The code of targeted poverty alleviation in China: A geography perspective

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HIGHLIGHTS

- Poverty is the maladjustment of elements in specific human-land territorial systems.
- The "5W2H" mode of China's targeted poverty alleviation (TPA) is proposed.
- The TPA mechanism is constructed from the human-land-industry perspective of the impoverished areal system.

GRAPHICAL ABSTRACT
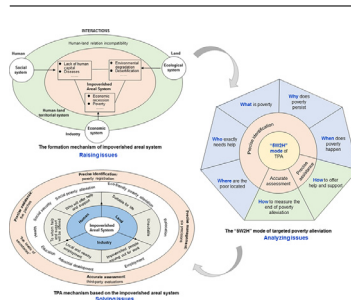
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ABSTRACT

Geography is suitable for the study of sustainability from a transdisciplinary perspective, which takes the human-land relationship as the core research. As a key obstacle to rural sustainability, poverty is an external manifestation of the coupling maladjustment of elements in human-land territorial systems. As the world's largest developing country, China eradicated extreme poverty in 2020 and made significant contributions to global poverty reduction. Especially over the last eight years, China has implemented a targeted poverty alleviation (TPA) strategy and has continuously promoted theoretical, organizational and institutional innovations for poverty reduction. From the perspective of geography, this paper extracts the experiences of China's TPA strategy, represented by the "5W2H" mode. The research concludes that: (1) Precise identification, as the foundation of TPA, aims to introduce a registration system to obtain records of all poor households and then answer the "5W" (what, where, why, who, when) issues of the geography of poverty. (2) Precise assistance is the key of TPA, which aims to solve the issue of "how to offer help and support". The barriers to escaping poverty can be accomplished through policies and measures that focus on the diverse causes of poverty and considering different situations. (3) Accurate assessments are an essential means of TPA, relevant to solve "how to measure the end of poverty alleviation", and third-party evaluations play an important role in improving the accuracy of poverty alleviation. (4) The TPA mechanism lies in reconstructing the human-land-industry structures in the impoverished areal system. It is urgent to introduce China's successful experience and typical modes of TPA for global human-earth system coordination and sustainable development and contribute to building a community of human destiny.

1. Introduction

Geography is a subject whose core of the study is the human-land relationship (Wu, 1991; Fu, 2017). It aims to reveal geographical elements' spatial distribution, evolution mechanism and regional characteristics (Fu, 2014). The field of geography is well suited to study sustainability from a transdisciplinary perspective, as it spans natural sciences, social sciences and humanities (Fu, 2020). The theories, methods and technologies of geography have become the basis for solving the problems of sustainable development faced by human society. Poverty is a key constraint on rural sustainability. The elimination of all forms of poverty is the first target of the UN 2030 Agenda for Sus-

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tainable Development, including the 17 global sustainable development goals (SDGs) (United Nations, 2016). Extant studies show that geography plays a vital role in shaping the global distribution of income and economic growth (Sachs et al., 2001). The most impoverished regions in the world are those saddled with two obstacles: distance from sea trade; and a tropical or desert environment (Sachs et al., 2001). Thus, poverty is closely connected to geography, particularly the "spatial poverty traps" of remote mountainous or arid and semi-arid areas (Bird and Shepherd, 2003; Pani and Carling, 2013; Zhou et al., 2019). From the perspective of human-land relationship, poverty is an external manifestation of human-land relation incompatibility in specific areas and their undesirable evolution within the system (Liu et al., 2017; Ding and Leng, 2018; Zhou and Liu, 2019). Rural impoverishment is a complex social phenomenon caused by element shortages and structural disorders. Poverty-stricken areas are a special category of geographic spaces (Guo and Jiang, 1995). In 2012, 14 contiguous poverty-stricken areas containing 680 counties were delimited in China (The State Council, 2011). Spatially, there are three types of rural poverty in China: isolated poverty areas in mountainous hilly areas and old revolutionary areas in the eastern region; environmentally fragile poverty zones in mountainous plateaus in the central region; and environmentally harsh poverty areas in the desertification, rocky desertification and alpine mountain areas in the west (Liu et al., 2016; Ge et al., 2019).

Poverty is multidimensional (Ravallion, 2011) and is characterized by multiple deprivations, including low consumption, inadequate living standards, poor health, a shortened lifespan, limited access to education, knowledge and information and powerlessness in various domains (Ferreira, 2011). Hence, poverty is a highly complex problem involving aspects of sociology, economics, politics and geography. People in extreme poverty lack six types of capital: human, commercial, infrastructure, natural, public institution and intellectual (Sachs, 2006). Poverty is a stubborn problem of human society. Solving poverty is a globally significant challenge, and an increasing number of people are dreaming of a poverty-free world. Since mid-industrialization, human beings have had the capacity to reduce poverty. China has long been committed to eradicating poverty. Since the foundation of new China, its poverty relief has experienced six stages: relief-type poverty alleviation (1949–1977); structural reform promoted poverty relief (1978–1985); development-oriented poverty relief drive (1986–1993); tackling critical problems in poverty relief (1994–2000); consolidation-oriented comprehensive poverty alleviation (2001–2012); and targeted poverty alleviation (2013–2020) (Guo et al., 2019a; Wang and Hu, 2020). This process reflects changes in poverty relief from regional development in impoverished regions to precise poverty alleviation targeting disadvantaged households (Liu and Cao, 2017). The progress is also reflected in accurately mapping the distribution of rural poverty.

Since the reform and opening more than 40 years ago, China has lifted 770 million rural residents out of poverty when considering China's current poverty line. According to the World Bank's international poverty standard, China's poverty reduction accounts for more than 70% of the global poverty reduction population over the same period. Since the 18th National Congress of the Communist Party of China (CPC), held in 2012, China has taken a series of significant initiatives and launched a precise poverty alleviation campaign named Targeted Poverty Alleviation or TPA. After eight years of the anti-poverty battle, China completed the target of eradicating poverty by the end of 2020. Almost 99 million impoverished rural residents were removed from poverty as were 832 poor counties and 128,000 impoverished villages. This outstanding achievement makes China the first developing country to accomplish the poverty alleviation target of the SDGs ten years ahead of schedule. This proves the scientific and effectiveness of the TPA strategy and provides an excellent example for global poverty reduction.

China's policy system for poverty reduction incorporates economic policies on pro-poverty growth, social policies to narrow the income gap and promote social equity, and special poverty-reduction policies targeting impoverished areas and people (Wang and Zhang, 2020). China has embarked on a path of poverty reduction with Chinese characteristics and formed a unique anti-poverty theory. Some scholars have pointed out that the success of China's poverty alleviation may be summarized as the "5Ds" from a political economics perspective: determined leadership, detailed blueprint, development-oriented, data-based governance and decentralized delivery (Xinhua News Agency, 2021). From the perspective of development economics, the reform of the economic system has led to the growth of income (Zhu and He, 2018). China adheres to such development models as the combination of economic development with the phased national poverty alleviation strategy and the combination of poverty alleviation and development with social security, which are beneficial to the development of poor groups (Yang et al., 2018). Some researchers stress that the foremost lesson of smallholder-led agricultural growth in land-scarce countries often has the most significant impact on poverty reduction (Fan and Cho, 2021). Yet, there are still no studies on the anti-poverty experiences from the perspective of geography for rural sustainability. According to the transdisciplinary requirements of sustainability research, such as poverty reduction and the transdisciplinary characteristics of geography, sustainability research requires input from geography. In this context, this paper aims to distill the Chinese experience to solve poverty from the perspective of geography and to identify sustainable poverty reduction paths, which is of significance in the global fight against poverty.

2. Geography-based poverty theory

2.1. The impoverished areal system

Human-land territorial systems (HLTSs) and sustainable development have become the key frontiers of integrated physical geography and geography in general (Wu, 1991; Fu et al., 2019a). HLTSs are complex and open systems with specific structures and functions formed by two major subsystems, human and land, which interact with each other in time and space (Wu, 1991; Wang, 1997; Lu and Guo, 1998). The two subsystems are linked by material circulation and energy transformation, exchanging elements with the external environment. In this open system, land refers to the geographic environment formed by the intertwined natural and human elements of the earth's surface (Feng et al., 2016; Li et al., 2016a). Human capacity is the decisive factor in the geographic system of human-land relations, especially since the onset of the Anthropocene. The natural environment provides the material basis and spatial carrier for the evolution of the HLTSs (Zhou et al., 2018). The significant challenges of achieving sustainable development goals highlight an urgent need to systematically understand the mechanisms linking humans and nature (Fu et al., 2019b).

Poverty is an external manifestation of the maladjustment of elements in specific HLTSs (see Fig. 1). Based on the human-land relationship, the impoverished areal system (IAS) is defined as an open system with structure and function, composed of natural endowments, location conditions, economic foundation, human and geographical capital within a particular area (Zhou et al., 2019). The IAS is an integral part of the HLTSs, with the subsystems of humans, land and industry as the core of the system. Under the influence of natural geography, ecological environment, history and culture and social and economic factors, poverty areas often overlap with old revolutionary regions, minority concentration areas, border areas and restricted or prohibited development zones (Liu et al., 2016). These areas have major human-land conflicts, insufficient sustainable development capacity and intergenerational transmission of rural poverty (Li et al., 2016b; Liu and Li, 2017). At the village level, factors such as poor road transport, labor force, rural factor flow, low per-capita arable land resources and distant from cities and market towns are usually the main reasons for poor villages (Wang et al., 2018).
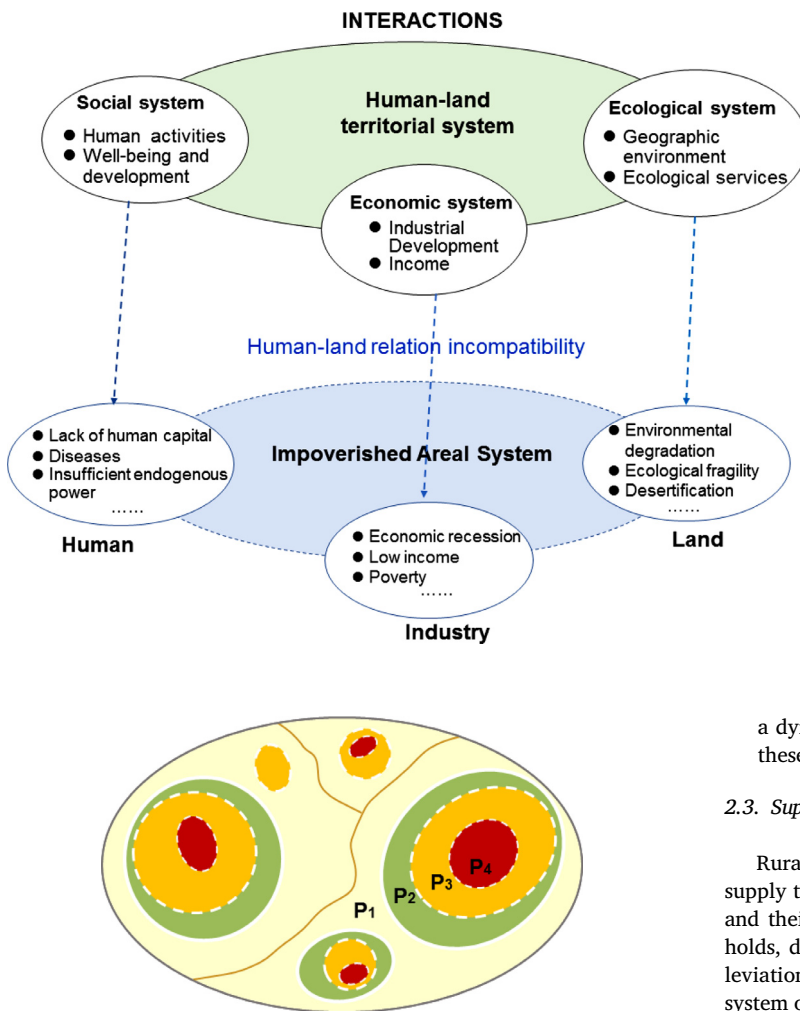
Fig. 2. The isolated island effect of rural poverty (Cited from Liu et al., 2020).

2.2. Island effect of poverty

With the implementation of poverty reduction strategy, areas along roads and major rivers have taken the lead in eliminating poverty. At the same time, the remaining populations in impoverished villages are concentrated in less economically developed areas far from cities where natural disasters are frequent and water and soil resources are constrained. This presents a relatively clustered, closed and isolated state, forming the island effect of poverty (Liu et al., 2016; Liu et al., 2017). Extreme poverty is synonymous with extreme isolation, especially rural isolation (Sachs, 2008). The island effect of rural poverty reflects regional enclosure, spatial agglomeration and diversity characteristics (Liu et al., 2020). Fig. 2 shows the four stages of the isolated island effect of rural poverty.

- P_1 is the stage of overall regional poverty when it is appropriate to adopt developmental poverty alleviation and whole-village promotional measures.
- P_2 is the precise identification stage.
- P_3 requires both precise identification and targeted assistance and emphasizes production development to facilitate precise poverty eradication.
- P_4 refers to severely impoverished counties and townships or unique poverty-stricken villages. In this stage, it is suitable to eliminate poverty by establishing social security guarantees to prevent previously disadvantaged people from returning to poverty and establish

a dynamic mechanism for monitoring and avoiding poverty among these people.

2.3. Supply-side structural system for targeted poverty alleviation

Rural poverty alleviation seeks to match the government-supported supply to rural poverty demand. The heterogeneity of different regions and their poverty-stricken counties, impoverished villages and households, determine the differences in the supply structure of poverty alleviation and the diversity of their demands. The supply-side structure system of TPA mainly includes policy supply, factor supply, service supply and product supply, which answers the questions of "what to do", "how to do it" and "what to do it with" (Liu and Cao, 2017). The policy supply mainly includes the TPA strategy and its related innovation concepts. Factor supply of TPA includes four items: special funds, land allocation, labor force training and science and technology for poverty alleviation, which provides the resource base and power guarantee for the effective promotion of targeted poverty alleviation. The service supply includes four items: industrial poverty alleviation, cadres at all levels, compulsory education and medical protection. Product supply mainly includes three items: rural facilities, farm housing and agricultural products. Service and product supply together provide an effective means and systematic organization to coordinate targeted poverty alleviation. Product supply focuses on meeting the needs of impoverished households. Service supply aims to meet the demands of impoverished villages and counties seeking to be delisted from the poverty list. Factor supply mainly adapts to the needs of counties and districts seeking to get out of poverty. Policy supply adapts to multiple levels of poverty alleviation targets and their needs.

3. Experience and practice of targeted poverty alleviation

The geography of poverty focuses on the 5W1H issues of poverty, which is shorthand for "what, where, why, who, when, and how" (Zhou et al., 2019). The 2012 targeted poverty alleviation (TPA) strategy adopted precise measures based on different poverty-stricken households and areas and implemented anti-poverty policies based on local situations, causes and types of poverty. Then poverty barriers can be eliminated, and a long-term development mechanism with endogenous motivation and vitality can be established (Wang et al., 2016; Guo et al., 2019b). Implementing the TPA strategy involves four elements: precise
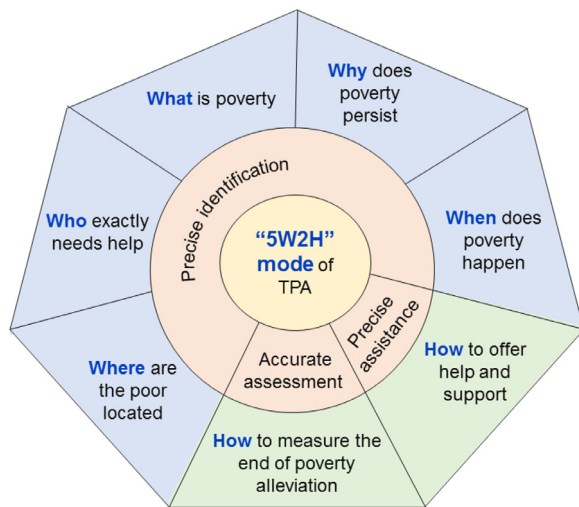
Fig. 3. The "5W2H" mode of targeted poverty alleviation.

identification, assistance and management, and accurate assessment. Precise identification is the basis, precise assistance is the key, precise management is the guarantee and accurate assessment is an important mean. The core of TPA policy lies in poverty registration, precise assistance and accurate evaluation to help those in need. Precise management is integrated into the entire TPA system. By coupling the "5W1H" framework with the four elements of TPA, we find that poverty registration answers the 5W questions; precise assistance focuses on addressing how to alleviate poverty, and accurate assessment aims to answer how to measure the end of poverty alleviation. In this context, we summarize the "5W2H" mode of TPA based on the geography of poverty in Fig. 3.

The major mechanism of TPA is the introduction of a registration system to clarify the root causes of household poverty. During the implementation of TPA, the working mechanism of "five levels of secretaries" is established, which refers to five levels of party secretaries coordinating their responsibilities in the anti-poverty campaign: provincial, municipal, county, township and village. Moreover, "six precisions"[1] and "five batches"[2] have been proposed, and a stringent assessment system has been implemented (see Fig. 4) to balance the government-supported supply and the rural poverty demand. The achievement of TPA contains five major paradigms: major theoretical innovation, grand institutional design, the great practice of poverty alleviation, huge assistance team and tremendous achievements (Liu, 2020), which have become a driving force and an important guarantee for the battle against poverty.

3.1. Precise identification: poverty registration

Poverty identification is the basis for precise poverty alleviation, which involves solving the 5W geography of poverty issues. Poverty is a diversified and multidimensional concept and the premise for implementing TPA is to define poverty. China's poverty threshold is a per capita net income of less than 2,300 yuan (at constant price in 2010). Also, it ensures that rural poor need not worry about food or cloth-

ing and that they have access to education, basic medical care and safe housing, i.e., "two assurances and three guarantees"[3].

After defining poverty, it is critical to identify who are the poor and where are they located. The geography of both regional and individual poverty is important. Anti-poverty targets in China have undergone a great change from the regional to county scale and are now aimed at impoverished villages and households (Jiang et al.,1988; Li et al., 2015; Fang and Zhang, 2021). Targeting poverty reduction from regions to households has improved the efficiency of poverty alleviation resources. The strategy of TPA lies in its precision, evolving from the previous indiscriminate and unrefined methods to a precise "drip irrigation" approach that allocates resources to every impoverished household. The large and complex structure of China's impoverished population makes it necessary to achieve precise poverty alleviation. The first step of TPA is to identify disadvantaged people accurately. Each household is identified through the application, democratic deliberation, public announcement, and verification steps. The organization carries out a "look back" to verify the accuracy of the data, classifying individuals as impoverished, and implements tracking and dynamic adjustment measures, eliminating the inaccurate identification of impoverished people promptly and making up for the newly identified population. During the identification process, a registration system of poverty alleviation was developed, which realized the recording of accurate information on impoverished households for the first time in China. According to systematic big data analysis, the root causes of poverty for every household were also first identified, providing powerful support for TPA implementation.

According to China's national poverty alleviation data system established in 2014, 128,000 poor villages, 29.48 million impoverished households, and 89.62 million disadvantaged people have been identified nationwide and dynamically adjusted. This system clarifies the distribution of the impoverished population, causes of poverty, and needs for poverty alleviation and establishes a unified nationwide information system for poverty alleviation and development. It solves the problem of "who exactly needs help" and provides the government with the necessary information for public investment and specific assistance measures. It also provides an accurate basis for the government to invest and take specific measures to help impoverished people. The documented impoverished population is mainly concentrated in the mountainous and hilly areas along the Hu Line, which marks a striking difference in the distribution of China's population drawn by the demographer Hu Huanyong (Liu et al., 2016; Liu et al., 2017). Among the registered impoverished households with archives, the numbers of people who are poor because of illnesses, disasters, school-related expenses, and poor labor ability account for 42%, 20%, 10%, and 8% of the total impoverished population, respectively; these are the leading causes of disadvantaged households and their returning to poverty. By providing targeted measures based on the needs of individuals, households, and villages and the precise identification and management of impoverished households and individuals, the constraints and obstacles that result in poverty could be fundamentally removed. At the same time, the endogenous motivation and capacity of disadvantaged households and regions could be enhanced to achieve sustainable development. Based on the 5W contents of the geography of poverty, a framework of precise identification is shown in Fig. 5, which clearly highlights that precise identification is an essential part of TPA as the basis.

3.2. Precise assistance: classified measures

How to alleviate poverty (i.e., 1H) is the scope of the geography of poverty and precise assistance is the key to targeted poverty alleviation. The innovation of TPA compared with the previous policies is

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[1] The "six precisions" refer to precisely identifying impoverished people, accurately arranging projects, properly using funds, developing household-targeting measures, precisely stationing poverty-relief officials in villages and measuring the effects of poverty relief.

[2] The "five batches" refer to lifting people out of poverty by expanding production to increase employment; through relocation; through ecological compensation (such as providing jobs involved in protecting the surrounding natural environment); through education; and by providing allowances to assist in meeting basic needs.

[3] The "two assurances and three guarantees" refer to ensuring the basic needs of food and clothing for those living in poverty and to guaranteeing that they have appropriate access to compulsory education, medical care, and safe housing.
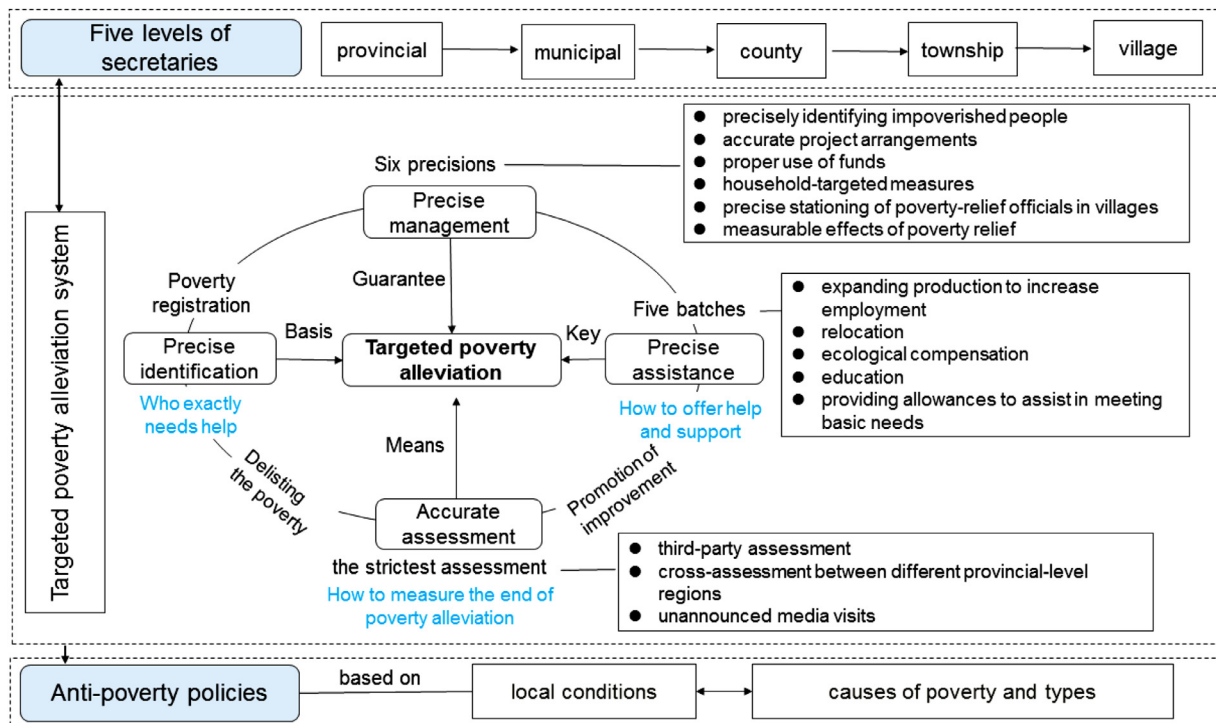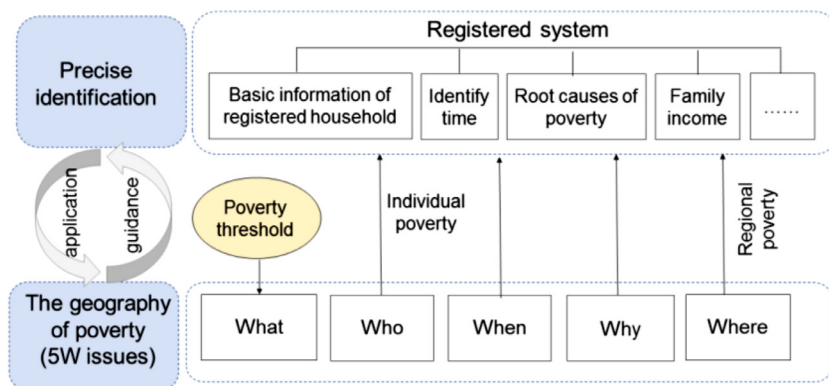
Fig. 4. Targeted poverty alleviation system.

Fig. 5. The framework of precise identification from the perspective of the geography of poverty.

that anti-poverty efforts have been tailored to the needs of individuals, households and villages in a precise and targeted manner. TPA is based on adapting measures to local conditions and providing classified guidance according to the root cause of poverty by eliminating obstructive factors. Because of the multidimensionality and complexity of poverty, it is difficult to achieve poverty reduction through individual measures. Therefore, the practice of reducing poverty is often a comprehensive system encompassing multiple measures to enhance self-development capacity of impoverished regions and people.

The "five batches" have played a leading role in tackling the root causes of poverty in China, by developing ways to increase employment through relocation, ecological compensation and education, and by providing allowances to meet basic needs. Based on the main causes of poverty, TPA practice focuses on industrial development, employment transfer, relocation projects, education, health projects, ecology, social security and society (see Fig. 6). Each is described below in more detail.

3.2.1. Industrial development

Based on the resource endowment factor of impoverished regions, poverty alleviation through industrial development gives rise to the role of cooperatives, leading enterprises and other types of market players in

increasing the operating and property incomes of poor households by establishing an industrial system with market-oriented poverty-relief ability. This factor includes measures involving the agriculture and forestry, tourism, e-commerce, photovoltaic-based intervention, asset income, science and technology. Poverty alleviation by asset income refers to projects in which poor villages and farmers benefit from capitalizing natural resources, public assets (funds) or farmers' interests according to shares or specific proportions. E-commerce poverty alleviation is an approach in which poverty-stricken people in rural areas can obtain employment, start businesses, and sell high-quality, local agricultural products online. This has effectively promoted the industrial development of poor areas, boosted employment and increased the incomes of impoverished households.

3.2.2. Employment transfer

By strengthening vocational skills training and employment services for impoverished people, poverty reduction through employment ensures employment for impoverished people who have the ability and willingness to work but are unemployed. From 2015 to 2020, the number of those in the impoverished labor force beginning to work increased from 12.27 million to 32.43 million.
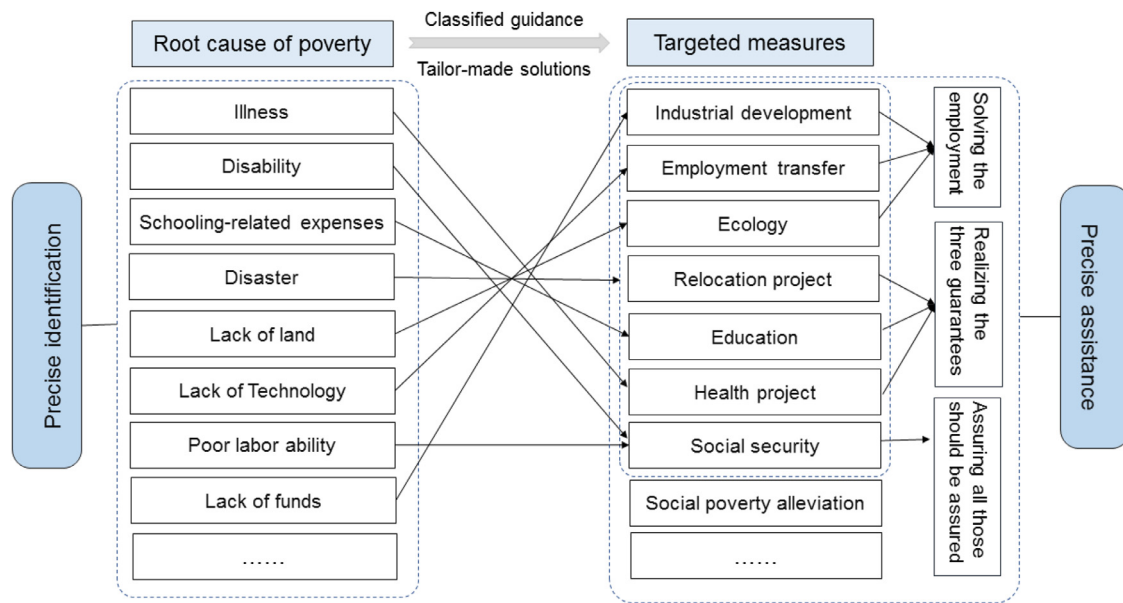
Fig. 6. Main help measures.

3.2.3. Relocation projects

The relocation project is a special poverty alleviation program targeting impoverished people who live in harsh environments. The development of production and infrastructure is slow in these areas, so implementing in-situ poverty alleviation can be difficult (Yang et al., 2020). On the principle of voluntariness, the relocation project could improve living standards, incomes and access to infrastructure and services of the poor rural deemed unable to support sustainable livelihoods (Lo and Wang, 2018). During the "13th Five-Year Plan" period, approximately 35,000 centralized resettlement areas were built nationwide, and 9.6 million poor were relocated to new homes, including more than 5 million people in urban areas and 4.6 million people in rural areas. Relocation to alleviate poverty involves moving impoverished people and reconstructing their production activities, lifestyles, urban and rural patterns and social relations.

3.2.4. Education

The education project is carried out to support areas with weak basic education, which is conducive to preventing intergenerational poverty. It aims to improve the cultural quality of impoverished people and the skills of working low-income families by improving educational infrastructure, reducing the educational burden of low-income families, developing vocational education and strengthening the supply of higher education.

3.2.5. Social security

Social security is a way to alleviate poverty by focusing on rural residents who have difficulties due to illness and disability, age and infirmity or loss of working ability. The social security system, including old-age pension insurance, medical care, subsistence allowance and support for people in extreme poverty, can help people obtain a stable source of income to cover their living and medical expenses and minimize the impact of poverty-causing factors. The Minimum Livelihood Guarantee Scheme, popularly known as Dibao, has been the government's response with potential to address the new challenges of social protection in the post 2007 market-based economy.

3.2.6. Health

Health poverty alleviation focuses on medical resources that are undersupplied in poor areas. By improving medical and health conditions and perfecting the basic medical security system, major and chronic diseases could be effectively cured. The burden of impoverished people could be reduced to effectively solve poverty caused by illness. At present, China has achieved full coverage of the triple security system of basic and major medical insurance and medical assistance for impoverished people. Thus basic medical care has been fully realized, so the problem of impoverished people returning to poverty due to illness has been largely alleviated.

3.2.7. Ecology

Eco-friendly poverty alleviation refers to impoverished people being lifted out of poverty by participating in environmental protection through ecological compensation, creating ecological public welfare jobs. This method could strengthen environmental protection and restore impoverished areas to consolidate the foundation of regional sustainable development. By implementing eco-friendly poverty alleviation since 2013, 4.97 million hectares of land has been returned to forest and grass in poor areas, and 1.1 million impoverished people have been recruited as forest rangers, thus achieving a win-win situation in poverty alleviation and ecological conservation.

3.2.8. Social poverty

Social poverty alleviation aims to gather social strength to form a synergy in poverty eradication, mainly including the east-west collaboration program[4], pairing-off assistance[5], enterprise assistance, military assistance, social organizations and volunteer assistance, international exchange and cooperation.

3.3. Accurate assessment: third-party evaluations

Accurate assessments are an important mean to enhance TPA effectiveness. Quantitative assessments make poverty relief work pragmatic, the process of poverty eradication solid and the results of poverty eradication real. Assessment methods include third-party assessments, provincial cross-assessment and unannounced media assessments. The

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[4] The east-west collaboration program refers to the developed provinces and municipalities in eastern coastal areas entering into cooperation with western regions to support the development and construction of western poverty-stricken areas.

[5] The pairing-off assistance refers to the public sectors giving assistance to the designated poverty-stricken areas.

introduction of third-party assessments in the evaluation of TPA effectiveness is an essential institutional innovation that can compensate for the shortcomings and deficiencies of the government's self-assessment. This improves the credibility of the assessment results and helps to modernize China's governance system and capacity (Meng and Li, 2018). China has proposed implementing a strict assessment and evaluation system in order to establish a sound assessment mechanism for targeted poverty alleviation. The scheme of third-party assessment of TPA effectiveness was based on geography. The participants of this program were geography scholars from universities and research institutes who utilized geography in cross-sectional research. Between 2015 and 2020, more than 10,000 experts participated in the assessment survey of 603 counties, 5,380 villages and more than 160,000 farming households in 22 central and western provinces.

The third-party assessment of TPA effectiveness aimed to evaluate poverty alleviation policies and measures in 22 provinces in central and western China. Its core mission was to calculate the "two rates and one degree"[6], evaluate "two assurances and three guarantees" and to identify successful experiences and problems. This complex third-party evaluation was the earliest and largest national third-party evaluation of poverty alleviation. Based on changes in TPA effectiveness over the years, third-party assessments make the identification and withdrawal of the impoverished population more accurate and the assistance for villages and households more focused. Through the evaluation and promotion of improvement, China's poverty identification accuracy rate increased by 2.09% between 2016 and 2020, the exit accuracy rate increased by 3.22% and the mass satisfaction degree increased by 10.74%. The third-party evaluation of TPA effectiveness has played an important role in supporting the national assessment and decision-making on poverty alleviation.

3.3.1. Index system for assessment

Based on the theory of rural impoverishment and the principle of targeted poverty alleviation, the third-party TPA effectiveness assessment selected precise identification in order to comply with the *Measures for Assessing the Effectiveness of Poverty Alleviation Work of Provincial Party Committees and Governments*. Among them, the accuracy rate of poverty identification and existence was considered. The assessment indexes of precise assistance include mass satisfaction according to villages and households, i.e., "two rates and one degree". The accuracy rate of poverty identification includes two indicators of impoverished household incorrect entry rates and omission rates. The accuracy rate of poverty exit includes one indicator of impoverished household incorrect exit rate. The mass satisfaction rate includes one indicator that refers to itself. The three indicators reflect the entry, exit and process of targeted poverty alleviation, reflecting the process-based assessments. During the assessment, the investigators verified incorrect entry households, omitted households and incorrectly delisted households, and then confirmed their findings with the two village committees.

3.3.2. Stratified sampling

The island effect of rural poverty requires higher and stricter requirements to improve the effectiveness and accuracy of targeted poverty alleviation. The distribution of China's rural impoverished population shows spatially heterogeneous characteristics. It has a structure and spatial pattern of multilevel coexistence of poverty-stricken areas, counties, villages and households (Liu et al., 2016), showing zonal characteristics and differences (Liu, 2020). In formulating the sampling scheme for the third-party assessment, the geographical evolution and dynamic features of impoverishment were fully considered, and the laws of geographic locality were followed. Typical survey counties were se-

lected according to regional differences. At the same time, the principle of classification assessment was considered, i.e., the types of deep poverty-stricken counties, delisting counties, poverty-stricken counties and nonpoverty-stricken counties. Within the county, villages under investigation were randomly selected based on regional differences while considering the types of severely impoverished villages, generally impoverished villages, delisted villages and non-impoverished villages. In villages, the number of farm households in each category in the sampled villages was determined based on the size and composition of registered households (the proportion of households in poverty and out of poverty), and individual differences of farm households in the village sample were randomly selected. The sampling system of "poverty-stricken counties – villages – households" was formed, ensuring the sampling survey data collection's full range, representativeness and authenticity.

3.3.3. Questionnaire design and data collection

Third-party evaluation questionnaires focused on registered households, unregistered households and village cadres (see Fig. 7). To ensure data quality and completeness, the survey also collected spatial location, courtyard photos, survey videos and audio of the interviewees. In the process of data collection, the technical survey specifications were unified. In addition, field survey workflows, work requirements, technical means and survey equipped programs were developed. In addition, field survey assessment operations were standardized. These steps ensured that the survey assessments could be restored, the process could be traced and the results compared. Moreover, the data collection and management specifications were unified to provide reliable technical assurance for assessment. The third-party assessment expert team independently developed the "*National Third-party Assessment Platform for Targeted Poverty Alleviation Effectiveness*" to provide strong technical support and security guarantees to collect, manage and analyze data.

3.3.4. system for assessment

To ensure the authenticity of the information and data quality of the assessment survey, the national third-party assessment team on TPA effectiveness explored and proposed "two institutions and three systems". The "two institutions" refer to the provincial team cross-evaluation system and the team member examination and certification induction system; the "three systems" refer to the digital data collection system of the app, the data quality audit and backstage management system, and the standardized statistical analysis and decision-making system. They include six key technologies, four support technologies and the "six-in-one" equipment guarantee system[7] (see Fig. 8).

3.4. Poverty alleviation based on the impoverished areal system

Rural poverty is characterized by unbalanced and insufficient development in rural areas. Poverty alleviation is a process of spatial and social association reconstruction for poverty-stricken regions. The impoverished areal system (IAS) is a multibody system composed of natural and human elements and is a dynamic and complex system. In this context, it is necessary to analyze the multiple elements of the IAS. Human, land and industry are the core elements of the IAS. Human and land are the essential elements of the human-land relationship, while the industrial structure is the framework of the human-land system. Therefore, the synergistic development of human, land and industry is the key to eliminating poverty and realizing rural revitalization. Based on the theory mentioned above, this paper constructs the TPA mechanism in China from the human-land-industry perspective of the IAS (see Fig. 9). To solve the main contradictions and problems of rural poverty and development, we need to take the rural population, land, industry and

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[6] The "two rates and one degree" refer to the accuracy rate of poverty identification, the accuracy rate of poverty exit, and the degree of mass satisfaction according to villages and households.

[7] The "six-in-one" equipment guarantee system refers to the equipment which contains a questionnaire, a recorder, a camera, a video camera, a GPS and a map in this system.
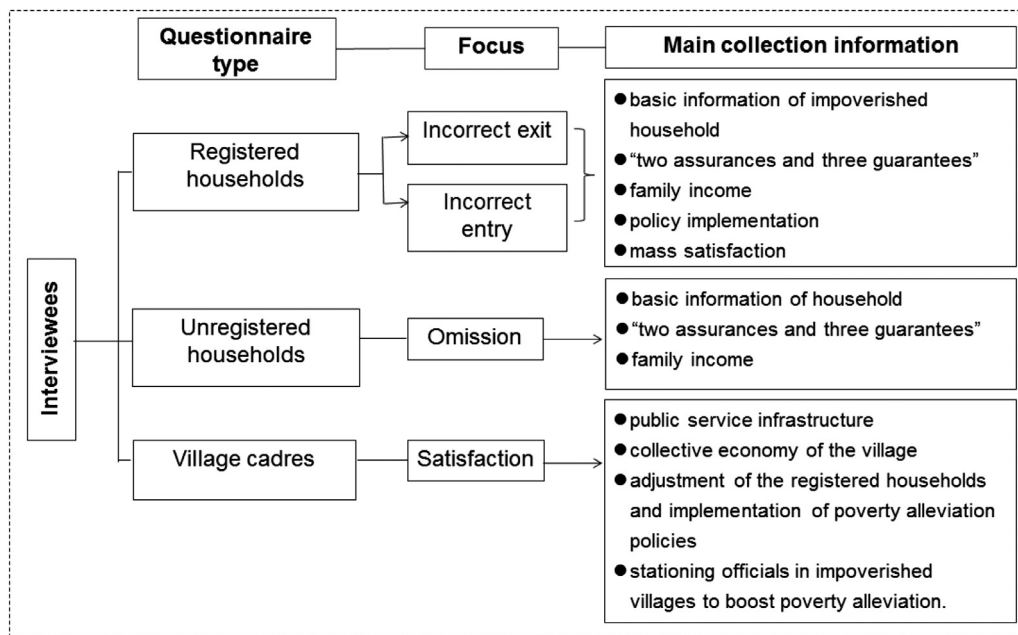
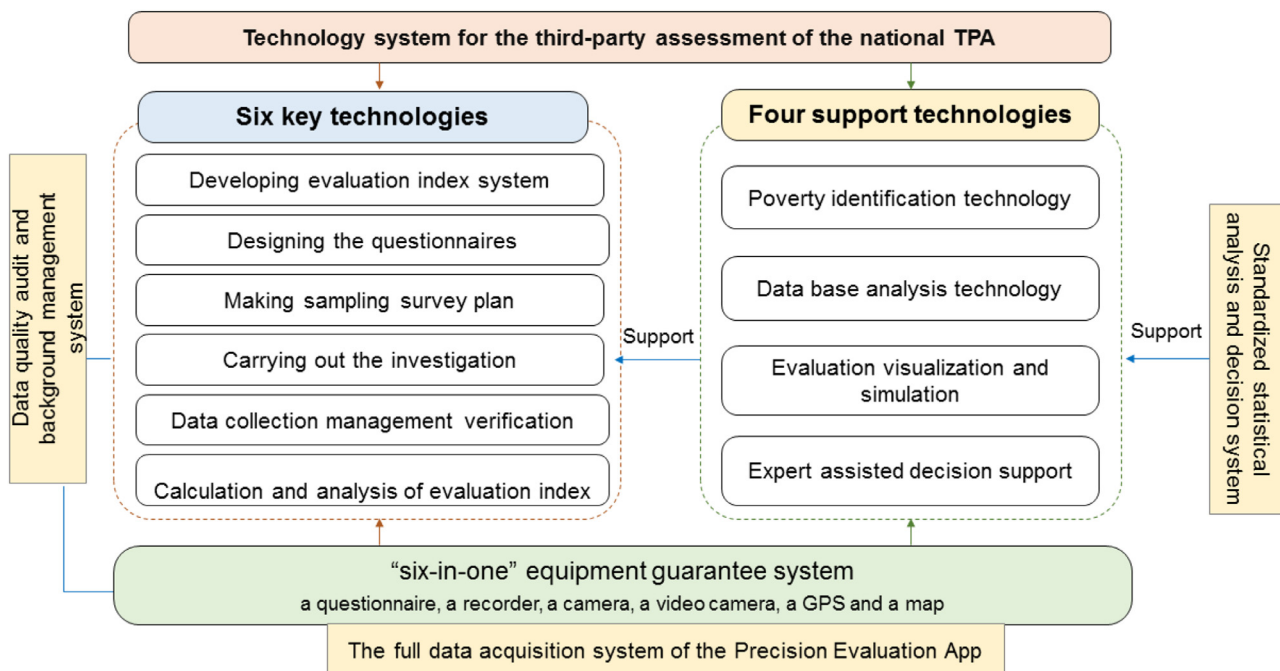**Fig. 7.** Questionnaire collection information.

Fig. 8. Third-party TPA evaluation.

other elements and systematically build a coupling pattern and innovation system of people, land and industry.

4. Sustainable path of poverty reduction

Targeted poverty alleviation is a complex project. Following the basic strategy of "six precisions" and "five batches", China has developed innovative policies and measures for poverty alleviation and implementation. In this way, China has formed an anti-poverty theory with Chinese characteristics that have explored a new path for global poverty reduction.

4.1. Integrating China's poverty reduction and development into dual domestic and international cycles

The decisive year in the battle against poverty was 2020. China proposed a new development paradigm in which domestic and international circulations reinforce each other. The domestic circulation of the economy can create more jobs, laying a solid foundation for poverty eradication and poverty prevention. Moreover, poverty reduction significantly contributes to expansion of the domestic market and improvement of China's consumption capacity, becoming an important guarantee for the realization of the domestic circulation of the economy. The relationship between the two is mutually reinforcing. In addition, the rural territo-
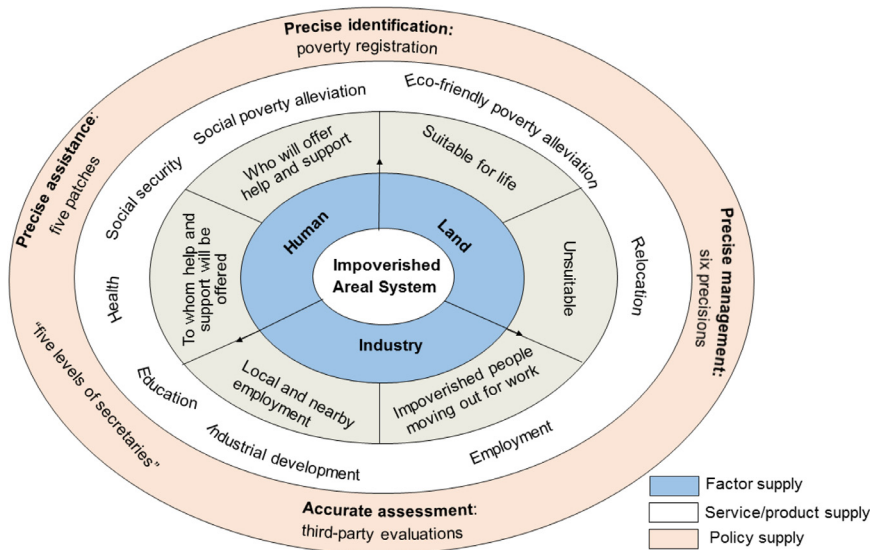
rial system is influenced by multiple external factors, such as urbanization and economic globalization. Under an open system, the intensity of global, national, local and urban-rural exchanges is increasing. The flow space of human, logistic, information and capital flows contributes more to explaining the regional pattern than stationary space. As the flow space and open system increase the interaction between regions, the spatial recombination of various production factors creates opportunities and possibilities to further enhance their competitiveness (Fan, 2018). During the process of poverty alleviation, China has formed a governance structure of international and domestic circulation that prioritizes internal flows based on the targeted poverty alleviation strategy. It has dealt with the relationship between inner strength and external forces, brought into play internal advantages and accelerated industrial transfer and east-west communication.

In the context of globalization, it is inevitable that rural territorial systems will become integrated into globalization patterns. However, in the face of an increasingly complex international situation, relying solely on foreign markets increases the vulnerability of rural territorial systems, which need to be integrated into a new double-cycle pattern of international and domestic cycles to maintain sustainable development. The double-cycle pattern can reconfigure the urban-rural development space, consolidate the achievements of poverty eradication and build a new urban-rural relationship (Zheng and Guo, 2021). Impoverished regions should take full advantage of their resource advantages and endogenous development momentum. In addition, regional linkages with an open system need to be promoted. This can occur by breaking down the closeness of impoverished areal system and addressing institutional barriers and spatial fragmentation. Moreover, it is important to promote the flow of elements (i.e., population, land) and industrial interactions and focus on integrating resources, features and regional development linkages (Liu et al., 2020). The path to sustainable poverty reduction involves building a long-term mechanism for urban-rural integration across regions and flow spaces.

4.2. Stimulating and enhancing motivation of impoverished households as the core driver of poverty eradication

Stimulating the motivation of impoverished households so that they can lift themselves out of poverty is the key to poverty eradication. Based on the adage—'give a man a fish and you have fed him for a day, but teach a man to fish and you have fed him for a lifetime.' Impoverished people often have a serious "waiting, wanting and relying on" mentality, and their lack of motivation is an obstacle to poverty erad-

ication. External forces can improve the speed of poverty eradication; however, relying on external forces alone leads to excessive dependence. Even if people get out of poverty, they can quickly return to poverty. China's TPA works by increasing people's confidence and enriching their knowledge so that they can develop themselves and form an overall anti-poverty pattern underpinned by "social mobilization + individual progress". Poverty alleviation aims to eliminate poverty and to improve the viability of impoverished people. The TPA focuses on mobilizing disadvantaged people's enthusiasm, initiative and creativity, and cultivating their basic skills. In the short term, we focus on solving the problem of "two assurances and three guarantees" for impoverished people and improving their living standards so their incomes put them over the poverty line. However, in the long term, the aim is to solve the problem of insufficient development motivation and capacity, gradually reduce the proportion of transfer income and increase income through industrial development, stable employment and regular income. China's poverty reduction practice shows that individuals are the creators and drivers of history. By stimulating the motivation of the poor to be self-reliant, absolute poverty can be definitively eradicated.

4.3. Constructing a ternary mechanism of government control, market regulation and social participation, and building a strong synergy for overall poverty alleviation

National targeted poverty alleviation is a prominent political project, a people's livelihood project and a complex scientific and technological project and information project. China's TPA has constructed a three-tier mechanism, with the government as the leading force, the market as the main force, and society participating and collaborating. Together a large poverty alleviation pattern is formed, with industrial poverty alleviation and social poverty alleviation complementing each other. This also creates a poverty alleviation system with multiple subjects across regions, departments, units and society participating together to guarantee the continuity and effectiveness of poverty alleviation. Government regulation is conducive to solving large-scale and concentrated poverty. However, market regulation is more professional and precise, and the promotion and complementary role of the market economy is indispensable for poverty alleviation. The market economy can be a strong tool for poverty eradication in terms of financial security, industrial development and project promotion, injecting sustainable power for endogenous growth into poor areas through the effective transformation of market advantages.

Social forces have significant advantages in development, education improvement and social security, which are powerful supplements to the government's poverty alleviation program and implant endogenous elements for poverty eradication and rural revitalization. To this end, under the leadership of the Party, introducing market mechanisms and market forces to participate in poverty alleviation is an effective way to improve the efficiency of poverty alleviation. Through the practice of poverty alleviation, China has successfully alleviated poverty which is driven by economic growth, social assistance, farmer participation, universal and preferential policies and links with development and social security (Zhou et al., 2018).

5. Conclusion

The geography of poverty plays a vital role in rural poverty and poverty eradication experiences. China won the battle against poverty in 2020 and made a significant contribution to global poverty reduction. Implementing a TPA strategy is a significant innovation in the theory and practice of poverty reduction in China. Based on the human-land relationship, rural poverty is the maladjustment among human-land-industry subsystems in the impoverished areal system. From the perspective of geography, this paper summarizes the experience of China's targeted poverty alleviation which is represented by the "5W2H" mode. The core of TPA's success lies in the following. (1) A registration system for precise identification based on the evolution, law and characteristics of the impoverished areal system. This system solved the "5W" (what, where, why, who, when and how) issues of poverty. (2) Precise measures, which answered "how to offer help and support", could be adapted according to the different cases of poverty-stricken people and areas. (3) The introduction of third-party assessment aiming to solving "how to measure the end of poverty alleviation". Taken together, the synergistic development of human-land-industry is the key to eliminating poverty in the impoverished areal system.

In 2020, China become the first developing country in the world to eradicate absolute poverty. In light of the goal of global sustainable development in the human-land territorial systems and the world's need for poverty reduction, China must participate in global poverty governance actively and introduce its successful experience and typical models of targeted poverty alleviation. Moreover, international organizations need to help strengthen cooperation among governments to build a shared future for humanity.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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