and gives full play to the important role of the market in agricultural production, thus promoting agricultural supply-side structural reform and enhancing endogenous growth momentum in poverty-stricken areas. Based on these practices, agricultural efficiency in poor areas has improved significantly, the rural economy has developed rapidly, and farmers' income has increased steadily (Fig. 3).

Obviously, the key of PALA lies in land circulation, which is a complex process involving the government, village committee, enterprise and farmer. Therefore, it is necessary to build an effective interest connection and sharing mechanism to allow all participants to enjoy the benefits of land development (Fig. 4). The government acts as a supervisor, and its main responsibilities are to guide the work of the village committee, strengthen policy supply to stabilize the land contract right and liberate the land management right, attract business investment and supervise the production and operation activities of enterprises. The enterprise is the actual operator. It contracts farmers' land, develops modern agricultural practices, provides employment opportunities for farmers, accelerates regional development through the adjustment of the agricultural production structure, and increases local financial revenue. Additionally, it promotes the construction of grassroots organizations in the process of interaction with the village committee. Farmers, as owners of land contract right and management right, elect the members of the village committee to represent their interests, respond to the decisions of the village committee, participate in the production and operation activities of enterprises through land circulation and labor export, and then establish an endogenous growth mechanism. As a coordinator, the village committee should not only provide feedback on grassroots information to the government to support its decision making but also coordinate and monitor the production and operation activities of the enterprise, as well as do a good job in mass work and safeguard

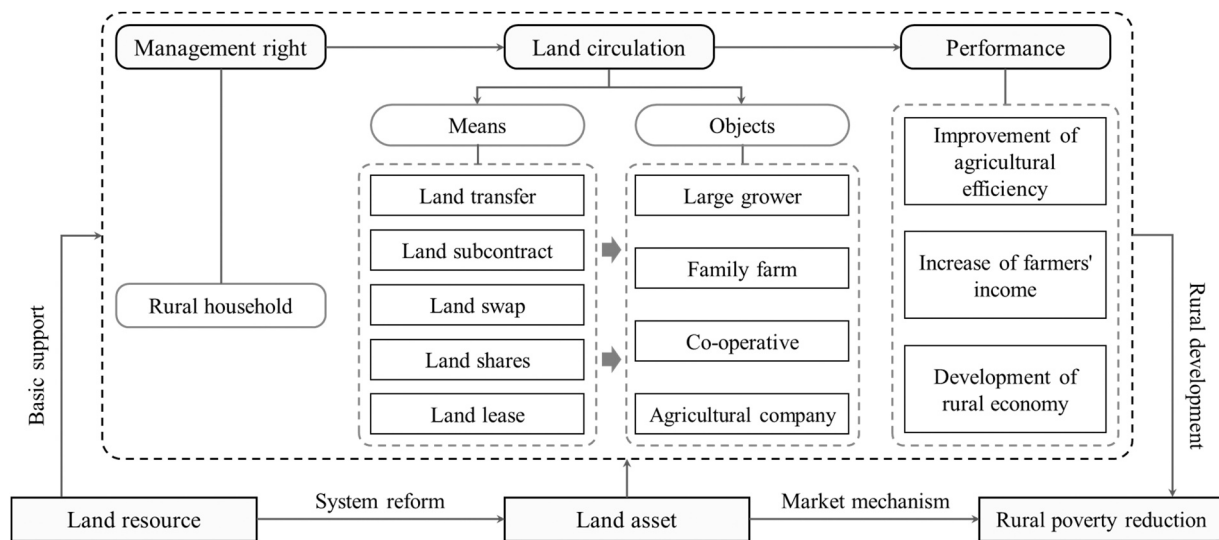


Fig. 3. Mechanism of poverty alleviation through land assetization.



Fig. 4. Interest connection and sharing mechanism of poverty alleviation through land assetization.

farmers' interests. In this process, the government improves its resource allocation abilities through economic development; the enterprise not only obtains preferential policies from the government but also develops rapidly through scale production; farmers escape poverty by increasing their incomes; and the village committee improves its grassroots governance abilities through organizational construction. As a result, poverty-stricken areas have built an anti-poverty model with government guidance, village committee promotion, enterprise operation and farmer participation.

3.3. Empirical analysis: a case study of Fuping County, Hebei Province

Since the implementation of targeted poverty alleviation strategy in 2013, Fuping County has made full use of the advantages of land-use policy pilot, actively carried out land tenure system reform, and taken land consolidation as the breakthrough to promote the assetization of land resources. These measures have greatly boosted the social and economic development of the county, effectively guaranteed the anti-poverty process in the county, and provided useful experience for development in poverty-stricken areas.

3.3.1. Study area

Fuping is located in western Baoding, Hebei Province. With an area of 2496.0 km², the county contains 13 townships and 209

administrative villages, and the total population was 230.8 thousand in 2014. As a remote county in the Yanshan-Taihang Mountain area, there is a mountainous area of 2173.3 km², accounting for 87.2% of the total area of the county, and the area of cultivated land is only 146.0 km². Limited by natural disadvantages and socioeconomic shortcomings, such as low bearing capacity and poor infrastructure, Fuping has long been in a state of poverty and backwardness. For example, the per capita disposable income of rural households was 44.7% and 40.5% of the national and provincial averages in 1990, respectively, and the ratios increased only to 56.9% and 54.5% in 2017, respectively (Fig. 5). The main features of rural poverty in Fuping are its large quantity, deep degree, and wide distribution as well as the difficulty in implementing anti-poverty measures. According to statistics from the county government, there were 164 poor villages and 108.0 thousand poor people in 2014.

3.3.2. Practice of poverty alleviation through land assetization

The problem of insufficient per capita farmland is prominent in Fuping, but it is rich in reserve land resources. Therefore, some policies have been applied to convert these potential resource advantages into practical development advantages. In 2013, the Ministry of Natural Resources of the PRC designated Fuping as the pilot county of the "requisition-compensation balance of farmland" policy, which allowed the county to develop and reorganize unused land below 25 degrees that was suitable for cultivation as garden/arable land. These new cultivated lands can be used to balance the requisition and compensation of farmland and can be included in the farmland system for management after being certified by professional institutions. Subsequently, the county was authorized to pilot the "linking the increase and decrease between urban and rural construction land" policy in 2014, and was allowed to transfer surplus increase-decrease linked construction land indexes within Hebei Province. On this basis, Fuping has actively improved the top-level design of poverty alleviation and development, adopted a multistakeholder model involving the government, village committees, enterprises and farmers; and focus on land consolidation to promote the assetization of land resources. The government's responsibilities are authorizing overall planning, implementing project approval, attracting leading enterprises and supervising their production and operation activities; the village committees mainly deal with issues such as the circulation of barren mountain lands and mass work; the role of enterprises lies in promoting market-oriented operations, high-standard land consolidation and high-efficiency modern agriculture as well as protecting farmers' interests; and the farmers are mainly

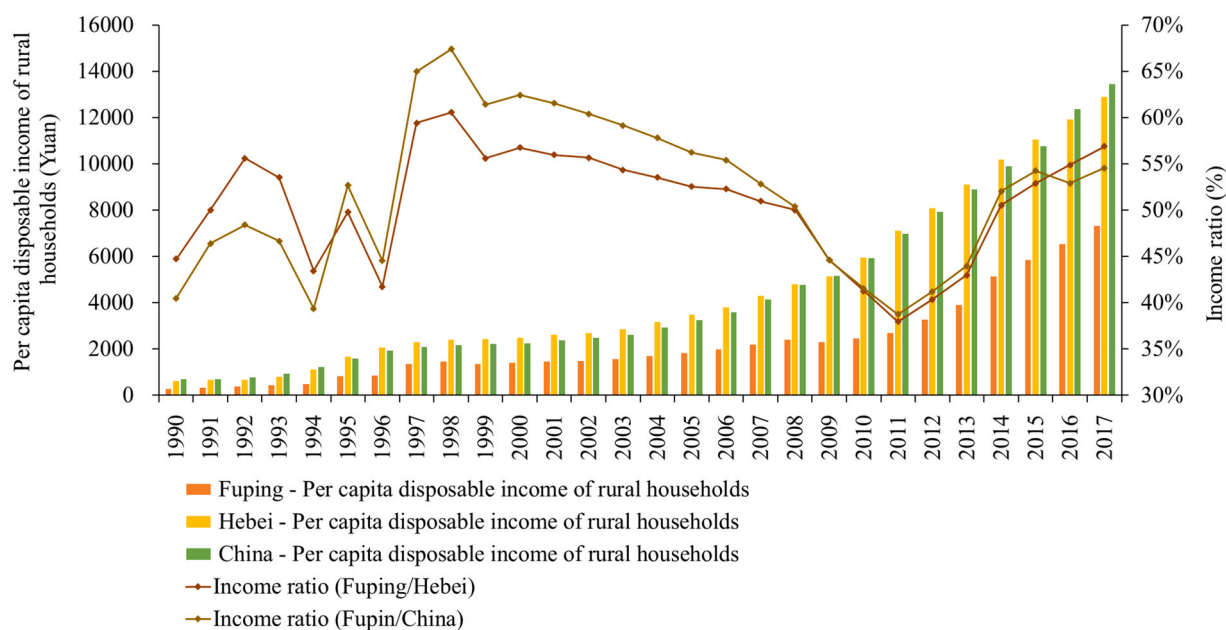


Fig. 5. Rural residents' income in Fuping County from 1990 to 2017 and its comparison with the provincial and national averages. Source: Fuping County People's Government.

responsible for circulating the management right of barren mountain lands and participating in enterprise production through land shares and labor export.

Relying on land consolidation, Fuping has explored a comprehensive development and management mechanism in poor mountainous areas that is conducive to rural sustainable development. The county government obtains financial revenue for infrastructure construction and public-service support and promotes the implementation of antipoverty projects, including relocation, educational assistance and ecological compensation. For example, the circulation income of the construction land index originating from the requisition-compensation balance of farmland in 2015 accounted for one-third of the total financial expenditure in the county. Meanwhile, the government cooperates with enterprises to carry out land consolidation, which turns the barren mountain lands into fertile terraces and realizes the simultaneous improvement of economic, social and ecological benefits. Enterprises achieve scale production and operation through land circulation, carry out variety optimization and standardized management in line with local conditions, promote the green and safe production of agricultural and sideline products, and build an industrial system integrating primary, secondary and tertiary industries. Farmers convert the land management right into shares according to the area and entrust them to village committees to cooperate with companies in agricultural development and operation. The profits are divided in half by the enterprises and village committees, and a minimum income is set to guarantee the basic income for the farmers. Thus, farmers collect rents through land circulation, obtain dividends through land shares, and obtain salaries through labor export. Additionally, the village collective economy continuously develops in this process, laying a solid foundation for improving the governance capability of grassroots organizations.

In general, the land market in Fuping is enlivened by land system innovation, with land assetization as the main content. Land circulation transforms land resources into land assets, manifesting the value of the land in poverty-stricken areas; land consolidation turns barren mountain lands into fertile fields, which is conducive to the development of modern agriculture; and the displacement of construction land indexes in different areas realizes the differential incomes of construction land and effectively solves the problem of insufficient development funds in poor areas. These greatly strengthen the endogenous growth momentum

of the poor and promote regional development at a higher level. At the end of 2019, the number of poor people had decreased to 832, and the poverty incidence had dropped to 0.45%. By the end of 2020, the county had successfully completed the task of lifting all rural residents living below the current poverty standard out of poverty and achieved the goal of building a moderately well-off society on scheduled.

4. Policy implications for rural revitalization

In the process of poverty alleviation in rural China, land assetization has played a significant role in stimulating the endogenous power of poverty-stricken villages and poor people to get rid of poverty and strengthening rural sustainable development. However, under the influence of the urban-rural dual structure, PALA faces problems such as unclear land property rights, an imperfect land circulation market and irregular land circulation behavior (Liu, 2014; Lu and Chen, 2015; Lu, 2017), which restrict the continuous exertion and further amplification of the effects of land assetization.

With the completion of the goal of eliminating poverty in rural China, the focus of issues concerning agriculture, rural areas and farmers has changed from poverty alleviation to rural revitalization (Liu, 2018b). In essence, antipoverty and revitalization are the two strategic choices to deal with the main problems in different stages of rural development (Guo et al., 2019b). The former aims at the poverty-stricken population and focuses on solving the basic needs of the poor through multidimensional poverty governance, while the latter focuses on solving problems associated with rural transformation and strengthening the driving force of rural sustainable development through comprehensive measures. Therefore, shaking off poverty is the key and basic premise of rural revitalization, and rural revitalization is the deepening and guarantee of poverty alleviation. Because of the close relationship between poverty alleviation and rural revitalization and the prominent role of land in rural development, it is necessary to further deepen rural land system reform and policy innovation in the process of implementing rural revitalization strategy, thus improving the system and mechanism of land assetization and promoting the modernization of agriculture and rural areas.

First, deepening land tenure system reform is necessary to clarify land property rights. According to the current land system arrangement,

rural land belongs to the village collective, and the farmers only have contract and management rights, which are incomplete property rights. Thus, farmers can be easily interfered by other property rights subjects in the process of transferring their contracted land, thus hindering land circulation. In this context, it is urgent to deepen land tenure system reform, mainly including improving the land acquisition system, reforming the rural homestead system, and establishing a market system of rural collective construction land. These changes will fundamentally eliminate the institutional barriers restricting the performance of land resources and establish an independent, clear and complete property rights relationship to consolidate the foundation of land assetization and promote the realization of the goal of "strong agriculture, beautiful countryside and prosperous farmers".

Second, the rural land market should be improved to give full play to the role of market mechanisms in rural revitalization. Under the current system design, the land market in rural China faces the problems of an imperfect circulation mechanism, a lack of intermediary organizations and prominent supply-demand contradictions, which restrict land circulation and the exertion of land functions (Liu, 2018a). These problems inherently require strengthening the construction of the rural land market and realizing the optimal allocation of land resources. When implementing the rural revitalization strategy, more attention should be paid to cultivating all kinds of land management entities; promoting price management, legal consultation, information release and other services; and constantly improving the market mechanism. These will help to activate the vitality and competitiveness of land factors, promote the equal exchange of urban and rural factors, and allow farmers to enjoy income from their land.

Third, the legal system of land circulation should be perfected to improve the level of land resource management. In recent years, the Chinese government has issued laws and regulations to promote land circulation. However, problems such as nonstandard procedures, incomplete contract content and interest disputes still exist in the process of land circulation, damaging farmers' rights and interests. To reverse this situation and give full play to the role of land assetization in rural revitalization, the central government should strengthen laws and regulations related to land circulation and stipulate the necessary procedures, contract terms, circulation registration, dispute settlements, etc. Additionally, local governments need to formulate targeted measures and rules to ensure the smooth progress of land circulation.

5. Conclusion and discussion

The land rights and interests enjoyed by farmers have long been incomplete due to the incompleteness of land property rights, which restricts farmers' investment in land and affects the exertion of land functions (Li et al., 1998; Ma et al., 2013; Liu and Li, 2017). The deepening land system reform in China has reversed this situation and promoted the transformation of rural land from resource to asset. In this study, we analyze how land assetization promotes poverty alleviation in rural areas and discuss its policy implications for China's rural revitalization in the new era. The results show that land plays a significant role in rural sustainable development through its production-living-ecological functions, and the insufficient quantity and poor quality of land and the resulting problems are important reasons for rural poverty. Land tenure system reform constantly adjusts rural production relations to adapt to the evolution of productive forces, which creates conditions for land assetization and activates production factors in rural areas. In this process, land assetization stimulates the subjective initiatives of different stakeholders through the establishment of an interest connection and sharing mechanism, which compensates for the shortcomings of poor areas and effectively promotes rural poverty alleviation and development. Focusing on the fact that rural China has transformed from poverty alleviation to rural revitalization, it is necessary to further deepen land tenure system reform, improve the rural land market and perfect the legal system of land circulation to

strengthen the mechanism of land assetization and give full play to its role in rural revitalization.

Land is not only a natural resource, but also plays a role as asset in a market economy. The multiple functions of land help to promote the optimal allocation and efficient utilization of land resources (Liu, 2018a). Since 2013, China has implemented and basically completed the large-scale confirmation of rural land rights, registering the contracted land owned by farmers and issuing certificates to guarantee farmers' land rights, such as possession, use and disposal. These policies meet the practical demands of farmers to leave their hometowns for cities, promote the transfer of farmers to secondary and tertiary industries, and accelerate land circulation in rural areas (Zheng et al., 2020; Zhou et al., 2020). This not only lays a solid foundation for the scale production and intensive management of agriculture but also effectively promotes land assetization. As a result, an increasing number of land resources are concentrated in the new-type agricultural management entities, which helps to increase farmers' incomes and promotes rural development to a higher level (Wang and Zhang, 2017). In this process, the urban-rural unified land market is constantly improving, and the transaction of land property rights realizes the incrementalization and capitalization of land, promoting the transformation of land from a single attribute of resource to a trinity of resource-asset-capital attributes (Fan et al., 2020). Therefore, deepening land system reform in rural China is conducive to promote the optimal allocation of land resources and land assetization, steadily improve the development capacities of collective economy and increase farmers' income from land asset, thus fully implementing the strategy of rural revitalization and accelerating the construction of mechanism and policy system of urban-rural integrated development in China.

In the process of land assetization, land circulation is the critical link. As income from grain planting is comparatively low, the transferred land is mainly used for nongrain production, such as vegetables and fruits growing (Wang et al., 2011; Qiu et al., 2020; Su et al., 2020), which is consistent with the current supply-side structural reform of agriculture. However, some regions unilaterally regard supply-side structural reform as reducing grain production, threatening national grain security. Thus, more attention should be paid to promoting land-use control after assetization to realize the sustainable and high-quality development of agriculture. China is a country with a vast area. The diversity of rural regional types is determined by differences in physical geography and urban-rural spatial patterns in different regions (Liu, 2018b; Zhou et al., 2019b). Accordingly, there are obvious differences in the problems of rural development. Therefore, systematically determining the typical modes of land assetization according to the main problems of rural development is of great significance to guide the implementation of rural revitalization strategy in different types of areas. Additionally, in the context of China's decisive victory in poverty alleviation and turning to the strategy of rural revitalization, rural land assetization, agricultural specialization and joint-stock management become basic guarantees to activate the vitality and develop the competitiveness of rural assets. For example, as a county in the ecotone of agriculture and animal husbandry, Yanchi vigorously develops sheep industry with regional characteristics through ecological governance of degraded land, scale management and forage planting, forms a new mode of industrial development with the basic idea of "building sheep bank and making sheep fortune" and the main contents of cooperative production between enterprises and farmers and land scale management, which provide inexhaustible power for rural high-quality poverty alleviation and rural revitalization.

Author statement

The authors declare that there is no conflict of interests regarding the publication of this article.

Acknowledgments

This study is supported by the National Natural Science Foundation of China (Grants 42001203, 41931293) and the Strategic Priority Research Program of the Chinese Academy of Sciences (Grant XDA23070300). Also, we are grateful to the editor and the reviewers for their valuable comments and suggestions.

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