

Construction of Audit Evaluation Index System of Targeted Poverty Alleviation Based on AHP

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Abstract:

In recent years, the state and regions have invested a large number of special funds in poverty alleviation. Based on combing relevant literature, the audit evaluation index system of targeted poverty alleviation was constructed from two dimensions: the process and the benefit of poverty alleviation. And the weight of each index was determined by AHP. Then, taking Z county as an example, the field application is carried out to revise the audit evaluation index system of targeted poverty alleviation. It is better to promote the development of targeted poverty alleviation and elimination smoothly.

Keywords: Targeted poverty Alleviation audit, Evaluation index, AHP, Fuzzy evaluation method.

I. INTRODUCTION

Since reform and opening up, China has reduced the number of people living in poverty by 710 million, from 770 million in 1978 to 55.75 million in 2015, through the efforts of relief poverty alleviation, development-oriented poverty alleviation and participatory poverty alleviation.[1,2]. However, due to the decline of the efficiency of poverty reduction driven by the economy, the remaining 50 million poor people have become the backbone of poverty reduction with the deepest degree of poverty, the most complex causes of poverty, the weakest capacity for self-development, and the most prominent phenomenon of returning to poverty[3,4]. National and local government invested a large amount of money in poverty alleviation, but local government failed to enforce the rules of the making good use of carryover and surplus government funds of poverty alleviation and the mechanism of steadily increasing government input strictly, so that the corruption cases in the field of poverty alleviation occur frequently[5,6]. In 2017, discipline inspection and supervision organs at all levels investigated and dealt with 48,700 cases of corruption and misconduct in the field of poverty alleviation, and handled 64,500 people. This behavior not only affect the implementation of poverty alleviation policy implementation and the effect of poverty alleviation seriously, and hinder the poor families and individuals to get rid of poverty, but also affect the relationship between cadres and masses at the grass-roots level, and inhibit the enthusiasm of participating in the poverty alleviation for the poor people seriously, so the local government must take full advantage of the money and make differences in eliminating poverty. In addition, the information asymmetry

between central and local governments increases the cost of policy formulation and implementation, highlighting the risk of influence of government credibility and conflict in policy formulation. Motivated by adverse selection and moral hazard, local governments may withhold or embezzle more financial funds or meet the requirements of political performance assessment by means of false data and performance whitewashing, thus turning poverty alleviation work into a tool of profit grabbing[7]. Therefore, in order to solve the problems of imperfect precision identification mechanism, poor poverty alleviation policy implementation, serious waste of idle funds, and illegal use of poverty alleviation funds effectively, ensure the smooth progress of poverty alleviation work of grassroots and help targeted poverty alleviation enter a new stage of vigorous implementation, it is extremely urgent to carry out tracking audit of targeted poverty alleviation policy[8].

In fact, in 2011, the Outline of China's Rural Poverty Alleviation and Development (2011-2020) put forward that it is essential to strengthen audit supervision, broaden supervision channels, and investigate and handle the embezzlement of poverty alleviation funds resolutely. In 2013, audit office issued 'Opinions on Further Strengthening the Poverty Alleviation Audit to Promote the Implementation of Targeted Poverty Alleviation Policies', which stressed that the audit organs at all levels must strengthen the specific contents of the audit of poverty alleviation and the principle of work, bring into the policies and measures of the tracking audit, leading cadres economic responsibility audit, revenue and expenditure audit and others, and then achieve the full coverage of poverty alleviation audit with focus, steps, depth and effectiveness.

Based on above, this article construct the accurate audit evaluation index system of poverty alleviation based on AHP and combined with the present situation of targeted poverty alleviation audit in China, existing problems and the specific contents and working principle of poverty alleviation audit, which can provide theoretical reference for the implementation of targeted poverty alleviation policies and the application of targeted poverty alleviation audit. In this way, it can play an important role in improving the effectiveness of targeted poverty alleviation by scientific and reasonable audit methods and procedures.

II. THE CONNOTATION AND VALUE ORIENTATION OF TARGETED POVERTY ALLEVIATION POLICY AUDIT

2.1 The Connotation of Targeted Poverty Alleviation Policy Audit

Targeted poverty alleviation policy is the strategic direction of China's poverty alleviation and development in the new era, the policy response to the optimal allocation of poverty alleviation resources and the improvement of development quality required by the new economic normal. The implementation, adjustment and improvement of policies are of great significance for China to improve people's livelihood, adjust wealth distribution pattern, enhance citizen welfare, promote the sharing of reform results and promote social equity and justice. As one of the core approaches of poverty alleviation governance, targeted poverty alleviation audit adopts special auditing procedures and methods by auditing institutions,

internal auditing institutions and certified public accountants (mainly government auditing institutions) based on laws or authorization and focuses on the authenticity, legality and effectiveness of the allocation and use of poverty alleviation funds, which aims to supervise, evaluate and verify the implementation situation of current poverty alleviation policy and the degree of achieving the goal of poverty alleviation policy, to assess and supervise the situation of responsibility fulfillment for governments and departments in governing poverty alleviation, to analyze policy loopholes and defects and the causes of them, and to put forward repairing policy, institutional improvement and risk prevention and resolution audit recommendations[8, 9].

2.2 The Significance of Targeted Poverty Alleviation Tracking Audit

Under the goal of poverty alleviation governance, targeted poverty alleviation audit at least can achieve the poverty alleviation goal through the following paths on the basis of tracking and auditing the effects of the transmission and implementation of targeted poverty alleviation policies by ministries and commissions and local governments[10].

2.2.1 Facilitate top-down policies and decrees by supervision of auditing tracking

The government is the main body of the formulation and implementation of various poverty alleviation policies and the leading force of poverty alleviation governance. However, the effective implementation of government governance depends on the role of political authority power required to maintain social order within a limited area and the rational use of administrative power [11]. In fact, the targeted poverty alleviation audit maintain the authority and rationality of governance of government by normalizing the tracking, supervision and accountability of the implementation of policies by governments and departments. Targeted poverty alleviation audit will not only help promote the spirit of central document, ensure that the departments and governments grasp the central spirit of the targeted poverty alleviation, and promote the 'consistency' of top-down poverty alleviation policy from central to local, but also can be used as a regular supervision system arrangement. Through the top-down supervision, it can promote policy implementation by the ministries, local governments and the competent department of industry, curb opportunistic actions of departments or governments, eliminate the obstacles in the transmission process of policies, reduce the diminishing effect of policies, achieve the purpose of smooth decrees and promote policies to transfer into the grass-roots level of policy implementation efficiently and completely[12].

2.2.2 Ensure the implementation and effectiveness of policies by supervision of auditing tracking

In order to achieve the goal of poverty alleviation, when the poverty alleviation policy is issued, it needs to be publicized, interpreted, promoted and implemented by departments and governments, and then implemented by departments, governments and the public as the target of targeted poverty alleviation according to the poverty alleviation policy. However, not all these processes are transparent or objective,

and information asymmetry and the resulting moral hazard and adverse selection are often the key factors that make it difficult to implement policies. Moreover, as mentioned above, departments, governments and the public may have their own selfish motives[4]. Therefore, policies remaining in internal document circulation, "transmitting layer upon layer, text by text", no specific implementation of the operating rules, the lack of response and implementation for the public and related units, that is, the so-called "loud thunder, small rain" failure examples of policy implementation occur frequently. In this case, through targeted poverty alleviation audit, on the one hand, it can dredge information communication among different level institutions, government agencies and the object of poverty alleviation, alleviate the information asymmetry among the targeted poverty alleviation policy-makers, police-executors and audience, promote the transparency and openness of implementation of poverty alleviation policy, and solve the "first one kilometer" of the implementation of the policy; On the other hand, is an appropriate poverty alleviation mechanism established? Has it helped the real poor and solved the poverty problem of the poor? In the process of poverty alleviation, are there problems that deviate from the original intention of poverty alleviation policies, such as poor organization and coordination, additional conditions attached to the central poverty alleviation policies, reduction and discount of poverty alleviation measures, and cutting corners? Are there problems such as sloth administration? Through the above audit and timely feedback will help reveal and investigate violations of laws and regulations in the process of poverty alleviation, timely correct deviations in the implementation of targeted poverty alleviation policies, remove "obstructions" in the implementation of policies, and improve the effect of the implementation of policies and measures.

2.2.3 Promote scientificity and coordination of policies by supervision of audit tracking

Achieving the supervision and evaluation of the realization and impact of poverty alleviation governance goals and investigating the rationality and effectiveness of targeted poverty alleviation policies by targeted poverty alleviation audit, which is conducive to discovering policy defects and institutional loopholes and promoting the deepening reform of audit policies. Moreover, with the deepening of poverty alleviation governance, the poverty situation and the phased target of poverty alleviation in regions will change accordingly. However, the targeted poverty alleviation audit just can track the characteristics of poverty and the suitability of poverty alleviation policy timely, pushing departments and the government to adjust the targeted poverty alleviation policy according to the periodic task in each phases.

III. SELECTION OF AUDIT EVALUATION INDEX SYSTEM OF TARGETED POVERTY ALLEVIATION BASED ON AHP

3.1 Basic Principles of the Design of Audit Evaluation Index

Since the audit evaluation of targeted poverty alleviation includes many factors, the following principles should be followed in the process of designing the index system in order to build a scientific evaluation index system that takes many factors into account.

3.1.1 Comprehensiveness

The targeted poverty alleviation audit mainly includes two aspects: the audit of poverty alleviation implementation process evaluation and the audit of poverty alleviation performance evaluation. Each aspect contains multiple dimensions, and each dimension involves multiple levels. Therefore, the index system should include all aspects to satisfy the comprehensiveness of evaluation.

3.1.2 Scientificity

The establishment of the evaluation index system should follow the scientific principle strictly and must clearly reflect the management and control relationship between the target and the index, which is to avoid excessive index system and miscellaneous content.

3.1.3 Maneuverability

The designed indicators must fully consider the availability of data and the convenience of field investigation to ensure the quality of the data. At the same time, the meaning of each indicator must be clear so that researchers can carry out specific operations.

3.1.4 Representativeness

There may be many indicators reflecting a feature, but representative and key indicators should be selected as far as possible. The index setting should reflect the essence of the audit evaluation of targeted poverty alleviation, and irrelevant factors should not be considered.

3.2 Selection of Audit Evaluation Index of Targeted Poverty Alleviation

The performance audit of poverty alleviation fiscal funds supervise and evaluate the process and effect of the use of poverty alleviation fiscal funds comprehensively. According to the objective and content of targeted poverty alleviation audit, the indicators are divided into two levels: poverty alleviation implementation process audit and poverty alleviation benefit audit.

3.2.1 Poverty alleviation implementation process audit

The evaluation audit of poverty alleviation implementation process mainly includes three aspects: accurate identification audit, accurate helping audit and the use and management of poverty alleviation funds audit.

The first is accurate identification audit. It mainly starts from the details, grasping the poverty

household identification standard carefully and evaluating whether the poverty household identification work is reasonable, transparent and complete. The rate of missed evaluation, wrong evaluation and wrong regression are taken as the quantitative assessment index of the accurate audit of poverty alleviation objects, and the rationality of the identification method and the transparency of the identification process are taken as the qualitative criteria of the accurate identification audit.

The second is accurate helping audit. It aims to evaluate whether the local government pays attention to precision power and gives full play to the active role of cadres and masses in poor areas. The audit index of accurate help is measured from two aspects: the attitude of helped objects towards activities and the implementation and completion of helping projects.

The third is the use and management of poverty alleviation funds audit. It tests the distribution, allocation, management, and use of poverty alleviation funds, audits the reliability of the data and evaluates whether the auditees use funds accurately and manage funds normally. So the secondary indicators of the use and management of poverty alleviation funds start from two aspects: the accurate use and the normal management of the poverty alleviation funds.

3.2.2 Poverty alleviation benefit audit

Poverty alleviation performance evaluation audit is conducted from five dimensions of economic benefit, political benefit, social benefit, ecological benefit and cultural benefit.

Economic benefit audit. It mainly audits the economic benefits brought by targeted poverty alleviation, focusing on the authenticity and accuracy of relevant financial data and the risk of material misstatement. The economic benefits of targeted poverty alleviation are studied from the living standards of poor people and the poverty alleviation loans of poor households.

Political benefit audit. It mainly examines the motility shown by the guidance and regulation of top-level design of local governments, behavior rules reflected by practice and innovation and implications of policy making. The audit includes three aspects: firstly, whether the top-level design has been implemented, whether it has been distorted, whether it is realistic and whether targeted poverty alleviation has achieved its original intention; Secondly, whether the audited unit violates or fails to implement the targeted poverty alleviation policy seriously in the implementation process; Thirdly, the popularization of targeted poverty alleviation policies.

Social benefit audit. It mainly audits and evaluates the degree of changes in the production and living conditions of people in poor areas and the social environment in their areas under the influence of poverty alleviation projects. The impact of renovation projects of dilapidated rural houses, relocation projects for the poor and health projects on people's living conditions can be evaluated by the proportion of the area of dilapidated houses, the transformation rate of "three links" (water, electricity and access) and the

participation rate of the new rural cooperative endowment insurance. The rate of documented poverty reduction and incidence of poverty can reflect the impact of poverty alleviation projects on the social environment in poor areas.

Ecological benefit audit. It is the benefit audit evaluation that evaluate whether poverty alleviation projects are beneficial to maintain and restore ecological balance and forming ecological virtuous cycle. Based on the availability of actual situation and data of ecological poverty alleviation projects and irrigation poverty alleviation projects, the ecological benefits are measured by three subdivision criteria: vegetation coverage rate, effective utilization coefficient of irrigation water, and water quality compliance rate of important rivers and lakes.

Cultural benefit audit. It evaluates the cultivation of the individual feasible ability of the poor formed by the poverty alleviation of cultural undertakings and cultural industries. It mainly investigates from two aspects: intellectual poverty alleviation and cultural facilities construction.

Based on the above analysis, the establishment of a precision poverty alleviation audit evaluation index system is shown in Table I:

TABLE I. Screening of audit evaluation indicators of targeted poverty alleviation

Object Evaluation	First-Level	Audit Content	Second-Level
The Audit Goal Of Targeted Poverty Alleviation Is To Evaluate The Poverty Alleviation Work Comprehensively And Strengthen The Audit Supervision Of The Implementation Process And Results Of Poverty Alleviation.	accurate identification	grasp the poverty household identification standard carefully and evaluate Whether The Poverty Household Identification Work Is Reasonable, Transparent And Complete	the rate of missed evaluation(%)
			the rate of wrong evaluation(%)
			the rate of wrong regression(%)
			rationality of identification mode
			transparency of identify process
	Accurate Helping	Evaluate Whether The Local Government Gives Full Play To The Active Role Of Cadres And Masses In Poor Areas.	degree of participation in public of helping projects(%)
			the completion of helping projects

			degree of satisfaction in public(%)
	The Use And Management Of Poverty Alleviation Funds	Test The Distribution, Allocation, Management, And Use Of Poverty Alleviation Funds, Audit The Reliability Of The Data	
			rate of allocation of special funds(%)
			time efficiency of funds allocation
			degree of disclosure of funds project information
			the rate of village aid funds utilization(%)
			the rate of annual funds carryover and balance(%)
	Economic Benefits	Audit The Economic Benefits Brought By Targeted Poverty Alleviation	the increasing range of average disposable income of the poor (%)
			loan rate of poor households(%)
	Political Benefits	Examine The Motility Shown By The Guidance And Regulation Of Top-Level Design Of Local Governments, Behavior Rules Reflected By Practice And Innovation And Implications Of Policy Making.	The Rationality Of The Local Poverty Alleviation System
			Degree Of Implementation Of Targeted Poverty Alleviation Policies
			Number Of Corruption Cases In Poverty Alleviation
			Awareness Rate Of Poverty Alleviation Policy(%)
	Social	Audit And Evaluate	The Proportion Of

	Benefits	The Degree Of Changes In The Production And Living Conditions Of People In Poor Areas And The Social Environment In Their Areas Under The Influence Of Poverty Alleviation Projects	The Area Of Dilapidated Houses (%)
			The Transformation Rate Of "Three Links" (%)
			The Participation Rate Of The New Rural Cooperative Endowment Insurance (%)
			The Rate Of Documented Poverty Reduction (%)
			The Rate Of Incidence Of Poverty (%)
	Ecological Benefits	Evaluate Whether Poverty Alleviation Projects Are Beneficial To Maintain And Restore Ecological Balance And Forming Ecological Virtuous Cycle.	Effective Utilization Coefficient Of Irrigation Water
			Vegetation Coverage Rate (%)
			Water Quality Compliance Rate Of Important Rivers And Lakes. (%)
	Cultural Benefits	Evaluate The Of The Individual Feasible Ability Of The Poor	Enrollment Rate Of Compulsory Education (%)
			Retention Rate Of Compulsory Education (%)
			Number Of Places For Cultural Activities
			Observation And

			Training Times Of Poverty Alleviation Cadres
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3.3 Determination of Evaluation Index Weight based on AHP

The analytic hierarchy process (AHP) is to compare and assign values to experts' decision-making ideas at different levels, which aims to obtain the importance level quantified by different factors at the same level and provide reference for related decisions with quantitative results. Applying AHP to set the evaluation model can realize the internal logic matching of indicators, and also can assign scores to each indicator appropriately. This paper uses AHP to determine the weight of indicators at all levels, which can be divided into the following three steps:

3.3.1 Construct judgment matrix

Construct the judgement matrix on the basis of the established hierarchy, judge the importance of each index in the same hierarchy and the judgment matrix represents the importance degree of the criterion layer to the target layer and the importance degree of the index layer to the criterion layer respectively. The 1-9 scale value method is used to judge the importance of indicators. Experts are asked to compare the importance of indicators through questionnaires. The 1-9 scale value method is seen in Table II.

TABLE II. The table of judgement matrix significance scale and meaning description

Scale Value	Meaning
1	x_i and x_j are compared, two indicators are of the same importance
3	x_i and x_j are compared, x_i is slightly more important
5	x_i and x_j are compared, x_i is obviously important
7	x_i and x_j are compared, x_i is very important
9	x_i and x_j are compared, x_i is extremely important
2, 4, 6, 8	between the above adjacent judgments
inverse	when the ratio of importance of x_i and x_j is a_{ij} , the ratio of importance of x_j and x_i is $a_{ji}=1/a_{ij}$

After pairwise comparison and assignment of different indexes at the same level, a specific judgment matrix is formed. The form of the constructed judgment matrix is shown in Table III.

TABLE III. The general form of judgement matrix

C	C ₁	C ₂	C _n
C ₁	A ₁₁	A ₁₂	A _{1N}
C ₂	A ₂₁	A ₂₂	A _{2N}
.....
C _n	A _{N1}	A _{N2}	A _{NN}

3.3.2 Consistency test

The maximum characteristic root λ_{\max} and corresponding characteristic vector of the judgment matrix are calculated according to the importance of the index, and the consistency test is carried out. The specific calculation steps are as follows:

1) The maximum characteristic root λ_{\max} is calculated according to the judgment matrix, and the maximum characteristic root λ_{\max} , is calculated by the following formula (1):

$$\lambda_{\max} = \sum_{i=1}^n \frac{(Bw)_i}{nw_i} \quad (1)$$

2) Consistency index CI is calculated according to the obtained λ_{\max} . The consistency index CI is calculated by the following formula (2):

$$CI = \frac{\lambda_{\max} - n}{n - 1} \quad (2)$$

3) Consistency test is carried out according to the obtained consistency index CI, which is calculated by the following formula (3):

$$CR = \frac{CI}{RI} \quad (3)$$

If $CR < 0.$, the judgment matrix is consistent; Otherwise, it is not. The value of random consistency index RI is seen in Table IV.

TABLE IV. The random consistency index ri

N	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.52	0.89	1.12	1.26	1.36	1.41	1.46	1.49

3.3.3 Determination of index weight

According to the maximum characteristic root λ_{\max} , the eigenvector Z_i corresponding to the maximum characteristic root is obtained, and the relative weight W_i of the evaluation index relative to the upper level is obtained by normalization of the eigenvector Z_i .

According to the above steps, this study uses Yaaph software to calculate the weights, and the results are shown in Table V, Table VI, Table VII, Table VIII, Table IX, Table X, Table XI, Table XII, Table XIII.

TABLE V. The weight distribution of first-level indicators of targeted poverty alleviation audit

First-Level Indicators	Accurate Identification	Accurate Helping	The Use And Management Of Poverty Alleviation Funds	Economic Benefits	Political Benefits	Social Benefits	Ecological Benefits	Cultural Benefits	Cr
Weight	0.0497	0.0938	0.0713	0.1217	0.2506	0.1810	0.1347	0.0973	0.0763

TABLE VI. The weight distribution of index under the accurate identification criterion

Accurate Identification	The Rate Of Missed Evaluation	The Rate Of Wrong Evaluation	The Rate Of Wrong Regression	Rationality Of Identification Mode	Transparency Of Identify Process	Cr
Weight	0.2611	0.0967	0.1589	0.4238	0.0596	0.0949
Comprehensive Weight	0.0130	0.0048	0.0079	0.0210	0.0030	-

TABLE VII. The weight distribution of index under the accurate helping criterion

Accurate Helping	Degree Of Participation In Public Of Helping Projects	The Completion Of Helping Projects	Degree Of Satisfaction In Public	Cr
Weight	0.2684	0.1172	0.6144	0.0707
Comprehensive Weight	0.0252	0.0110	0.0576	-

TABLE VIII. The weight distribution of index under the criterion of the use and management of poverty alleviation funds

The Use And Management Of Poverty Alleviation Funds	Rationality Of Fund Allocation	Rate Of Allocation Of Special Funds	Time Efficiency Of Funds Allocation	Degree Of Disclosure Of Funds Project Information	The Rate Of Village Aid Funds Utilization	The Rate Of Annual Funds Carryover And Balance	Cr
Weight	0.4149	0.1651	0.1285	0.1225	0.0547	0.1145	0.0896
Comprehensive Weight	0.0296	0.0118	0.0092	0.0087	0.0039	0.0082	-

TABLE IX. The weight distribution of index under the economic benefit criterion

Economic Benefit	The Increasing Range Of Average Disposable Income Of The Poor	Loan Rate Of Poor Households	Cr
Weight	0.7500	0.2500	0.0000
Comprehensive Weight	0.0913	0.0304	-

TABLE X. The weight distribution of index under the political benefit criterion

Political Benefit	The Rationality Of The Local Poverty Alleviation System	Degree Of Implementation Of Targeted Poverty Alleviation Policies	Number Of Corruption Cases In Poverty Alleviation	Awareness Rate Of Poverty Alleviation Policy	Cr
Weight	0.4140	0.4140	0.0629	0.1090	0.0574
Comprehensive Weight	0.1038	0.1038	0.0158	0.0273	-

TABLE XI. The weight distribution of index under the social benefit criterion

Social Benefit	The Proportion Of The Area Of Dilapidated Houses	The Transformation Rate Of "Three Links"	The Participation Rate Of The New Rural Cooperative Endowment Insurance	The Rate Of Documented Poverty Reduction	The Rate Of Incidence Of Poverty	Cr
Weight	0.1220	0.0610	0.1520	0.3877	0.2774	0.0735
Comprehensive Weight	0.0221	0.0110	0.0275	0.0702	0.0502	-

TABLE XII. The weight distribution of index under the social benefit criterion

Ecological Benefit	Effective Utilization Coefficient Of Irrigation Water	Vegetation Coverage Rate	Water Quality Compliance Rate Of Important Rivers And Lakes.	Cr
Weight	0.3275	0.2599	0.4126	0.0516
Comprehensive Weight	0.0441	0.0350	0.0556	-

TABLE XIII. The weight distribution of index under the cultural benefit criterion

Cultural Benefit	Enrollment Rate Of Compulsory Education	Retention Rate Of Compulsory Education	Number Of Places For Cultural Activities	Observation And Training Times Of Poverty Alleviation Cadres	Cr
Weight	0.3573	0.4126	0.1459	0.0842	0.0614
Comprehensive Weight	0.0348	0.0401	0.0142	0.0082	-

As shown in the table above, after obtaining the weight of each index, the index weight is multiplied by the weight of the corresponding criterion layer to obtain the comprehensive weight of the index. Table V consistency ratio of comprehensive evaluation judgment matrix of targeted poverty alleviation audit is 0.0763, $\lambda_{\max} = 8.7533$. CR of the judgment matrix = $0.0763 < 0.1$, so it passes the consistency test. The consistency ratio of accurate identification index, accurate help index, poverty alleviation fund use and management index, economic benefit index, political benefit index, social benefit index, ecological benefit index and cultural benefit index matrix is 0.0949, 0.0707, 0.0896, 0.0000, 0.0574, 0.0735, 0.0516, respectively. 0.0614, CR values are all less than 0.1, passing the consistency test. Table XIV shows the calculation results of the weights of audit evaluation indicators for targeted poverty alleviation.

TABLE XIV. The weight of audit evaluation index of targeted poverty alleviation

Object Level(I)	First-Level Index (II_I)	First-Level Weight	Second-Level Index (III_{Ij})	Second-Level Weight
	Accurate Identification II ₁		The Rate Of Wrong Evaluation III ₁₂	0.0967
			The Rate Of Wrong Regression III ₁₃	0.1589
			Rationality Of Identification Mode III ₁₄	0.4238
			Transparency Of Identify Process III ₁₅	0.0596

	Accurate Helping II ₂	0.0938	Degree Of Participation In Public Of Helping Projects III ₂₁	0.2684
			The Completion Of Helping Projects III ₂₂	0.1172
			Degree Of Satisfaction In Public III ₂₃	0.6144
	The Use And Management Of Poverty Alleviation Funds II ₃	0.0713	Rationality Of Fund Allocation III ₃₁	0.4149
			Rate Of Allocation Of Special Funds III ₃₂	0.1651
			Time Efficiency Of Funds Allocation III ₃₃	0.1285
			Degree Of Disclosure Of Funds Project Information III ₃₄	0.1225
			The Rate Of Village Aid Funds Utilization III ₃₅	0.0547
			The Rate Of Annual Funds Carryover And Balance III ₃₆	0.1145
	Economic Benefits II ₄	0.121	The Increasing Range Of Average Disposable Income Of The Poor III ₄₁	0.7500
			Loan Rate Of Poor Households III ₄₂	0.2500
	Political Benefits II ₅	0.2506	The Rationality Of The Local Poverty Alleviation System III ₅₁	0.4140
			Degree Of Implementation Of Targeted Poverty Alleviation Policies III ₅₂	0.4140
			Number Of Corruption Cases In Poverty Alleviation III ₅₃	0.0629

			Awareness Rate Of Poverty Alleviation PolicyIII ₅₄	0.1090
	Social Benefits II ₆	0.1810	The Proportion Of The Area Of Dilapidated Houses III ₆₁	0.1220
			The Transformation Rate Of "Three Links"III ₆₂	0.0610
			The Participation Rate Of The New Rural Cooperative Endowment Insurance III ₆₃	0.1520
			The Rate Of Documented Poverty Reduction III ₆₄	0.3877
			The Rate Of Incidence Of Poverty III ₆₅	0.2774
	Ecological Benefits II ₇	0.1347	Effective Utilization Coefficient Of Irrigation WaterIII ₇₁	0.3275
			Vegetation Coverage Rate III ₇₂	0.2599
			Water Quality Compliance Rate Of Important Rivers And Lakes. III ₇₃	0.4126
	Cultural Benefits II ₈	0.0973	Enrollment Rate Of Compulsory Education III ₈₁	0.3573
			Retention Rate Of Compulsory EducationIII ₈₂	0.4126
			Number Of Places For Cultural ActivitiesIII ₈₃	0.1459
			Observation And Training Times Of Poverty Alleviation Cadres III ₈₄	0.0842

IV.APPLICATION OF AUDIT EVALUATION SYSTEM OF TARGETED POVERTY ALLEVIATION BASED ON FCE

4.1 Grade Evaluation Criteria of Evaluation Index

Refer to the "Government Poverty Alleviation and Development Work Performance Appraisal Method", "the Eastern and Western Collaborative Assessment Measures of Poverty Alleviation", "the Opinions of the Poor Exit Mechanism", "Measures of Implementing the Special Evaluation and Inspection of the Poverty-Stricken Counties", "Planning of water pollution prevention and control of the Key River Basin water (2016-2020)" and other national policies and refinement of some local standards. As shown in Table XV, the evaluation standards of audit evaluation indicators of targeted poverty alleviation are graded.

4.2 Fuzzy Comprehensive Evaluation of Targeted Poverty Alleviation Audit in Z County

4.2.1 The introduction of Z county

Z County is located in the northwest of China, with a total area of 6593 square kilometers under the jurisdiction of 3 townships (towns) and 75 administrative villages. There are 12 ethnic groups such as Tibetan, Han, Hui with 81,300 people. In 2017, 4,607 poor people in 1,121 households get rid of poverty, and 15 poor villages were out of poverty. The rate of poverty incidence dropped from 13.6 percent to 6.9 percent at the beginning of 2017, and the average disposable income of poor farmers and herdsmen reached 3,532 yuan, getting the stage achievements.

4.2.2 Determine the value and scores of specific index

Combined with the field investigation in Z County and relevant internal data, the value and scores of the specific index determined are shown in Table XV.

TABLE XV. Grade evaluation criteria of audit evaluation index of targeted poverty alleviation

Criterion Level	Index Level	Grade Evaluation Criteria Of Index				Real Value
		Excellent [90,100]	Good [80,90)	Marginal [60,80)	Fail (0,60)	
Accurate Identification	The Rate Of Missed Evaluation	$\leq 2\%$	$\leq 3\%$	$\leq 4\%$	$> 4\%$	2%
	The Rate Of Wrong Evaluation	$\leq 2\%$	$\leq 3\%$	$\leq 4\%$	$> 4\%$	2%
	The Rate Of Wrong	$\leq 2\%$	$\leq 3\%$	$\leq 4\%$	$> 4\%$	2%

	Regression					
	Rationality Of Identification Mode	Reasonable	Relatively Reasonable	Relatively Unreasonable	Unreasonable	85
	Transparency Of Identify Process	Strictly Implement The "Two Reviews, Two Public Announcements, A Comparison Of An Announcement"	-	-	Failure To Strictly Implement The "Two Reviews, Two Public Announcements, A Comparison Of A Notice"	92
Accurate Helping	Degree Of Participation In Public Of Helping Projects	$\geq 95\%$	$\geq 90\%$	$\geq 85\%$	$< 85\%$	100%
	The Completion Of Helping Projects	Finish On Time With Good Quality	-	-	Finish Out Of Time Or With Low Quality	100
	Degree Of Satisfaction In Public	$\geq 90\%$	$\geq 80\%$	$\geq 70\%$	$< 70\%$	90%
The Use And Management Of Poverty Alleviation Funds	Rationality Of Fund Allocation	Reasonable	Relatively Reasonable	Relatively Unreasonable	Unreasonable	85
	Rate Of Allocation Of Special Funds	100%	$\geq 98\%$	$\geq 95\%$	$< 95\%$	100%
	Time Efficiency Of Funds	≤ 30 DAYS	≤ 60 DAYS	≤ 90 DAYS	> 90 DAYS	30 DAYS

	Allocation					
	Degree Of Disclosure Of Funds Project Information	Disclose Regularly And Timely	Disclose Irregularly	Disclose Out Of Time	Close	95
	The Rate Of Village Aid Funds Utilization	100%	≥95%	≥90%	< 90%	94.92 %
	The Rate Of Annual Funds Carryover And Balance	The Rate Of Funds Carryover And Balance In One Year < 5% , The Rate Of Funds Carryover And Balance In1-2 Years < 2%, The Rate Of Funds Carryover And Balance Over 2 Years Is 0	The Rate Of Funds Carryover And Balance In One Year≤7% , The Rate Of Funds Carryover And Balance In1-2 Years≤5 %	The Rate Of Funds Carryover And Balance In One Year≤10 % , The Rate Of Funds Carryover And Balance In1-2 Years≤8 %	The Rate Of Funds Carryover And Balance In One Year > 10% The Rate Of Funds Carryover And Balance In1-2 Years > 8% , The Rate Of Funds Carryover And Balance Over 2 Years Exists	The Rate Of Funds Carryover And Balance In One Year Is About 8% , The Rate Of Funds Carryover And Balance In1-2 Years Is About 6%
Economic Benefits	The Increasing Range Of Average Disposable Income Of The Poor	≥The Increasing Range Of Average Disposable Income	-	-	< The Increasing Range Of Average Disposable	6.9% < 9.1%

		Of The Poor Nationwide In The Same Year			ble Income Of The Poor Nationwide In The Same Year	
	Loan Rate Of Poor Households	$\geq 50\%$	$\geq 43\%$	$\geq 36\%$	$< 36\%$	59.94 %
Political Benefits	The Rationality Of The Local Poverty Alleviation System	Reasonable	Relatively Reasonable	Relatively Unreasonable	Unreasonable	85
	Degree Of Implementation Of Targeted Poverty Alleviation Policies	Complete Implementation	Basic Implementation	Inadequate Implementation	Incomplete Implementation	85
	Number Of Corruption Cases In Poverty Alleviation	0	≤ 2	≤ 4	> 4	1
	Awareness Rate Of Poverty Alleviation Policy	$\geq 95\%$	$\geq 90\%$	$\geq 85\%$	$< 85\%$	90%
Social Benefits	The Proportion Of The Area Of Dilapidated Houses	0	$\leq 10\%$	$\leq 20\%$	$> 20\%$	16.50 %
	The Transformation Rate Of	100%	$\geq 95\%$	$\geq 90\%$	$< 90\%$	98%

	"Three Links"					
	The Participation Rate Of The New Rural Cooperative Endowment Insurance	$\geq 98\%$	$\geq 95\%$	$\geq 90\%$	$< 90\%$	100%
	The Rate Of Documented Poverty Reduction	$\geq 95\%$	$\geq 90\%$	$\geq 80\%$	$< 80\%$	97%
	The Rate Of Incidence Of Poverty	The Central Region $\leq 2\%$, The Western Region $\leq 3\%$	$\leq 10\%$	$\leq 15\%$	$> 15\%$	6.70 %
Ecological Benefits	Effective Utilization Coefficient Of Irrigation Water	≥ 0.55	≥ 0.45	≥ 0.35	< 0.35	0.4
	Vegetation Coverage Rate	$\geq 70\%$	$\geq 50\%$	$\geq 30\%$	$< 30\%$	81.20 %
	Water Quality Compliance Rate Of Important Rivers And Lakes.	$\geq 80\%$	$\geq 70\%$	$\geq 60\%$	$< 60\%$	100%
Cultural Benefits	Enrollment Rate Of Compulsory Education	100%	$\geq 98\%$	$\geq 95\%$	$< 95\%$	99.80 %
	Retention Rate Of Compulsory Education	\geq The Retention Rate Of Nine-Year Compulso	-	-	$<$ The Retention Rate Of Nine-Ye	94% \geq 93.8 %

		ry Education Nationwi de In The Same Year			ar Compuls ory Educatio n Nationw ide In The Same Year	
	Number Of Places For Cultural Activities	≥ 100	≥ 75	≥ 50	< 50	75
	Observation And Training Times Of Poverty Alleviation Cadres	≥ 15	≥ 10	≥ 5	< 5	7

4.3 Determine the Fuzzy Evaluation Matrix

According to the actual value of each indicator in Z county in the above table, the degree of the membership of this index is calculated by the probability distribution of determined discontinuity point. And then the fuzzy comprehensive evaluation matrix is obtained:

$$\begin{aligned}
 R1 &= \begin{bmatrix} 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix}, & R2 &= \begin{bmatrix} 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix}, & R3 &= \begin{bmatrix} 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0.984 & 0.016 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}, \\
 R4 &= \begin{bmatrix} 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 \end{bmatrix}, & R5 &= \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0.5 & 0.5 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix}, & R6 &= \begin{bmatrix} 0 & 0.35 & 0.65 & 0 \\ 0.6 & 0.4 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0.471 & 0.529 & 0 & 0 \end{bmatrix}, \\
 R7 &= \begin{bmatrix} 0 & 0.5 & 0.5 & 0 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix}, & R8 &= \begin{bmatrix} 0.9 & 0.1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0.4 & 0.6 & 0 \end{bmatrix}
 \end{aligned}$$

4.4 Implement Fuzzy Evaluation

In this paper, a weighted average fuzzy comprehensive evaluation algorithm is adopted. And the first-level evaluation results can be obtained by using the weight values of each second-level index ω_i and

the fuzzy comprehensive evaluation matrix R_i in Table XIV:

$$\begin{aligned} II_1 &= \omega_1 R_1 = (0.5762, 0.4238, 0, 0), II_2 = (1, 0, 0, 0), II_3 = (0.4161, 0.4686, 0.1153, 0), \\ II_4 &= (0.2500, 0, 0, 0.7500), II_5 = (0.0315, 0.9685, 0, 0), II_6 = (0.7069, 0.2138, 0.0793, 0), \\ II_7 &= (0.6724, 0.1638, 0.1638, 0), II_8 = (0.7342, 0.2153, 0.0505, 0) \end{aligned}$$

The comprehensive evaluation matrix II of the criterion level is constructed from II_1 -8, and the second-level comprehensive evaluation results can be obtained by combining each index weight values ω in Table XIV: $I = \omega, II = (0.0497, 0.0938, 0.0713, 0.1217, 0.2506, 0.1810, 0.1347, 0.0973)$.

$$\begin{bmatrix} 0.5762 & 0.4238 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0.4161 & 0.4686 & 0.1153 & 0 \\ 0.2500 & 0 & 0 & 0.7500 \\ 0.0315 & 0.9685 & 0 & 0 \\ 0.7069 & 0.2138 & 0.0793 & 0 \\ 0.6724 & 0.1638 & 0.1638 & 0 \\ 0.7342 & 0.2153 & 0.0505 & 0 \end{bmatrix} = (0.4803, 0.3789, 0.0495, 0.0913)$$

4.5 Analysis of Results

Through the evaluation of the targeted poverty alleviation audit of Z County and the principle of maximum degree of membership, it can be concluded that the targeted poverty alleviation audit of Z County belongs to the "excellent" grade. Specifically, accurate identification, accurate helping, social, ecological and cultural benefits evaluation results are excellent, the use and management of poverty alleviation funds and political benefits evaluation result are good, but economic benefit evaluation result is failed, the economic benefits of targeted poverty alleviation work in Z county remains to be improved.

V. CONCLUSIONS AND IMPLICATIONS

Based on the present situation and existing problems of poverty alleviation, AHP is used to construct the accurate audit evaluation index system in accurate identification, accurate helping, the use and management of poverty alleviation funds, economic benefits, political benefits, social benefits, ecological benefits and cultural benefits, and then taking Z county as an example for application. The study conclude that the economic benefits of targeted poverty alleviation in Z County is not good. We believe that aiming to achieve better poverty alleviation effect, the following task must be done. Firstly, do a good job in the disclosure of poverty alleviation information to reflect the funds campaign and project construction performance of targeted poverty alleviation projects accurately. Secondly, construct audit evaluation mechanism to achieve accurate evaluation of poverty alleviation work. Thirdly, improve the applying mechanism of audit results to promote targeted implementation of poverty alleviation policies.

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