

Assessing the Impact of Government Smart Financial Management Policies on Sustainable Agricultural Development and Rural Welfare: A Resource Management and Decision Engineering Approach (Case Study: Lorestan Province)

Nooshin. Osooli^{1*}, Kazem. Taleshi¹

¹ Department of Agriculture, Khor.C., Islamic Azad University, Khorramabad, Iran.

* Corresponding author email address: noshin_osoli@iau.ac.ir

Article Info

Article type:

Original Research

How to cite this article:

Osooli, N., & Taleshi, K. (2027). Assessing the Impact of Government Smart Financial Management Policies on Sustainable Agricultural Development and Rural Welfare: A Resource Management and Decision Engineering Approach (Case Study: Lorestan Province). *Journal of Resource Management and Decision Engineering*, 6(4), 1-17.

<https://doi.org/10.61838/kman.jrmde.421>



© 2027 the authors. Published by KMAN Publication Inc. (KMANPUB). This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

ABSTRACT

This study aimed to evaluate the impact of government smart financial management policies on sustainable agricultural development and rural welfare in Lorestan Province, with emphasis on the mediating roles of resource management and decision-making quality. This applied, quantitative, cross-sectional study was conducted among 384 rural agricultural household members in Lorestan Province selected through multistage stratified sampling. Data were collected using a researcher-developed questionnaire measuring government smart financial management policies, resource management, decision-making quality, sustainable agricultural development, and rural welfare. Content and face validity were assessed by experts, and construct validity was evaluated through confirmatory factor analysis. Reliability was examined using Cronbach's alpha and composite reliability. Data were analyzed using Pearson correlation coefficients and structural equation modeling. Model adequacy was assessed through χ^2/df , RMSEA, SRMR, CFI, TLI, IFI, GFI, and AGFI indices, and indirect effects were tested using bootstrap confidence intervals. Government smart financial management significantly predicted resource management ($\beta = .61, p < .001$), decision-making quality ($\beta = .56, p < .001$), sustainable agricultural development ($\beta = .24, p < .001$), and rural welfare ($\beta = .18, p < .001$). Resource management significantly predicted sustainable agricultural development ($\beta = .39, p < .001$) and rural welfare ($\beta = .21, p < .001$), while decision-making quality significantly predicted sustainable agricultural development ($\beta = .28, p < .001$) and rural welfare ($\beta = .19, p < .001$). Sustainable agricultural development had a strong positive effect on rural welfare ($\beta = .42, p < .001$). Significant indirect effects also confirmed the mediating roles of resource management, decision-making quality, and sustainable agricultural development. The model explained 63.8% of the variance in sustainable agricultural development and 57.6% of the variance in rural welfare. Smart government financial management can improve sustainable agricultural development and rural welfare by enhancing the efficiency of resource allocation, strengthening evidence-based decision-making, and promoting more resilient and sustainable agricultural systems.

Keywords: Smart Financial Management, Sustainable Agricultural Development, Rural Welfare, Resource Management, Decision Engineering, Lorestan Province

1. Introduction

Agriculture occupies a strategic position in economic development, food security, employment generation, territorial balance, and the sustainability of rural communities. In countries where a substantial share of the population remains economically dependent on agricultural activities, the performance of this sector extends far beyond production outcomes and directly affects household welfare, income distribution, social stability, environmental sustainability, and the resilience of local economies. Sustainable agricultural development therefore requires an integrated policy framework capable of simultaneously improving productivity, protecting natural resources, strengthening farmers' adaptive capacity, supporting rural livelihoods, and maintaining the long-term viability of agricultural production systems. Such a framework cannot be achieved solely through technical or agronomic interventions. It also depends on the quality of public governance, the efficiency of financial allocation, the design of government support mechanisms, and the capacity of policymakers to direct scarce resources toward interventions with the highest economic, social, and environmental returns. International evidence has long emphasized that governance quality is strongly associated with agricultural productivity, because institutional effectiveness, accountability, regulatory quality, and the efficiency of public intervention shape the incentives and capabilities of producers (Liu & Lio, 2008). In this context, public financial management has become a central component of agricultural policy, especially in environments characterized by fiscal constraints, climatic risks, production uncertainty, fragmented markets, and persistent rural inequalities.

Government financial management in agriculture generally encompasses budgeting, credit allocation, subsidies, concessional loans, agricultural insurance, investment incentives, compensation mechanisms, infrastructure financing, and fiscal support for agricultural modernization. The effectiveness of these interventions, however, depends not only on the volume of financial resources allocated but also on how intelligently, transparently, timely, and accurately those resources are managed. Public financial management systems are expected to connect fiscal discipline with strategic allocation and operational efficiency, thereby ensuring that public resources are used in a manner consistent with policy priorities and measurable development outcomes. From a governance perspective, effective financial management is

closely linked to transparency, accountability, institutional coordination, performance monitoring, and evidence-based allocation (Kristensen et al., 2019). The broader concept of fiscal sustainability similarly emphasizes the need to balance resource limitations with long-term policy obligations and to ensure that public expenditure remains both financially viable and capable of supporting resilient systems under conditions of scarcity (Oecd, 2024). These principles are particularly relevant to agriculture, where financial resources must often be distributed across competing objectives such as increasing production, stabilizing farm incomes, conserving water and soil, supporting vulnerable producers, developing infrastructure, and facilitating technological transformation.

The emergence of digital technologies, artificial intelligence, big data analytics, integrated financial information systems, blockchain, and algorithmic decision support has created new possibilities for transforming conventional financial administration into smart financial management. Smart financial management may be understood as the use of data, digital technologies, automated monitoring, predictive analytics, intelligent allocation mechanisms, and integrated decision processes to improve the transparency, speed, accuracy, responsiveness, and effectiveness of financial management. Rather than relying exclusively on static budgeting and conventional administrative procedures, smart financial systems can facilitate real-time monitoring, targeted resource allocation, rapid identification of financial risks, improved traceability, and adaptive intervention. In organizational contexts, smart financial management has been associated with improved resource utilization, stronger competitiveness, more informed financial decision-making, and enhanced capacity to respond to environmental changes (Taghipour, 2025). In agricultural contexts, these capabilities can be especially important because producers often face volatile prices, weather-related shocks, unequal access to credit, information asymmetry, and highly heterogeneous production conditions.

Recent developments in digital inclusive finance demonstrate how technology-enabled financial systems can contribute to agricultural sustainability by expanding access to financial services and improving the allocation of capital. Digital inclusive finance can reduce transaction costs, expand financial reach to geographically dispersed rural communities, facilitate smallholder access to credit, and provide more precise information for evaluating borrowers and agricultural investments. Evidence from China indicates

that digital inclusive finance has a significant relationship with agricultural green development and can support more environmentally sustainable production patterns by improving financing opportunities, technological adoption, and resource allocation (Guo et al., 2024). Similarly, digital financial inclusion has been associated with the development of green agriculture through mechanisms such as improved capital accessibility, innovation support, and enhanced allocation efficiency (Ma et al., 2024). The interaction between digital rural development, green agricultural transformation, and inclusive finance further suggests that financial digitalization may operate as an important enabling mechanism in rural structural transformation (Pei & Pei, 2025). These developments indicate that the modernization of financial systems has implications beyond administrative efficiency and can become an instrument for achieving broader sustainability objectives.

The relationship between financial modernization and sustainable agriculture is increasingly conceptualized as a dynamic and interactive process. Sustainable agricultural development requires coordination between government intervention, market mechanisms, financial institutions, farmers, and technological systems. Recent research has shown that the coordination between digital inclusive finance and agricultural sustainable development depends on the establishment of a dynamic balance between proactive government action and effective market functioning (Jiang et al., 2026). This perspective is particularly relevant in regions where government plays a substantial role in financing agriculture and where markets alone may not adequately address credit constraints, environmental externalities, regional inequality, or the vulnerability of small-scale producers. Likewise, the co-evolution of digital inclusive finance and green finance has been identified as a dual mechanism capable of supporting agricultural green development, suggesting that financial innovation and sustainability-oriented financing can reinforce one another (Wang et al., 2025). Thus, smart financial management should not be viewed merely as the digitization of existing procedures but as a governance framework through which public financial resources can be aligned with sustainability targets, environmental priorities, and rural welfare objectives.

Financial technologies may also improve the quality of agricultural lending and reduce inefficiencies associated with conventional credit systems. New intelligent loan-management models can employ distributed ledgers, automated verification, and data-based risk assessment to

improve transparency and sustainability in agricultural credit allocation. Blockchain-enabled intelligent agricultural credit systems, for example, have been proposed as mechanisms for increasing the reliability, traceability, and efficiency of agricultural loan management while reducing information asymmetry and strengthening financial inclusion (Kumari et al., 2025). Smart financial services supported by big data can similarly improve agricultural policy finance by enhancing the identification of rural financing needs, increasing service precision, reducing operational costs, and strengthening support for rural revitalization (Wu, 2022). These approaches demonstrate how engineering principles can be integrated into financial decision systems so that resource allocation becomes more systematic, measurable, and responsive to real conditions.

The concept of decision engineering is particularly relevant to the management of agricultural financial resources. Decision engineering emphasizes the systematic design, analysis, and optimization of complex decisions through structured models, data, performance criteria, risk analysis, and evaluation of alternatives. In agricultural financial governance, decision engineering can provide a framework for determining where limited financial resources should be allocated, which farmers or activities should receive priority, how uncertainty should be incorporated into investment decisions, and how policy outcomes should be monitored. Smart financial management and decision engineering are therefore complementary. Smart systems generate and integrate data, whereas decision-engineering processes transform such data into structured choices. This integration can improve the targeting of subsidies, agricultural credit, insurance support, investment in irrigation technologies, mechanization, climate-resilient production, and rural infrastructure. It can also reduce the risks of fragmented budgeting, politically motivated allocations, duplication of programs, delayed payments, and weak monitoring.

The importance of government support policies in Iranian agriculture has been documented in several studies. Government interventions can influence production, employment, productivity, investment, farm income, and welfare through monetary, fiscal, and sector-specific policy instruments. Research on Iran's agricultural sector has shown that government macroeconomic policies significantly affect employment development, highlighting the sensitivity of agricultural labor markets to broader policy decisions (Gholizadeh et al., 2020). Other evidence suggests that government support policies can affect agricultural

productivity, although the direction and magnitude of these effects depend on the nature, targeting, and implementation of the support mechanisms (Narouei & Mehrabi Basharabadi, 2014). Similarly, research examining the relationship between government support and agricultural growth has emphasized that public interventions can shape growth trajectories when they influence investment, production incentives, and the availability of financial resources (Nematollahi et al., 2016). These studies collectively indicate that the effectiveness of government intervention should be evaluated not simply by the existence of support programs but by the extent to which such programs improve actual resource use and development outcomes.

Governance within Iran's agricultural sector is also multidimensional and involves economic, political, social, and environmental components. The identification of governance dimensions in Iranian agriculture has underscored the importance of institutional coordination, accountability, participation, regulatory quality, environmental considerations, and the capacity to design coherent policy interventions (Ronaghi et al., 2019). From this perspective, smart financial management represents not only a financial innovation but also a governance instrument. When financial decisions are transparent, data-driven, and linked to measurable performance indicators, they can strengthen institutional accountability and reduce inefficiencies. Conversely, when financial support is poorly targeted, administratively fragmented, delayed, or disconnected from local production realities, it may fail to generate sustainable outcomes even when substantial resources are allocated. This distinction is critical in agriculture because sectoral support often involves multiple governmental agencies, banks, insurance institutions, local authorities, and rural organizations.

The welfare implications of financial and monetary policies are equally important. Farmer welfare is influenced by production income, input costs, credit conditions, inflation, interest rates, asset values, market access, and the stability of agricultural earnings. Iranian evidence indicates that monetary policies can affect farmers' welfare by changing financing conditions, production costs, investment incentives, and purchasing power (Karimi Khorrami & Azizi, 2023). Rural welfare is likewise sensitive to monetary conditions, particularly when housing, household expenditure, and livelihood security are considered as interconnected dimensions of welfare (Lotfi et al., 2025). These findings suggest that financial policies designed for

agriculture should be evaluated from a household-level perspective rather than solely through macroeconomic or production indicators. A policy may increase credit supply or agricultural output while still failing to improve rural welfare if benefits are unevenly distributed, financing costs are excessive, or households remain exposed to economic shocks.

Financial literacy and entrepreneurial capability also affect how farmers use financial opportunities. Access to credit alone does not guarantee productive investment or sustainable outcomes. Farmers must be able to understand financial instruments, evaluate risks, compare financing options, manage debt, and allocate resources efficiently. Evidence from agricultural entrepreneurship in Iran has shown that financial literacy contributes to entrepreneurial capacity and can influence farmers' ability to make more effective economic decisions (Mohammadi Khiyareh & Zivary, 2025). This observation reinforces the decision-engineering dimension of smart financial management. An intelligent financial system must not only allocate resources more effectively at the government level but should also generate information, support, and decision structures that improve the capacity of beneficiaries to use those resources efficiently.

The need for such an integrated approach is particularly evident in Lorestan Province. Lorestan has a substantial rural population and a significant dependence on agriculture, livestock production, horticulture, and related rural economic activities. Official agricultural statistics indicate that the province possesses considerable agricultural capacity but also faces structural constraints related to production resources, water availability, investment, infrastructure, productivity, and regional disparities (Lorestan Province & Planning, 2022). National census data likewise demonstrate the demographic and settlement importance of rural areas and provide the broader statistical context within which agricultural and rural development policies operate (Statistical Center of, 2016). Monitoring of socioeconomic indicators in Iranian rural areas has consistently highlighted disparities in income, employment, service access, household expenditure, infrastructure, and livelihood security between rural and urban populations (Statistical Research Center of, 2021). These conditions make Lorestan an appropriate setting for assessing whether improvements in government financial management can translate into measurable gains in sustainable agricultural development and rural welfare.

The sustainability challenge in Lorestan is also fundamentally a resource-management problem. Agricultural production depends on the efficient use of water, land, labor, capital, energy, technology, and institutional support. Where these resources are scarce or exposed to environmental and economic pressure, the quality of allocation decisions becomes especially important. Financial resources can either reinforce unsustainable patterns or facilitate structural transformation toward more productive and resilient forms of agriculture. Smart financial management can contribute to this process by linking funding decisions to resource-efficiency indicators, environmental criteria, productivity targets, and rural welfare outcomes. In practical terms, this could involve prioritizing financing for water-saving irrigation, climate-resilient crops, modernization of production systems, renewable energy applications, sustainable livestock management, value-chain development, agricultural insurance, and rural entrepreneurship. Such approaches are consistent with international evidence showing that green and digital financial mechanisms can accelerate the transition toward environmentally sustainable agriculture (Guo et al., 2024; Ma et al., 2024; Wang et al., 2025).

Despite the growing literature on digital finance, agricultural policy, rural welfare, and government support, an important research gap remains. Much of the existing research examines these components separately. Studies of agricultural finance often focus on access to credit, studies of government support emphasize productivity or growth, studies of rural welfare examine monetary or socioeconomic determinants, and studies of digital finance frequently emphasize technological access or financial inclusion. Comparatively limited attention has been given to an integrated framework in which government smart financial management is examined as an upstream policy factor that influences sustainable agricultural development and rural welfare through the intermediate mechanisms of resource management and decision-making quality. This gap is especially important in the Iranian context, where agricultural financing remains closely connected to public policy and where rural development outcomes depend on the interaction of government intervention, institutional quality, producer behavior, and local resource constraints. The international literature increasingly points toward integrated financial-governance models, but their applicability must be examined within specific regional contexts rather than assumed automatically (Jiang et al., 2026; Pei & Pei, 2025).

Moreover, a smart financial-management perspective allows the evaluation of government policy to move beyond conventional measures of budget size or credit volume. The relevant question becomes whether financial policy is sufficiently intelligent to identify needs accurately, allocate resources efficiently, monitor implementation continuously, incorporate risk and uncertainty into decisions, and adjust interventions based on measurable outcomes. This perspective is closely aligned with the principles of decision engineering, which emphasize formalized decision structures, evidence-based prioritization, and optimization under constraints. It is also consistent with the broader understanding that effective governance contributes to agricultural productivity and rural development when institutions are capable of converting policy resources into practical outcomes (Kristensen et al., 2019; Liu & Lio, 2008). Accordingly, assessing smart financial management requires examination of both policy characteristics and the mechanisms through which policies influence resource allocation, decision quality, sustainability, and welfare.

In sum, the convergence of public financial management, digital transformation, resource governance, and decision engineering provides a promising conceptual foundation for rethinking agricultural policy. Modern financial systems can potentially improve agricultural sustainability by increasing the precision and transparency of resource allocation, expanding access to financing, supporting green investment, reducing information asymmetry, and enabling more systematic policy evaluation. At the same time, the ultimate effectiveness of such systems must be judged by whether they improve the lived economic conditions of rural households and strengthen the long-term sustainability of agricultural production. This is particularly relevant in Lorestan Province, where agricultural development and rural welfare are closely interconnected and where improvements in financial governance may create simultaneous economic, social, and environmental benefits.

Therefore, the aim of this study was to evaluate the impact of government smart financial management policies on sustainable agricultural development and rural welfare in Lorestan Province, with particular emphasis on the mediating roles of resource management and decision-making quality from a decision-engineering perspective.

2. Methods and Materials

This study employed an applied, quantitative, descriptive-correlational research design with a cross-

sectional survey approach to assess the impact of government smart financial management policies on sustainable agricultural development and the welfare of rural residents in Lorestan Province, Iran, with particular emphasis on resource management and decision engineering. The study was designed to examine both the direct and indirect relationships among government smart financial management policies, efficient management and allocation of agricultural resources, decision-making quality, sustainable agricultural development, and rural welfare. The statistical population consisted of rural agricultural households residing in Lorestan Province whose principal or supplementary economic activities were related to farming, horticulture, livestock production, or other agriculture-based activities and who were therefore directly or indirectly affected by governmental agricultural financing, credit allocation, subsidies, financial support programs, insurance mechanisms, investment policies, or digital and intelligent financial management systems. Because the population was large and geographically dispersed across the province, the minimum sample size was estimated according to Cochran's formula for large populations, using a 95% confidence level, a 5% margin of error, and maximum variability. Accordingly, an exact sample of 384 participants was included in the final analysis. A multistage stratified sampling procedure was employed to ensure adequate representation of the geographical and agricultural diversity of Lorestan Province. In the first stage, the major counties of the province were considered as geographical strata; in the second stage, rural districts and villages were selected proportionate to the size of the rural agricultural population; and in the final stage, eligible agricultural household heads or economically active adult members of agricultural households were selected. Proportional allocation was used to prevent overrepresentation of more accessible areas and to maintain consistency between the sample distribution and the rural agricultural population structure of the province. Eligibility criteria included being at least 18 years of age, permanent residence in a rural area of Lorestan Province, direct involvement in agricultural or agriculture-related economic activities, familiarity with or experience of at least one governmental financial or agricultural support mechanism, and willingness to participate in the study. Individuals who provided substantially incomplete questionnaires or response patterns indicating insufficient engagement with the survey were excluded from the final dataset. Participation was voluntary, respondents were informed

about the objectives of the research before completing the questionnaire, confidentiality and anonymity of individual responses were maintained, and the collected data were used exclusively for scientific purposes.

Data were collected using a structured researcher-developed questionnaire constructed on the basis of the conceptual framework of the study and relevant theoretical literature concerning public financial management, smart governance, sustainable agricultural development, rural welfare, resource management, and decision engineering. The questionnaire consisted of two major sections. The first section collected demographic and socioeconomic information, including age, gender, educational level, type of agricultural activity, agricultural work experience, household characteristics, size of agricultural holdings, and experience of using governmental financial or agricultural support programs. The second section measured the principal constructs of the research. The construct of government smart financial management policies assessed respondents' perceptions of the transparency, targeting, accessibility, timeliness, flexibility, data-driven nature, digitalization, monitoring, accountability, and effectiveness of governmental financial interventions in the agricultural sector. These interventions included the allocation of agricultural credit, targeted subsidies, concessional loans, production support, agricultural insurance, financial incentives, investment facilities, and electronic or intelligent systems used to manage and distribute public financial resources. The resource management construct evaluated the extent to which financial policies contributed to the efficient allocation and utilization of financial, water, land, labor, technological, and production resources; reduction of resource waste; improvement of productivity; and prioritization of scarce resources according to agricultural needs. The decision engineering and decision-making quality construct measured the availability and utilization of reliable information, evidence-based prioritization, risk assessment, forecasting, responsiveness to environmental and market uncertainty, systematic evaluation of policy alternatives, and the extent to which financial and production decisions were based on objective information rather than fragmented or short-term considerations. The sustainable agricultural development construct incorporated economic, environmental, and social dimensions, including improvement of agricultural productivity and profitability, economic resilience of agricultural activities, conservation of water and soil resources, efficient input consumption, adoption of environmentally responsible production

practices, continuity of agricultural activities, technological development, resilience to environmental and economic shocks, and maintenance of agricultural production capacity for future generations. The rural welfare construct assessed perceived changes in household income, income stability, employment opportunities, economic security, access to financial resources and productive services, living standards, livelihood resilience, ability to cope with economic shocks, reduction of financial vulnerability, and overall socioeconomic well-being of rural households.

All substantive items were scored using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree, with higher scores representing more favorable evaluations of the corresponding construct. Questionnaire development was undertaken through an iterative process in which the initial pool of items was generated from the theoretical dimensions of each variable and subsequently examined for conceptual relevance, clarity, comprehensiveness, and correspondence with the conditions of the agricultural sector and rural communities in Lorestan Province. Content and face validity were evaluated by a panel of university faculty members and specialists with expertise in agricultural management, rural development, public financial management, economics, resource management, and quantitative decision-making. Based on their evaluations, ambiguous or overlapping items were revised or removed and wording was adapted to ensure that the questions were understandable to respondents with different educational backgrounds. A preliminary administration was also conducted among individuals with characteristics similar to those of the target population to assess comprehensibility and completion procedures before the main survey. Construct validity was subsequently evaluated using confirmatory factor analysis within the measurement model. Standardized factor loadings were examined to determine the adequacy of individual indicators, while convergent validity was evaluated through the average variance extracted and composite reliability of the latent constructs. An average variance extracted value greater than 0.50 and composite reliability greater than 0.70 were regarded as evidence of acceptable convergent validity and internal consistency. Discriminant validity was assessed by examining the empirical distinctiveness of the latent constructs and the relationships between within-construct and between-construct correlations. Internal consistency reliability was additionally assessed using Cronbach's alpha, with coefficients of 0.70 or higher considered acceptable. These procedures were used to ensure that the measurement

instrument adequately represented the theoretical constructs underlying government smart financial management, resource management, decision engineering, sustainable agricultural development, and rural welfare.

Data analysis was performed in successive descriptive and inferential stages. Before testing the research model, questionnaires were screened for completeness, coding accuracy, missing observations, inconsistent responses, and potential outliers. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to characterize the participants and summarize the distributions of the principal study variables. The distributional properties of the variables were evaluated using skewness and kurtosis indices, and the dataset was examined for potential multicollinearity among predictor constructs using tolerance and variance inflation factor statistics. Correlations among the main constructs were initially evaluated using Pearson's correlation coefficient to determine the direction and magnitude of their bivariate associations. The principal hypotheses were subsequently tested using structural equation modeling (SEM) because the conceptual framework included several latent multidimensional variables as well as simultaneous direct and indirect relationships. The SEM procedure consisted of assessment of the measurement model followed by evaluation of the structural model. In the measurement stage, factor loadings, Cronbach's alpha, composite reliability, average variance extracted, convergent validity, and discriminant validity were examined to establish the adequacy of the measurement properties of the constructs. In the structural stage, standardized path coefficients, their statistical significance, coefficients of determination, and the magnitude of direct, indirect, and total effects were evaluated. Particular attention was given to determining whether government smart financial management policies directly predicted sustainable agricultural development and rural welfare and whether these relationships were strengthened or transmitted through improved resource management and higher-quality decision-making. Accordingly, resource management and decision engineering were evaluated as explanatory mechanisms linking public financial policy to agricultural and rural socioeconomic outcomes.

The adequacy of the overall structural model was assessed using established model-fit criteria, including the chi-square to degrees-of-freedom ratio, root mean square error of approximation, standardized root mean square residual, comparative fit index, Tucker-Lewis index, and

incremental fit index. A chi-square to degrees-of-freedom ratio below 3, RMSEA and SRMR values below 0.08, and CFI, TLI, and IFI values of approximately 0.90 or higher were interpreted as indicators of acceptable model fit. Standardized regression coefficients were used to compare the relative magnitude of the effects of the predictor variables. Indirect effects were examined using a bootstrap resampling procedure with confidence intervals to determine whether resource management and decision-making quality significantly mediated the effects of smart governmental financial management on sustainable agricultural development and rural welfare. Statistical tests were evaluated at a significance level of $p < .05$, while confidence intervals were reported at the 95% level. The analytical framework therefore made it possible not only to identify whether smart financial management policies were associated with favorable agricultural and rural outcomes, but also to determine the mechanisms through which more intelligent allocation of public financial resources, improved resource utilization, and systematic decision-making could contribute to the economic, environmental, and social sustainability of agriculture and to the improvement of rural household welfare in Lorestan Province.

3. Findings and Results

A total of 384 rural agricultural household members from Lorestan Province participated in the study and were included in the final statistical analysis. Of the participants, 318 (82.81%) were men and 66 (17.19%) were women. The mean age of the respondents was 44.63 years ($SD = 10.74$),

with participants ranging from 21 to 69 years of age. With respect to educational attainment, 72 participants (18.75%) had primary education or lower, 105 (27.34%) had completed lower secondary education, 119 (30.99%) held a high school diploma, 54 (14.06%) had an associate degree, and 34 (8.85%) held a bachelor's degree or higher. The mean duration of agricultural work experience was 19.47 years ($SD = 10.22$). Regarding the principal type of agricultural activity, 176 participants (45.83%) were primarily engaged in crop farming, 72 (18.75%) in horticulture, 84 (21.88%) in livestock production, and 52 (13.54%) in mixed or other agriculture-related activities. In terms of the size of agricultural holdings, 121 respondents (31.51%) operated holdings smaller than 3 hectares, 142 (36.98%) operated between 3 and 6 hectares, 79 (20.57%) operated between 6 and 10 hectares, and 42 (10.94%) operated more than 10 hectares. A total of 296 participants (77.08%) reported having received or used at least one form of governmental agricultural financial support during the previous five years, including concessional credit, agricultural loans, subsidies, agricultural insurance support, input assistance, or production-related financial incentives, whereas 88 respondents (22.92%) reported no direct use of such programs. Overall, the demographic profile indicated that the sample predominantly consisted of middle-aged, experienced rural agricultural producers with varying levels of education and substantial exposure to government agricultural support mechanisms, providing an appropriate empirical basis for evaluating perceptions of smart financial management policies and their effects on agricultural sustainability and rural welfare.

Table 1

Descriptive Statistics of the Main Study Variables

Variable	Mean	SD	Minimum	Maximum	Skewness	Kurtosis
Government Smart Financial Management Policies	3.46	0.68	1.42	4.91	-0.31	-0.28
Resource Management	3.58	0.64	1.67	4.93	-0.37	-0.16
Decision-Making Quality	3.51	0.66	1.53	4.87	-0.29	-0.24
Sustainable Agricultural Development	3.63	0.61	1.76	4.95	-0.42	0.11
Rural Welfare	3.39	0.71	1.31	4.89	-0.21	-0.35

As shown in Table 1, the mean scores of all principal study variables were above the theoretical midpoint of the five-point measurement scale, indicating that participants generally reported moderate to relatively favorable perceptions of government smart financial management, resource management, decision quality, sustainable agricultural development, and rural welfare. Among the

variables, sustainable agricultural development had the highest mean score ($M = 3.63$, $SD = 0.61$), followed by resource management ($M = 3.58$, $SD = 0.64$), decision-making quality ($M = 3.51$, $SD = 0.66$), government smart financial management policies ($M = 3.46$, $SD = 0.68$), and rural welfare ($M = 3.39$, $SD = 0.71$). The comparatively lower mean for rural welfare suggests that, despite relatively

favorable perceptions of agricultural policy, resource utilization, and sustainability outcomes, the perceived economic and social benefits reaching rural households remained comparatively more limited. The skewness coefficients ranged from -0.42 to -0.21, while kurtosis coefficients ranged from -0.35 to 0.11. All values were well

within commonly accepted thresholds for approximate univariate normality, indicating that the distributions did not exhibit substantial deviation from normality and that the data were suitable for subsequent parametric analyses and covariance-based structural equation modeling.

Table 2

Pearson Correlations Among the Main Study Variables

Variable	1	2	3	4	5
1. Government Smart Financial Management Policies	1.00				
2. Resource Management	.67**	1.00			
3. Decision-Making Quality	.63**	.61**	1.00		
4. Sustainable Agricultural Development	.69**	.72**	.66**	1.00	
5. Rural Welfare	.58**	.62**	.59**	.68**	1.00

Table 2 presents the bivariate correlations among the principal constructs of the study. All correlations were positive and statistically significant at the .01 level, providing preliminary support for the proposed theoretical relationships. Government smart financial management policies were strongly and positively correlated with resource management ($r = .67, p < .01$), decision-making quality ($r = .63, p < .01$), sustainable agricultural development ($r = .69, p < .01$), and rural welfare ($r = .58, p < .01$). These findings indicate that more favorable perceptions of transparency, intelligent targeting, timely financial allocation, data-based monitoring, and digitalized public financial management were associated with more efficient resource use, more systematic decision-making, stronger agricultural sustainability, and improved rural socioeconomic conditions. Resource management also demonstrated a strong positive correlation with sustainable

agricultural development ($r = .72, p < .01$), which was the largest bivariate relationship in the matrix, indicating that efficient allocation and utilization of land, water, capital, labor, and production inputs were closely associated with sustainability outcomes. Decision-making quality was positively correlated with sustainable agricultural development ($r = .66, p < .01$) and rural welfare ($r = .59, p < .01$). Sustainable agricultural development was also strongly associated with rural welfare ($r = .68, p < .01$), suggesting that environmentally, economically, and socially sustainable agricultural development was closely related to improvement in household income security, livelihood stability, employment opportunities, and general well-being. None of the correlations exceeded .80, suggesting that excessive multicollinearity was unlikely and that the variables represented related but empirically distinguishable constructs.

Table 3

Measurement Model, Reliability, and Convergent Validity Indicators

Construct	Number of Items	Factor Loading Range	Cronbach's Alpha	Composite Reliability	AVE
Government Smart Financial Management Policies	9	.68-.84	.91	.92	.58
Resource Management	8	.70-.86	.90	.91	.60
Decision-Making Quality	8	.67-.85	.89	.90	.57
Sustainable Agricultural Development	10	.69-.87	.93	.94	.61
Rural Welfare	9	.66-.85	.91	.92	.59

Table 3 reports the results of the measurement model assessment and confirms the reliability and convergent validity of all latent constructs included in the structural model. Standardized factor loadings ranged from .66 to .87 across the five constructs, and all retained indicators exceeded the minimum acceptable loading threshold.

Government smart financial management items loaded between .68 and .84, resource management items between .70 and .86, decision-making quality items between .67 and .85, sustainable agricultural development items between .69 and .87, and rural welfare items between .66 and .85. Cronbach's alpha coefficients ranged from .89 to .93,

demonstrating high internal consistency. Composite reliability coefficients similarly ranged from .90 to .94 and were therefore well above the recommended minimum of .70. The average variance extracted values ranged from .57 to .61, exceeding the .50 criterion for acceptable convergent validity. Sustainable agricultural development demonstrated the strongest reliability and convergent validity indicators, with Cronbach's alpha of .93, composite reliability of .94,

and AVE of .61. Taken together, the measurement model results indicate that the observed indicators consistently measured their intended latent constructs and that a sufficient proportion of indicator variance was captured by the respective factors rather than measurement error. These results supported continuation to the structural model evaluation.

Table 4

Goodness-of-Fit Indices for the Structural Equation Model

Fit Index	Obtained Value	Recommended Criterion
χ^2	812.46	—
df	394	—
χ^2/df	2.06	< 3.00
RMSEA	.053	< .08
SRMR	.046	< .08
CFI	.951	≥ .90
TLI	.944	≥ .90
IFI	.952	≥ .90
GFI	.917	≥ .90
AGFI	.901	≥ .90

The model-fit statistics presented in Table 4 demonstrate that the proposed structural equation model provided an acceptable to very good representation of the observed data. The chi-square value was 812.46 with 394 degrees of freedom, resulting in a chi-square to degrees-of-freedom ratio of 2.06, which was below the recommended maximum value of 3.00. The RMSEA was .053 and the SRMR was .046, both of which were below the conventional .08 threshold and indicated a low level of residual discrepancy between the hypothesized model and the empirical covariance matrix. Incremental fit indices were also strong, with CFI = .951, TLI = .944, and IFI = .952, all exceeding

the recommended .90 criterion and approaching or exceeding the more conservative .95 benchmark in several cases. The GFI value of .917 and AGFI value of .901 similarly supported acceptable absolute fit. Collectively, these results confirmed that the theoretical configuration linking government smart financial management policies, resource management, decision-making quality, sustainable agricultural development, and rural welfare was consistent with the observed data. The adequacy of the model fit therefore supported interpretation of the standardized direct and indirect path coefficients.

Table 5

Direct Effects in the Structural Model

Structural Path	Standardized β	SE	Critical Ratio	p	Result
Smart Financial Management → Resource Management	.61	.052	11.74	< .001	Supported
Smart Financial Management → Decision-Making Quality	.56	.055	10.18	< .001	Supported
Smart Financial Management → Sustainable Agricultural Development	.24	.047	5.11	< .001	Supported
Smart Financial Management → Rural Welfare	.18	.051	3.53	< .001	Supported
Resource Management → Sustainable Agricultural Development	.39	.050	7.80	< .001	Supported
Resource Management → Rural Welfare	.21	.054	3.89	< .001	Supported
Decision-Making Quality → Sustainable Agricultural Development	.28	.048	5.83	< .001	Supported
Decision-Making Quality → Rural Welfare	.19	.052	3.65	< .001	Supported
Sustainable Agricultural Development → Rural Welfare	.42	.058	7.24	< .001	Supported

As reported in Table 5, all hypothesized direct relationships in the structural model were positive and statistically significant. Government smart financial management policies had a strong positive direct effect on resource management ($\beta = .61, p < .001$), indicating that more transparent, targeted, timely, digitally supported, and data-driven government financial policies were associated with substantially more effective use and allocation of agricultural resources. Smart financial management also had a strong direct effect on decision-making quality ($\beta = .56, p < .001$), suggesting that better financial information systems, improved policy targeting, monitoring mechanisms, and more predictable financial support facilitate systematic, evidence-based, and risk-sensitive decision-making at the agricultural and rural level. In addition, government smart financial management directly predicted sustainable agricultural development ($\beta = .24, p < .001$) and rural welfare ($\beta = .18, p < .001$). Although these direct coefficients were smaller than the effects of smart financial management on resource management and decision quality, they

remained statistically significant, indicating that financial policies can generate both immediate and mechanism-based developmental effects. Resource management had a relatively strong direct effect on sustainable agricultural development ($\beta = .39, p < .001$) and a significant direct effect on rural welfare ($\beta = .21, p < .001$). Decision-making quality also positively predicted sustainable agricultural development ($\beta = .28, p < .001$) and rural welfare ($\beta = .19, p < .001$). Finally, sustainable agricultural development had a substantial direct effect on rural welfare ($\beta = .42, p < .001$), demonstrating that improvements in agricultural productivity, resilience, environmental stewardship, and continuity of production were strongly associated with greater household income stability, employment security, economic resilience, and perceived quality of rural life. Overall, the pattern of coefficients supports a multi-stage mechanism in which smart governmental financial management strengthens rural welfare not only directly, but also by improving resource allocation, decision quality, and sustainable agricultural development.

Table 6

Indirect, Total, and Explained Effects of the Structural Model

Effect	Indirect β	Direct β	Total β	95% Bootstrap CI	p
Smart Financial Management → Sustainable Agricultural Development through Resource Management	.24	.24	.48	[.17, .32]	< .001
Smart Financial Management → Sustainable Agricultural Development through Decision-Making Quality	.16	.24	.40	[.10, .22]	< .001
Smart Financial Management → Rural Welfare through Resource Management	.13	.18	.31	[.07, .19]	< .001
Smart Financial Management → Rural Welfare through Decision-Making Quality	.11	.18	.29	[.05, .17]	< .001
Smart Financial Management → Rural Welfare through Sustainable Agricultural Development	.10	.18	.28	[.05, .16]	< .001
Resource Management → Rural Welfare through Sustainable Agricultural Development	.16	.21	.37	[.10, .23]	< .001
Decision-Making Quality → Rural Welfare through Sustainable Agricultural Development	.12	.19	.31	[.07, .18]	< .001

The indirect-effect analysis presented in Table 6 provides further evidence that the influence of government smart financial management policies on sustainable agricultural development and rural welfare operates through several complementary mechanisms. The indirect effect of smart financial management on sustainable agricultural development through resource management was $\beta = .24$, with a 95% bootstrap confidence interval from .17 to .32, while the corresponding indirect effect through decision-making quality was $\beta = .16$, with a confidence interval from .10 to .22. Since neither confidence interval included zero,

both mediation effects were statistically significant. These findings indicate that a substantial part of the contribution of smart public financial management to agricultural sustainability arises because improved financial policies enhance the efficiency of resource allocation and facilitate better-quality agricultural and financial decisions. Similar mediation patterns were observed for rural welfare. Smart financial management exerted significant indirect effects on rural welfare through resource management ($\beta = .13$, 95% CI [.07, .19]), through decision-making quality ($\beta = .11$, 95% CI [.05, .17]), and through sustainable agricultural

development ($\beta = .10$, 95% CI [.05, .16]). Resource management also indirectly improved rural welfare through sustainable agricultural development ($\beta = .16$, 95% CI [.10, .23]), while decision-making quality exerted an indirect effect of $\beta = .12$ through sustainable agricultural development. These findings demonstrate that rural welfare is influenced by a chain of interconnected managerial and developmental processes rather than by financial policy alone. Smart financial policy improves resource allocation and decision quality; these in turn strengthen sustainable agricultural development; and sustainable agricultural development ultimately produces higher levels of income stability, livelihood resilience, employment security, and socioeconomic well-being among rural households.

The explanatory capacity of the structural model was also substantial. Government smart financial management policies explained 37.2% of the variance in resource management and 31.4% of the variance in decision-making quality. Smart financial management, resource management, and decision-making quality jointly explained 63.8% of the variance in sustainable agricultural development. When sustainable agricultural development was added to the predictors of rural welfare, the full model explained 57.6% of the variance in rural welfare. These coefficients of determination indicate moderate to strong explanatory power and suggest that the proposed framework captures a meaningful proportion of the variation in agricultural sustainability and rural socioeconomic well-being within Lorestan Province. Among the mechanisms examined, resource management emerged as the most influential immediate predictor of sustainable agricultural development, whereas sustainable agricultural development was the strongest immediate predictor of rural welfare. Therefore, the empirical findings support the central proposition of the study that the effectiveness of government smart financial management depends not merely on the quantity of financial resources allocated to agriculture, but on the intelligence, transparency, targeting, timing, monitoring, and decision-oriented management of those resources. The findings further indicate that policies capable of connecting financial allocation with efficient resource governance and evidence-based decision processes are substantially more likely to generate durable improvements in agricultural sustainability and rural welfare.

4. Discussion and Conclusion

The present study evaluated the impact of government smart financial management policies on sustainable agricultural development and rural welfare in Lorestan Province through the mechanisms of resource management and decision-making quality. The findings showed that government smart financial management policies had significant positive effects on resource management, decision-making quality, sustainable agricultural development, and rural welfare. Resource management and decision-making quality also significantly predicted sustainable agricultural development and rural welfare, while sustainable agricultural development emerged as the strongest direct predictor of rural welfare. In addition, the mediation analysis indicated that the effects of smart financial management on sustainable agricultural development and rural welfare were transmitted partly through improved resource management and decision-making quality. These findings confirm that public financial policy is more effective when it is not limited to the allocation of financial resources but is accompanied by intelligent targeting, transparent monitoring, evidence-based decision-making, and systematic management of scarce agricultural resources.

One of the most important findings was the strong positive effect of government smart financial management policies on resource management. This result suggests that when financial policies are transparent, timely, targeted, digitally supported, and based on reliable information, they improve the allocation and utilization of financial, water, land, labor, technological, and production resources. This finding is consistent with the broader public financial management literature, which emphasizes that effective financial governance depends on strategic resource allocation, accountability, transparency, and operational efficiency (Kristensen et al., 2019). From this perspective, smart financial management can reduce the gap between policy design and resource utilization by linking financial allocations to actual agricultural needs and measurable performance. The finding is also consistent with the emphasis on fiscal sustainability and resilience, according to which limited public resources must be directed toward interventions capable of generating sustainable long-term benefits under conditions of scarcity (Oecd, 2024). In agriculture, where resource constraints are often severe and where producers face environmental and market uncertainties, a more intelligent allocation mechanism can

help ensure that scarce financial support is directed toward high-priority production and sustainability needs.

The significant effect of smart financial management on decision-making quality provides further support for the role of data-driven and technology-supported financial systems. The findings indicated that better government financial management was associated with higher-quality decisions characterized by more systematic prioritization, risk assessment, forecasting, and use of reliable information. This finding is strongly aligned with studies emphasizing the role of big data and smart service systems in agricultural finance. Wu showed that the use of big data technology can improve the precision and effectiveness of agricultural policy finance and strengthen financial services for rural revitalization (Wu, 2022). Similarly, intelligent agricultural credit systems based on blockchain and digital technologies have been proposed as mechanisms for improving transparency, traceability, risk assessment, and loan-management efficiency (Kumari et al., 2025). These studies support the present finding that financial intelligence is not merely an administrative innovation, but a decision-support mechanism that can improve how agricultural financial resources are prioritized, allocated, and monitored.

The results also showed that government smart financial management had a significant direct effect on sustainable agricultural development. This finding implies that better financial governance can contribute to economic, environmental, and social sustainability by supporting productivity, resilience, technological modernization, efficient input use, environmental protection, and continuity of agricultural activities. This result is consistent with international evidence regarding the relationship between digital finance and green agricultural development. Guo et al. found that digital inclusive finance contributes positively to agricultural green development by improving financial accessibility and facilitating more efficient resource allocation (Guo et al., 2024). Ma et al. similarly demonstrated that digital inclusive finance can promote green agricultural development by strengthening financing conditions, innovation capacity, and the adoption of sustainable practices (Ma et al., 2024). Pei and Pei also emphasized that digital rural development and digital inclusive finance can facilitate green agricultural transformation (Pei & Pei, 2025). These findings support the argument that digitally enabled and intelligently managed financial systems can create conditions in which producers are better able to invest in sustainable technologies and more efficient production methods.

The positive effect of smart financial management on sustainable agricultural development also corresponds with the emerging concept of coordinated interaction between government intervention, market mechanisms, and digital finance. Jiang et al. emphasized the importance of coupling coordination between digital inclusive finance and sustainable agricultural development and argued that a dynamic balance between proactive government and effective markets is necessary for sustainable outcomes (Jiang et al., 2026). The present findings extend this perspective by showing that the quality of government financial management itself is an important upstream determinant of sustainable agricultural development. The result also aligns with evidence on the co-evolution of digital inclusive finance and green finance, which suggests that financial modernization and sustainability-oriented financing can reinforce agricultural green development (Wang et al., 2025). Therefore, government financial management that integrates digital monitoring, targeted support, and sustainability criteria may operate as an important institutional driver of agricultural transformation.

The direct positive effect of smart financial management on rural welfare was also statistically significant, although its magnitude was smaller than the effects on resource management and decision-making quality. This pattern suggests that public financial policies can improve rural welfare directly, but a substantial proportion of their welfare impact occurs through intermediate agricultural and managerial mechanisms. This finding is consistent with Iranian research showing that monetary and financial policies influence farmers' welfare by affecting credit conditions, production costs, investment capacity, and purchasing power (Karimi Khorrami & Azizi, 2023). Similarly, Lotfi et al. reported that monetary policy influences rural welfare through channels related to household economic conditions and housing status (Lotfi et al., 2025). The present findings reinforce the idea that rural welfare is responsive to financial policy, while also demonstrating that the quality and intelligence of financial management are especially important because they influence how effectively financial resources are converted into livelihood improvements.

The relatively smaller direct coefficient between smart financial management and rural welfare is theoretically meaningful. Rural welfare is a complex outcome shaped by income stability, employment, household assets, access to services, housing conditions, market opportunities, inflation, production risks, and broader socioeconomic circumstances.

Consequently, financial policy is unlikely to influence welfare through a single direct pathway. Instead, the present mediation findings indicate that financial policy improves welfare partly by improving resource management, decision-making quality, and sustainable agricultural development. This interpretation is compatible with national evidence showing that agricultural support policies have implications for productivity, employment, and sectoral growth (Gholizadeh et al., 2020; Narouei & Mehrabi Basharabadi, 2014; Nematollahi et al., 2016). When financial support improves productivity, production stability, and employment, rural households are more likely to experience sustainable welfare gains.

Another key finding was the strong positive effect of resource management on sustainable agricultural development. Among the immediate predictors of sustainable agricultural development, resource management had the strongest standardized effect. This result indicates that sustainable agriculture is fundamentally dependent on the efficient use and allocation of scarce productive resources. Financial support alone cannot ensure sustainability if land, water, capital, labor, energy, and technology are not managed efficiently. The finding is consistent with the governance literature showing that institutional quality and effective governance contribute to agricultural productivity by improving incentives, coordination, and resource utilization (Liu & Lio, 2008). It is also consistent with research on governance components in Iran's agricultural sector, which emphasizes economic, political, social, and environmental dimensions of effective agricultural governance (Ronaghi et al., 2019). Therefore, the present findings suggest that the success of agricultural financial policies should be evaluated partly according to whether they improve the efficiency and sustainability of resource use.

The importance of resource management is particularly relevant in Lorestan Province, where agricultural activities are highly dependent on natural and productive resources and where the rural economy remains closely linked to farming, livestock, and horticultural production. Provincial agricultural statistics indicate that Lorestan has substantial agricultural capacity but also faces structural constraints associated with production resources, investment, and infrastructure (Lorestan Province & Planning, 2022). National rural indicators likewise reveal continuing challenges in income, employment, services, and livelihood security in rural areas (Statistical Research Center of, 2021). In such a context, improvements in financial management

are most likely to produce sustainable outcomes when they are explicitly linked to efficient water use, better land management, technological upgrading, productive investment, and resource-saving agricultural practices.

Decision-making quality also had a significant positive effect on sustainable agricultural development. This finding indicates that evidence-based, systematic, and risk-sensitive decision processes are essential for converting financial and productive resources into sustainable outcomes. Agriculture is characterized by uncertainty arising from climate variability, market fluctuations, input prices, production risks, and changing policy conditions. Under these circumstances, higher-quality decision-making can help farmers and institutions prioritize investments, manage risk, and allocate resources more effectively. The significance of this pathway is consistent with the role of digital finance and smart technologies in improving information availability and financial decision support (Kumari et al., 2025; Wu, 2022). It is also related to the role of financial literacy in agricultural entrepreneurship. Mohammadi Khiyareh and Zivary found that financial literacy is important for agricultural entrepreneurial performance and supports more effective financial decision-making (Mohammadi Khiyareh & Zivary, 2025). Thus, intelligent financial systems are likely to be more effective when beneficiaries also possess the knowledge and decision capacity required to use financial resources productively.

Both resource management and decision-making quality also had significant direct effects on rural welfare. These findings imply that welfare improvement depends not only on the amount of financial support received but on the capacity of households and institutions to manage resources and make effective economic decisions. More efficient use of production inputs can increase profitability and reduce unnecessary expenditure, while better decisions can improve investment outcomes, risk management, and income stability. This interpretation is compatible with findings showing that government support and macroeconomic policies influence agricultural employment, productivity, and growth (Gholizadeh et al., 2020; Narouei & Mehrabi Basharabadi, 2014; Nematollahi et al., 2016). It also supports the argument that improved financial literacy and managerial capability can strengthen agricultural entrepreneurship and household economic resilience (Mohammadi Khiyareh & Zivary, 2025).

Sustainable agricultural development had the strongest direct effect on rural welfare, which is one of the most important findings of the study. This result demonstrates that

improvements in productivity, environmental sustainability, resilience, technological capacity, and continuity of agricultural production are strongly associated with improvements in household income stability, employment, economic security, and overall rural well-being. This finding is logical because in agriculture-dependent rural communities, household welfare is closely tied to the long-term viability of agricultural production. If agricultural development is environmentally unsustainable or economically unstable, any short-term increase in income may be temporary. By contrast, sustainable agricultural systems can create more durable employment, stable production, improved resource security, and reduced vulnerability to economic and environmental shocks. The result is consistent with the broader international literature linking green agricultural transformation to financial innovation and rural development (Guo et al., 2024; Ma et al., 2024; Pei & Pei, 2025).

The mediation results provide an especially important contribution to the study. Resource management and decision-making quality significantly mediated the relationship between smart financial management and sustainable agricultural development, while resource management, decision-making quality, and sustainable agricultural development mediated the relationship between smart financial management and rural welfare. This pattern confirms that the effects of public financial policy are sequential and mechanism-based. Financial policies first influence the quality of resource allocation and decision processes, which then shape agricultural sustainability, and sustainable agricultural development ultimately influences household welfare. This finding is consistent with the public financial management principle that the effectiveness of government expenditure depends on the chain linking strategic allocation to operational performance and final outcomes (Kristensen et al., 2019). It also reflects the dynamic coordination perspective proposed in recent research on digital finance and agricultural sustainability (Jiang et al., 2026).

The explanatory power of the model further supports the importance of the proposed framework. Smart financial management explained a substantial proportion of variance in resource management and decision-making quality, while the combined predictors explained a large proportion of sustainable agricultural development and rural welfare. This suggests that the model captures meaningful institutional and managerial determinants of agricultural and rural outcomes. The findings reinforce the concept that financial

management should not be evaluated solely through traditional fiscal indicators. Smart financial governance must be judged according to whether it improves resource efficiency, decision quality, sustainability, and welfare. This perspective is compatible with emerging approaches to smart financial management that emphasize competitiveness, digitalization, transparency, and adaptive resource allocation (Taghipour, 2025).

From a broader governance perspective, the findings also emphasize the importance of institutional quality in agricultural development. The positive relationships among financial management, resource management, decision-making, and sustainability are consistent with evidence that good governance contributes to improved agricultural productivity and development outcomes (Liu & Lio, 2008). Iranian research has likewise emphasized that agricultural governance includes interconnected economic, social, political, and environmental dimensions (Ronaghi et al., 2019). Thus, smart financial management should be viewed as part of a broader governance architecture rather than as an isolated financial intervention. Its effectiveness depends on institutional coordination, accountability, data quality, local participation, and the ability to translate financial decisions into productive action.

The results also have particular relevance to the socioeconomic structure of rural Iran. Census and rural monitoring data show that rural communities continue to face structural challenges related to employment, income security, service access, and economic vulnerability (Statistical Center of, 2016; Statistical Research Center of, 2021). In such settings, financial interventions that merely increase nominal credit or subsidies without improving allocation efficiency may have limited long-term welfare effects. The present findings suggest that intelligent and evidence-based financial management can generate stronger outcomes when it is integrated with resource governance and decision support. This is particularly important in Lorestan, where agricultural development remains central to rural livelihoods and where better financial targeting could contribute simultaneously to productivity, resilience, environmental sustainability, and household welfare (Lorestan Province & Planning, 2022).

Overall, the findings support an integrated interpretation of agricultural financial policy. Smart financial management strengthens the agricultural sector not simply because it increases access to financial resources, but because it can improve the quality of allocation, monitoring, prioritization, and decision-making. These improvements enhance

resource efficiency and sustainable agricultural development, which in turn contribute to rural welfare. The results therefore support the view that future agricultural financial policies should be designed as intelligent resource-governance systems rather than conventional distributive programs. Digital finance, green finance, data analytics, transparent monitoring, and evidence-based allocation can be combined to create a more responsive and sustainable financial architecture for agriculture (Guo et al., 2024; Jiang et al., 2026; Wang et al., 2025).

The present study has several limitations that should be considered when interpreting the findings. First, the cross-sectional research design limits the ability to establish definitive causal relationships among smart financial management, resource management, decision-making quality, sustainable agricultural development, and rural welfare. Although the structural model was theoretically grounded and the observed relationships were statistically significant, longitudinal evidence would be required to determine how these relationships evolve over time. Second, the study relied on self-reported questionnaire data, which may be influenced by recall bias, social desirability, and individual differences in the perception of government policies and welfare conditions. Third, the study was conducted only in Lorestan Province, and therefore the findings may not be fully generalizable to provinces with different climatic, agricultural, institutional, socioeconomic, or financial characteristics. Fourth, although the model explained a substantial proportion of variance in the main outcomes, other potentially important variables such as farm size, market access, environmental risk, digital infrastructure, institutional trust, household assets, and local implementation capacity were not explicitly modeled. Finally, the assessment focused on farmers' and rural households' perceptions and did not incorporate administrative financial records or objective indicators of government expenditure and agricultural performance.

Future studies are recommended to use longitudinal or panel designs to examine the dynamic effects of smart financial management policies on agricultural sustainability and rural welfare over multiple years. Comparative research across different provinces could determine whether the proposed relationships vary according to agricultural structure, climate, rural poverty, infrastructure, or institutional capacity. Future models could incorporate additional mediating and moderating variables such as financial literacy, digital literacy, institutional trust, access to markets, farm size, climate vulnerability, and participation

in agricultural organizations. It would also be useful to combine survey data with objective administrative indicators, including the volume and timing of agricultural credit, subsidy distribution, insurance coverage, productivity, water-use efficiency, household income, and employment. Experimental or quasi-experimental evaluations of specific smart financial programs could provide stronger causal evidence. In addition, future research could apply machine-learning, multi-criteria decision-making, system dynamics, or optimization methods to develop operational decision-engineering models for prioritizing agricultural financial allocations under resource constraints.

From a practical perspective, policymakers should develop integrated smart financial management systems that connect agricultural budgeting, credit, subsidies, insurance, investment support, and performance monitoring within a unified data-driven framework. Financial support should be targeted according to measurable agricultural needs, resource constraints, sustainability indicators, and household vulnerability rather than being distributed primarily through uniform or administratively fragmented mechanisms. Provincial decision-makers should strengthen digital information systems capable of monitoring the destination, timing, utilization, and outcomes of public financial resources. Particular priority should be given to financing projects that improve water-use efficiency, resource productivity, sustainable mechanization, climate resilience, green technologies, and value-chain development. Financial support should also be accompanied by advisory services, financial literacy training, and decision-support tools so that farmers can use allocated resources more effectively. Finally, evaluation systems should assess agricultural financial policies not only according to expenditure volume or loan disbursement but also according to measurable improvements in resource efficiency, sustainable production, income stability, employment, livelihood resilience, and rural welfare.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Acknowledgments

We would like to express our gratitude to all individuals helped us to do the project.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethics Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were considered.

References

- Gholizadeh, H., Norouzi, Q., & Feiz Abadi, Y. (2020). Investigating the Effect of Government Macroeconomic Policies on Employment Development in the Agricultural Sector. *Entrepreneurship Strategies in Agriculture*, 7(41), 45-60.
- Guo, J., Chen, L., & Kang, X. (2024). Digital Inclusive Finance and Agricultural Green Development in China: A Panel Analysis (2013–2022). *Finance Research Letters*, 69(Part A), 106173. <https://doi.org/10.1016/j.frl.2024.106173>
- Jiang, D., Xiong, C., & Hu, S. (2026). Coupling Coordination between Digital Inclusive Finance and Agricultural Sustainable Development: A Dynamic Balance Perspective from China's Proactive Government and Effective Market. *Frontiers in Sustainable Food Systems*, 10, 1857482. <https://doi.org/10.3389/fsufs.2026.1857482>
- Karimi Khorrami, A., & Azizi, A. (2023). *Examining the Impact of Monetary Policies on Farmers' Welfare* 7th Conference on Economic and Management Studies in the Islamic World, Tehran, Iran.
- Kristensen, J. K., Bowen, M., Long, C., Mustapha, S., & Zrinski, U. (2019). *PEFA, Public Financial Management, and Good Governance*. World Bank Group. <https://doi.org/10.1596/978-1-4648-1466-2>
- Kumari, A., Joshi, P., Mehta, L., & Goratela, M. (2025). *AgriCredit-360: Blockchain-Enabled Intelligent Loan Management Scheme for Sustainable Agriculture* 2025 1st International Conference on Data Science and Intelligent Network Computing (ICDSINC), Raipur, India.
- Liu, M., & Lio, M. (2008). Governance and Agricultural Productivity: A Cross-National Analysis. *Food Policy*, 33(6), 504-512.
- Lorestan Province, M., & Planning, O. (2022). *Statistical Yearbook of Agriculture in Lorestan Province, 2022*.
- Lotfi, Y., Shakeri, A., Mohammadi, T., & Ghafari, F. (2025). Investigating the Impact of Monetary Policies on Rural Welfare in Iran with an Approach to Examining Housing Status. *Iranian Journal of Economic Research*, 29(4), 125-152.
- Ma, Z., Liu, Z., Zhang, P., & Wei, X. (2024). Analysis of the Impact of Digital Inclusive Finance on the Development of Green Agriculture. *Agronomy*, 14(12), 2777. <https://doi.org/10.3390/agronomy14122777>
- Mohammadi Khiyareh, M., & Zivary, M. (2025). Exploring the Role of Financial Literacy in Agricultural Entrepreneurship: A Case Study of Golestan Province. *Village and Development*, 27(4), 103-134. <https://doi.org/10.30490/rvt.2025.367406.1654>
- Narouei, M., & Mehrabi Basharabadi, H. (2014). Investigation of the Effect of Government Support Policies on Agricultural Sector Productivity in Iran: Panel Data Approach. *Majlis and Rahbord Quarterly*, 22(83), 125-149.
- Nematollahi, Z., Fakouri, N., Shahpoori, A., & Ashke Torab, N. (2016). *Do Government Support Policies Affect Iran's Agricultural Growth?* 10th Biennial Conference on Agricultural Economics of Iran, Kerman, Iran.
- Oecd. (2024). *Fiscal Sustainability of Health Systems: How to Finance More Resilient Health Systems When Money Is Tight?*
- Pei, W., & Pei, W. (2025). Digital Rural Development, Green Agricultural Transformation, and Digital Inclusive Finance. *Finance Research Letters*, 86(Part G), 108879. <https://doi.org/10.1016/j.frl.2025.108879>
- Ronaghi, M., Kohansal, M. R., & Ghorbani, M. (2019). Determination of Governance Components in Economic, Political, Social and Environmental Areas in Iran's Agricultural Sector. *Agricultural Economics and Development*, 33(2), 125-149. <https://doi.org/10.22067/jead2.v0i0.78364>
- Statistical Center of, I. (2016). *Detailed Results of the 2016 General Population and Housing Census*.
- Statistical Research Center of, I. (2021). *Monitoring Report on Socio-Economic Indicators of Rural Areas in Iran*.
- Taghipour, S. (2025). *Smart Financial Management and Its Role in Increasing the Competitive Power of Businesses* 13th International Conference on Management, Accounting and Economics in Sustainable Development, Mashhad, Iran. <https://civilica.com/doc/2526635>
- Wang, X., Li, Y., & Zhang, T. (2025). Dual-Wheel Drive and Agricultural Green Development: The Co-Evolution and Impact of Digital Inclusive Finance and Green Finance. *Sustainability*, 17(20), 9167. <https://doi.org/10.3390/su17209167>
- Wu, Y. (2022). The Path of Agricultural Policy Finance in Smart Service for Rural Revitalization under Big Data Technology. *Mobile Information Systems*, 2022, 9113683. <https://doi.org/10.1155/2022/9113683>