

Multidimensional Poverty Measurement and Cause Analysis of Sichuan Qiang Ethnic Minority

—Based on the Investigation of 245 Poor Households in Mao County

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Abstract—Since the central government made a decision to help the poor, China has achieved remarkable results in poverty alleviation, but ethnic minority areas are still the main battlefield for China to fight poverty. Mao County is the country's largest ethnic minority settlement. It uses the MPI analysis method to conduct multi-dimensional analysis of 245 households in four dimensions including education, health, income, and living conditions. It finds that household income structure and medical expenditure affect poverty. In the factor analysis, the individual factors and basic guarantees were added. SPSS 19.0 was used for logistics binary regression analysis. It was found that gender also had a significant impact on poverty. Through understanding the poverty status of the poverty-stricken households currently surveyed, the new understanding Poverty reduction factors, and the reconstruction of poverty alleviation policies, and further optimization of the poverty alleviation pathway, can play a positive role in the local poverty alleviation work.

Keywords—Poverty alleviation; Poverty measures; Multidimensional poverty

I. INTRODUCTION

Although the current poverty alleviation policy has achieved remarkable achievements and has entered a new process of poverty alleviation at this stage, the current poverty-stricken population in Sichuan Aba Dai Autonomous Prefecture remains large, coupled with its low economic development and natural disasters^[1]. Frequently, living conditions are poor, so the problem of poverty is prominent. It is necessary to summarize the main problems and reflect on them, so we need to find the new direction of development at present, and put forward relevant countermeasures and suggestions.

The research group went deep into Mao County from July 18 to July 22, 2017. It mainly conducted investigations in 21 rural towns, 57 villages and 245 impoverished households in Mao County, through in-depth discussions among rural households and residents, exchanges with household heads, and discussions with cadres. 245 questionnaires were issued, 228 valid questionnaires were finally retrieved, and 57 data sheets were read. The basic situation of the households in poverty households, the situation of agricultural production, household income structure, housing sanitation facilities, and village status data were known. To summarize, collate,

compare, analyze the local poverty situation and its causes, and poverty alleviation policies, and on this basis, put forward references and suggestions for further optimization of poverty alleviation routes.

II. LITERATURE REVIEW

Poverty caused the attention of scholars both at home and abroad, in 1973, Amata Sen in his masterpiece "poverty and famine - theory of rights and deprivation" a book put forward the concept of "capability poverty", this paper expounds the essence of poverty. He argued that poverty should not be judged solely by economic resources, but by the ability to achieve income, social status and other living conditions; On the basis of this the first time put forward the concept of "multidimensional poverty", think that poverty is not only refers to the revenue cannot satisfy the lowest life consumption demand, but should also include such as the lack of health, education and living ability, poverty is deprived of the basic feasible abilities^[2]. Townsend points out that in modern society, in addition to the basic nutritional needs of individuals, we also need to consider the needs of individuals for education, housing and security^[3]. The two dimensions first construct the multidimensional poverty index; The United Nations Development Programme (UNDP) constructed the Capability Poverty Measure and the Human Poverty Index in 1996 and 1997 respectively. The multi-dimensional poverty research method can provide a more powerful tool and perspective for poverty identification and poverty alleviation policy. For example, research based on Kerala in India shows that multidimensional poverty can more effectively identify poor households than the single income dimension^[4]. Analysis of multidimensional poverty in rural households in Vietnam also found that the income/expenditure of rural households is poor and multidimensional. There is a large difference between the levels of poverty^[5]; studies in Nigeria show that multidimensional poverty measures can more effectively reveal the vulnerability of families and adopt coping mechanisms^[6]. The current literature mainly focuses on multidimensional poverty of rural households, but there is relatively little analysis of the deep-level mechanism of multidimensional poverty.

III. MULTIDIMENSIONAL POVERTY MEASUREMENT METHOD

The UNDP-MPI index recognizes poverty deprivation in different dimensions through three dimensions: health,

education, and living standards. The three dimensions contain seven indicators, using the equal weighting method. The specific methods are as follows:

A. Determination of the poverty dimension

Select the four dimensions of education, health, income and living conditions used by UNDP.

B. Selection of poverty indicators

The education dimension indicators include the education level of the head of the household and the status of children out of school in the family; the health dimension index refers to the family medical expenditure; the income dimension index includes the per capita net income and household income structure; the housing condition is the housing structure.

C. Determine the deprivation threshold for poverty indicators in each dimension

D. Determine the weight of each indicator

It is different from the determination of the weight of each indicator by equal weight method. It draws on Yang Zhen's research on multidimensional poverty, and uses weighted method of objectivity to determine the weights of the seven dimensions of education, health and living standards.

E. Adding dimensions

That is, the multidimensional poverty index is calculated. Mainly through two steps: ① Calculate the incidence of multidimensional poverty population H; ② Calculate the multidimensional poverty intensity index A. The product of multidimensional poverty population and multidimensional poverty intensity index is the multidimensional poverty index.

- The incidence of multidimensional poverty population H: $H = q_{ij}(k)/n$
- Multidimensional poverty intensity index A:

$$q_{ij}(k) = \begin{cases} 1 & C_{ij}(k) > 0 \\ 0 & \text{Other} \end{cases}, \text{ get the population of}$$

multidimensional poverty.

$$C_{ij}(k) = \begin{cases} \sum_{j=1}^d g_{ij} & \sum_{j=1}^d g_{ij} \geq k \\ 0 & \text{Other} \end{cases}, C_i(k) \text{ is the}$$

number of indicators that individual i was deprived in the case of a poverty threshold of K.

$$A = \frac{\sum_{i=1}^n C_i(k)}{q_{ij}(k)}, \text{ The number of indicators that}$$

individual i was deprived in the case that $C_i(k)$ was the poverty critical value K.

- Multidimensional poverty index MPI: $MPI = H \times A$

Where: $q_{ij}(k)$ is the number of populations under multidimensional poverty; n is the total population of the

sample; $C_i(k)$ is the number of indicators that individual i was deprived in the case of a poverty threshold of K.

F. Decomposition of dimensions

Use indicator contribution C to determine how each indicator contributes to multidimensional poverty in households.

$$\text{Indicator Contribution: } C = W_i \times M_i / \text{MPI}$$

Where: W_i represents the weight of the i'th dimension; M_i represents the deprivation rate of the i'th dimension; MPI is multidimensional poverty index.

Use indicator contribution C to determine how each indicator contributes to multidimensional poverty in households.

IV. RESEARCH RESULTS AND ANALYSIS

A. Sample Farmers Profile

1) *Farmers head households tend to age.* In the sample, 71 persons aged 55 or over accounted for 28.98% of the sample population, 35 the proportion of rural households below the age is the lowest, only 7.76%.

2) *The head of household has a low level of education.* The level of education for heads of households is 204 in primary schools and below, accounting for 83.27% of the total.

3) *The number of family members is mostly a family of three with a small population.* There are 122 households with 3 or fewer members, accounting for 49.80%; 66 households with 4 family members, accounting for 26.94%; 41 households with 5 family members, 16.73%.

4) *The number of family members working outside the home is small.* There are 133 households without migrant workers, accounting for 54.29% of the total; the number of migrant workers in the family is 28.16%, with 69 households.

B. Multidimensional Poverty Measurement Results

From table 1, it can be seen that 100.00% of households have poverty in at least one dimension, 95.10% of households have poverty in at least two dimensions, 75.51% of households have poverty in at least three dimensions, and MPI reaches its maximum. When the critical value of the poverty dimension is equal to 4, the incidence rate of the rural poverty multidimensional poor population is equal to 26.81%. When the deprivation threshold for poverty is $k=1$, the multidimensional poverty rate for rural households in the study area is 4.90%. With the increase of k value, the number of individuals in multidimensional poverty gradually decreased, and the overall MPI value also gradually decreased. When $k=6$ and 7, there are no multidimensional poor individuals in the surveyed villages, that is, there are no extreme poverty individuals whose surveyed households are deprived of more than six indicators.

TABLE I. RESULT OF MULTIDIMENSIONAL POVERTY MEASUREMENT

k	H	A	MPI	the incidence of income poverty
1	100.00%	4.90%	4.90%	6.12%
2	95.10%	24.49%	23.29%	6.12%
3	75.51%	64.49%	48.70%	6.12%
4	26.81%	92.65%	24.84%	6.12%
5	0.22%	100.00%	0.22%	6.12%
6	0.00%	--	--	6.12%
7	0.00%	--	--	6.12%

C. Analysis of Factors Affecting Multidimensional Poverty of Farmers

1) Variable definitions

The assignment and meaning of variables are shown in Table 2.

TABLE II. VARIABLE DESIGN AND ASSIGNMENT

indicator	variable	Variable and assignment meaning
Individual factors	gender	Householder gender, male 1, female 0.
	age	< 35=1, 35 ~ 45= 2, 45 ~ 55=3, > 55=4
	education level	primary school and below =1, middle school =2, high school=3, university and above =4
Family factors	total population	The actual number of households.
	number of students	The number of actual students in the family.
	family of major disease	Family members with major disease (yes, assignment 1; No, assignment 0)
	number of migrant workers	The number of domestic migrant workers.
Economic level	transfer income	Transfer income accounts for more than 25% of total household income. (yes, assignment 1; No, assignment 0.
	per capita net income of farmers	Per capita annual income of poverty households exceeds the national standard line (yes, assignment 1; no, assignment 0)
Basic guarantee	Dibao	yes, assignment 1; no, assignment 0
	New Rural Cooperatives	yes, assignment 1; no, assignment 0

2) Analysis of Factors Affecting Multidimensional Poverty

From the regression results in table 3, it can be seen that in all poor households, the ratio of transfer income to total income and gender factor reach a significant level. The proportion of transfer income to total income is positively related to whether the family is in multidimensional poverty, and the gender of the head of household is significantly negatively correlated. This shows that the proportion of transfer income to total income, and the greater the likelihood that the family is in a multi-dimensional poverty situation, individuals will rely more on government subsidies. Various kinds of financial subsidies include forest protection subsidies, dangerous housing subsidies, subsidies for returning farmland to forests, and others include social security, five guarantees, new rural cooperative medical insurance, and medical insurance. Many poor households rely on financial subsidies to survive, but rely on their own to create less labor income. . Some peasant households have low awareness of creating labor value and

lack labor enthusiasm. Even if they provide assistance and provide production materials, they still cannot create value, and there is still no significant progress. Some villagers have even adopted a state of mind. In addition, the phenomenon of "empty nests" is remarkable. More than half of the poor households have elderly people who live in over 60 years and lack of labor. As a result, they have less operating income and rely on government financial subsidies.

When the head of household is male, the less likely the family is in a multi-dimensional poverty situation, the male head of household will be able to occupy a more dominant position in the family because of gender advantages and will have more opportunities in external competition. Factors such as conditions, personal skills, and children in the family restrict their chances of increasing household income. On the one hand, households with a large proportion of transfer income as a share of total income will directly affect households' living conditions, living environment, and medical expenses of patients in their homes. On the other hand, families headed by men are able to escape from poverty. There is a greater desire and there are a relatively large number of out-of-home employment opportunities compared with households with less-educated heads of households, which has an important impact on increasing household income.

The presence or absence of seriously ill patients in the family (disabled persons, chronic diseases, and severely ill patients) has reached a significant level in affecting multidimensional poverty. The coefficient of regression of the number of home-school students is positive, indicating that families with seriously ill patients are more likely to be in multidimensional poverty. According to the survey data, if the poverty due to illness, disability, and mental retardation is collectively classified as poor due to illness, 21 towns, 57 villages, and 286 poor households were investigated, of which 13 were due to illness. The poverty rate exceeds 70%, 5 towns are between 50% and 70%, and only 3 towns are less than 50%. 14 households are not out of poverty. Poverty due to illness is the main cause of poverty. The main manifestation is that the proportion of rural residents living in mountainous areas is relatively high, most of them are family-owned genetic diseases; chronic diseases are many and there is no timely treatment; living conditions are poor; consciousness of "disease treatment" is insufficient, and injuries caused by accidents are not obtained timely treatment.

Further analysis of the prevalence of poor households caused by the disease found that the diseases that cause rural residents to become poor due to illness may be sudden major diseases, and may also be long-term chronic diseases that are not easily curable, such as hypertension and rheumatism. Arthritis, even worse, has both major and chronic diseases. The major diseases are mainly malignant tumors, cerebral hemorrhage, meningitis, uremia, viral hepatitis, and severe Parkinson's disease, epilepsy, etc. Long-term chronic diseases are mainly high blood pressure, gallstones, gastric ulcers, heart diseases, and mental illnesses. Among the poverty-stricken households with disabilities, 29.6% were poor, 21.2% were seriously ill, and 49.1% were chronic diseases. The proportion of chronically ill patients is the highest among those who suffer from illness, followed by the disabled, and the severely ill

patients. Only Feihong Township, Goukou Township, Wadi Town, Weimen Township, and Tumen Township have a higher proportion of disabled people than chronic diseases and serious diseases. What is worth noting is that in the 57 villages that participated in the survey, some of the diseases were regional. Parkinson's syndrome was concentrated in the Heihu Township, accounting for 36.7% of the total poverty caused by the disease, and epilepsy accounted for 18.2%.

Most of the poverty-stricken households in the village of Aiziguan Village live on the slopes of about 2300-2800 meters in the high mountains. The living environment here is rather harsh. Four out of 11 poverty-stricken households in the township have Parkinson's disease, which is characterized by family genetic diseases. The health conditions are backward, so more patients have this disease. These impoverished households have a shortage of labor because of their remnants, and medical expenses due to illness increase, which inevitably has a direct impact on income.

TABLE III. CALCULATION RESULTS OF MODEL EQUATIONS

	B	SE	Sig.	Exp (B)	EXP (B) 95% C.I.	
					Lower limit	Upper limit
gender	-1.02	.453	.024	.358	.148	.872
age	-.19	.215	.367	.824	.541	1.255
education	.20	.396	.606	1.23	.564	2.666
household population	.11	.168	.697	1.068	.768	1.485
student population	.20	.262	.682	1.113	.667	1.858
migrant workers	.06	.246	.794	1.066	.658	1.728
Transfer income	2.60	.456	.000	13.454	5.508	32.86
income standard	19.7	9392.2	.998	3.960 E8	.000	
Dibao	-.26	.371	.492	.775	.375	1.603
seriously ill patients	3.12	.493	.000	22.643	8.624	59.45
constant	-1.93	1.16	.109	.156	--	--

V. CONCLUSIONS AND SUGGESTIONS

A. Conclusion

Based on relevant multi-dimensional poverty research, using existing research methods, and measuring the poverty status of the 245 poor households in Mao County, the poverty status can be measured. , followed by the level of education, medical expenditure (disabled, chronic diseases, severely ill

patients), the main source of family income (transfer income of more than 25% of total income), subjective attitude that the disease is the cause of its poverty, low per capita income In the national standards, children out of school conditions, housing structure. In all the samples, it can be found that the factors affecting multi-dimensional poverty are the same as the single dimensions. The main factors are also the medical expenses (disabled persons, chronic diseases, severely ill patients) and the main source of family income (transfer income accounts for 25% of the total income. Above), there are also gender factors. In addition to the variables that have been proposed in the study, there may be other impact factors, including geographical factors, natural disasters, and the listed indicators do not completely show the characteristics of poverty. Most of the poverty-stricken households in the village of Aiziguan Village live on the slopes of about 2300-2800 meters in the high mountains.

B. Suggestions

1) Strengthen basic education for youth, enhance professional skills of workers, and raise farmers' awareness of environmental protection.

2) Optimize the layout of facility design, speed up the construction of facilities, and lay a solid foundation for poverty alleviation.

3) Activate various types of rural resources, reposition the development model, and increase farmers' access to wealth.

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