

Economic Development Performance Evaluation and Industrial Optimization of Agricultural Specialty Industry in Southwest China

Xingjun Xu¹ and Liu Liu²

¹ Associate Professor and Head, Department of Accounting, School of Economics and Management at Southwest University of Science and Technology, Mianyang, 621010, China, E-mail: xkdxj@126.com (corresponding author).

² Graduate Student, School of Economics and Management, Southwest University of Science and Technology, Mianyang, 621010, China

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Abstract: Currently, the development of the agricultural specialty industry in Southwest China faces challenges such as insufficient brand competitiveness and lagging processing technology, which restrict industrial development performance. Taking Sichuan Province in Southwest China as an example, the research employs the Analytic Hierarchy Process (AHP) combined with the Fuzzy Comprehensive Evaluation (FCE) method to evaluate performance. The former decomposes the problem into the target layer, criterion layer, and solution layer and uses an expert-scoring method to determine the weights of each indicator. The latter uses fuzzy mathematical theory to compute comprehensive evaluation results using membership functions and weight matrices. Based on the evaluation results, the factors affecting performance improvement are analyzed in depth, and industry optimization measures are developed. The overall performance level of the agricultural specialty industry in Sichuan Province in 2023 was moderate, with a comprehensive evaluation value of 3.10. The economic performance was poor, with a comprehensive evaluation value of only 2.95. The social and ecological performance was moderate, with comprehensive evaluation values of 3.26 and 3.38, respectively. The performance evaluation method can effectively quantify the multidimensional performance of the agricultural specialty industry in Sichuan Province, providing reliable technical support for the scientific diagnosis and industrial optimization of the agricultural specialty industry in Southwest China.

Keywords: Agricultural specialties; analytic hierarchy process (AHP); performance; fuzzy comprehensive evaluation (FCE) method; Sichuan.

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1. Introduction

Sichuan Province is an important economic node and agricultural province in Southwest China, and its agricultural specialty industry is of great significance for rural revitalization and ecological sustainability (Torres, 2022; Oh, 2023; Izaba et al., 2023). In recent years, the agricultural specialty industry in Sichuan Province has ushered in new development opportunities. However, during industrial development, many challenges arise, including insufficient brand competitiveness and lagging processing technology, which greatly restrict the further development of the agricultural specialty industry (Wang, 2024). Therefore, it is necessary to evaluate the development performance of Sichuan's agricultural specialty industry, analyze the reasons for its improvement, and propose targeted optimization strategies. In practical applications, factor analysis can effectively extract key factors, but it is difficult to construct clear hierarchical relationships when dealing with numerous evaluation indicators across different performance dimensions (Goretzko et al., 2024). Data Envelopment Analysis (DEA) employs linear programming to assess the relative efficiency of decision units with the same inputs and outputs. Although this method can distinguish regions with different efficiencies, it cannot visually display their development performance (Camanho et al., 2024). The Malmquist index method primarily decomposes changes in total factor productivity into changes in technological efficiency and technological progress. This method cannot incorporate non-efficiency factors into the evaluation system (Walheer, 2022). The Analytic Hierarchy Process (AHP) decomposes the elements related to decision-making into levels such as targets, criteria, and solutions, which can effectively reflect the reasons that affect development performance and formulate optimized plans (Tavana et al., 2023). Therefore,

the study introduces the AHP and Fuzzy Comprehensive Evaluation (FCE) to design a reasonable performance evaluation system that effectively assesses the agricultural specialty industry and reflects its current development status in Sichuan Province. The innovation of the research lies in comprehensively considering multidimensional characteristics of the agricultural specialty industry in Sichuan. The performance evaluation is conducted from three levels: economic, social, and ecological. It can more accurately identify the key factors that constrain industry development and provide a scientific basis for formulating targeted optimization strategies.

2. Methods and Materials

2.1. Research Area and Related Data

Sichuan is an important province in southwestern China, located in the upper reaches of the Yangtze River. It is a crucial transportation hub connecting southwest, northwest, and central China, which is known as the "Land of Abundance". It is located between 97°21'E and 108°33'E and 26°03'N and 34°19'N, spanning several geomorphic units, including the Qinghai-Tibet Plateau, Hengduan Mountains, the Yunnan-Guizhou Plateau, Qinba Mountains, and Sichuan Basin. Sichuan Province has 21 prefecture-level administrative regions, with a total area of 486,000km² (Ye et al., 2022; Liang et al., 2023). Fig. 1 shows the regional map of Sichuan Province.

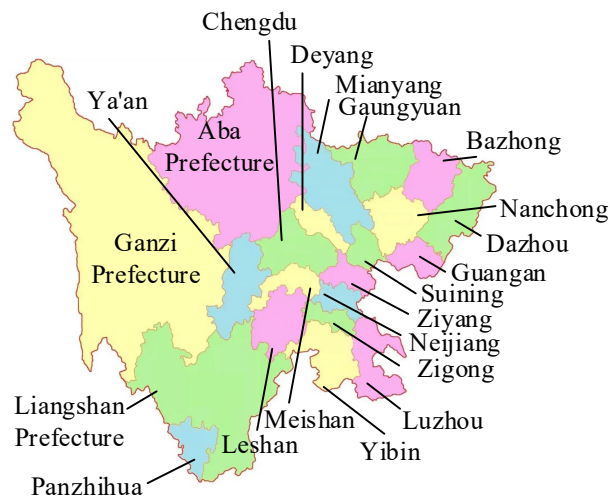


Fig. 1. Regional map of Sichuan province (source: <https://www.tianditu.gov.cn>, accessed on July 23, 2026)

Sichuan has a diverse climate and abundant ecological resources, giving rise to characteristic agricultural products such as Meishan Kimchi, Anyue Lemon, and Cangxi Kiwifruit, and promoting a modern agricultural system that integrates the three industries and enriches the people. The processing industry for agricultural specialties has also flourished, including Pixian Doubanjiang, Yibin Sprouts, Liangshan Tartary Buckwheat and Garze Yak Meat (Wang, 2023). Ten typical agricultural specialties from different regions of Sichuan Province have been organized, and the relevant information is presented in Table 1.

Table 1. Details of ten typical agricultural specialties

Serial Number	Characteristic agricultural products	Administrative Region
1	Pixian Doubanjiang	Pidu District, Chengdu City
2	Anyue Lemon	Anyue County, Ziyang City
3	Cangxi Kiwifruit	Cangxi County, Guangyuan City
4	Yibin Sprouts	Yibin City
5	Meishan Kimchi	Meishan City
6	Liangshan Tartary Buckwheat	Liangshan Prefecture
7	Garze Yak Meat	Ganzi Prefecture
8	Pujiang Chou Gan	Pujiang County, Chengdu City
9	Shimian Huangguo Orange	Shimian County, Ya'an City
10	Tongjiang Silver Ear	Tongjiang County, Bazhong City

Driven by the rural revitalization strategy and industrial support policies, the scale of Sichuan's characteristic agricultural product processing industry continues to expand. However, the industry still faces bottlenecks such as insufficient brand competitiveness, lagging deep-processing technology, and weak industrial-chain synergy, which restrict further development. Therefore, the economic development of agricultural specialties in Sichuan Province is analyzed in

depth, and corresponding optimization measures are proposed. The research data mainly comes from the "Sichuan Provincial Statistical Yearbook" from 2018 to 2023 (with a focus on Table 12-1 "Total output value of agriculture, forestry, animal husbandry and fishery" and Table 10-5 "Main economic indicators of industrial enterprises above designated size"), the "Sichuan Provincial Statistical Bulletin" and the "China Industrial Economic Statistical Yearbook". To eliminate the impact of price fluctuations, all economic data on amounts are based on 2018 and have been adjusted using the Consumer Price Index or the Producer Price Index and converted to 2018 constant prices. The definition of relevant indicators strictly follows the "Classification of National Economic Industries" (GB/T 4754-2017) standard of the National Bureau of Statistics of China. Due to the different dimensions of the data, the study conducts dimensionless processing. The specific expression is shown in Eq. (1) (Xiong et al., 2023).

$$\begin{cases} V^+ = \frac{X - \min X}{\max X - \min X} \\ V^- = \frac{Y - \min Y}{\max Y - \min Y} \end{cases} \quad (1)$$

In Eq. (1), V^+ and X represent the standardized results and statistical values of positive indicators, respectively. $\max X$ and $\min X$ signify the maximum and minimum values of the indicator. V^- and Y represent the standardized results and statistical values of negative indicators. $\max Y$ and $\min Y$ signify the maximum and minimum values of the indicator. In the industrial performance evaluation, the AHP is mainly used in research. This method primarily translates qualitative analysis into weight calculations, which can intuitively reveal the key factors that affect performance (Mitra et al., 2022; Bouramdane, 2023; Vafadarnikjoo et al., 2023). The schematic diagram of the hierarchical structure model is presented in Fig. 2.

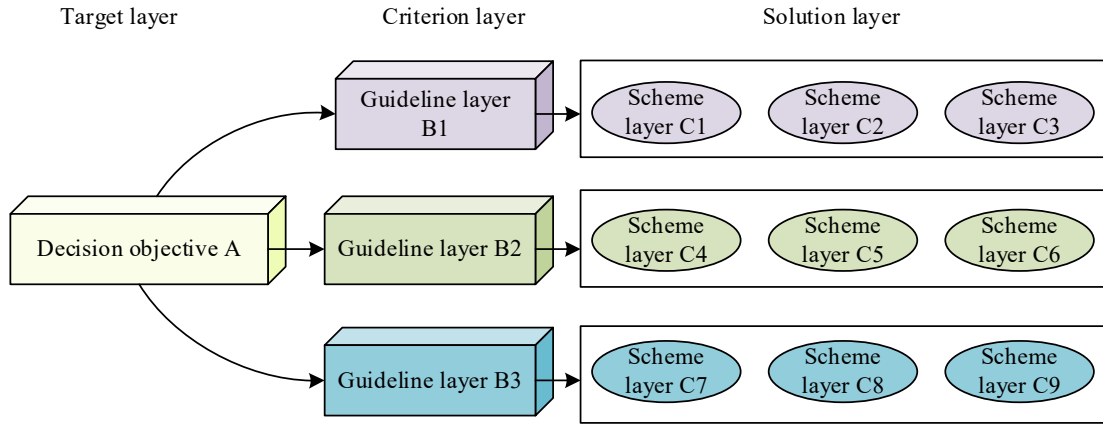


Fig. 2. Schematic diagram of hierarchical structure

In Fig. 2, the hierarchical structure includes the target layer, criterion layer, and solution layer. The target layer is the overall goal of industrial performance evaluation. The criterion layer includes various key factors that affect industrial performance, and the solution layer corresponds to specific evaluation objects.

2.2. Performance Evaluation of Agricultural Specialty Industry Development in Sichuan Province

After determining the research area, data, and performance evaluation methods, the study proceeds to evaluate the area's performance. The agricultural specialty industry processes and transforms characteristic agricultural products to produce high-value, highly competitive products. In agricultural development, it can not only enhance the value of agricultural products themselves but also drive rural economic growth and income growth. Based on relevant research on enterprise development performance, the development performance of the agricultural specialty industry is divided into three categories: economic, social, and ecological. In terms of economic performance, the agricultural specialty industry can enhance value added, strengthen market competitiveness, and promote the upgrading and optimization of the rural industrial structure. In terms of social performance, this industry can absorb a large number of farmers into employment, broaden income sources, and improve farmers' living standards. In terms of ecological performance, the agricultural specialty industry efficiently utilizes the nutritional components of agricultural products and reduces resource waste. A theoretical model for performance evaluation of agricultural specialty industries in Sichuan is presented in Fig. 3.

In the rationality evaluation of performance indicators, the study primarily asks expert teams to rate them on a 5-point Likert scale. The importance and the coefficient of variation are calculated from the scoring results. The mean importance is shown in Eq. (2) (South et al., 2022).

$$N = \frac{1}{n} \sum_{a=1}^n c_{ab} \quad (2)$$

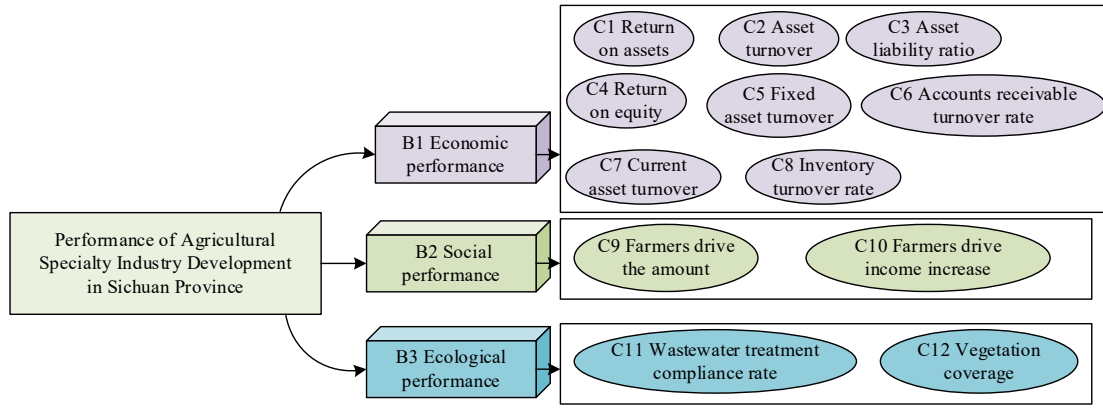


Fig. 3. Theoretical model for performance evaluation of agricultural specialty industry development in Sichuan province

In Eq. (2), n signifies the number of score members. c_{ab} represents the score given by the a -th member to the b -th indicator. N represents the mean importance. The coefficient of variation is shown in Eq. (3).

$$D_b = \frac{\delta_b}{N} \quad (3)$$

In Eq. (3), D_b signifies the coefficient of variation of the b -th indicator. δ_b signifies the standard deviation of the indicator, as presented in Eq. (4).

$$\delta_b = \sqrt{\frac{1}{n-1} \sum_{a=1}^n (c_{ab} - N)^2} \quad (4)$$

When $N \geq 3.5$ and $D \leq 0.25$, it indicates that the evaluation criteria are reasonable. Otherwise, they need to be readjusted. After constructing the hierarchical structure model, Saaty's 1-9 scale method is used to construct the judgment matrix. For each level, a pairwise comparison matrix $A = (a_{ij})_{n \times n}$ is constructed, where a_{ij} represents the importance of indicator i relative to indicator j . To ensure the rationality of the weights, the study employs the eigenvector method to compute them and performs consistency checks. Firstly, the consistency index CI is shown in Eq. (5).

$$CI = \frac{\lambda_{max} - m}{m - 1} \quad (5)$$

In Eq. (5), λ_{max} is the maximum eigenvalue of the judgment matrix. m is the order of the matrix. Subsequently, the average random consistency index is RI introduced. Finally, the consistency ratio CR is calculated, as shown in Eq. (6).

$$CR = \frac{CI}{RI} \quad (6)$$

When $CR < 0.1$, it is considered that the judgment matrix has satisfactory consistency, and the weight allocation is reasonable. Otherwise, the judgment matrix needs to be adjusted. All judgment matrices in the study have CR values less than 0.10, passing the consistency test. In the performance evaluation of the agricultural specialty industry in Sichuan Province, the study uses the FCE method. This method primarily uses the concept of membership degree in fuzzy mathematics to quantitatively analyze phenomena influenced by multiple factors yet difficult to define clearly (Zhu, 2022; Sahoo et al., 2023). The steps to implement this method are to first establish a fuzzy evaluation index system and determine the domain factor of the index, as shown in Eq. (7) (Garcia et al., 2022).

$$\begin{cases} A = \{B1, B2, B3\} \\ B1 = \{C1, C2, C3, C4, C5, C6, C7, C8\} \\ B2 = \{C9, C10\} \\ B3 = \{C11, C12\} \end{cases} \quad (7)$$

Next, a rating domain $V = \{v_1, v_2, v_3, v_4, v_5\}$ is established for comments, corresponding to {poor, below average, average, good, excellent}, and assigned a value of $V = \{1, 2, 3, 4, 5\}$. The study uses a membership function that combines trapezoidal and triangular distributions to establish the membership relationship. Taking the good level as an example, the membership function expression is shown in Eq. (8).

$$\mu_{v_4}(x) = \begin{cases} \frac{x-2}{3-2}, & 2 \leq x < 3 \\ \frac{4-x}{4-3}, & 3 \leq x < 4 \\ 0, & \text{other} \end{cases} \quad (8)$$

After determining the fuzzy relationship matrix R , the weight vectors W and R are used for fuzzy synthesis. The study uses weighted average operator $M(\cdot, +)$ for aggregation operation to preserve the information of all factors, as is shown in Eq. (9).

$$B = W \circ R = (b_1, b_2, b_3, b_4, b_5) \quad (9)$$

The final score is $S = B \times V^T$, and the final performance level is determined based on the S value.

3. Results

3.1. Analysis of Performance Evaluation of Agricultural Specialty Industry Development in Sichuan Province

The study invites 20 experts to score the established performance evaluation indicators. The mean importance and coefficient of variation results are shown in Table 2. The mean importance of various performance evaluation indicators in the agricultural specialty industry was 3.5, with a coefficient of variation of less than 25%. Therefore, all indicators are reasonable.

Table 2. The mean importance and coefficient of variation of performance evaluation indicators

Performance evaluation dimensions	Performance evaluation index	Mean importance	Coefficient of variation (%)
Economic performance	Return on assets	4.3	16.2
	Asset turnover	3.9	18.1
	Asset liability ratio	3.7	15.8
	Return on equity	4.0	12.3
	Fixed asset turnover	4.5	13.1
	Accounts receivable turnover rate	3.7	7.2
	Current asset turnover	4.2	13.8
	Inventory turnover rate	3.8	15.5
Social performance	Farmers drive the amount	4.2	17.1
	Farmers drive income increase	4.0	14.2
Ecological performance	Wastewater treatment compliance rate	3.9	17.8
	Vegetation coverage	4.3	14.1

Based on the determined performance indicators, a corresponding AHP model was constructed. Pairwise evaluations were conducted on indicators at the same level to obtain the weights of each indicator, as presented in Table 3. The weight of economic performance indicators was 0.562, higher than that of social and ecological performance. The weight proportion of ecological performance was the lowest, at 0.154. In the development of the agricultural specialty industry in Sichuan, economic factors are the most important.

The study uses the FCE to evaluate the performance of the agricultural specialty industry in Sichuan Province. The evaluation statistics and membership results for each performance indicator, as reported by 20 experts, are presented in Table 4. P signifies the number of evaluators for each level, and Q represents the degree of membership for each level. Based on the statistical results and membership degrees of various performance evaluation indicators, a membership degree fuzzy matrix can be constructed. By combining the weights in Table 3, the FCE values of each performance indicator can be calculated. The calculation result of the FCE value for economic performance (B1) was 2.95, the calculation result for social performance (B2) was 3.26, and the calculation result for ecological performance (B3) was 3.38. The FCE value for the overall development performance of the agricultural specialty industry in Sichuan Province was the weighted sum of the FCE values for the three criterion layers, yielding a final result of 3.10. The performance level of the agricultural specialty industry in Sichuan Province in 2023 is moderate; the economic performance level is poor, and the ecological

and social performance is moderate.

Table 3. Index weights of analytic hierarchy process model

Decision layer	Criterion layer	Weight	Solution layer	Weight
Performance of Agricultural Specialty Industry Development in Sichuan Province	B1 Economic performance	0.562	C1 Return on assets	0.138
			C2 Asset turnover	0.125
			C3 Asset liability ratio	0.100
			C4 Return on equity	0.150
			C5 Fixed asset turnover	0.130
			C6 Accounts receivable turnover rate	0.113
			C7 Current asset turnover	0.135
			C8 Inventory turnover rate	0.119
	B2 Social performance	0.284	C9 Farmers drive the amount	0.500
			C10 Farmers drive income increase	0.500
	B3 Ecological performance	0.154	C11 Wastewater treatment compliance rate	0.500
			C12 Vegetation coverage	0.500

Table 4. Evaluation statistics and membership results of various performance indicators in 2023

Evaluation	Poor		Below average		Average		Good		Excellent	
	P	Q	P	Q	P	Q	P	Q	P	Q
C1 Return on assets	0	0	6	0.3	4	0.2	10	0.5	0	0
C2 Asset turnover	0	0	9	0.45	5	0.25	6	0.3	0	0
C3 Asset liability ratio	2	0.1	6	0.3	5	0.25	7	0.35	1	0.05
C4 Return on equity	3	0.15	10	0.5	2	0.1	5	0.25	0	0
C5 Fixed asset turnover	4	0.2	2	0.1	10	0.5	4	0.2	0	0
C6 Accounts receivable turnover rate	4	0.2	4	0.2	8	0.4	8	0.4	0	0
C7 Current asset turnover	6	0.3	2	0.1	6	0.3	6	0.3	0	0
C8 Inventory turnover rate	3	0.15	5	0.25	9	0.45	3	0.15	0	0
C9 Farmers drive the amount	0	0	5	0.25	10	0.5	5	0.25	0	0
C10 Farmers drive income increase	2	0.1	6	0.3	8	0.4	4	0.2	0	0
C11 Wastewater treatment compliance rate	3	0.15	3	0.15	7	0.35	7	0.35	0	0
C12 Vegetation coverage	0	0	2	0.1	8	0.4	10	0.5	0	0

Taking the economic and ecological performance in 2023 as an example, for the economic performance criteria layer, the normalized weight vector is $W_{B1} = [0.138, 0.125, \dots, 0.119]$. According to expert scoring statistics, the fuzzy relationship matrix R_{B1} consists of membership vectors from C1 to C8. By calculating $B_{B1} = W_{B1} \circ R_{B1}$, the membership vector $B_{B1} = [0.18, 0.22, 0.28, 0.32, 0.00]$ is obtained. The final score is $S_{B1} = 1 \times 0.18 + 2 \times 0.22 + 3 \times 0.28 + 4 \times 0.32 + 5 \times 0.00 = 2.95$. Similarly, for ecological performance, the weight is $W_{B3} = [0.5, 0.5]$. Combining the membership degrees of C11 and C12, $S_{B3} = 3.38$ is calculated. Based on the above calculation method, the FCE values for the agricultural specialty industry in Sichuan from 2018 to 2023 were calculated. The results are presented in Fig. 4. The economic performance (B1) was initially constrained by traditional models and remained poor for an extended period. In 2020, it reached a medium level via e-commerce channels. In 2023, it fell back to 22.85 due to extreme weather conditions, indicating a relatively poor level. The overall trend was "slow

improvement, brief breakthrough, and fluctuating decline". The overall stability of social performance (B2) and ecological performance (B3) ranged from 3.0 to 3.4, indicating a moderate level of stability. Social performance shows a slight increase with policy support, while ecological performance approaches a good critical value from 2019 to 2021 due to ecological protection policies. The overall comprehensive evaluation value increased from 2.85 in 2018 to 3.47 in 2021 and fell back to 3.10 in 2023.

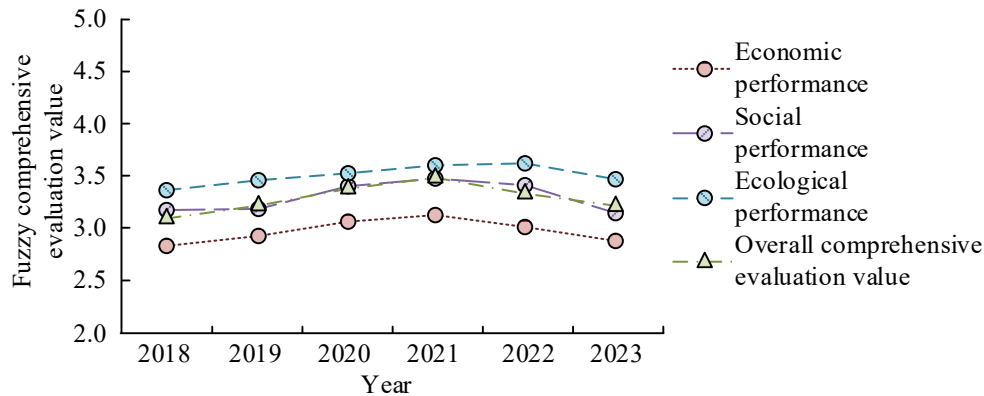


Fig. 4. Fuzzy comprehensive evaluation values from 2018 to 2023

The study then compares the FCE values of the development performance of ten typical agricultural specialties in Sichuan from 2018 to 2023, as presented in Fig. 5. The performance levels of Meishan Kimchi, Pixian Doubanjiang, and Yibin Sprouts among processed specialties were relatively high and stable. Meishan Kimchi had an FCE value of 4.11 in 2021 and experienced a slight decline in 2023 due to reduced international market demand. Anyue Lemon, Pujiang Chou Gan, and Cangxi Kiwifruit were greatly affected by climate and market fluctuations. In 2019, due to drought during the flowering period, the FCE value of Anyue Lemon dropped to 2.84. In 2021, it rebounded to 3.21 through e-commerce promotion. Liangshan Tartary Buckwheat, Garze Yak Meat, and Tongjiang Silver Ear, which are specialties of the plateau and mountainous areas, were limited by ecological protection and transportation conditions, and their performance was at a moderate level. Due to large-scale breeding and organic certification, the FCE value of Garze Yak Meat increased to 3.32 in 2021 and fell back to 3.09 in 2023 due to grassland grazing restrictions.

3.2. Analysis of Reasons Affecting Performance Improvement

After obtaining the performance evaluation results for agricultural specialty industries in Sichuan Province, the study further analyzes the factors affecting performance improvement. The agricultural specialty industry is a key link between agricultural production and market consumption, and its core value lies in enhancing the added value through processing. The statistical results of the processing conversion rate of agricultural specialties from 2018 to 2023 are presented in Fig. 6. The processing conversion rate showed an increasing trend year by year, gradually growing from 46.39% in 2018 to 57.96% in 2023. Despite some growth, the overall conversion rate remains relatively low, and it is expected to be difficult to break through the 60% bottleneck by 2025. Processing conversion rate refers to the proportion of the total output value of the agricultural product processing industry to the total agricultural output value. The total processing output value during the same period also continued to grow, increasing from 74.3 billion RMB in 2018 to 175.8 billion RMB in 2023. With the slow increase in the processing conversion rate, the value created by the processing industry is steadily rising, but a low processing conversion rate will limit further growth in total processing output value.

The increase in processing revenue for agricultural specialties is shown in Fig. 7. The processing revenue growth rate for agricultural specialties in Sichuan Province was highest from January to March, at 6.81%, and then declined. From January to June, it decreased to 5.12%. The overall average has fluctuated across months, but it has remained in the positive range. The revenue growth rate for January and February 2023 was only -12.64%, a relatively low level and significantly below the annual average of previous years. From January to March, it gradually rebounded and increased to -5.98% from January to April. Although it still showed negative growth, the decline gradually shortened, reaching only -3.02% from January to December. Based on the statistical results, the reason for the impact on the development performance of the agricultural specialty industry is that its transformation and upgrading are relatively slow, which limits increases in added value and the industry's overall competitiveness.

Financial investment is a key driver of the development of the agricultural specialty industry in Sichuan. The financial revenue and expenditure of Sichuan Province from 2018 to 2023, and the fixed-asset investment from 2022 to 2023, are shown in Fig. 8. In Fig. 8(a), the general public budget expenditure increased year by year, reaching 114.769 billion RMB in 2023. Meanwhile, the general public budget revenue for 2023 was only 552.393 billion RMB. This indicates that the overall financial situation of the agricultural specialty industry in Sichuan Province is tight. Fig. 8 (b) shows the year-on-year growth of fixed assets investment in Sichuan Province from 2022 to 2023. The value in 2022 was positive before January and September. From January to September, there was negative growth. In 2023, the value was negative, and the growth rate from January to May was only -19.68%.

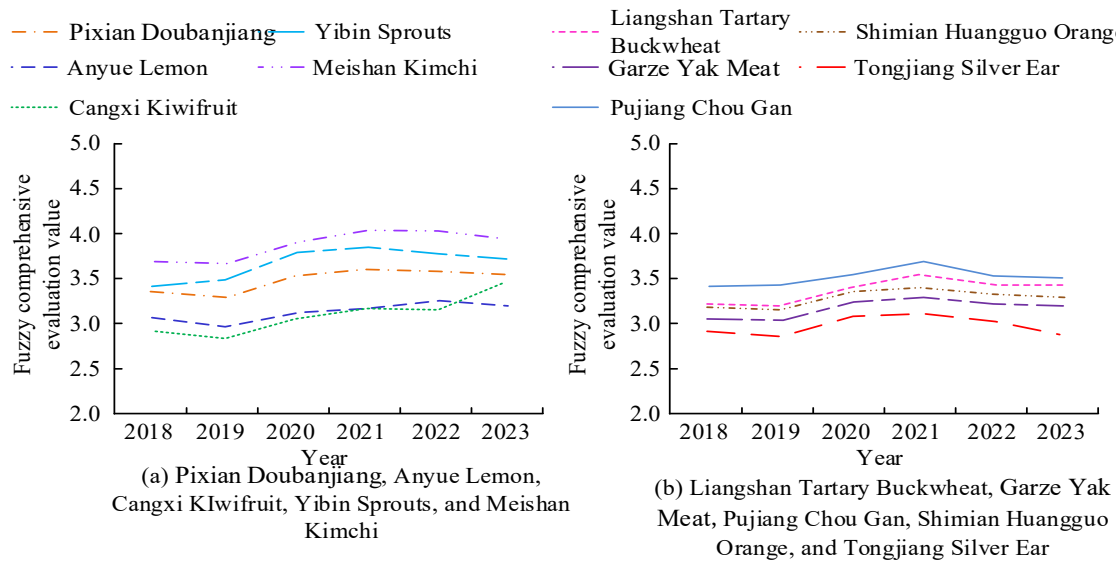


Fig. 5. Fuzzy comprehensive evaluation values of ten typical agricultural specialties from 2018 to 2023

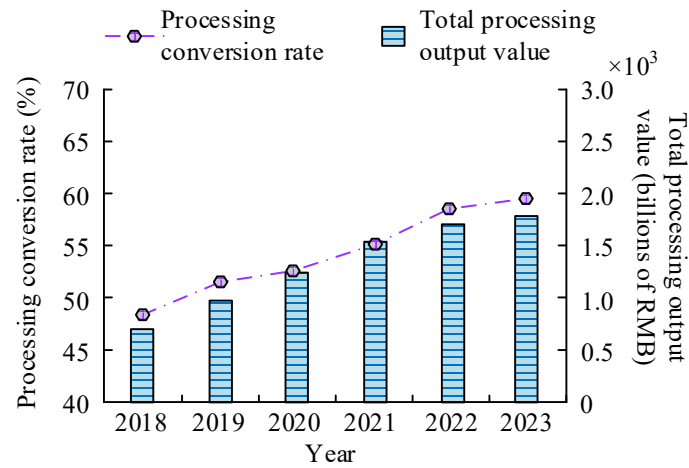


Fig. 6. Statistical results of conversion rate of agricultural specialty processing in Sichuan Province from 2018 to 2023

3.3. Optimization Strategy for Agricultural Specialty Industry in Sichuan Province

Four optimization strategies have been proposed to improve the performance of the agricultural specialty industry in Sichuan Province. The first is to strengthen the construction of leading organizations, select key regional characteristic products for cultivation, and promote enterprise technological upgrading through policy support and industry university research cooperation. Secondly, it is necessary to enhance innovation capabilities, build a full-chain R&D system and an innovation cluster, increase financial support, and promote the transformation of products towards high-end, refined products. In addition, it is necessary to strengthen technological and talent support, optimize tax incentives and research subsidy policies, guide diversified capital investment in research and development and talent cultivation, and build platforms to connect with high-quality global resources. Finally, it is necessary to deepen brand building, strengthen brand awareness among all employees, integrate marketing channels through new media and e-commerce platforms, and comprehensively enhance brand influence and market competitiveness.

4. Conclusion

Regarding the evaluation and optimization of the development performance of the agricultural specialty industry in Sichuan, the research mainly adopted the AHP and FCE method for performance evaluation. It conducted an in-depth analysis of the factors affecting performance improvement and proposed corresponding optimization measures. The results showed that the overall evaluation of the development performance of the agricultural specialty industry in Sichuan in 2023 was 3.10, indicating a moderate level. From 2018 to 2023, the economic performance showed a "slow improvement, brief breakthrough, fluctuating decline", while the social and ecological performance remained stable at a moderate level. The processing conversion rate increased from 46.39% to 57.96%, but it remained low, limiting further growth in the total processing output value. The overall development performance of the agricultural specialty industry in Sichuan Province has shown an upward trend, but fundamental breakthroughs have not yet been achieved, and economic performance remains the main weakness. In terms of finance, in 2023, the general public budget expenditure was 114.769 billion RMB, and the revenue was 552.393 billion RMB. In 2022-2023, the year-on-year growth of fixed assets investment was mostly

negative in the latter period. The reason is that insufficient market demand, rising raw material prices, and other factors have led to declining profits in the specialty industry, reducing enterprises' investment in agricultural product processing (Nugroho et al., 2022).

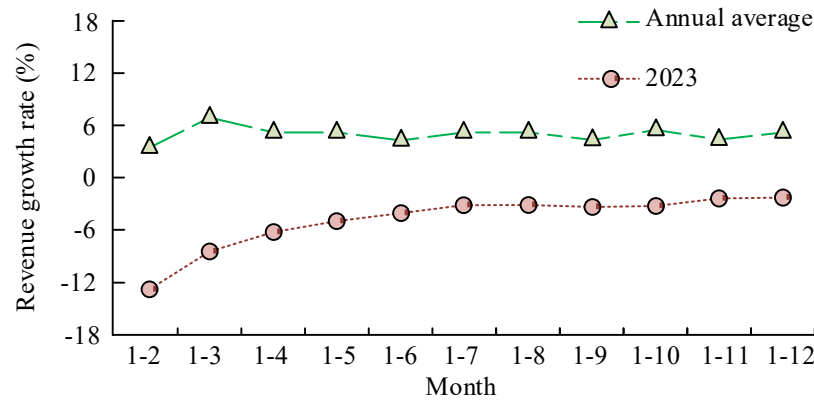


Fig. 7. The increase in processing revenue of agricultural specialties in Sichuan Province

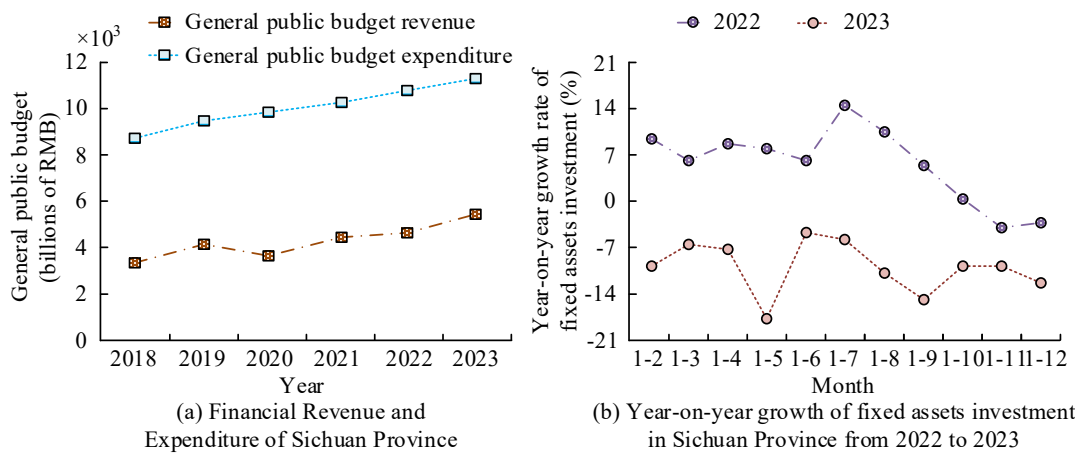


Fig. 8. The financial revenue and expenditure situation and the year-on-year growth rate of fixed asset investment

In response to the poor economic performance of the agricultural specialty industry in Sichuan Province, the study proposes focusing on cultivating leading enterprises in agricultural specialty products and building industry-university research platforms to promote technological upgrading. In terms of innovation capability, a full-chain research and development system can be established, encouraging cooperation between enterprises and researchers and increasing financial support. In terms of technology and talent support, the government optimizes policies to attract talent and technology and guides capital investment. In the field of brand building, regional characteristics can be deeply dug into to create brand stories, expand communication through the Internet, and increase marketing investment to enhance influence. Although the research is based in Sichuan, it has global promotional value. Firstly, the constructed economic, social, and ecological evaluation system provides standardized decision support tools for resource-based regions such as Southeast Asia and Africa. Secondly, the contradiction of abundant resources but weak processing is widely present in industries such as Vietnamese coffee and Ghanaian cocoa. The proposed path "leading + innovation + brand" provides a replicable paradigm for breaking through the low-value-added trap. Finally, the emphasis on ecological and economic balance provides policy references for the sustainable development of the global agricultural industry. In summary, the study effectively evaluates the economic development performance of the agricultural specialty industry in Sichuan Province and proposes targeted industry optimization measures by analyzing the causes of the existing challenges. Subsequent research will further track the effectiveness of the implementation of optimization strategies. In addition, drawing on the industrial development experience of other provinces in Southwest China, the deep integration of the agricultural specialty industry with rural revitalization and ecological protection will be explored.

Author Contributions

Xingjun Xu contributed to conceptualization, resources, data curation, software, formal analysis, and supervision. Liu Liu contributed to validation, investigation, visualization, methodology, writing of the original draft, project administration, writing, reviewing and editing.

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Institutional Review Board Statement

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Declaration of Artificial Intelligence Tools

The authors used Grammarly Premium solely for language editing and readability improvement. The authors reviewed and verified all content and take full responsibility for the accuracy and integrity of the manuscript.

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Xingjun Xu obtained his master's degree in 2002 from Southwestern University of Finance and Economics. He is currently an Associate Professor and Head of the Department of Accounting in the School of Economics and Management at Southwest University of Science and Technology. He has completed and is currently undertaking more than 30 provincial, ministerial, municipal, and departmental-level research projects, including one provincial-level project for which he served as the principal investigator. He has published over 30 academic papers in journals such as *Sichuan Accounting*, *Academic Forum*, *Reform of Economic System*, and *Journal of Coastal Research*. His research areas include accounting theory and practice, as well as investment and financing.



Liu Liu will obtain her Master of Business Administration in 2027 from Southwest University of Science and Technology. She is currently pursuing her master's degree in the School of Economics and Management at Southwest University of Science and Technology. She was invited to participate in the 22nd Chinese Academic Annual Conference on Technology Management held in Guangzhou, where she delivered a thematic presentation in a sub-forum and engaged in in-depth discussions with scholars. Meanwhile, as the second principal participant, she took part in the Mianyang City-level Social Science Research Planning Project of 2025, organizing the team to conduct theoretical and data analysis, demonstrating solid research capabilities and a strong sense of teamwork. Her research interests focus on accounting theory and practice.