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Research on the Current Situation of Overall Rural Poverty in China and Countermeasures—Empirical Evidence from Practice in Yunnan Area

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ABSTRACT

Eradicating regional poverty constitutes a cornerstone of China's strategy to achieve a moderately prosperous society in all respects. As one of the nation's most poverty-stricken regions, Yunnan Province epitomizes the complexities of this endeavor. Geographically, Yunnan encompasses 4 of China's 14 Contiguous Extremely Poverty-Stricken Regions (CEP), accounting for nearly 30% of the country's most disadvantaged areas. Administratively, 27 classified as deep poverty counties—the highest number nationally. Socioeconomic data reveal that over 60% of the province's impoverished population resides in 4277 registered poverty villages, underscoring the spatial concentration of deprivation. This paper employs the "S-curve" theory and integrates the micro-behavioral "poverty trap" theory (including initial fixed costs of inter-job transitions and social interactions among impoverished groups). It aims to explain the evolutionary process of regional overall poverty alleviation from both macro-regional and micro-individual perspectives, using household income as the primary thread, and elucidates the formation mechanism of regional overall poverty in Yunnan. The aim is to answer three core questions: first, what are the formation mechanisms and salient features of overall regional poverty in Yunnan? Secondly, what are the structural challenges in the fight against poverty? Third, how to build targeted strategies to break through the 'poverty trap' and 'middle-income trap'? By analysing Yunnan's practice, we will put forward precise policy suggestions to provide reference

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for poverty eradication in deeply impoverished areas.

Keywords: Regional Overall Poverty; "Sigmoid-Curve" Theory; Scarcity Trap; Poverty Alleviation Strategies

1. Introduction

This study employs the national rural poverty line currently set by the Outline for Rural Poverty Alleviation and Development in China (2011–2020) (2855 yuan per person per year), using per capita annual net income as the measurement basis. It aims to identify individuals living in absolute poverty and provide a unified quantitative benchmark for poverty alleviation efforts. General Secretary Xi Jinping has emphasised that lifting rural populations out of poverty represents the critical shortfall in building a moderately prosperous society in all respects. Targeted poverty alleviation and precise poverty eradication must be implemented, with extraordinary measures taken to ensure all impoverished individuals meet current standards and all impoverished countries are lifted out of poverty (for details, please refer to the first item in **Appendix A**). The nation's 14 contiguous areas of extreme poverty are predominantly located in older, minority-populated, and border regions. These areas face multiple challenges, including lagging infrastructure, fragile ecosystems, and a high incidence of poverty, constituting the primary battleground for poverty alleviation efforts (for details, please refer to the second item in **Appendix A**). As a plateau province in southwestern China's frontier region, Yunnan features mountainous terrain covering 94% of its land area. It encompasses four major pockets of extreme poverty: the Wumeng Mountains, areas affected by rock desertification, border mountainous regions, and the Tibetan-inhabited areas of Diqing. The province exhibits pronounced characteristics of regionalised, comprehensive poverty.

To formulate more scientifically precise anti-poverty policies, academic research has extensively explored the classification and measurement of poverty, its influencing factors, precise identification methods, and approaches to poverty alleviation alongside their effectiveness. This research provides crucial theoretical and practical support for addressing regional poverty

as a whole. Specifically, this study focuses on regional poverty in rural areas of Yunnan Province, with its research subjects primarily encompassing the peasant population within this region. This definition facilitates an in-depth analysis of the urban-rural divide and the unique poverty challenges faced by the peasantry.

The study of the definition of poverty classification is the basis of anti-poverty theory and practice. Ravallion categorizes poverty over time into permanent and temporary poverty^[1], while Hulme and Shepherd further classify households into five groups: perpetual, recurrent, implicated, occasional, and never-poor^[2]. Focusing on rural China, Gustafsson and Ding found temporary poverty significantly more prevalent than permanent poverty^[3]. Zhang Yuan et al., using rural household panel data, analyzed poverty dynamics and decomposed it into chronic and temporary components, revealing chronic poverty as the dominant share^[4]. Yin Lingxiao noted that academic understanding of poverty is continually evolving, with research on consolidating poverty alleviation outcomes classifying poverty through dimensions such as income, capability, cognition, and control^[5].

With advances in theory and practice, poverty measurement has evolved from absolute poverty (focused on subsistence and basic needs) to relative poverty (assessing comprehensive needs through multidimensional evaluation). This shift provides a sustainable framework for poverty alleviation strategies. Currently, rural China exhibits a dual poverty landscape, where absolute and relative poverty coexist. Li Yongyou and Shen Kunrong argued that relative poverty requires government intervention, as market mechanisms alone are insufficient^[6]. Gu Xin noted the inherent relativity of poverty^[7]. China's absolute and relative poverty lines were remarkably low. Scholars like Chi Zhenhe and Yang Yiyong^[8] and Chen Zongsheng et al.^[9] advocated for a dual measurement approach using both absolute and relative standards. Early research also focused on comprehensive measurement frameworks^[10], multi-dimensional poverty analy-

sis^[11], and rural-urban and ethnic disparities^[12]. Recent literature, however, has pivoted to the post-2020 era following China's historic eradication of absolute poverty. Researchers now frame the new anti-poverty strategy as a shift from a "hard battle" to a "protracted war," from "growing the pie" to "dividing it fairly"^[13]. The strategic alignment between poverty alleviation and common prosperity is highlighted^[14], with scholars like Jiang Xiaoping and Zheng Shiyan detailing how China's theoretical framework for relative poverty surpasses Western models by unifying collective and individual values and integrating empowerment with income redistribution^[15]. Measurement studies confirm that while absolute poverty has been drastically reduced, relative poverty remains a significant challenge, with its share in overall poverty increasing^[16,17]. New research also explores the nuanced impacts of specific factors like urbanization^[18], land transfer^[19], and social security^[20]. Despite these advances, a research gap exists in the systematic, micro-level analysis of specific governance practices and the practical application of multi-dimensional poverty indicators in the new context of relative poverty. This paper aims to fill this gap by investigating.

With the deepening of targeted poverty alleviation, a so-called "elite capture" phenomenon has attracted widespread attention in rural poverty alleviation. Xing Chengju and Li Xiaoyun argued that the key reasons for the deviation of poverty alleviation programmes in China are the interaction of forces inside and outside the project area, the paradox of participatory development, the division of rural society, the asymmetry of information about the project, the unbalanced allocation of participatory rights, and the threshold effect of the project, resulting in the "capture of the elite"^[21]. In agricultural development programs, Liang Jianfeng documented elite dominance in farmer cooperatives through leadership control, equity concentration, and "large farmers exploiting smallholders," fundamentally contradicting cooperative principles^[22]. Wen Tao et al. found that the proportion of non-specialised financial institution loans obtained by impoverished households in China has declined year on year, reflecting a pronounced phenomenon of "elite capture" within the rural financial market^[23]. However, Hu Lian and Wang Sangui's Wu-

meng region case study found even the household registration system (file-establishing cards) suffers significant elite capture biases, challenging the foundation of precision targeting^[24]. Yun Chunxi emphasised that "elite capture" reflects disorder in rural governance^[25]. It necessitates institutional empowerment and structural restructuring to facilitate the transition of resource allocation authority from elite monopoly to pluralistic sharing, thereby achieving inclusive rural revitalisation and poverty alleviation.

Analysis of the primary determinants of poverty facilitates the implementation of targeted poverty alleviation through the 'one village, one policy' approach. Giulia Zanzi combined general equilibrium models with micro-simulation models, providing an effective tool for the quantitative analysis of poverty determinants^[26]. Du Fenglian and Sun Jingfang identified regional and geographical factors, individual characteristics, and the intergenerational transmission of poverty as key influences on poverty^[27]. T. Glauben et al. utilising multi-province data, demonstrated an inverse relationship between educational attainment and persistent poverty, with households solely reliant on agriculture and those residing in mountainous areas exhibiting the highest probability of enduring poverty^[28]. Xie E examined the effects of public transfer payments on income inequality and poverty, emphasising the role of fiscal redistribution^[29]. Zhang Jianchun and Deng Dasong emphasised the primary factors influencing social security's role in rural poverty alleviation^[30]. Throughout the entire process from its establishment to operation, the modern social security system is fraught with various types of risks, presenting issues of 'malfunction' or 'ineffectiveness'.

A. Park and S. Wang contend that bottom-up mechanisms carry the risk of "elite capture"^[31], while J. Ricker-Gilbert^[32] and L. Meng^[33] observe that top-down mechanisms may generate 'crowding-out effects' or lead to resource misallocation. F. J. Buera et al.^[34] and S. Rogers^[35] also highlight issues of misallocation and elite capture in government subsidies. A decade of recent Chinese research provides a more nuanced view, showing how the nation has transcended this dichotomy. Jia Junxue et al. summarized China's shift from a 'blood transfusion' to a 'blood production' approach^[36], while

Yan Jiao et al.^[37] and Xiang Deping & Gao Fei^[38] explored how the country's model evolved from top-down to an integrated approach that combines "specialized" and "development-oriented" strategies. While these models have achieved significant success, they still face challenges like the "effectiveness paradox"^[39] and issues with precise beneficiary identification^[40]. Therefore, future efforts must focus on building long-term mechanisms that clarify the relationship between government, market, and society, and elevate the anti-poverty work to address new tasks in the post-poverty era^[41]. This body of work underscores that China's model is not simply top-down or bottom-up, but a dynamic, integrated, and institutionalized approach that provides a valuable reference for global poverty reduction.

While existing research has established a solid foundation in poverty theory, three key research gaps remain regarding Yunnan's 'regionalised comprehensive poverty': firstly, there is insufficient analysis of the 'poverty trap' effect resulting from the compounding of factors such as 'mountainous terrain, border location, ethnic minority populations, and entrenched poverty'; Secondly, it overlooks the holistic interconnection between multidimensional challenges such as ecological fragility, economic weakness, and governance deficiencies. Thirdly, it fails to integrate the 'S-curve' theory to construct an effective pathway for transitioning from 'poverty alleviation' to 'moderately prosperous society'.

Building upon prior research, this paper examines the current state and challenges of regional poverty in Yunnan Province, proposing targeted poverty alleviation strategies. As the province with the highest number of impoverished counties and population in China, Yunnan's case study holds significant exemplary value, offering direct reference for concentrated contiguous areas of extreme poverty nationwide, particularly for similarly profoundly impoverished regions.

2. Methods

This study employs theoretical analysis, literature review, and field research to construct an economic explanatory framework of poverty evolution in Yunnan Province based on the 'S-curve' theory. It examines

the causes of the 'poverty trap' and 'middle-income trap' from economic and behavioral science perspectives. By analyzing poverty-alleviation policies, registered household data, and regional economic statistics—complemented by case studies in typical areas—this research systematically investigates the characteristics, mechanisms, and pathways out of deep poverty, aiming to provide theoretical and practical insights for poverty eradication.

3. Economic Framework for Regional Poverty Transition

In Yunnan's poverty alleviation efforts, the most pronounced characteristics of the poverty trap manifest in two aspects: initial fixed costs that cannot be covered through borrowing, and entrenched social interactions between impoverished and non-impooverished groups. These will be elaborated upon below.

i) The classic pathway out of the poverty trap involves transitioning from low-productivity to high-productivity occupations, though this process necessitates overcoming substantial initial fixed costs. In Yunnan, this manifests specifically in two ways: firstly, educational costs, where impoverished households struggle to afford vocational training or academic advancement, thereby hindering their progression to higher-value-added roles; secondly, transport costs, where isolated transport infrastructure inflates the expenses associated with labour and information mobility, exacerbating the isolation of disadvantaged groups from external markets.

ii) Poverty is not merely an economic condition but also a social phenomenon. The lack of positive social interaction between impoverished and non-impooverished groups further exacerbates the poverty trap. In Yunnan, this manifests specifically in two ways: firstly, information scarcity, where limited external communication hinders impoverished communities from accessing advanced technologies, market dynamics and employment opportunities, thereby impeding their ability to make optimal economic decisions; secondly, a mindset of 'waiting, relying and demanding' – this dependency fostered by unequal resource distribution undermines the drive

for self-reliance in overcoming poverty, creating a vicious cycle.

From a social development perspective, a moderately prosperous society represents a transitional form between poverty and affluence, constituting an indispensable stage on the path towards a 'well-functioning society'. This paper employs the 'S-curve' theory from a behavioural economics perspective, using household income growth as the central thread to elucidate the evolutionary mechanism of regional poverty eradication and the comprehensive realisation of a moderately prosperous society.

3.1. Economic Significance of S-Curve Theory in Poverty Transition

The process of eradicating poverty and achieving a moderately prosperous society is fundamentally one of escaping the low-income trap and advancing towards affluence. This trajectory can be explained through the theory of the S-curve, as shown in **Figure 1**, the diagonal NQ indicates that today's income is equal to tomorrow's income. The "poverty trap" refers to the situation where individuals trapped in poverty perpetuate their own destitution, becoming ensnared in a vicious cycle that is difficult to escape and which perpetuates across generations.

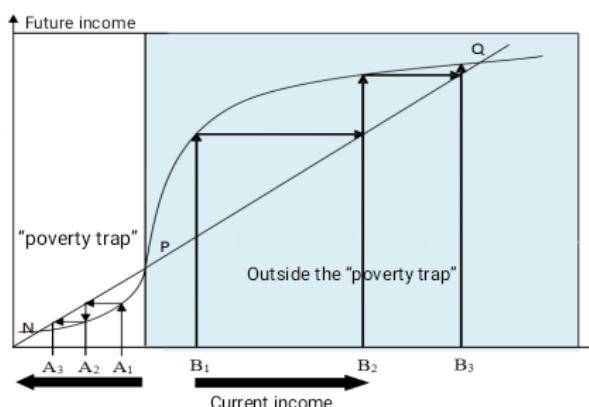


Figure 1. "Sigmoid-Curve" vs."Low-Income Trap" Challenge.

The causes of poverty illustrated in **Figure 1** constitute both direct factors affecting farmers and common obstacles constraining the overall development of the region. For instance, shortages of land and water resources directly impede agricultural production, while

poor transport links and a lack of educational and health-care resources universally restrict development opportunities for all residents—including both farmers and non-farmers—and hinder the diversified and healthy development of regional industries.

Marxist political economy establishes the material primacy principle: productive forces must satisfy basic subsistence needs (food, clothing, shelter) before superstructural development (science, culture, art) can emerge (for details, please refer to the third item in **Appendix A**). This necessitates prioritizing poverty trap. In the 'S-curve' theory, groups trapped in the 'poverty trap' ($A_1 \rightarrow A_2 \rightarrow A_3 \rightarrow N$) experience persistently declining future income relative to their present levels, ultimately becoming ensnared in poverty at point N. This leads to deepening destitution and increasing difficulty in escaping it. Conversely, groups progressing towards 'poverty alleviation and moderate prosperity' ($B_1 \rightarrow B_2 \rightarrow B_3$) experience steady future income growth, gradually becoming middle-income households. They subsequently achieve increasing affluence, enabling the region as a whole to realise the goal of building a moderately prosperous society in all respects (B_3 and above), subsequently developing along a relatively stable, high-level trajectory. The comprehensive realisation of a moderately prosperous society (transcending the B_3 stage) signifies a complete escape from the risk of returning to poverty. For low- and middle-income households, particularly those living below the poverty line in conditions of absolute subsistence poverty, ensuring basic survival needs is merely the first step. It is imperative to facilitate their transition through structural transformation, enabling them to escape what economists often term the 'poverty trap' and cross the threshold into a 'middle-income', moderately prosperous society, ultimately achieving sustainable prosperity.

This theory holds strong explanatory power for Yunnan: over 60% of the impoverished population across the province's 4277 registered impoverished villages remain trapped within the "poverty trap" (stages A_1-A_3) depicted in the curve, characterised by stagnant incomes and high indebtedness – precisely the hallmark manifestations of the "low-income trap". Natural conditions serve as the initial catalyst: the isolation of moun-

tainous regions perpetuates their prolonged stagnation within this phase. From Yunnan's experience, natural conditions constitute the initial trigger for the 'poverty trap'. The transportation isolation caused by mountainous terrain traps impoverished regions in the A1-A3 stages of the 'S-curve': in 2016, agricultural income constituted 55.9% of revenue in impoverished counties. Affected by steep slopes yielding low productivity and frequent disasters (causing annual yield reductions of 10%–15%), income volatility reached 20% (compared to the national average of 8%). Asset accumulation proved feeble (net property income merely 1.7%), rendering communities unable to undertake long-term investments in education or healthcare. This fostered a vicious cycle: 'poor natural conditions → unstable income → weakened human capital → persistent poverty,' mutually reinforcing the short-sighted behaviours characteristic of the 'poverty trap' (such as prioritising basic sustenance over children's education).

3.2. The Causes, Essence, and Logical Relationships of the "Poverty Trap"

To gain a deeper understanding of the poverty trap, we must also introduce the theory of the scarcity trap at the micro level of the individual. This theory explains that poverty is not merely a lack of material resources, but rather a psychological state that influences personal behaviour and decision-making. Poverty constitutes a state where survival and development face systemic threats, manifesting as a vicious cycle formed by the intertwined hardships of hunger, homelessness, lack of clean drinking water, exclusion from education and employment, and the burden of disease. Economic research indicates that impoverished regions are often situated in ecologically fragile areas with harsh climates and poor transport links. Subject to uncertainties such as natural disasters and frequent conflicts, these areas struggle to enhance social productivity without substantial initial investment to address local challenges. Simultaneously, their poverty prevents them from affording the returns on such investment, perpetuating their predicament. For those residing in impoverished regions, the absence of initial capital and basic safeguards, compounded by overlapping traps such as illness, ed-

ucational deprivation, and debt, further intensifies the depth and persistence of poverty.

Behavioral economists Mulaenaren and Schaffler proposed the "scarcity theory," which argues that poverty and busyness are not merely due to a lack of money and time, but rather a deficiency in mindset and capacity. Scarcity refers to the psychological sensation of possessing less than one needs, and poverty is fundamentally a scarcity of cognitive resources: when people are severely short of money, they become overwhelmed by "mental bandwidth overload," leading to diminished cognitive abilities and frequent short-sighted behaviors (such as neglecting education or engaging in speculative tendencies, which exacerbate mental stress and physical illness). This reinforces the vicious cycle of "poverty → mental constraints → greater poverty." The "wait-and-ask" mentality and the phenomenon of competing to be classified as poor households emerging in rural Yunnan are concrete manifestations of this mechanism—a scarcity environment shapes a scarcity mindset^[42]. Only by altering the state of scarcity, particularly by persistently transforming adverse environments to change people's mindsets, poverty mentality, and other psychological behaviors, can the self-perpetuation of poverty be fundamentally reversed. In Yunnan, this micro-level "poverty trap" interacts with macro-level factors such as "natural conditions" and "economic backwardness," creating a vicious cycle that constitutes the deep-seated logic behind regional poverty as a whole.

3.3. The 'Middle Income Trap' Challenge for the Region to Escape the Plight of the Poor

Emerging economies transition from low-income to upper-middle-income status (reflected in S-curve growth patterns), marking their escape from poverty risks as they progress toward prosperity, observable through Rostow's S-curve model, consistent with Maslow's hierarchy of needs. The "middle-income trap" refers to the phenomenon in which emerging economies, after reaching a per capita GDP of \$5,000 to \$10,000, are unable to break through the \$10,000 threshold due to the failure of the transformation of the development model, resulting in stagnant growth. Its core contradic-

tion lies in the fact that the original growth momentum has decayed, while new kinetic energy (such as innovation drive) has not yet been formed, superimposed on the risks of wealth polarization and social conflicts, and ultimately plunged into long-term economic stagnation and the risk of returning to poverty.

The "S-curve" reveals the objective trend of economic development in which the incomes of the rich and the poor are polarized. For this reason, the fight against poverty must be people-centred, and by promoting the equalization of public resources and narrowing the gap between urban and rural areas (income, education, employment, etc.), it is necessary to achieve common prosperity while striking a balance between efficiency and fairness, and ultimately to build a harmonious moderately well-off society that ensures the sustainable development of the region.

4. Analysis of the Current Situation of Overall Regional Poverty in Yunnan

The term 'impoverished population' as discussed herein refers to all residents living in impoverished counties within Yunnan Province whose per capita disposable income falls below the national poverty alleviation threshold. Whilst predominantly comprising rural residents (particularly farmers), this group also includes certain non-agricultural populations residing and working in rural areas, who are similarly constrained by the region's overarching poverty factors. Yunnan's poverty exhibits a regionally integrated characteristic encompassing mountains, border areas, ethnic minorities, and impoverishment. It is primarily concentrated in ethnic minority settlements, revolutionary base areas, and remote mountainous regions with harsh natural conditions. Of the province's 129 counties (districts and cities), 122 are tasked with poverty alleviation. Among the 88 impoverished counties (accounting for 68.2%), 72.0% are located within concentrated contiguous areas of extreme poverty, while 30.7% are classified as deeply impoverished counties. By the end of 2016, 4.476 million people remained living in poverty (accounting for over 10% of the national total), with a poverty inci-

dence rate of 13.6%. The province ranked first nationally in both the number of impoverished counties and the scale of its impoverished population. The 4277 registered impoverished villages accounted for over 60% of the province's impoverished population, reflecting a situation where poverty coverage is both geographically extensive and densely populated, with a pronounced regionally integrated poverty pattern.

4.1. The Poverty Trap Is Pronounced: Regional Poverty in Yunnan Exhibits a Triple Core Characteristic of Low Income, High Indebtedness, and Deep Ethnic Poverty

Rural residents' income levels remain excessively low, resulting in a weak, sustained capacity to combat poverty. Although Yunnan's rural per capita disposable income in 2016 (9020 yuan) exceeded the national poverty line (2855 yuan), this average figure masks a substantial wealth disparity. Many households earn only marginally above the poverty line, rendering them highly vulnerable to shocks. Even a modest increase of 100 to 200 yuan in the national poverty threshold would substantially elevate the actual poverty rate. This indicates that behind the average income figures, approximately 30% of low-income households teeter on the brink of the 'poverty trap', at risk of relapsing into poverty due to external disruptions.

Yunnan's rural households have weak wealth accumulation and a single income structure (relying on 55.9% of net income from traditional agricultural production and operation in 2016). Poverty alleviation policies, such as relocation and resettlement schemes alongside dilapidated housing renovation projects, have significantly increased transfer income for impoverished households in the short term, enabling them to temporarily escape poverty. However, these measures have failed to guarantee sustainable poverty eradication. Many households, driven by a desire to keep up appearances, have constructed dwellings exceeding permitted standards, resulting in a sharp rise in debt. Without sustained income growth, the crushing burden of debt may plunge them back into poverty. Moreover, the urban-rural income disparity in Yunnan constitutes a funda-

mental cause of regional poverty. In the absence of publicly available direct income data for farmers and non-farmers, we may infer from income sources. Rural residents' earnings primarily depend on traditional agriculture and migrant labour, whereas urban dwellers enjoy more stable and property-related income. This structural disparity hinders wealth accumulation and human capital development in rural areas, thereby exacerbating poverty across the region as a whole.

The issue of ethnic minority poverty in Yunnan Province is severe. Twenty-two ethnic autonomous counties (accounting for 75.9%) have been designated as key counties for poverty alleviation, with 45% of ethnic minority households living in poverty. By the end of 2016, the poverty rate among 15 distinct ethnic groups exceeded 20%, indicating characteristics of deep-seated poverty. Moreover, impoverished ethnic minority populations are scattered across 13,700 natural villages in 105 counties throughout the province. Particularly noteworthy are 11 ethnic groups, including the Lisu, Wa, and Jingpo, along with other smaller ethnic minorities, who constitute 10.5% of the province's impoverished population. Due to the high costs and significant challenges involved in lifting them out of poverty, these groups have become a key challenge in poverty alleviation efforts.

4.2. Rural Social Development Lags, with Widespread 'Scarcity Mentality' among Residents

The weak rural economy and insufficient social development investment in Yunnan have exacerbated inequalities in public education and healthcare resources. Despite recent improvements in school and health center construction, severe challenges persist, including "difficulty in studying" due to a lack of teachers and "difficult and expensive access to medical care" due to a shortage of doctors and medicine. For low-income families, illness is the second leading cause of poverty, as minor ailments can escalate into major diseases or disability, leading to the loss of labor and plunging families into destitution.

The phenomenon of a 'scarcity mentality' is pronounced in rural Yunnan. During poverty alleviation visits, many farmers proactively request to be 'designated

as impoverished households' or receive subsistence allowances,' with some even harbouring the distorted notion that 'competing for poverty status is a mark of honour.' Some households already registered for assistance view welfare as an entitlement, refusing to escape poverty, concealing income, and vying to remain on the poverty list. Those not selected, dissatisfied, threaten to report, complain, or petition. This dependency mindset and distorted perception of rights perpetuates the smallholder mentality that 'poverty dulls ambition,' treating 'being a registered poor household' as an urgent demand for benefits.

According to **Figure 2**, the primary causes of poverty exhibit structural disparities. Subjective assessments by impoverished households indicate that the foremost reason is capital shortage (28.4%), followed by illness and disability (22.5%), then lack of skills (19.1%), followed by insufficient labour (9.2%), inadequate infrastructure (6.6%), lack of endogenous development drive (5.5%), educational issues (4.0%), insufficient land (2.1%), and uncertainties such as disasters (2.7%). However, these subjective assessments do not fully reflect reality. The causes of poverty are typically complex outcomes of multiple intertwined factors, accompanied by a pronounced 'wait-and-see' mentality and short-sighted behaviour. On one hand, grassroots levels lack industrial planning capabilities, and impoverished households exhibit insufficient endogenous motivation; on the other, some families have incurred excessive debt due to building houses exceeding permitted standards. Furthermore, difficulties in land acquisition and a 'free-riding' mentality in public project construction hinder implementation, leading certain groups to develop a dependency on 'passive poverty alleviation'.

4.3. Infrastructure Gaps Persist and Traditional Industries Lag in Transformation

Rural investment suffers from severe shortages, with a significant historical backlog in infrastructure development. In 2016, fixed-asset investment in Yunnan's rural areas amounted to merely 62.91 billion yuan, representing a decline in its share of total societal investment from 7.1% in 2010 to 4.0%. Moreover, this invest-

ment was predominantly directed towards housing construction, with public infrastructure accounting for only approximately 3%. By the end of 2015, 26,900 natural villages across the four contiguous poverty-stricken regions remained without road access, 1,396 villages lacked electricity, 1.65 million households faced housing difficulties, and 1.24 million people lacked access to safe drinking water.

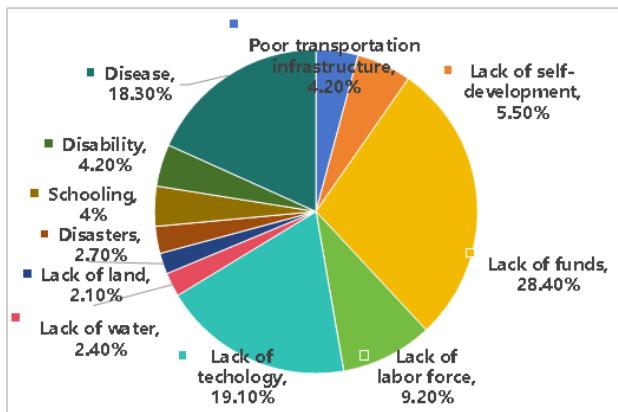


Figure 2. Structure of the Causes of Poverty in Yunnan in 2016.

Source: Yunnan Provincial Poverty Alleviation Office.

Rural public infrastructure exhibits significant shortcomings. In 2016, of the province's total road network spanning 238,000 kilometres, expressways accounted for merely 1.7%, whilst lower-grade roads (grades 3–4 and below) constituted 92.8%, indicating a need for improvement in the road network structure. Concurrently, the added value of the cultural industry remained below 5%, with cultural and sports facilities generally lacking at the county, township, and village levels. The combination of underdeveloped infrastructure, inadequate public services, and traditional production methods constrains the advancement of social productivity.

The upgrading of rural industries in Yunnan is lagging, and farmers face significant risks in increasing their income. Most rural areas remain reliant on traditional agriculture, where decentralized operations lack the driving force of professional cooperatives and agribusinesses, preventing the formation of economies of scale. Consequently, farmers are exposed to several key "poverty trap" risks: First, natural disasters; ecological fragility in impoverished rural areas, coupled with severe soil erosion, has led to reduced yields or complete

crop failure. Second, insufficient human capital is a critical factor, as statistics show that 60.3% of poverty causes are related to factors such as illness, disability, a lack of skills, and insufficient labor^[43]. Finally, market fluctuations, a lack of financial support, and low e-commerce penetration all exacerbate the difficulties in accessing markets for agricultural products.

4.4. Fundamental Constraints of Natural Conditions: Triple Overlap of Topography, Ecology, and Location

The root cause of Yunnan's overall regional poverty lies in the rigid constraints of its natural conditions, resulting in the overall predicament of 'high mountains and deep valleys—fragile ecology—remote borders':

The terrain presents significant barriers, with 93.9% of Yunnan comprising mountainous areas and 39.3% featuring slopes steeper than 25 degrees. All four designated impoverished regions are situated here. By the end of 2015, 26,900 natural villages remained without road access. This resulted in transport costs 40%–60% higher than in areas. Information isolation constrained the development of other regional industries (such as tourism and handicrafts), inflated commuting and living costs across the province, and hindered the inflow of high-quality human capital and industrial resources. The agricultural products from 4277 registered impoverished villages commanded less than 50% of the national price premium, directly weakening the economic foundation.

Ecological fragility and educational deprivation exacerbate poverty. The province suffers from soil erosion across 141,300 km² (36.9% of its total land area), with 82% of impoverished counties affected. In areas affected by rock desertification, crop yields per mu are merely 58% of the provincial average, creating a vicious cycle where development leads to ecological deterioration while conservation results in stagnant incomes. Concurrently, educational deprivation not only dampens farmers' motivation to escape poverty and impedes skill development, but also results in widespread human capital shortages across the region. This hinders the attraction of high-value-added industries, thereby obstructing sustainable development for all segments of society.

Illness exacerbates poverty. For both farmers and non-farmers alike, serious illnesses can deplete household savings, plunging families into the poverty trap; regional health deficits further undermine overall labour supply and productivity^[44].

The intertwined economic, natural, and social challenges have led to regional poverty. A monolithic industrial structure coupled with absent market mechanisms has resulted in sluggish regional economic growth, leading to persistently low income levels across the entire population. Harsh natural conditions not only directly impede farmers' production but also hinder the development of all industries within the region. This constitutes the root cause of the region's overarching 'natural poverty'. Social factors such as inadequate education and healthcare provision, alongside outdated mindsets, have weakened human capital and social development, creating systemic barriers to growth.

5. Yunnan's Overall Poverty Alleviation and Rural Revitalization

Yunnan faces pronounced regional poverty and severe, deep-seated poverty, presenting formidable challenges in achieving poverty alleviation and building a moderately prosperous society in step with the nation. It confronts serious challenges stemming from ecological and environmental pressures, economic development, and rural poverty reduction efforts.

5.1. Ecological Health and Resource Security Risks: Answering "One of the Structural Challenges—How Ecological Vulnerability Exacerbates Regional Poverty"

Yunnan's mountainous areas account for 93.9% of the province's total area, and 39.3% of it has steep slopes of more than 25, which makes ecological vulnerability prominent and puts enormous pressure on the resources and ecosystems, with soil erosion, land sanding, and rocky desertification becoming more and more serious. According to relevant data (for details, please refer to the fourth item in **Appendix A**), the soil erosion area of 141,300 km² (accounting for 36.9% of the

province), 82% of poor counties are seriously affected, and the upper reaches of the Yangtze River, the Yunnan section of the amount of sediment accounted for 42.6%. The restoration of natural resources is an extremely long process of biological evolution, and it is unrealistic to achieve a significant improvement in the short term.

There is a time mismatch between the long cycle of ecological restoration and the short-term goal of poverty alleviation. For example, it typically takes 20–30 years to control soil erosion. In Yunnan, which lies in the upper reaches of the Yangtze River, soil erosion affects an area of 47,000 square kilometers, and its sediment accounts for 42.6% of the river's total. If ecological red lines are relaxed for the sake of short-term poverty alleviation (e.g., by clearing steep slopes for farming), it will exacerbate the long-term risk of households returning to poverty.

In the industrial dimension, natural conditions limit the choice of industry: the traditional planting industry (tobacco, sugar cane) relied on by the poor counties is very destructive to the ecology, while the ecologically friendly industry (organic agriculture) has a high initial investment (the cost of certification is about 3000 yuan per mu), which is difficult for poor farmers to bear, and they are caught in the risk of 'poverty alleviation through destruction of the ecology → return to poverty through ecological deterioration'.

Pressure on arable land protection has become increasingly evident. In 2016, the province's arable land totalled 6.208 million hectares (a 1.9% increase from 2005), while its population reached 47.705 million (a 7.2% rise from 2005). Accelerated urbanisation has expanded various types of construction land, further complicating efforts to safeguard arable land and basic farmland. Concurrently, issues arising from agricultural modernisation—including the excessive use of chemical fertilisers and pesticides, soil contamination, and declining soil fertility—have not received sufficient attention, thereby threatening the sustainable use of arable land.

Water resources and air quality are both in critical condition. Over-exploitation has led to river drying and widespread water pollution, with the treatment of Yunnan's nine major plateau lakes—Dianchi being the most representative—facing severe challenges. Concurrently, industrial emissions, vehicle exhaust, and PM2.5 pollu-

tion have triggered localised smog episodes, highlighting the risks of environmental degradation^[45].

The detrimental impact of human activities on ecosystems is particularly pronounced in Yunnan's vast mountainous regions and rural areas. The traditional production and lifestyle of 'living off the land and water', combined with a mindset that 'prioritises development over conservation', has exacted a heavy ecological toll. In recent years, the province has witnessed frequent natural disasters and extreme weather events, with the persistent droughts since 2008 serving as clear evidence. The natural ecological balance has been disrupted by human activities, while various forms of pollution threaten ecological equilibrium and species survival through water, air, and food chains. The health of the ecological environment remains under constant threat and demands urgent attention.

5.2. Lagging Transformation of Economic Dynamics: Answering Structural Challenges II—How Traditional Growth Models Constrain the Sustainability of Poverty Eradication

For a long time, Yunnan has been a typical investment-driven province that also suffers from a serious lack of consumer demand, insufficient net exports, and widespread deep poverty. Under the new normal, the province faces numerous challenges and risks in deepening its reform and development.

The "troika" driving Yunnan's economic growth is insufficient, with a clear reliance on fixed asset investment. Data on the contribution of the three major demands to economic growth from 2005 to 2016 (see **Figure 3**) show that capital formation's contribution rate surged from 52.0% to 93.9%, with fixed capital's contribution increasing from 45.2% to 89.9%. Concurrently, the final consumption's contribution rate fell from 68.3% to 65.3%. Net exports consistently had a negative contribution, declining sharply from -20.3% to -59.2%. This reflects a structural imbalance in the province's economic drivers. In terms of economic momentum, Yunnan's social fixed asset investment expanded from 175.53 billion yuan to 1.61 trillion yuan between 2005 and 2016. The fixed asset investment rate

rose from 50.7% to 109.5%, showing a clear upward trend that created a distinct "crowding out effect" on consumption. Notably, the marginal return of fixed asset investment dropped from -0.11 in 2005 to -1.31 percentage points. The strong dependence on government-led (state-owned enterprise) investment and major projects highlights the lack of sustainable momentum in Yunnan's economic growth.

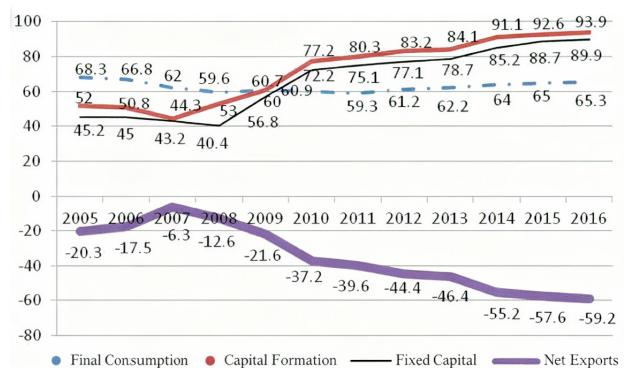


Figure 3. Changes in the Three Major Demand Curves of Yunnan's Economic Growth from 2005 to 2016 (%).

Source: Yunnan Provincial Statistical Yearbook.

The contradiction of comprehensively promoting supply-side structural reform is prominent, and the quality of industrial development is not ideal. First of all, the upgrading power of the three industrial structures is insufficient^[46]. Yunnan's primary industry (agriculture) has a weak foundation and belongs to the traditional disadvantaged industries; the secondary industry is in the primary stage of the development of new-type industrialisation and urbanisation; the industrial structure of the heavy industry is characterized by high-energy consumption, high-pollution, and rough development of scale, with more backward production capacity, and the construction industry is weak and uncompetitive, and there is still a big gap in the development of the tertiary industry; the tertiary industry is mainly traditional service industry. The tertiary industry is mainly a traditional service industry, the development of the modern service industry started late, especially the development of strategic emerging industries led by high and new technology is lagging behind, reflecting the deep-rooted contradiction of insufficient endogenous power of industrial structure. The second is the weak strength of non-public economic entities, resulting in insufficient

vitality of economic development; in 2016, Yunnan's non-public economy accounted for 46.9% of GDP, an increase of 11.9 percentage points over 2005, and it still has not become the dominant force in the province's economic growth, and the private economy is underdeveloped. The third is that the quality and efficiency of economic development is not satisfactory enough, mainly reflected in the inefficiency of the use of factors of production, the high cost of economic growth, low efficiency of credit output, 0.72, down 0.15 from 2005, highlights the deep contradictions in the transformation of the traditional crude growth model.

The total economic volume (GDP) of Yunnan grew at an average annual rate of 11.0 per cent from 2005 to 2016, while the average annual increase in employment was only 1.8 per cent, which is equivalent to only 45.5 per cent of the efficiency of normal employment growth driven by economic growth, reflecting the fact that the growth rate of job creation and opportunities brought about by the province's high rate of economic growth has been insufficient.

5.3. Weak Legal Compliance and Rural Grassroots Party Challenges

In the process of promoting rural revitalization and governance modernization, it is urgent to break free from the shackles of traditional concepts and strengthen the awareness of the rule of law. The governance closed loop of "scientific legislation, strict law enforcement, impartial justice, and universal law-abiding" must be improved. This will guide the modernization of the governance system in the spirit of the Constitution, thereby facilitating the arduous task of modernizing the nation's governance system and capacity.

The rule of law in Yunnan faces a triple dilemma. At the macro level, the vast majority of impoverished areas have an underdeveloped understanding of the concept of governing the country and the province by law, resulting in weak legal awareness. Additionally, poverty alleviation policies lack continuity and precision. At the meso level, lawful conditions are lacking and local legislation lags behind. The environment for law enforcement and justice urgently needs improvement, with violations of the law, lax enforcement, and failure to investigate occur-

ring frequently. Legal services coverage is not extensive; in 2016, there were only 1.88 lawyers per 10,000 people, which is lower than the national figure of 2.35, and legal aid is particularly lacking. Furthermore, the supervision of the rule of law is absent and ineffective, with overlapping institutions and a lack of communication. At the micro level, there is insufficient motivation and capacity for cadres to enforce laws strictly. Public education on the rule of law needs to be strengthened, as citizens' awareness of laws and regulations remains weak^[47]. The co-existence of official "inaction" and public "distrust of the law" suggests that the authority of the rule of law has yet to be truly established.

Rural grassroots Party organisations remain weak, and village governance capacity is inadequate. In 2016, village committees constituted 84.3% of Yunnan's 14,300 autonomous organisations, yet service institution coverage remained low. Since the reform and opening-up, the outflow of young labour has led to a shortage of wealth-creation leaders, while grassroots Party organisations face severe ageing. Low remuneration for village cadres diminishes their motivation, resulting in insufficient cohesion within grassroots organisations. Rural governance lags behind, with prominent issues of poor sanitation and disorder. The bottleneck at the 'last mile' urgently requires resolution.

6. Commit to the Poverty Alleviation Strategy to Achieve Victory

Yunnan's regional poverty is representative of the national situation. Poverty alleviation is characterised by relativity and complexity, necessitating a long-term strategy that follows the 'S-curve' theory to overcome the 'poverty trap' and 'middle-income trap'. Precise interventions must be implemented targeting the psychological and behavioural traits of low-income households. Only by generating stable expectations through industrial income growth and establishing a virtuous cycle of sustained income expansion can the mindset of 'waiting, relying, and demanding' be overcome. This approach enables the fundamental transition of low-income households towards middle-income status, thereby overcoming the challenges posed by these traps.

6.1. Precision Targeting, Consolidate Grass-roots Organizations and Grassroots Mobilization for Poverty Alleviation

Building a moderately prosperous society is crucial for consolidating poverty eradication, escaping the "poverty trap" and "middle-income trap" threats, and creating a better life for the people. Precise poverty alleviation is the key path to achieving this goal. We should anchor the moderately prosperous society target by integrating the dual standards of "poverty eradication" and "moderately prosperous society." Specifically, impoverished areas should focus on the "two assurances and three guarantees" to address shortcomings and break through the "double traps." Meanwhile, non-poor areas need to take the lead in meeting the standards to solidify the foundation for overall prosperity. By developing income-generating industries and implementing differentiated strategies, we can ensure that the goal of a moderately prosperous society is achieved on schedule.

Under the work pattern of five-level secretaries working together to combat poverty, efforts should be made to strengthen grass-roots organisational construction, to consolidate the foundation of the work of the village two committees, and to effectively carry out the task of eradicating poverty and building a moderately affluent society in all aspects of life in the 'last kilometre'^[48].

6.2. Comprehensively Promote Supply-Side Structural Reform and Cultivate New Drivers of Economic Growth

Development is key to lifting people out of poverty and achieving prosperity, with stable economic growth at its core. To this end, we must first optimize the investment structure by balancing the input of physical capital, human capital, and technological innovation to improve investment returns and total factor productivity. By developing advanced productive forces and a modern industrial system, we can cultivate competitive advantages and create new economic growth momentum, providing a reliable guarantee for a sustainable investment strategy. Second, we should proactively integrate into national development strategies, make every effort to promote supply-side structural reform, and

actively seize and leverage the opportunities and policy dividends from national initiatives like the "Belt and Road" and "Made in China 2025." Finally, it is crucial to put the concept of innovative development into practice. By focusing on the real economy's shortcomings, we can concentrate on developing emerging industries such as intelligent and green manufacturing and increase investment in technological innovation. This will help upgrade the economic growth model to one primarily driven by innovation (2.5), providing new momentum for sustainable development.

6.3. 'Building Ladders': Breaking down Spatial and Temporal Constraints by Expanding Investment in Response to 'Shortcomings That Exacerbate the Poverty Trap'

Efforts should start with improving Yunnan's infrastructure and transforming unfavorable factors like the natural environment. By expanding openness and changing the "poverty mentality," we can address investment shortcomings and enhance the capacity for sustainable income growth. On one hand, it's crucial to continue strengthening infrastructure investment in the 88 impoverished counties, focusing on the "Five Networks" initiative (2017–2027) to break through development bottlenecks. On the other hand, we must intensify ecological restoration, improve fragile environments, and address green infrastructure deficiencies to achieve sustainable development.

For areas with slopes exceeding 25, priority should be given to constructing 3-meter-wide industrial roads (e.g., in walnut planting areas) with matching water storage tanks to reduce transport costs by 18%. In the Dian-Guizhou-Guizhou karst region, the "highway construction + soil and water conservation forests" model should be implemented, where each kilometer of highway is paired with 100 acres of protective forests to balance transportation and ecology. Additionally, building cross-border cold chain logistics nodes in the border counties of western Yunnan can reduce the loss rate of cross-border agricultural products from 25% to less than 10%, thereby overcoming locational barriers.

6.4. 'Cutting off the Roots of Poverty': Targeting the 'Scarcity Trap Leading to the Degradation of Human Capital' and Interrupting Intergenerational Transmission through Education and Health Investments

The core principle of 'poverty alleviation through intellectual empowerment' lies in investing in human capital to break the cycle of intergenerational poverty. Specific pathways include: firstly, health-based poverty alleviation by enhancing the three-tier county-township-village healthcare system and addressing deficiencies in township health centres; secondly, sustaining educational poverty reduction efforts through stable investment in basic and vocational education, strengthening teacher development, expanding senior secondary and vocational education access, and promoting rural cultural and sports activities; thirdly, ensuring policy fairness—such as rigorously implementing relocation programmes to prevent increased farmer debt or entrenched 'poverty mentality,' thereby averting new injustices.

6.5. Transforming Livelihoods: Building Farmers' Sustainable Income Capacity

Precision poverty alleviation must focus on low-income rural households, centring on stimulating endogenous motivation while balancing dignity-based incentives with an orientation towards fostering aspirations. This approach drives their transition from absolute to relative poverty, and from material deprivation to spiritual development. Policies must consistently adopt an outcome-oriented approach, prioritising industrial income growth^[49]. By expanding employment opportunities and optimising income structures (enhancing factor, transfer, and property income), we can improve household balance sheets and the trajectory of the 'S-curve,' thereby strengthening resilience to risks and facilitating wealth accumulation. Only through such measures can we win public support and consolidate achievements.

6.6. Precision: Building Government-Business-Farmer Synergies to Address 'Weak Governance and Elite Capture at the Grassroots Level'

The government should adhere to the principle of 'knowing what to do and what not to do', establishing a poverty alleviation mechanism that integrates top-down and bottom-up approaches. The core lies in fully implementing the national targeted poverty alleviation strategy, accelerating the government's transformation from a traditional provider of assistance to a modern facilitator of poverty reduction, and efficiently utilising policy funds and instruments to fully leverage the guiding role of the 'visible hand'^[50].

The government must focus on providing public infrastructure, public services, and improving the public environment. By creating an atmosphere where "poverty eradication is an honor," it can stimulate endogenous motivation. Concurrently, the government should firmly grasp the role of enterprises as market leaders. These enterprises can drive employment and income growth, thereby promoting a change in farmers' mindsets and achieving sustainable poverty alleviation.

Strengthen the promotion and delivery of poverty alleviation policies, leveraging grassroots officials to ensure policy implementation while prioritising safeguards against "capture by elites". Promote widespread awareness of rural financial insurance knowledge and tools, advancing comprehensive coverage of financial insurance services to enhance risk resilience among impoverished households. Address rural social equity by providing basic income and livelihood support for vulnerable groups, thereby refining the social welfare safety net.

6.7. Legislative Empowerment for Anti-Poverty and Rural Development

We are highlighting the special features of local legislation and strengthening laws in key areas to improve legislative quality and efficiency. We will also further advance legal system construction to put power into the "cage" of the system. Additionally, we are deepening judicial system reform, implementing the judicial account-

ability system, promoting social justice, and enhancing judicial credibility^[51]. We will accelerate the building of a public legal service system that covers urban and rural areas and benefits everyone. By enhancing legal awareness, we can quickly form a favorable society where people act in accordance with the law, seek legal help when in trouble, use the law to solve problems, and rely on the law to resolve conflicts.

7. Discussion

Based on the "S-curve" theory, this study deepens the understanding of the dynamic evolution of poverty and the formation mechanism of traps, expanding the theoretical perspectives of regional poverty alleviation paths. By analyzing the practice in Yunnan, the study verifies the key roles of "scarcity mentality" and "elite capture" in the persistence of poverty, enhancing the explanatory power of the coupling between theory and reality. However, the paper still has three shortcomings: a lack of discussion on the long-term impacts on different groups, insufficient exploration of localized poverty eradication paths, and weak empirical analysis. Therefore, future research should focus on: further analyzing the intergenerational transmission of poverty and its changing trends to cope with new types of poverty; exploring the formulation of more locally-aligned poverty alleviation measures; and constructing multi-dimensional poverty indicators for empirical analysis to enhance the precision of conclusions and the scientific validity of policy recommendations.

8. Conclusions

Based on the S-curve theory, this study offers a deeper understanding of poverty dynamics and how traps form. It verifies the key roles of "scarcity mentality" and "elite capture" in persistent poverty, which enhances the explanatory power of the coupling between theory and reality. From this, we can draw three main conclusions.

Firstly, the formation mechanism of Yunnan's overall regional poverty is a triple superposition of 'natural constraints—economic lag—cognitive solidification': mountainous terrain and ecological fragility form the

natural foundation, and the lack of economic momentum leads to weak income growth. The 'scarcity trap' solidifies the poverty mentality, forming the overall characteristics of 'mountains, borders, people, and poverty'.

Secondly, the fight against poverty faces three major structural challenges: the contradiction between ecological protection and economic development, the fault line between the transformation of traditional industries and the cultivation of new kinetic energy, and the mutual reinforcement of the 'scarcity mentality' and the weakness of grass-roots governance.

Ultimately, the path to overcoming poverty must follow the law of the "S-curve." This can be achieved by bridging infrastructure gaps (the "ladder"), improving human capital (addressing the "root of poverty"), and promoting industrial transformation (changing the "poor industry"). These steps will help the poor leap from the "poverty trap" (A1–A3) to the "well-off stage" (B1–B3). Simultaneously, a "government-enterprise-farmer" mechanism must be built to ensure sustainability.

Author Contributions

Research, research conceptualization, methodology design, project management, resource organization, Q.Z.; data organization, S.Z.; editorial layout, N.X.; discussion of results, manuscript review, constructive comments on the overall structure of the manuscript, Z.Z.; writing of the original manuscript, Q.Z. and N.X.; revision of the original manuscript, Q.Z. and S.Z.; completion of the study, Q.Z., S.Z., N.X., and Z.Z. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

This study adheres to the principles of the Declaration of Helsinki, focusing on regional poverty among hu-

man populations. All research data is derived from fully anonymised macro-statistical sources such as the Yunnan Provincial Poverty Alleviation Office and the Yunnan Statistical Yearbook (e.g., Yunnan Statistical Yearbook (2017)). The aforementioned data contains no personally identifiable information (such as names, addresses, or ID numbers) and constitutes non-personal data accessible within the public domain. Field research materials were lawfully collected by professionally trained national poverty alleviation personnel (such as village-based assistance cadres) during the course of their duties and do not include any individual privacy information collected by the researchers themselves. Given that this study does not involve human subjects experimentation or sensitive personal data, ethical review procedures are not applicable. The entire research process strictly adheres to requirements for data authenticity, compliance, and research integrity, conforming to ethical standards for social science research.

Informed Consent Statement

Informed consent has been obtained from all research subjects.

Data Availability Statement

Not available.

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Conflicts of Interest

The authors disclosed no conflict of interest.

Appendix A

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Item 2: Outline for Development-oriented Poverty Reduction for China's Rural Areas (2011–2020), Gazette of the State Council of the People's Republic of China, 2011, No. 35. Available from: https://www.gov.cn/gongbao/content/2011/content_2020905.htm

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