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Research on the Mechanism of Agricultural Socialized Services in China Under the Leadership of the Communist Party—A Case Study of Shanxi

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Abstract: Based on the perspective of agricultural socialized services under the leadership of the Communist Party of China (CPC), this paper focuses on analyzing the mode and working mechanism of village collective participation in agricultural socialized services. The stochastic frontier model is employed to assess the technical efficiency of agricultural production among sample farmers, as well as the influence of the type and scale of agricultural socialized services on agricultural production efficiency. The research found that CPC leadership effectively promotes the consolidation of farmland, enabling the scaling and mechanization of agricultural socialized services, which increases production and income. The expansion of service scale and increased participation of farmers in socialized agricultural services contribute to improving agricultural production efficiency. Agricultural socialized service work should fully leverage the leadership role of the CPC. Party committees at all levels should establish a coordinated linkage mechanism for management services, guiding grassroots party organizations to actively promote the deepening development of agricultural socialized services.

Keywords: CPC leadership, agricultural social services, village collectives, grassroots governance

1. Introduction

Against the backdrop of rapid urbanization and increasingly severe rural depopulation, the questions of "who will farm the land" and "how to farm the land" are becoming more prominent. These issues are of great concern in the comprehensive promotion of rural revitalization strategies and the realization of agricultural modernization [1]. The transfer of rural labor, severe aging, land fragmentation, and low levels of agricultural production organization have become significant obstacles to the development of modern agriculture. Breaking through these constraints is essential for achieving rural revitalization and realizing large-scale agricultural production. The 2024 No. 1 Document of the Central Government of China emphasizes the need to "build a modern agricultural operation system based on small farmers, focusing on new types of agricultural business entities and supported by socialized services." It calls for supporting rural collective economic organizations to provide intermediary services, such as production and labor, thereby improving grain yields and ensuring reasonable grain planting benefits for farmers. Local Party committees and governments at all levels must also take political responsibility for grain security. Existing research in China in terms of agricultural socialized services mainly focuses on the development models and paths of rural collective economies from the perspectives of the characteristics of rural collective economies [2], development status (Xiao Hongbo et al., 2021), and policy recommendations [3]. They also examine the evolution, types, and typical cases of agricultural socialized services [4], and their impact on agricultural production efficiency and green agriculture [5].

These studies found that agricultural production hosting services exist in four modes: single-link hosting, multi-link hosting, whole-process hosting, and menu hosting [6]. There are apparent differences in agricultural production efficiency under different agricultural socialization service links (Sun Dingqiang et al., 2016), and the scale of trusteeship service has a positive impact on agricultural production technical efficiency [7]. The influence of agricultural production trusteeship service on agricultural production under the Leadership of the Communist Party mainly focuses on researching the content of trusteeship service or the docking mode between village collectives and small farmers. Yu Yali (2023) believes that village collectives primarily provide

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three types of services in agricultural socialized services: agricultural production trusteeship services, coordination and supervision services, and intermediary services. Based on the dual organizational perspective of agricultural socialized services, Guan Shan (2020) believes that the "unified management" function of rural collective economic organizations promotes the connection between supply and demand for large-scale services, thereby facilitating the sustainable development of the farmland trusteeship mode. However, it is relatively rare for systematic analysis to be conducted on how to strengthen the construction of typical types of rural collective economy organizations and how to provide intermediary services to achieve coordinated development between these organizations and agricultural socialized services [8]. There is a lack of research on the impact of agricultural socialized service types and service scales on agricultural production efficiency under the Leadership of the Communist Party.

In China's rural revitalization efforts, various models are being employed, including leveraging family farms to develop rural tourism, promoting red cultural tourism, promoting leisure agriculture, and expanding agricultural product sales through internet technology. However, these models often have distinct local characteristics and are usually only suitable for rural areas with unique resources [9]. For the revitalization of many ordinary rural areas, it is necessary to develop an industry model that suits local conditions. Agricultural socialized services, which emphasize mechanized and modernized production, provide a scientific and practical approach to achieving large-scale, professional production while accommodating China's context of smallholder farming. The "H-type" agricultural socialized service model, developed in Shanxi Province, has proven to be replicable and sustainable, demonstrating significant market potential. This model, led by the Party's leadership and leveraging the governance capabilities of grassroots party organizations, strengthens the organization of agricultural production and ensures national food security through the production mechanism.

2. Current Situation of Land Trusteeship in Shanxi Province

2.1 Overview of Agricultural Socialization Services in Shanxi Province

Since the implementation of agricultural socialization service pilot projects in China in 2017, national and local governments have introduced various supportive policies in finance, agricultural inputs, and legislation to ensure the smooth progress of these pilot projects. The Shanxi Provincial Department of Agriculture and Rural Affairs has established a six-level collaboration involving municipal, county, township, village, and service organizations to focus on selecting service entities, standardizing service contracts, monitoring inspections, disbursing subsidy funds, summarizing experience models, and conducting project audits. Shanxi Province has taken the lead nationwide in creating and improving a local regulatory framework for agricultural socialization services, evaluating the performance of agricultural production trusteeship projects in pilot counties, rewarding excellence, and penalizing shortcomings, thereby promoting the deepening of agrarian socialization services throughout the province [10]. Successful models have emerged in regions such as Yicheng, Pingyao, and Wanrong, laying a solid foundation for the extensive promotion of agricultural socialization services. These pilot projects have adapted to the trends of aging agricultural labor and diversified farmer needs, addressing issues such as “inability to farm,” “poor farming quality,” and “unprofitability,” resulting in a win-win outcome for farmers, service entities, rural collective economic organizations, and local governments.

However, due to the fragmented nature of the contracted farmland in China, which is often small and scattered, large-scale and mechanized operations have become quite tricky, severely restricting the efficient implementation of large agricultural machinery, technical expertise, and scientific farming solutions in the farm socialization service process. This has led to less significant outcomes in certain areas and slowed the promotion of agricultural socialization services [11]. Therefore, this paper focuses on analyzing the current situation and impact mechanisms of the "H-type" agricultural socialization service under the guidance of party building. It argues that the role of party building in leading agricultural socialization services should be emphasized, highlighting the importance of grassroots party organizations and village collectives in promoting the concentration of farmland, supervising the trusteeship production process, and safeguarding the rights and interests of farmers. By leveraging party building as a driving force and agricultural socialization services as a bridge, the aim is to facilitate rural industrial revitalization, organizational revitalization, cultural revitalization, ecological revitalization, and talent revitalization, ensuring the comprehensive implementation of the rural revitalization strategy.

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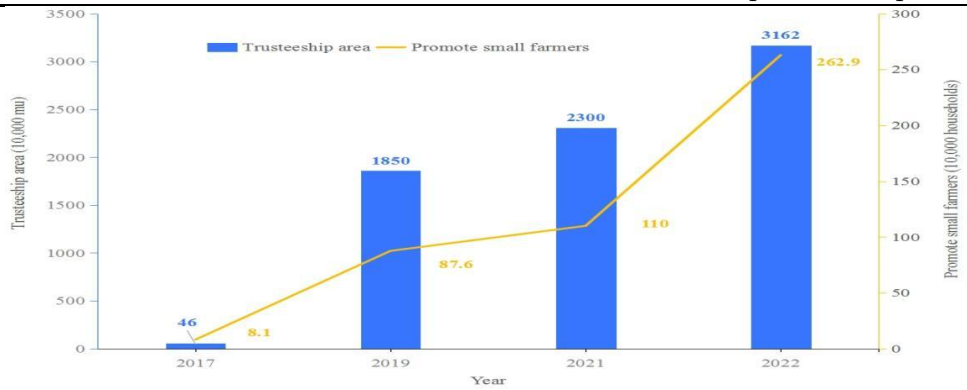

Fig.1: The Development of Farmland and Small Farmers Scale in Agricultural Production Trusteeship Services in Shanxi from 2017 to 2022

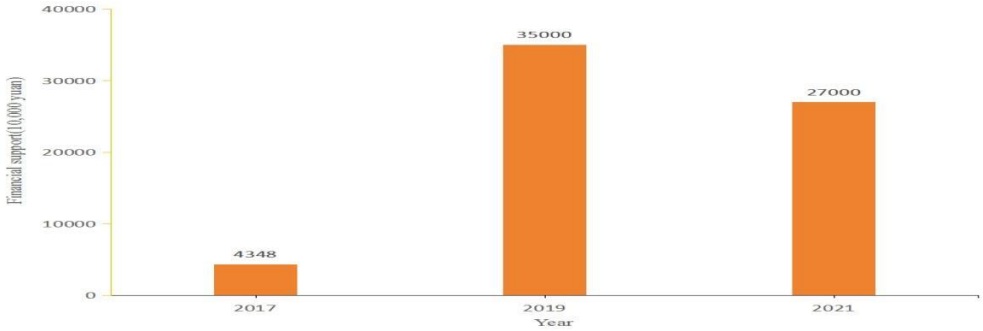

Fig. 2: The Development of Financial Support for Agricultural Production Trusteeship Services in Shanxi from 2017 to 2021

2.2 Main Models of Agricultural Socialization Services in Shanxi Province

In recent years, the agricultural socialization service models in Shanxi Province have become increasingly refined, positioning the province as a leading exemplar of agricultural socialization services in China. Based on the organizational forms of farmers, these models can be categorized into party-led trusteeship and service entity-driven trusteeship. According to the phases of the trusteeship, they can be divided into full-process trusteeship, key segment trusteeship, and package segment trusteeship models. Based on the level of government involvement, they can be classified into government-led, government-guided, and market-led models. Depending on land type, there are models for flat and hilly mountainous areas; and by crop type, there are models for staple grain, miscellaneous grain, fruit, and vegetable trusteeship. This research summarizes the agricultural socialization service models suitable for the farming conditions of Shanxi Province, based on an analysis of pilot practices and trusteeship models across different regions. It provides guidance and reference for improving the farm socialization service system.

2.3 Work Mechanism of Agricultural Socialization Service Models under Party Leadership

2.3.1 Operational Mechanism

Service Providers: The trusteeship entities provide mechanized farming and prevention services, reducing operational costs through economies of scale and lowering material costs by streamlining the distribution of agricultural inputs. They enhance market competitiveness by offering trusteeship service prices that are 10% to 20% lower than market rates. While ensuring that farmers' incomes are not underwritten, they establish direct contacts with supermarkets and grain processing enterprises to reduce intermediary links and expand profit margins by purchasing grains from trusted farmers at prices above local market rates. This approach enables trusteeship entities to significantly reduce the rental and maintenance costs of transferred land while providing agricultural production services to farmers, thereby generating profits. Farmer Participation: Farmers authorize their land to be uniformly managed by agricultural socialization service entities (trusteeship area) and can voluntarily choose specific trusteeship services, such as "benefit-type" or "package-type" services. They pay service fees according to the quotations provided by the trusteeship entities. In practice, farmers may pay

service fees in advance or on the day of grain harvest after weighing and recording the yield in the field. This arrangement leads to increased income for farmers due to reduced planting costs, improved grain yields, and the acquisition of grains at prices higher than market rates. Additionally, as farmers are freed from land cultivation, they can seek non-agricultural employment to increase their off-farm income. Moreover, direct subsidies for grain from the government still belong to the farmers [12]. Party Organization Leadership: Party organizations lead and coordinate the agricultural socialization service work. Higher-level party organizations oversee the direction of agrarian socialization service development, arranging for relevant authorities to issue regulations and standards, coordinating the allocation of subsidies, cultivating trusteeship entities, and ensuring food security. Grassroots party organizations are responsible for promoting agricultural socialization service policies, encouraging farmers with needs to participate actively, and organizing the concentration of farmland to facilitate the scale and mechanization of agricultural production by the trusteeship entities.

2.4 Main Work Content

The "H-type" model in agricultural socialization services refers to a dual-structured approach that combines two key components.

The left side of the "H-type" model represents the land concentration system, "Field Steward," which is mainly composed of a three-tier service organization: county-level trusteeship service centers, township-level trusteeship service offices, and village trusteeship service stations, all guided by the county, township, and village party organizations. County-level parties and government organizations are primarily responsible for organizing and guiding agricultural socialization services, managing subsidies and resource allocation, formulating implementation plans, and exploring suitable agricultural socialization service models based on local conditions. Township parties and government organizations connect with county-level authorities and agricultural trusteeship service departments, fulfilling tasks assigned from above, conducting assessments of local land conditions, and actively promoting the importance of agrarian socialization services [13]. They also detail village-level task assignments and facilitate communication with village committee members. The right side of the "H-type" model represents the trusteeship service industrial alliance, "Field Nanny Union," which provides farmers with an array of agricultural production chain services, including seeds, fertilizers, pesticides, machinery, drones, insurance, finance, technology, information, grain merchants, and futures—11 service categories in total. Farmers can choose from full production chain trusteeship, multi-segment trusteeship, or single-segment trusteeship models based on their land endowments, labor availability, and service fees, creating a "benefit-type, package-style" menu of services that meets the diverse agricultural production service needs of farmers across different regions.

2.4.1 Typical Cases

In regions such as Yicheng, Xinjiang, Shanyin, Dingxiang, and Xinfu District, the "H-type" agricultural socialization service model has been implemented to manage surrounding farmers' lands uniformly, resulting in an average increase of approximately 222.8 yuan per mu, with an average increase of about 6,800 yuan per household. Through post-harvest assessments, the average yield reached 852 kg per mu, a 56 kg per mu increase compared to unmanaged fields, resulting in an average income increase of 89.6 yuan per mu (based on a grain price of 1.6 yuan per kg). Unmanaged fields experienced an average growth of 45 kg per mu and an income boost of 72 yuan per mu. The trusteeship entities purchased grains from demonstration fields at prices 0.1 yuan per kilogram higher than market rates, with an average yield of 852 kilograms per mu, resulting in an additional income of 85.2 yuan per mu for farmers. For the surrounding unmanaged fields, grains were purchased at prices 0.06 yuan per kg above market rates, averaging 841 kg per mu, leading to an additional income of 50.4 yuan per mu. Furthermore, farmers saved an average of 48 yuan per mu in costs compared to unmanaged fields.

3. 3. Analysis of Production Efficiency under Party-Led Agricultural Socialized Services

3.1 Data Sources and Descriptive Analysis

3.1.1 Data Sources

The data in this article comes from the research conducted by the research group on the pilot of agricultural socialized services in Shanxi Province, China. To ensure the representativeness of the survey samples, this study comprehensively considered the agricultural production trusteeship scale, social and economic conditions, geographical location, and other factors in Shanxi's three regions, and selected Taigu and Pingyao counties of Jinzhong City, Shanyin County of Shuozhou City, Yicheng County of Linfen City, and Tunliu District of Changzhi City as the first-level sample units. Then, according to the stratified sampling criteria, administrative

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villages and farmers were selected for questionnaire surveys using a sampling method proportional to probability and scale. Finally, a total of 380 sample farmers were investigated, and 362 valid samples were obtained, with an effective rate of 95.3%. As shown in Figure 3, the study area is located in the western part of North China, characterized by a terrain dominated by basins and hills. It primarily cultivates field crops, such as corn and various grains, that are suitable for agricultural machinery operations.

Table 2: Farmer Income Increase per Mu for Trusteeship Land and Surrounding Area

	Trusteeship Land	Surrounding Land
Area (mu)	2150	6400
Unit Yield (kg)	852	841
Yield Increase (kg)	56	45
Production Income Increase (yuan)	89.6	72
Grain Sale Income Increase (yuan)	85.2	50.4
Cost Savings (yuan)	48	48
Total Income Increase (yuan)	222.8	170.4
Total Income Increase (10,000 yuan)	47.9	109.1

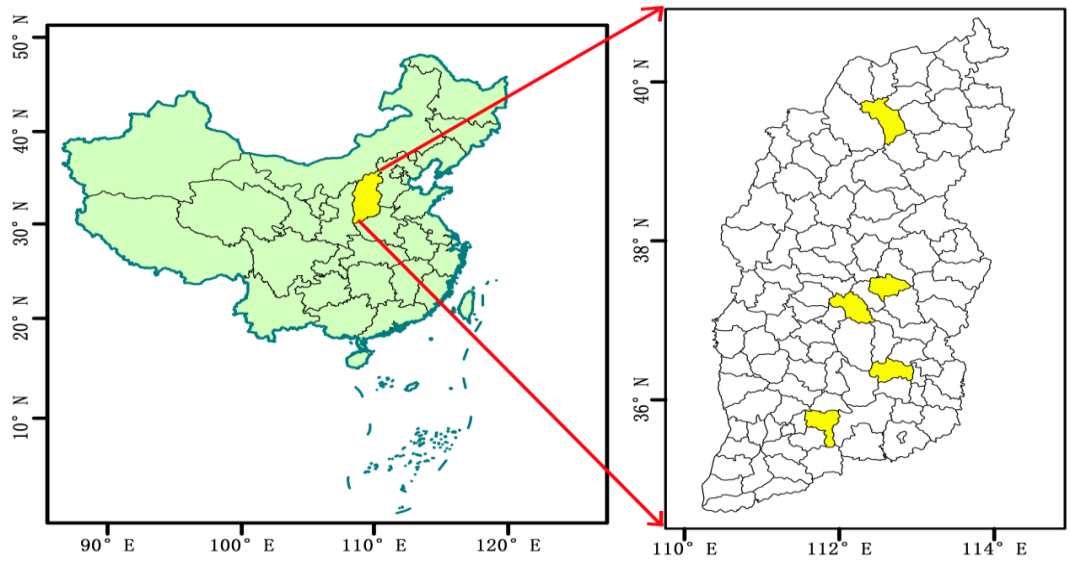

Fig.3: Geographical position of the research area

3.1.2 Descriptive Analysis

This article primarily analyzes the impact of agricultural production trusteeship on the efficiency of agricultural production technology. The core explanatory variable is agricultural production technology efficiency, which can be calculated from the following text. The core explanatory variable is the type of agrarian production trusteeship, which represents the degree to which farmers participate in agricultural production trusteeship services; the service scale refers to the scale of agricultural production trusteeship services undertaken by the trusteeship service provider. To further examine the impact of individual, farmland, livelihood, and other endowment conditions on farmers' agricultural production efficiency, this article also considers variables such as individual characteristics, human capital, social capital, agricultural land characteristics, and livelihood characteristics. The control variable is the regional characteristic variable.

Table 3: Descriptive Statistics of Variable Settings and Their Overall Characteristics

Variable Type		Variable Description	Mean	Standard Deviation
Agricultural	Service Types	1 = No participation or	2.6103	0.9094

Production Trusteeship Characteristics		part-process trusteeship, 2 = Full-process trusteeship without the entire chain, 3 = Full-process trusteeship with the entire chain		
	Service Scales(Mu)	Service scales of the service provider	76.56	162.51
Individual Characteristics	Gender of Household Head	0 = Female, 1 = Male	0.8369	0.3694
	Age of Household Head (Years)	Household head age	56.50	11.65
	Family Size (Number of Members)	Number of household members	3.9970	1.3146
Human Capital Characteristics	Education Level of Household Head (Years)	Years of education received by the household head	8.7251	5.2272
	Health Level of Household Head (1–5 Levels)	1 = Very Poor, 2 = Poor, 3 = Average, 4 = Good, 5 = Very Good	3.9199	1.0521
Social Capital	Party Membership of Household Head	0 = Not a Party Member, 1 = Party Member	0.0892	0.2976
	Whether the Household Head is a Village Cadre	0 = Not a village cadre, 1 = Village cadre	0.1178	0.3224
Land Characteristics	Cultivated Land Area (mu)	Family total cultivated land area	3.9970	3.1779
	Average Cultivated Land Area per Capita (mu)	Family average cultivated land area per capita	1.3315	1.7690
	Cultivated Land Slope Steepness (1–6 Levels)	1 = 0–3 meter, 2 = 4–6 meter, 3 = 7–10 meter, 4 = 11–15 meter, 5 = 16–20 meter, 6 = 21 meter or more	3.7070	1.3409
	Irrigation Convenience (1–8 Levels)	1 = Less than 1 meter, 8 = 7 meters or more	5.0802	1.8232
Economic Conditions	Previous Household Non-farming Income Proportion (%)	The proportion of non-farming income in the last period	0.5229	0.2634
Livelihood Characteristics	Distance to Local or Nearest Township (1–6 Levels)	1 = Local, 2 = Township, 3 = County-level city, 4 = Prefecture-level city, 5 = Provincial capital, 6 = Outside province	3.2870	1.7001
Regional Characteristics	County Characteristics (1–5)	The value is assigned in the positive order of the trusteeship area of each county	3.4411	0.8893

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3.2 Analysis of Production Efficiency under Agricultural Socialized Services

3.2.1 Production Efficiency Measurement Methods

The production inputs in this study include seed input (X1), fertilizer input (X2), Labor input (X3), and

$$\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln^2 X_1 + \beta_6 \ln^2 X_2 + \beta_7 \ln^2 X_3 + \beta_8 \ln^2 X_4 + \beta_9 \ln X_1 \times \ln X_2 + \beta_{10} \ln X_1 \times \ln X_3 + \beta_{11} \ln X_1 \times \ln X_4 + \beta_{12} \ln X_2 \times \ln X_3 + \beta_{13} \ln X_2 \times \ln X_4 + \beta_{14} \ln X_3 \times \ln X_4 + \nu_i - \mu_i \quad (1)$$

machinery input (X4). The transcendental logarithmic function model used in this study is as follows:

Where：

Y (corn yield per unit of land) represents the output,
X1 is the expenditure on seeds per unit of land,
X2 is the expenditure on fertilizers per unit of land,
X3 is the total number of labor days used in production,
X4 is the expenditure on machinery per unit of land.

3.2.2 Production Efficiency Measurement Results and Analysis

In empirical analysis, most scholars adopt a "two-step method": (1) estimate the stochastic frontier production function to calculate the technical efficiency of the samples, and (2) conduct a regression analysis to determine the direction and extent of each factor's impact on technical efficiency. However, this method has limitations, such as inefficiency and bias in parameter estimates. To address this, the BC1995 model (Battese and Coelli) is applied, which estimates the stochastic frontier production function and the factors affecting technical inefficiency in a single step using maximum likelihood estimation.

Table 4 presents the results of the model's regression analysis. The value of γ is 0.866, indicating that 86.6% of the variation in the error term can be attributed to technical inefficiency, while the rest is due to random disturbances. This shows that using stochastic frontier analysis is appropriate. The coefficients of inputs such as seeds, fertilizer, and management fees have a positive and significant influence on corn yield. Labor input, on the other hand, does not significantly affect output, reflecting that the use of machinery has reduced the contribution of labor to land productivity.

Table 4: Regression Results of the Production Function Model

Variable	Coefficient Estimate	Standard Error
Ln (Agricultural Inputs)	1.083*	0.635
Ln (Irrigation)	0.836*	0.519
Ln (Labor)	0.267	0.191
Ln (Trusteeship Fee)	1.127*	0.935
Ln (Agricultural Inputs)²	0.052	0.082
Ln (Irrigation)²	0.046	0.073
Ln (Labor)²	-0.028	0.049
Ln (Trusteeship Fee)²	0.066	0.080
Ln (Agricultural Inputs) × Ln (Irrigation)	0.331	0.446
Ln (Agricultural Inputs) × Ln (Labor)	-0.057	0.045
Ln (Agricultural Inputs) × Ln (Trusteeship Fee)	0.116*	0.072
Ln (Irrigation) × Ln (Labor)	-0.022	0.064
Ln (Irrigation) × Ln (Trusteeship Fee)	0.036	0.028
Ln (Labor) × Ln (Trusteeship Fee)	0.028	0.052
δ²	0.535	0.014
γ	0.866	0.062

Variable	Coefficient Estimate	Standard Error
Log Likelihood Value	461.16	

3.2.3 Analysis of the Impact Mechanism of Agricultural Socialized Service Types and Service Scale on Production Efficiency

3.2.4 Model Setup

To explain how different agricultural socialized service models affect the technical inefficiency of agricultural production, the following model for technical efficiency is set up:

$$m_i = \theta_0 + \theta_1 T_i + \theta_2 S_i + \sum \gamma_k C_{ik} + \varepsilon_i \quad (2)$$

mi represents the technical inefficiency term of farm i,
Ti represents the type of agricultural socialized service for farm i,
Si represents the service scale of the managed farm i,
Cik are control variables that may affect technical efficiency,
θ_1, θ_2, and γ_k are the parameters to be estimated.

3.2.5 Empirical Results

As shown in Table 5, the type of service negatively impacts agricultural production efficiency, which is statistically significant at the 5% level. This result is consistent with another study, which found differences in production efficiency among farmers participating in socialized services at different stages of trusteeship services [14]. This paper further expands and subdivides the degree of farmers' participation in trusteeship services, and the results suggest that the more stages of the agricultural process a farmer participates in through socialized services, the greater the decrease in agrarian inefficiency. This could be due to economies of scale and technology spillover effects that increase agricultural output, as well as collective bargaining power in the grain market. The larger the scale of socialized services, the more efficient farm production becomes, as larger service providers tend to have more stable operational procedures and relationships, reducing production costs and increasing output.

The scale of agricultural socialized services hurts agrarian production efficiency and is significant at the 10% level. This finding is consistent with the research results of Li Qi (2023), which indicate that the expansion of the service scale of the trusteeship service provider is conducive to improving production efficiency. Research has found that large-scale agricultural socialized service providers usually have more mature production operation procedures and stable custody service relationships, which are more likely to achieve economies of scale in production, reduce production costs, and increase unit output.

Table 5: Regression Results of Factors Influencing Technical Inefficiency

Variable	Coefficient Estimate	Standard Error
Core Variables		
Service Type	-1.036**	0.261
Service Scale	-0.329*	0.082
Household Head Characteristics		
Age of Household Head	-0.073	0.065
Education Level of Household Head	-0.181*	0.097
Economic Characteristics		
Proportion of Non-Agricultural Income	0.107**	0.0492
Production Management		
Scale of Household Participation in Management	-0.037*	0.016
Quality of Farmland	-0.630**	0.161
Deep Tillage of Farmland	-0.052*	0.028
Experience of Natural Disasters	0.077*	0.039

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Variable	Coefficient Estimate	Standard Error
Regional Characteristics	Controlled	
δ^2	0.528	0.011
γ	0.883	0.052
Log Likelihood Value	496.27	

(* and ** indicate statistical significance at different levels)

4. Conclusion

The research on agricultural socialized service mechanisms under Party leadership, using Shanxi Province as a case study, demonstrates that Party leadership plays a crucial role in advancing agricultural modernization and rural revitalization. The "H-type" agricultural socialized service model, developed under Party guidance, has proven to be an effective mechanism for overcoming challenges in small-scale, fragmented farming, allowing for the efficient management of agricultural production on a large scale. This model not only integrates fragmented land for mechanized and modernized production but also effectively addresses key issues, such as "who will farm" and "how to farm." Role of Party Leadership: Party leadership has played a key role in promoting agricultural social services, serving as an organizer, advocate, and intermediary between farmers and service providers. By leveraging grassroots Party organizations, the model enables the effective consolidation of farmland, coordination of agricultural services, and protection of farmers' rights. The Party's role in leading the development of the agricultural economy helps ensure the continued growth of rural collective economies and the sustainable development of agricultural production. Agricultural Socialized Services and Economic Efficiency: The findings reveal that agricultural socialized services significantly improve production efficiency, particularly when the scale of services is expanded. By providing comprehensive services across the agricultural production chain, including machinery, seeds, fertilizers, pest control, and marketing, these services help reduce costs and increase output. This not only enhances the economic returns for farmers but also increases their market bargaining power. Moreover, the involvement of service providers in post-production activities, such as marketing and grain sales, helps stabilize prices and ensure higher returns for farmers. The scale effects and technology spillovers are generated.

5. Policy Recommendations

5.1 Fully Leverage Party Leadership to Promote Industrial Revitalization

Village Party branches must place significant importance on agricultural socialized services, actively cooperating with higher-level Party organizations and relevant departments to implement agricultural socialized service work. This should align with the goals of modern, large-scale, mechanized agricultural production. It is essential to understand the critical role of agricultural social services in linking small-scale farmers with modern agriculture and in ensuring national food security.

5.2 Protect Farmers' Rights in Contractual Services and Promote Organizational Revitalization

Party organizations at all levels should work together to advance agricultural socialized services and promote the revitalization of rural organizations. The Party committees and government departments must emphasize the role of Party organizations at each level in organizing and leading agricultural production service cooperatives. This will enhance the village collective's management and operational capabilities, furthering organizational revitalization in rural areas.

5.3 Promote Educational and Scientific Activities in Agriculture to Support Cultural Revitalization

In the process of implementing agricultural socialized services, Party organizations should actively coordinate with agriculture, science, and education departments to promote educational and cultural activities. Establishing a model of knowledge-based and technology-driven agricultural practices will encourage more farmers and machine operators to participate in the farm service system, fostering a cultural revitalization of rural areas.

5.4 Village Collectives Should Supervise Contractual Services to Ensure Ecological Revitalization

Great importance should be placed on developing ecological agriculture. Village committees should supervise

the use of fertilizers, pesticides, plastic films, and irrigation in agricultural production. They should also promote the recycling of crop straws and strictly control agricultural pollution to enhance ecological revitalization.

5.5 Improve Farmers' Production Skills and Comprehensive Abilities to Promote Talent Revitalization

The Party-led agricultural socialized service model should focus not only on building a macro-level agricultural service alliance but also on engaging more specialized organizations and talents to participate in the farm production service chain at the micro level. This will help enhance the overall skill level and quality of village residents, supporting talent revitalization.

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Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent

Not applicable. This study uses publicly available, de-identified secondary data and does not involve human participants or personal information.

Competing interests

The authors declare no competing interests.

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