Capability-Based Poverty Reduction in Deep-Poor Areas Based on Big Data-- a Case Study of J County, Liangshan Prefecture, Sichuan Province

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Abstract. As the key area of poverty alleviation, the poverty problem is still serious, the problem of poverty alleviation is not sustainable, and the causes and manifestations of poverty are interwoven, it is more difficult to solve the problem of poverty because of the lack of endogenous development ability of the poor population, including the "demand" of seeking development and the "ability" of realizing demand. Therefore, this paper takes J county of Liangshan Prefecture in Sichuan Province as the object of investigation, and uses the theory of Amartya Sen to analyze the relationship between the capability of the poor population and poverty, the basic survival and development, productive capacity and development capacity of the poverty-stricken population all affect their poverty and are the factors that cannot be ignored to achieve sustainable poverty eradication in the deep-poverty areas.

Keywords: Ability Poverty, Deep Poverty Area, Self-Development Ability, Sustainable Poverty Eradication

1. Introduction
Poverty, as a universal problem in global economic development, is one of the most serious challenges facing human society today. Although China has brought substantial poverty alleviation under the rapid economic development, it has been achieved along the fast lane of anti-poverty. Large-scale poverty reduction. The rural poor population decreased from 770 million in 1978 to 16.6 million in 2017, a reduction of 97.8%, and the poverty incidence rate was reduced to 1.7% in 2018. Countries with the Millennium Development Goal of halving the population have contributed more than 70% of the world's poverty reduction. However, we should also be soberly aware that under the new situation, my country's anti-poverty has entered a new stage. Significant changes have taken place in the form of poverty and the anti-poverty strategy. Poverty alleviation has entered the critical stage of deep poverty, and the remaining poor population the regional ethnic poverty and special heterogeneous poverty are more vividly expressed. The poverty problem is not only a pure economic phenomenon, but a compound phenomenon integrating economic, political, social, and natural factors. In the deeply impoverished areas, the previous single and prevailing poverty alleviation policies have been difficult
to achieve. The high cost of poverty alleviation and the slow speed of poverty reduction have become established facts and challenges facing China. It has entered a “liquidity trap” similar to poverty alleviation and is in the process of poverty alleviation. The problem of uneven, uncoordinated, and unsustainable development in China has become more serious. The phenomenon of returning to poverty after poverty alleviation is prominent. The poverty alleviation in poverty-stricken areas has increasingly shown "rigid" characteristics. The fundamental reason lies in the poor development ability of the poor, which is also the multidimensional poverty of the poor. The main cause of deep poverty [1].

With the promotion and implementation of targeted poverty alleviation and rural revitalization, the resource endowment and development space of poverty-stricken areas will be further expanded, and many restrictive factors will be alleviated to varying degrees. However, there is no improvement in the quality of the poor and the development of their capabilities [2]. These anti-poverty is unsustainable. Relying solely on the input of external resources to eliminate poverty is not the ultimate motivation for the current anti-poverty. The focus is on stimulating the potential of the poor and solving the difficulties through the poor themselves, especially for extreme poverty. Regional and extremely poor people, the improvement of human capacity and the realization of value are the current important breakthroughs in getting rid of the "rigidity" of anti-poverty and realizing the sustainable development of the country and the region. Liangshan Yi Autonomous Prefecture in Sichuan Province is currently a deeply impoverished area, with poor natural conditions, weak economic foundation, deep poverty, and a large gap in infrastructure and public services. It is the main battlefield for poverty alleviation in the deeply impoverished areas of the province. It has the above-mentioned poverty commonality. Also has its particularities. The solution to deep poverty and the consolidation of poverty alleviation effects are still the focus and difficulty of achieving the goal of comprehensive poverty alleviation in 2020. Therefore, this research takes J County, Liangshan Prefecture, Sichuan Province as the specific research object, from the perspective of the micro-poverty population, explores the difficulties and challenges encountered in the current anti-poverty process in the deeply impoverished areas, analyzes the new characteristics of the poor population in the new era, and studies poverty. The population's basic survivability, production capacity, development capacity, etc., in order to properly adjust the anti-poverty operating mechanism, break through the actual bottleneck, realize the adjustment and innovation of the anti-poverty policy, and effectively solve the instability, Does not persist the problem [3].

2. Applicability Analysis of the Ability Poverty Theory to Solve the Problem of Sustainable Poverty Alleviation in Deeply Impoverished Areas

Before the 1970s, the poverty standard of income scarcity had always occupied the mainstream status. People often did not pay attention to the lack of ability of the poor. Reynolds in the United States believed that poverty means that many families did not have enough income to maintain a minimum standard of living [4]. With the in-depth research, the connotation of poverty has been greatly expanded. Amartya Sen is the representative. He pointed out that poverty is not only a low income, but a deprivation of people's basic viable abilities. The important value of Amartya Sen's feasible ability lies in the successful integration of poverty and ability into the research framework of poverty and anti-poverty. Although wealth and income are the goals that people pursue, they are only instrumental categories and are for people. Welfare and development services, but the highest value standard of human life is to achieve freedom, and this freedom is the kind of viable life ability that people have, that is, the possible realization of various possible functional activities, including Freedom from hunger, disease, etc., as well as being able to read and count, and enjoy political participation [5]. Amartya Sen’s poverty theory has greatly enriched the connotation of poverty in terms of breadth and depth, and provided a new perspective for us to understand poverty and study poverty issues more deeply, aiming to bring the poor to anti-poverty. The mainstay status of the poverty-stricken population expands the anti-poverty governance from a unified income to the improvement of the ability of the diversified poor population, pays attention to the autonomy and initiative of the poor population, and
achieves the goal of stable poverty alleviation through ability improvement. At the same time, on the other hand, the feasible capability theory focuses on the results of tracing the source, digging into the essence of poverty from the phenomenon of poverty, paying attention to the heterogeneity of poverty behind different micro-personal poverty, and emphasizing the subjectivity of people in anti-poverty policy formulation. The return, to enhance the subjective initiative of the poor and their status in economic and social development, to allow the poor to actively participate in the formulation and implementation of poverty alleviation policies, and to adopt differentiated assistance measures for different poor people so that the poor are all can get the actual effect of poverty alleviation [6].

This article believes that the ability poverty theory is highly compatible with the needs of sustainable poverty alleviation in deeply impoverished areas. First of all, we must ensure that comprehensive poverty alleviation will be achieved by 2020. Deeply impoverished areas are the current focus and difficulty, and the problem of returning to poverty is also a major issue that troubles the realization of this goal as scheduled. Therefore, to solve the problem of sustainable poverty alleviation in deeply impoverished areas, it is necessary to put the poor at the core, and to improve the ability of the poor to adapt to economic and social development as the basis for solving the poverty problem. It can grasp the poverty alleviation better than traditional economics Nature [7]. Second, ensure the sustainability of the results of poverty alleviation. Judging from the vulnerability of the current poverty-stricken population, the poverty-stricken population is very likely to fall into poverty again due to external natural risks, social risks, political risks, and economic risks. The fundamental reason is that the poverty-stricken population has not formed its own development ability and has insufficient anti-risk ability. Only by improving the self-development ability of the poor and making them self-reliant can they achieve sustainable and stable poverty alleviation.

3. An Empirical Analysis of the Self-Development Ability and Poverty of Poor Population in Deeply Impoverished Areas

(1) Data source and dimension index selection

The research data in this article comes from a questionnaire survey on poverty alleviation and poverty alleviation in ethnic areas in the new era conducted in Liangshan Prefecture, Sichuan Province at the end of October 2018. The survey content covers household surveys and village surveys, involving the basic situation of the village, characteristics, production and living conditions of households, basic policy demands enjoyed by households, and conditions after being separated from poverty alleviation policies.

(2) Index selection

Amartya Sen, a well-known poverty researcher, pointed out that human development capabilities include three levels of abilities, one is the ability to be healthy and long-lived, the other is the ability to acquire culture, technology, and share social civilization, and the third is to get rid of poverty and continuously improve. The ability of living standards [8]. Related domestic research scholars believe that the self-development ability of poor farmers refers to a series of behavioral decision-making capabilities displayed by poor farmers when driven by economic interests, using existing development space and development opportunities, and pursuing goals, including the ability of the poor to escape poverty [9]. Based on the basic development ability, learning ability, investment ability, management ability and communication ability, etc., based on the actual situation of the deeply impoverished area, and referring to the research of relevant scholars, [10]this paper selects three dimensions of basic survival ability, production ability and development ability to measure the depth. The ability of the poor population in poverty-stricken areas is relatively difficult to measure directly. In general, some instrumental variables are used to measure indirectly. The choice of variables is closely related to the characteristics of the analysis object. Different regions have different specific manifestations, and they are limited to ethnic groups. It is difficult to obtain and measure regional related variables. Therefore, this study selects the following related variables to represent.

One is basic survivability. Health is the foundation of the basic survival ability of the poor. Especially in minority areas, the social environment is difficult, social public services are relatively
unsound, and the lack of labor caused by long-term chronic diseases and disability is a major factor in poverty. The labor force also affects the survival ability of poor families to a certain extent. Therefore, this study selects the number of healthy households and labor force population as indicators to measure their basic survival ability.

The second is production capacity. The reason why it is more difficult to get rid of poverty in deeply impoverished areas is mainly because of the lack of resources in the area and the relatively fragile natural environment. It is difficult for the poor to use limited resources for production and obtain certain benefits. Therefore, this article selects family business income to measure the production and management capabilities of households.

The third is development capabilities. The development ability is more reflected in the quality of the poor population and the expansion of production and development skills. A single skill can easily cause the poor population to fall into poverty again in the face of sudden external risks. Therefore, this article selects the education of the head of the household and the junior high school. The above three indicators are the number of the educated population and the number of migrant workers in the family to measure its development ability.

In this paper, there are still some shortcomings in the selection of the poverty population's self-development ability index. However, considering the practical difficulties in measuring the ability of the poor population and the availability of data in ethnic minority areas, the above indicators still have certain points for measuring the depth of poverty in J County. All the variables and their meanings involved in the empirical research in this article are listed in Table 1.

**Table 1. Variables and their meanings**

| Overall classification | variable name                                         | Variable interpretation                                      |
|------------------------|-------------------------------------------------------|-------------------------------------------------------------|
| Independe nt variable  | Basic survivability (X1)                              | Number of healthy family population                          |
|                        |                                                       | Measure the health of households                             |
|                        |                                                       | Family labor force                                           |
|                        |                                                       | Number of households over 16 years old who are engaged in agriculture or non-agriculture and earn income |
|                        | Production capacity(X2)                              | Family business income                                       |
|                        |                                                       | Measure the production and management capabilities of households |
|                        | Head of household education                          | Illiteracy=0; elementary school=1; junior high school=2; high school=3; junior college and above=4 |
|                        | Number of family members with junior high school education or above | Indirectly measure household development ability with human capital measurement |
|                        | Number of migrant workers in the household            | The number of foreign workers is used to measure the household’s ability to transfer employment |
| Dependent variable     | poverty(Y)                                            | Poverty level                                               |
|                        |                                                       | Assignment: very poor = 1; relatively poor = 2; general = 3; not poor = 4 |

**4. Empirical Analysis Model and Regression Results**

Use correlation analysis to study the relationship between poverty level and six items including household head’s education, family business income, the number of household members with a junior high school education or above, the number of migrant workers in the family, the healthy population, and the number of family laborers, using Pearson correlation. The coefficient indicates the strength of the correlation. Specific analysis shows that there is a significant negative correlation between poverty level and family business income, the number of family members with a junior high school degree or above, the number of migrant workers in the family, the healthy population, and the number of family laborers. The correlation coefficient values are respectively -0.587, -0.550, -0.276, -0.691, -0.276. At
the same time, the correlation coefficient between the poverty level and the educational background of the head of household is close to 0, indicating that there is no correlation between the poverty level and the educational background of the head of the household. Therefore, the educational background of the head of household is excluded from the development capacity index, and the number of household members with a junior high school education or above the number of migrant workers in the family indicates the capacity for family development.

Table 2. Correlation analysis between variables

|                          | Pearson       | Head of household education | Number of family members with junior high school education or above | Number of migrant workers in the household | Healthy population | Family labor force |
|--------------------------|---------------|-----------------------------|---------------------------------------------------------------------|-------------------------------------------|--------------------|--------------------|
| Poverty level            | 3.35          | 1.31                        | 1                                                                   |                                            |                    |                    |
| Head of household education | 0.78          | 0.48                        | -0.01                                                              |                                            |                    |                    |
| Family business income (ten thousand yuan) | 1.18          | 0.80                        | -0.051                                                             | 0.408**                                   |                    |                    |
| Number of family members with junior high school education or above | 1.43          | 1.79                        | -0.550**                                                           |                                            |                    |                    |
| Number of migrant workers in the household | 2.83          | 1.56                        | -0.276*                                                            | 0.238*                                    | 0.172              | 1                  |
| Healthy population       | 5.13          | 2.28                        | -0.691*                                                            | 0.569**                                   | 0.194              | 0.500**            |
| Family labor force       | 2.83          | 1.56                        | -0.276*                                                            | 0.238*                                    | 0.172              | 1.000**            | 0.500**            |

* p<0.05  ** p<0.01

Set the regression model: $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + u_i$. Among them, Y poverty degree is the dependent variable, $X_1$ is the basic viability of the poor, $X_2$ is the production capacity of the poor, $X_3$ is the development capacity of the poor as the independent variable, $\beta_0$ is the constant term, and $u_i$ is the random interference term, which is used to make multiple Linear regression analysis (the following table) shows that the model $R^2$ is 0.583, which means that the independent variable can explain 58.3% of the reasons for the change in poverty. When the model is F-tested, it is found that the model passes the F test ($F= 31.642$, $P<0.05$), which means that at least one of production capacity, basic survivability and development capacity will have an impact on the degree of poverty.
Table 3. Multiple linear regression model analysis

|                           | Non-standardized coefficient | Standardization factor | t    | p      | VI F | R² Adjustm ent | R² | F   |
|---------------------------|-----------------------------|------------------------|------|--------|------|----------------|----|-----|
| constant                  | 5.5                         | 0.269                  | -    | 20.4   | 0.00 | 0.5           | 0.564 | 31.642(0.000**) |
| Production capacity       | -0                          | 0                      | -0.237 | -2.4  | 0.01 | 1.5           | 24  |
| Basic survivability       | -0.158                      | 0.036                  | -0.403 | -4.4  | 0.00 | 1.3           | 3   |
| Development ability       | -0.27                       | 0.063                  | -0.368 | -4.2  | 0.00 | 1.2           |     |

Dependent variable: degree of poverty

D-W value: 1.796

* p<0.05 ** p<0.01

The regression analysis model is as follows: \( Y = 5.500 - 0.000X_1 - 0.158X_2 - 0.270X_3 + \mu_i \). The VIF values in the model are all less than 5, which means that there is no collinearity problem, and the D-W value is near the number 2, which means that the model does not have autocorrelation and there is no correlation between sample data, and the model is better. The final analysis shows that:

The regression coefficient value of productivity is -0.000 (t=-2.448, P=0.017<0.05), which means that productivity will have a negative impact on the degree of poverty; the regression coefficient value of basic survival ability is -0.158 (t=-4.460, P=0.000<0.01), which means that basic survivability will have a negative impact on poverty. The regression coefficient of development capacity is -0.270 (t=-4.284, P=0.000<0.01), which means that development capacity will have a significant negative impact on poverty. That is, as the poor population's productivity, basic survival ability, and development ability increase, the degree of poverty will decrease to varying degrees.

5. Construction of a Sustainable Poverty Alleviation System in Deeply Impoverished Areas from the Perspective of Capacity

In the late stage of large-scale anti-poverty, Liangshan Prefecture Yi District's poverty alleviation task is arduous. The problem of poverty is still serious, and the problem of unsustainable poverty alleviation is still prominent. The causes and performance of poverty are intertwined and mutually cause and effect, making it more difficult to solve the poverty problem. The fundamental reason lies in the poor endogenous development ability of the poor, including the "demand" for seeking development and the "ability" for realizing the demand. That is, the current entry of external resources does not fit with internal resources, and the poor subjects (including regions and individuals) have no inherent poverty factors. Get a fundamental solution. In the anti-poverty system, regional poverty alleviation is overly dependent on the entry of external resources, endogenous resources have not been mobilized, and long-term anti-poverty mechanisms have not been established. The key to sustainable poverty alleviation lies in the multi-center collaborative governance system with the improvement of the ability of the poor as the core. Established, the integration of regional endogenous poverty alleviation elements and mechanism innovation, to achieve long-term and sustainable development of poverty-stricken areas and poor people [11].

Exploring the poverty problem along the resource combination in Sen’s feasible ability theory provides a new way of thinking about anti-poverty in deeply impoverished areas. The realization of poverty alleviation is a long-term consideration, and it is necessary to improve the basic viability and production of the poor Ability and development ability, and then achieve sustainable and stable poverty alleviation. In this regard, in a sustainable anti-poverty system, the depth and breadth of the embedding of external poverty alleviation resources must be based on the premise of maximizing the
improvement of the poor's own capabilities, which can stimulate the inherent vitality of poverty-stricken areas and prevent the "subject and object" from being reversed. Based on this, this article incorporates the poor as an important actor into the anti-poverty system, changing the past passive input policy, and starting from the needs of the poor, building an anti-poverty system centered on the ability of the poor.

(1) **Take the capital expansion of the poor as the fundamental orientation**

Livelihood capital is the basis for the production and life of the poor. The single type of livelihood assets and weak capital are the main reasons for the poverty of rural households in the region. For Yi districts in the deeply impoverished areas, the expansion of livelihood capital types and the increase in livelihood capital stock are all conducive to their ability to resist risks. Enhancement is also a prerequisite for improving the ability of the poor to survive and develop. The amount of livelihood capital stock of the poor determines their ability to resist risks and obtain development. Therefore, the realization of sustainable poverty alleviation for the poor is to continuously increase their livelihood capital stock, and to shape, enhance and strengthen farmers’ resistance to risks through the expansion of livelihood capital to avoid falling into poverty again due to insufficient capacity. First, poverty alleviation policies have shifted more to the improvement of the human capital of the poor. Focus on strengthening regional education investment and training, including the popularization of preschool education and compulsory education, the promotion of vocational education and skill training, increase the stock of human resources of the poor, realize the transformation of human resources into human capital, and turn the poor into poverty alleviation forces; Strengthen the construction of the social security system for the poor, and expand the reimbursement of new types of rural cooperative medical care, especially for the poor with disabilities and long-term chronic diseases, which can be accurately implemented according to the condition and degree of disability; the second is to strengthen the innovation of financial poverty alleviation mechanisms. Financial poverty alleviation is an effective way to increase the financial capital of the poor, and constantly improve the organizational system of financial institutions to meet the diversified financial needs of the poor. At the same time, in the selection of collateral, explore and innovate to include the credit assessment of the poor, and improve the poverty Availability, and create a good credit environment; the third is to expand the social capital stock of the poor. Social capital plays an important role in the process of poverty alleviation for the poor. The lack of social capital is a common phenomenon in ethnic areas. It is more connected by family relationships. Therefore, the abundance of social capital in Liangshan Prefecture must be embedded. The establishment of an institutionalized relationship network is the premise, and the poor people are the mainstay to enrich their social capital stock, including the improvement of social public service levels in poor areas, the establishment and development of collective economic organizations, etc., to provide support and guarantee for the development of the production and life of the poor.

(2) **The intrinsic requirement is the independent participation of the poor**

As a deeply impoverished area with a lack of livelihood capital, supplementary entry of external resources is necessary for poverty alleviation. However, compared with direct money and goods, the participation of the poor is more important. Empowering the poor should become the current reaction. The core of the poverty policy reform is to transform the poverty alleviation policy from a guarantee type to a development type, give play to the initiative of poor individuals, stimulate development motivation and improve development capabilities through the participation of poor people themselves, so as to effectively achieve sustainable poverty alleviation. Therefore, in the new stage of poverty alleviation policies, we must first fully recognize the subjectivity of the poor in the poverty alleviation process. The government should correct its own guidance and position, attach importance to the participation of the poor, and fully mobilize the enthusiasm and initiative of the poor to get rid of poverty. At the same time, it pays attention to the cultivation of skills of the poor in terms of production development, employment and business. Second, actively promote the participation of the poor in poverty alleviation work. Through the design of relevant systems and mechanisms, the poor people will participate in the poverty alleviation work as the main body, including poverty alleviation...
policy publicity, poor population identification, poverty alleviation policy assistance, poverty alleviation project selection, targeted poverty alleviation evaluation, etc. especially in the construction of poverty alleviation projects, poverty alleviation project selection, implementation, management and other tasks must include the poor, meet the needs of the poor, respect the wishes of the poor, and cultivate the poverty awareness of the poor and enhance the self-development ability of the poor. At the same time, we should integrate the poverty alleviation of the poor with the regional economic and social development affairs to avoid "talking about poverty alleviation and poverty alleviation", forming a virtuous circle of "development promotes poverty alleviation, poverty alleviation and development" in poor areas.

(3) Focus on the activation of the endogenous power of the poor

The lack of endogenous motivation of the poor is not only the formation of its own "waiting and relying" thought, but also the influence of the external environment. The activation of the endogenous motivation of the poor must start with internal and external factors, so that the poor people's self-consciousness can be fundamentally changed. Guide the poor to increase their awareness of the market economy. The internalized awareness of poverty alleviation is not only to guide, but also to let the poor people subjectively recognize their poverty gap under the current open market economy conditions, adapt and accept the new social and economic environment, and stimulate the poor people's awareness of integrating into the market economy. There are desires and needs to get rid of poverty, and to strengthen the ideological capacity of the poor; secondly, improve the foundation and environment conducive to the improvement of the capacity of the poor. On the one hand, it is the construction and improvement of infrastructure. In the deeply impoverished ethnic areas, the shortage of infrastructure is a major constraint affecting their development. For example, the lack of infrastructure such as roads, water, electricity, and communications has made the poor people lifted out of poverty. Without the support of infrastructure conditions, they are facing poverty or return to poverty due to lack of infrastructure. On the other hand is the development of village collective economic organizations. Small farmers' production will face huge market risks. A good carrier and platform should be built for the poor through the construction and development of the village's collective economy to enhance the poor's confidence in the development of the economy and enter the market power. The activation of the endogenous power of the poor is a phased process. For ethnic areas, it is more necessary to break their traditional closed ideology and culture, so that the subjective consciousness of the poor can be fundamentally changed.

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