

Research on the Impact of the Development of Featured Grain Industry on Farmers' Livelihood Capital

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Abstract: The rural revitalization strategy is the general focus of the "three rural" work in the new era, and has always been the focus of national development. In recent years, the No. 1 central document of the Central Committee has repeatedly stressed that all regions should develop local industries with local characteristics, build an agricultural industry chain, consolidate development achievements, and promote the revitalization of villages and towns. Rural revitalization and industrial prosperity are key areas. As a traditional advantageous characteristic industry in Zhang-ye City, Gansu Province, "Jinhuazhai" millet plays an important role in improving land utilization, alleviating rural poverty, and increasing people's income. This paper takes "Jinhuazhai" millet as the research object, and through literature research, empirical research, questionnaire survey and other research methods, obtains relevant data on the impact of the development of the miscellaneous grain industry on livelihood capital. It analyzes the current problems such as the development status and operation of the industry model, and provides relevant opinions to effectively improve brand competitiveness and promote the sustainable development of the local characteristic miscellaneous grain industry.

Keywords: Featured miscellaneous grains; Livelihood capital; Countermeasures and suggestions.

1. Introduction

According to the requirements of developing rural industries and the goals of industrial revitalization proposed by the central government, on April 27, 2022, the No.1 document of the Gansu Provincial Party Committee, "Implementation Opinions on Doing a Good Job in the Key Work of Comprehensively Promoting Rural Revitalization in 2022", was officially promulgated and implemented. The document proposes to "carry out actions to improve agricultural varieties, enhance quality, build brands, and standardize production", cultivate "unique, special, excellent, and staggered" characteristic agricultural products with "sweet taste", and continuously amplify the specific requirements of the "honest Gansu, authentic sweet taste" brand effect. It points out the development direction for local governments and enterprises at all levels in the province to solidly develop agricultural products with "sweet taste" characteristics in the new era. As for the specific research object of this project, the "Jinhuazhai" millet in Zhang-ye City enjoys a high reputation in the national millet industry for its rich trace element "strontium". As an excellent representative of the characteristic grain industry in Gansu Province, this characteristic agricultural product obtained the national organic food certification in 2010, the "Gansu Gold Award Agricultural Product" in 2011, and the "Jinhuazhai" millet planting area was rated as the national "Standardized Millet Demonstration Zone" in 2012. In addition, according to relevant statistical data from the Zhang-ye City Bureau of Statistics, planting "Jinhuazhai" millet has become a powerful tool for local farmers to lift themselves out of poverty and increase their income. Expanding and strengthening the "Jinhuazhai" millet specialty grain industry has also become a direct manifestation of building a new brand of modern Silk Road cold and dry agriculture with Zhang-ye characteristics, developing characteristic agriculture, and cultivating "sweet" specialty agricultural products. Therefore, this project takes the "Jinhuazhai" millet specialty grain industry as the research

object, to study the impact of the development of specialty grain agricultural products on the livelihood capital of farmers in the region, and to propose countermeasures and suggestions for the problems existing in the development of the "Jinhuazhai" millet specialty grain industry.

2. Design Study on the Impact of Grain Industry Development on Farmers' Livelihood Capital

(1) Construction of livelihood capital indicator system

Analyzing the impact of rural characteristic industry development on farmers from the perspective of their livelihood capital not only helps to improve the quality and efficiency of rural characteristic industry development, but also contributes to the comprehensive promotion of rural revitalization and enables farmers to share the fruits of modernization development. In recent years, with the continuous deepening of research on livelihood capital both domestically and internationally, a series of indicator frameworks for evaluating livelihood capital have emerged. Among them, the Sustainable Livelihoods Framework proposed by the UK International Development Agency (DFID) is the most widely used, which divides livelihood capital into five categories: natural capital, financial capital, material capital, human capital, and social capital, providing a new perspective for livelihood capital research.

Based on this model framework, this article refers to the content of various types of capital included in the quantification of livelihood capital by domestic and foreign scholars, and combines the livelihood capital situation of farmers identified in field research. Following the principles of connectivity, misrepresentations, scientific, and penetrability, a rural livelihood capital indicator system is jointly constructed. The indicators and related information are shown in Table 1. Among them: (1) Human capital refers to the knowledge, skills, labor capacity, and labor force that farmers use to make a living, measured by the age, education

level, number of labor forces engaged in related industries, and opportunities for technical training of the main labor force in the household; (2) Material capital refers to the infrastructure and material equipment used by farmers for production and life, measured by household housing conditions, bank deposits, production equipment conditions, and infrastructure conditions; (3) Social capital refers to the social networks utilized to achieve different livelihood strategies, measured by the difficulty of participating in social organizations and obtaining social technological support; (4)

Financial capital refers to the cash used by farmers to purchase consumption and production goods, as well as the available loans and personal borrowings, measured by household annual income, borrowing capacity, and government subsidies; (5) Natural capital refers to the stock of natural resources and environmental services that are beneficial to the livelihoods of farmers, measured by the per capita arable land area of households and the overall arable land quality level of households.

Table 1. Evaluation Index System for the Impact of Featured Grain Industry on Farmers' Livelihood Capital

First level indicators	Second level indicators	Third level indicators	Variable indicators	Attribute indicators
Research on the Evaluation of the Impact of Featured Grain Industry on Farmers' Livelihood Capital	Human Capital (H)	Labor Age	H1	Positive Indicator
		Educational level	H2	Positive Indicator
		Labor force engaged in the cultivation of miscellaneous grains industry	H3	Positive Indicator
		Opportunities for technical training	H4	Positive Indicator
	Physical Capital(M)	Housing conditions	M1	Positive Indicator
		bank deposit	M2	Positive Indicator
		Production equipment conditions	M3	Positive Indicator
		Overall situation of infrastructure	M4	Positive Indicator
	Social Capital(S)	Degree of participation in social organizations	S1	Positive Indicator
		Obtain social and technological support	S2	Positive Indicator
	financial capital(F)	Annual household income	F1	Positive Indicator
		Borrowing capacity	F2	Positive Indicator
		Obtain government subsidies	F3	Positive Indicator
	Natural capital(N)	Per capita cultivated land area	N1	Positive Indicator
		Quality of cultivated land	N1	Positive Indicator

(2) Data source

The research data in this article mainly comes from a survey questionnaire distributed to "Jinhuaazhai" millet growers in Huazhai Township, Zhangye City from September to October 2023. The survey questionnaire mainly includes two parts: the first part is about the basic situation of farmers; The second part is about the livelihood capital of farmers, mainly including five categories: human capital, material capital, financial capital, natural capital, and social capital. The questionnaire has a total of 19 questions, and the

"Jinhuaazhai" millet growers are the survey objects. A total of 168 questionnaires were distributed and 168 were collected, with a valid questionnaire collection rate of 100%.

(3) Data analysis

Before conducting the analysis, in order not to affect the results, the first part of the basic information of farmers was removed. Through SPSS factor analysis, a small number of factors were used to reflect the information of 15 indicators, thereby reducing the conditionality and facilitating the analysis. The factors were named for subsequent analysis.

Table 2. Cronbach's coefficient scale for standardized terms

Reliability statistics		
Cronbach's alpha	Cronbach's alpha coefficient based on standardized terms	terms
0.850	0.854	16

Reliability analysis can measure the reliability and stability of scale data. The larger the value of α , the better the internal consistency of the scale, and the higher the reliability and stability. Typically, a coefficient of α greater than 0.7 indicates

that the scale is valuable and within an acceptable range. From Table 3, it can be seen that the Cronbach's alpha coefficient of the questionnaire is 0.85, indicating good internal consistency of the scale and high credibility.

Table 3. KMO and Bartlett test scales

KMO and Bartlett inspection			
KMO Sampling Suitability Scale			.838
Approximate chi square			1176.515
Bartlett sphericity test	Degree of freedom		105
	Significance		.000

From Table 3, it can be seen that the results of KMO test and Bartlett test show that the KMO value of 0.838 is greater than the judgment standard value of 0.8, indicating a high correlation between the scales; The Bartlett spherical

significance is 0.000 less than 0.5, indicating a high level of significance. Satisfying the prerequisite requirements of factor analysis indicates that the data can be used for factor analysis research

Table 4. KMO and Bartlett test scales

Explanation of Total Variance									
Component	Extraction of initial characteristic values of components			Extract the sum of squared loads			Sum of squared rotational loads		
	Total	Variance percentage	cumulative percentage	Total	Variance percentage	cumulative percentage	Total	Variance percentage	cumulative percentage
1	5.425	36.166	36.166	5.425	36.166	36.166	3.132	20.881	20.881
2	1.937	12.913	49.078	1.937	12.913	49.078	2.598	17.322	38.203
3	1.626	10.840	59.918	1.626	10.840	59.918	2.199	14.659	52.862
4	1.296	8.643	68.561	1.296	8.643	68.561	1.715	11.433	64.295
5	1.016	6.772	75.332	1.016	6.772	75.332	1.656	11.038	75.332

From Table 4, it can be seen that using principal component analysis to extract common factors, five factors were extracted, and the cumulative variance contribution rate of the five common factors was 75.332%, which is close to the requirement of factor analysis method of 80%. The variables selected in this article can be well explained by these 5 common factors, and can extract 75.332% of the information from 15 analysis items.

3. Weight Determination of Indicators Affecting Farmers' Livelihood Capital

(1) Determine weights

In order to make the factors more interpretable and named after each other, the maximum variance orthogonal rotation is used to maximize the variance of the factors while maintaining their orthogonal state. Make the relationship between common factors and original variables clear. As shown in Figure 5:

Table 5. Factor Load Coefficient Table after Rotation

Indicator variable components	1	2	3	4	5
Labor age	0.131	0.813	0.159	0.107	0.116
Education level	0.116	0.815	0.239	0.125	0.018
Labor force engaged in planting miscellaneous grains industry	0.306	0.561	0.201	0.328	0.200
Opportunities for technical training	0.121	0.771	0.112	0.143	0.176
Housing conditions	0.858	0.184	0.082	0.138	0.059
Bank deposit	0.872	0.063	0.145	0.031	0.162
Production equipment conditions	0.820	0.224	0.171	0.016	0.021
Overall infrastructure situation	0.843	0.072	0.056	0.242	0.079
Difficulty in participating in social organizations	0.107	0.067	0.137	0.090	0.885
Obtain social technical support	0.117	0.252	0.003	0.066	0.845
Annual household income	0.134	0.166	0.818	0.018	-0.019
Lending ability	0.130	0.091	0.800	0.063	0.142
Received government subsidy	0.102	0.288	0.810	0.039	0.049
Per capita cultivated land area	0.117	0.141	0.132	0.878	0.116
Farmland quality	0.172	0.255	0.044	0.832	0.035

(2) Calculate weight

The variance contribution rate is used to reflect the explanatory power of common factors on each indicator, and is an important basis for determining the impact of common factors on the problem(1).

$$w_i = \frac{\sum_{j=1}^p a_{ij} \times \theta_i}{\sum_{j=1}^m \sum_{i=1}^p a_{ij} \times \theta_i} \quad (1)$$

The specific method for weighting indicators is to consider the indicator coefficients as weighted based on the variance

contribution rate, and then normalize the coefficients of the indicators in the principal component linear combination by

weighted averaging. The calculation results are shown in Table 6.

Table 6. Weights of Various Indicators for Farmers' Livelihood Capital

First level indicators	Second level indicators	Third level indicators	Variable indicators	Attribute indicators
Research on the Evaluation of the Impact of Featured Grain Industry on Farmers' Livelihood Capital	Human Capital (H)	Labor Age	0.0444	0.2546
		Educational level	0.0796	
		Labor force engaged in the cultivation of miscellaneous grains industry	0.0555	
		Opportunities for technical training	0.0751	
	Physical Capital(M)	Housing conditions	0.0512	0.2717
		bank deposit	0.0751	
		Production equipment conditions	0.0782	
		Overall situation of infrastructure	0.0672	
	Social Capital(S)	Degree of participation in social organizations	0.0813	0.1634
		Obtain social and technological support	0.0821	
		Annual household income	0.0483	
		Borrowing capacity	0.0785	
	financial capital(F)	Obtain government subsidies	0.0713	0.1981
		Per capita cultivated land area	0.0518	
		Quality of cultivated land	0.0604	
	Natural capital(N)			0.1122

From Table 6, it can be seen that in the indicator matrix of the development of the miscellaneous grain industry on farmers' livelihood capital, material capital accounts for the largest proportion with a weight of 0.2717, followed by human capital, financial capital, social capital, and natural capital. This is mainly due to the small number of people with labor capacity in agricultural production, the aging of the labor force, and the difficulty in ensuring the quality of labor during the production process. From the ranking of individual indicator weights, obtaining social technical support, difficulty in participating in social organizations, education level, and borrowing ability have higher weights, which are 0.0821, 0.0813, 0.0796, and 0.0785, respectively. Lack of agricultural technicians, and farmers receive less agricultural technology training in a year; There are certain difficulties in participating in social organizations, and when facing problems in the development of the grain market and product marketing, they cannot be effectively solved; The overall labor force structure has a low level of education; Insufficient borrowing ability and weak risk resistance in the face of natural disasters all affect the livelihood capital of farmers.

4. Suggestions and Countermeasures

(1) Make good use of government policies and expand the scale of production bases. Strengthening government functions and specifying safeguard measures are important conditions for ensuring the development of the "Jinhuazhai" millet mixed grain industry. In terms of production, the government should take the lead in a series of safeguard work - including farmers in insurance to better avoid risks caused by natural disasters, including fertilizers, pesticides, seeds and other production materials in safeguard measures, and providing farmers with the greatest preferential policies; In terms of processing, the government should ensure that processing enterprises have a good business environment, provide preferential treatment for land, water, electricity and other aspects, and reduce enterprise costs; In terms of sales, actively utilize the advantages of mainstream government

media to promote products and provide certain tax benefits; More importantly, we need to improve technological support and increase technological support. We should not only train enterprises, but also drive farmers, and strengthen relevant skills training through forms that are popular among farmers.

(2) Strengthen technological support and develop high-end industries for miscellaneous grains. By means of refined processing and research and development of new products, we aim to promote the overall improvement and efficiency of the industry, further increase the added value of our products. As the low-end market tends to be saturated, "Jinhuazhai" Xiaomi should actively change its mindset and enter the mid to high end market - conduct sufficient market research, capture more consumer groups, and fully consider the needs of different target customer groups, such as young people who are more concerned about the convenience of food, high-end white-collar workers who are concerned about health and nutrition, and elderly people who are more concerned about their physical condition and taste. Develop different product types according to the needs of different groups.

(3) Emphasize brand building and establish a modern production and sales system. Develop the form of "Internet+" for miscellaneous grain, use the universal application of modern Internet technology, realize the transformation from traditional agents+sales terminals to modern circulation system, give full play to the brand effect of "Jinhuazhai" millet, which is healthy, green and rich in strontium, and improve market competitiveness. Encourage the use of trade fairs, mainstream media publicity and other means to expand influence, especially the driving role of the "Internet+agricultural products" in e-commerce, encourage retail investors, cooperatives, enterprises as the main body of sales, and establish online sales platforms on the well-known mass media such as Tiktok, Kwai, which can not only broadcast with goods, but also release videos about the planting, production, processing of millet in the "Jinhuazhai", further open the popularity, and promote the regional characteristics of coarse cereals to go out of Gansu to the whole country.

(4) Innovate production and sales models to create green and sustainable agriculture. To promote industrial integration, we must first attach great importance to the concept of green development, sustainable development, and industrial integration development. We can leverage the high-quality tourism resources of Zhangye City to establish rural tourism in the production areas, forming a high-quality agricultural tourism product that integrates scenery, agriculture, and tourism, and creating a distinctive rural tourism brand. Not only can it develop local tourism resources, but it can also serve as a promotional and sales model. Tourists can have a better understanding of the brand. If it is given as a special product to family and friends, it will subtly promote the product and enhance its popularity through word-of-mouth transmission between people.

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