

Assessing the Current Status of Components and Requirements of the Pluralistic Agricultural Extension System in Iran

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ABSTRACT

While the limitations of Iran's centralized agricultural extension system are well-documented, there is a critical lack of a prioritized, evidence-based framework to guide the transition toward a functional pluralistic model. This study was designed to critically assess the status of the key components and requirements for establishing a pluralistic agricultural extension system in Iran. Employing a quantitative, descriptive-survey design, this research targeted a statistical population of senior extension managers and experts nationwide (N=227). Based on Bartlett et al.'s (2001) table, a sample size of 155 was required. To mitigate non-response bias, 170 participants were initially recruited through simple random sampling via a random number generator. A total of 155 valid questionnaires were obtained, representing a 91.2% response rate. Data were collected using a researcher-developed questionnaire and were analyzed through one-sample t-tests and the Friedman test. Findings revealed a paradoxical picture. While three components—"content and subjects," "organizational structure," and "audiences"—were assessed above average, the system faces substantial deficiencies. Eight other components, including "approaches," "policies and strategies," and "financial resources," along with nine of the ten fundamental requirements, such as "networking and coordination among actors" and "reduction of government intervention," were rated below average level. The "approaches" component and its corresponding requirement, "attention to diverse extension approaches," received lowest ranks. These findings reveal a profound implementation gap between the envisioned goals of a pluralistic extension system and its operational realities in Iran, where systemic weaknesses in policy, financing, and coordination jeopardize the transition. By providing the first systematic mapping of readiness and requirements for pluralistic extension in a highly centralized context, this study contributes both a theoretical understanding of transition barriers and a strategic diagnostic framework for policymakers to restructure agricultural governance toward a collaborative innovation ecosystem.

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Keywords: Pluralistic, Agricultural Extension, Component, Requirements, Institutional Coordination, Agricultural Innovation Systems.

INTRODUCTION

In response to a multitude of environmental, economic, and social challenges within the agricultural sector, the global shift towards sustainable food systems has become an imperative (IFPRI, 2021). Central to this transition is the evolution of Agricultural Extension and Advisory Services (AEAS), which have moved beyond traditional technology transfer to encompass complex functions such as education, facilitation, consultation, and networking (Swanson, 2008; Blum et al., 2020; Davis et al., 2020; Cristóvão et al., 2012; Piñeiro et al., 2020). However, the rapid transformations in agriculture—from climate change to the increasing complexity of value chains—have rendered traditional, centralized, and one-way extension models largely inadequate (Roy, 2018; Klerkx, 2020; Rivera & Sulaiman, 2009).

This inefficiency necessitates a transition toward multi-actor and participatory models, most notably the pluralistic agricultural extension system. Such a system emphasizes the diversity of service providers and fosters synergy through the collaboration of public, private, and civil society sectors (Faure et al., 2012; Klerkx, 2020). By leveraging the synergistic capacities of diverse stakeholders, pluralistic models can achieve significantly higher levels of effectiveness and efficiency than traditional state-led extension systems (Osmanpour et al., 2025).

The theoretical “promise” of such pluralistic systems is well-supported by empirical evidence from diverse global contexts. When properly structured, these systems can enhance agricultural productivity and innovation through enhanced coordination and social synergy (AFAAS, 2020). For instance, studies in Brazil have demonstrated that a pluralistic approach can lead to increased effectiveness, farmer satisfaction, and improved economic status (Junior & Filho, 2024), while experiences in Ethiopia highlight the importance of institutional and policy coordination among diverse actors (AFAAS, 2020). Similarly, research in Ghana and Mozambique underscores the vital role of understanding farmers’ perceptions and the facilitating role of various actors in boosting productivity (Egyir Baah, 2017; Gêmo et al., 2013). In Malawi, the success of such systems has been closely linked to social factors and local governance structures that enhance coordination among actors (Chowa et al., 2013; Masangano & Mthinda, 2012).

Furthermore, in Tanzania, the effectiveness of advisory services is heavily influenced by their responsiveness, ease of access, and adaptability to local needs (Goodluck et al., 2024). However,

this potential for success is frequently countered by the “perils” of institutional and structural implementation. A critical synthesis of the literature suggests that pluralism does not inherently guarantee effectiveness; rather, its success is contingent upon robust regulatory mechanisms, efficient coordination, and competent human resources (Klerkx, 2020; Birner et al., 2009).

In many developing countries, the transition is often impeded by a lack of supportive policies, institutional misalignment, insufficient funding, and weaknesses in inclusivity (Faure et al., 2016; Barrantes-Bravo et al., 2017). Even in highly pluralistic environments, a lack of institutional coordination and limited joint capacity-building can significantly reduce system impact (Knierim et al., 2017; Ragasa et al., 2016). Moreover, without reformative interventions, these systems may fail to deliver equitable benefits, particularly to smallholder farmers who may not fully benefit from existing structures (Chowa et al., 2013; Ongayo et al., 2016). This tension between theoretical potential and practical implementation is particularly acute in Iran. While efforts to implement pluralistic systems have increased, the Iranian extension landscape remains predominantly dominated by government institutions, with the participation of private organizations, cooperatives, and farmer associations being limited and scattered (Karami et al., 2017). Recent reviews indicate that despite relatively favorable information exchange linkages, weaknesses in coordination, low social cohesion, and the marginalization of non-governmental organizations continue to hinder the formation of a cohesive system (Alimirzaei et al., 2019; Alizadeh et al., 2018). Furthermore, obstacles such as structural centralization, weak inter-sectoral coordination, a shortage of trained human resources, and the lack of sustainable performance evaluation frameworks have prevented the full realization of the pluralistic model in the country (Sulaiman & Davis, 2012; Anderson, 2008).

Despite the growing body of literature on the benefits and challenges of pluralistic extension globally, research within the Iranian context has remained largely descriptive or qualitative, focusing primarily on identifying general barriers such as weak coordination and the dominance of government institutions (Alimirzaei et al., 2019; Karami et al., 2017). While these studies have provided valuable insights into the obstacles facing the current system, they have failed to offer a structured and systematic taxonomy of the essential components (e.g., service quality, accessibility, and actor diversity) and requirements (e.g., regulatory frameworks, human resource capacity, and technological platforms) necessary for a successful transition. Consequently, there is a lack of quantitative evidence that ranks these elements in order of their current status and

importance within Iran's unique institutional landscape. This absence of a prioritized, evidence-based framework leaves policymakers without a clear roadmap for implementing reformative interventions.

To address this critical knowledge gap, the present study moves beyond mere problem identification to provide a comprehensive and quantitative evaluation of the systemic components and requirements of Iran's pluralistic agricultural extension system. This absence currently impedes the formulation of evidence-based policies required for an effective transition and undermines efforts to enhance agricultural sustainability. By systematically assessing and ranking these elements from the perspective of extension experts, this research contributes a novel, prioritized framework that can guide the structural and process-oriented reforms needed for a more effective and inclusive extension model. Specifically, this research seeks to answer two primary questions:

(1) What is the current status of key systemic components and requirements as perceived by extension experts? and

(2) How do these components and requirements rank in terms of their current standing?

"The objective of this study is to examine the components and requirements of a pluralistic agricultural extension system. These variables were systematically identified through a multi-round Delphi process (Osmanpour et al., 2023), which integrated theoretical insights from Theoretical Framework and Literature Review and Agricultural Innovation Systems (AIS) with expert consensus to ensure a robust and context-specific conceptual framework."

The Pluralistic Extension System in Iran

Iran's agricultural extension system, much like in many developing nations, has undergone significant institutional and paradigmatic transformations over the past several decades (Hadadi et al., 2024). This evolution mirrors a global shift in agricultural governance, moving from a "technology transfer" paradigm towards "agricultural innovation systems" (Klerkx and Gildemacher, 2012). Until the late 1990s, extension services were primarily delivered through a centralized, state-driven system based on the technology transfer model, wherein the government, as the dominant actor, was responsible for the production, organization, and dissemination of knowledge and technology to users (AREEO, 2004). Although this model played a crucial role in increasing agricultural production and the adoption of technologies during its time, its

inefficiencies gradually became apparent due to the increasing complexity of production systems, the diverse needs of users, limitations in state resources, the expansion of agricultural markets, and the necessity to address emerging challenges. In response to these developments, reform policies were initiated in the agricultural sector in the early 2000s, aiming to reduce government intervention, delegate certain specialized services to the non-governmental sector, and leverage the capabilities of agricultural graduates (Ministry of Jihad Agriculture, 2015). Consequently, the scheme for employing agricultural supervising engineers and subsequently, the network of agricultural consultancy and technical engineering companies were established, marking the initial practical steps towards the partial privatization of extension services and the diversification of service providers (Osmanpour, 2024). These operational transformations coincided with theoretical shifts at the international level. While the Agricultural Knowledge and Information System (AKIS) framework emphasized strengthening linkages among research, education, extension, and users, and managing knowledge flow, the emergence of the Agricultural Innovation System (AIS) approach broadened these interactions. AIS posited innovation as a result of network collaboration among a diverse array of actors, including governmental bodies, private enterprises, academia, agricultural associations, companies, NGOs, and farmers themselves. This paradigmatic shift provided the necessary theoretical groundwork for transitioning from monopolistic state-run systems to pluralistic agricultural extension systems. In these systems, the government is no longer solely a service provider but rather assumes the roles of policymaker, regulator, coordinator, and facilitator of interactions among various actors (Osmanpour, 2024).

In Iran, this change in perspective was formally implemented with the development and execution of the regulation for the New Agricultural Extension System in 2015 (Ministry of Jihad Agriculture, 2015). This regulation, for the first time, recognized the concept of pluralism as a fundamental principle for the delivery of extension services. It emphasized the simultaneous utilization of capacities from governmental agencies, consultancy companies, the private sector, cooperatives, the Agricultural and Natural Resources Engineering Organization, universities, research centers, producer associations, progressive farmers, and other actors within the agricultural innovation system (Osmanpour et al., 2023). Within this framework, achieving a pluralistic agricultural extension system necessitates the establishment of effective mechanisms for institutional coordination, role and responsibility division, enhanced participation, strengthened learning networks, and the implementation of multi-actor governance—an issue that

continues to be a primary challenge for Iran's agricultural extension system (Osmanpour et al., 2025). From this perspective, the present study was conducted with the objective of evaluating the current status and readiness of Iran's agricultural extension system in its transition towards a pluralistic agricultural extension system. It seeks to identify and elucidate the most significant components and requirements for this transition from the viewpoint of extension managers, policymakers, and experts.

MATERIALS AND METHODS

This study employed a quantitative, descriptive-survey research design to fulfill its applied purpose. The research aimed to assess the current status of the components, and requirements of a pluralistic agricultural extension system and to rank them based on their perceived importance. The statistical population consisted of all extension managers in provincial agricultural organizations, heads of extension coordination departments, and the heads and deputies of relevant offices at the Agricultural Education and Extension Institute (N = 227). The Sampling Frame was compiled by the Agricultural Education and Extension Institute, serving as the official authority for managing and guiding the country's agricultural extension system. This population was selected deliberately as these public-sector managers constitute the institutional core responsible for implementing extension policies. Based on the sample size table provided by Bartlett et al.'s (2001), and applying a 95% confidence level and a 5% margin of error, a minimum sample size of 155 was determined to be required. To mitigate potential non-response bias, 170 participants were initially recruited through simple random sampling via a random number generator. Ultimately, 155 valid questionnaires were obtained, yielding a response rate of 91.2%. The data collection tool was a researcher-made questionnaire developed through an integrated approach, utilizing the findings from the qualitative phase (conducted via Delphi technique and Grounded Theory). The questionnaire comprised four sections: (1) respondents' socio-professional characteristics; (2) components³ (12 items); and (3) requirements⁴ (29 items), all measured on a five-point Likert scale (from "very low" to "very high"). To ensure the rigor of the instrument, the measurement models derived from the qualitative findings were validated using Partial Least Squares Structural

³. **Components:** Refers to the foundational structural elements and functional pillars within the pluralistic extension system that must be reconfigured based on pluralistic principles to foster agricultural development.

⁴. **Requirements:** Refers to the essential preconditions, policy frameworks, and operational standards that must be met to facilitate the successful transition and implementation of a pluralistic agricultural extension system.

Equation Modeling (PLS-SEM) with a variance-based approach via SmartPLS 4 software. Construct validity and reliability were rigorously assessed. Convergent validity was confirmed through factor loadings > 0.5, Average Variance Extracted (AVE) > 0.5, and both Cronbach's Alpha and Composite Reliability (CR) > 0.7. Discriminant validity was established using the Fornell-Larcker criterion, ensuring that the square root of the AVE for each construct exceeded its correlation coefficients with other constructs. In addition, the reliability coefficient (Cronbach's alpha) was examined using data obtained from a pilot study involving a small, representative sample of the target population, and an acceptable value of 0.70 was obtained. Data analysis was performed using SPSS version 26 and SmartPLS 4. In the descriptive statistics section, mean and standard deviation were calculated. In the inferential statistics section, a one-sample t-test was used to compare the current status of each component and requirement with the scale midpoint (3.0, on a 1–5 scale). Additionally, the Friedman test was employed for ranking.

RESULTS

Individual and Professional Characteristics of Respondents

The demographic and professional profiles of the respondents are summarized in Table 1. Overall, the majority of the participants were males (58.1%) with a master's degree (61.3%). Most respondents fell within the 41–50 age group (56.1%) and possessed between 21 to 30 years of work experience (47.1%). In terms of academic background, approximately one-third (32.6%) were specialized in Agricultural Extension and Education.

Table 1. Demographic and Professional Profile of the Respondents (n=155).

Characteristic	Category	Frequency (nnn)	Percentage (%)
Age (years)	30–40	18	11.6
	41–50	87	56.1
	51–60	47	30.3
	> 60	3	1.9
	Mean (SD)	47.8 (1.6)	
	Range (Min–Max)	32–64	
Gender	Male	90	58.1
	Female	65	41.9
Education Level	Bachelor's	28	18.1
	Master's	95	61.3
	Doctorate	32	20.6
Work Experience (years)	< 10	7	4.5
	11–20	67	43.2
	21–30	73	47.1
	> 30	8	5.2
	Mean (SD)	21.3 (7.2)	
	Range (Min–Max)	2–35	
Major	Agricultural Extension	49	32.6
	Other Agricultural fields	85	54.8
	Social Sciences & Mgmt	15	9.7
	Other	6	3.9

Comparative and Ranking Results of Components and Requirements of a Pluralistic Agricultural Extension System based on Current Status

A) Components of the Pluralistic Agricultural Extension System

To evaluate the current status of the components of the pluralistic agricultural extension system in Iran, a **one-sample t-test** was used. It is worth noting that since a 5-point Likert scale (from 1 = very low to 5 = very high) was used to measure the components, the value of **3**, which is the midpoint of the scale, was considered as the hypothetical mean (standard) for the comparisons.

According to the results presented in Table 1 (not included here), three components—**content and subjects**, **organizational structure**, and **audiences**—were evaluated **above the average level**. Eight components—**policies and strategies**, **information resources**, **approaches**, **communication methods and channels**, **financial resources**, **agricultural extension agents**, **institutional relations and surrounding environment**, and **program monitoring and evaluation methods**—were found to be **below the average level**. One component, **methods of organization and management**, was at the **average level**.

Ultimately, the overall status of the components of the pluralistic agricultural extension system in Iran was evaluated as being **below the average level** (Table 2).

Table 2. Results of the current status assessment of the components of a pluralistic agricultural extension system in Iran. Agricultural Extension System in Iran.

<i>Component</i>	<i>Mean</i>	<i>t-statistic</i>	<i>Significance Level</i>	<i>Mean Difference</i>	<i>Status</i>
<i>Policies and strategies</i>	2.52	-6.829	0.001	-0.477	Below average
<i>Content and subjects</i>	3.28	3.661	0.001	0.277	Above average
<i>Information resources</i>	2.84	-2.194	0.030	-0.161	Below average
<i>Approaches</i>	2.03	-14.744	0.001	-0.968	Below average
<i>Methods and communication channels</i>	2.52	-7.105	0.001	-0.484	Below average
<i>Audiences</i>	3.30	4.079	0.001	0.297	Above average
<i>Organization and management approach</i>	3.14	1.720	0.087	0.135	Average
<i>Financial resources</i>	2.63	-5.229	0.001	-0.368	Below average
<i>Organizational structure</i>	3.23	3.170	0.002	0.226	Above average
<i>Extension agents</i>	2.64	-5.188	0.001	-0.361	Below average
<i>Institutional relations and surrounding environment</i>	2.68	-4.071	0.001	-0.323	Below average
<i>Monitoring and evaluation methods</i>	2.45	-7.689	0.001	-0.555	Below average
<i>Overall components</i>	2.77	-4.675	0.001	-0.230	Below average

To better illustrate the findings, the results presented in the above table are also shown in a radar chart (spider diagram) (Figure 1).

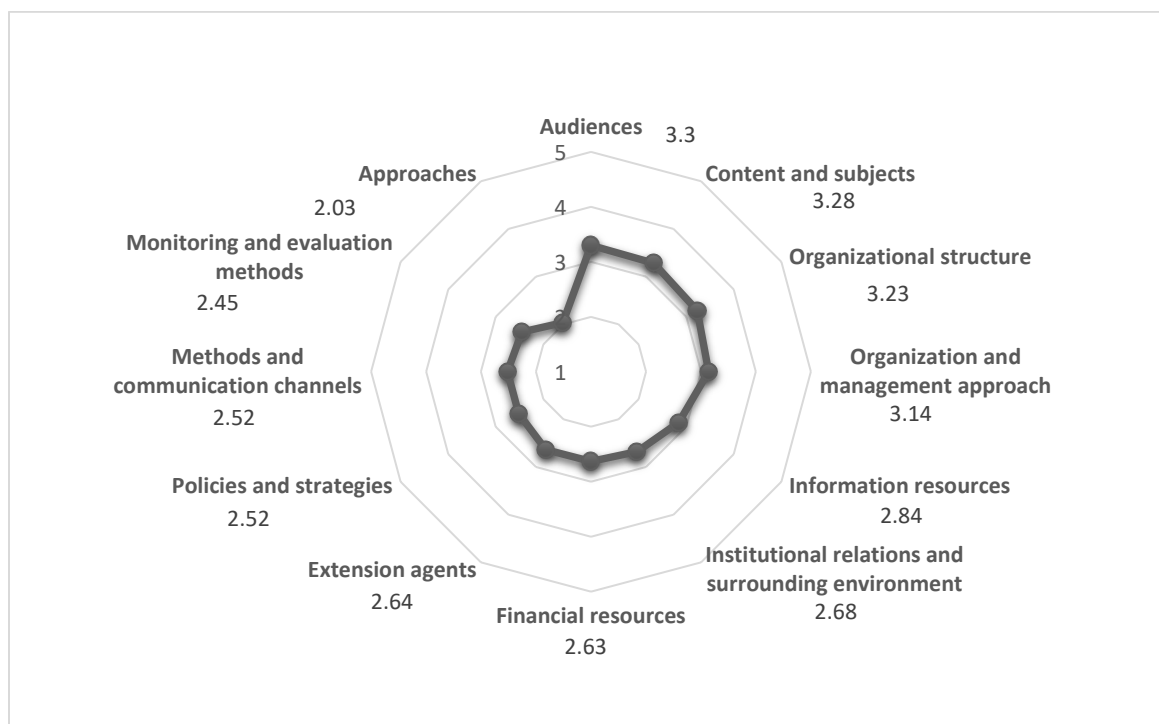


Figure 1. Status of the Components of the Pluralistic Agricultural Extension System in Iran.

In addition to the above findings, to provide a clearer view of the status of the components of a pluralistic agricultural extension system in Iran, the components were ranked using the Friedman test, with the results presented in Table 3. In this regard, since the Chi-square value was significant at the 0.001 level, it can be inferred that there was a statistically significant difference among the means of the 12 components evaluated. Based on this, the 12 studied components were ranked according to their mean rank values, with the highest rank belonging to the "Audiences" component and the lowest to the "Approaches" component (Table 3).

Table 3. Final ranking results of the components of the pluralistic agricultural extension system in Iran.

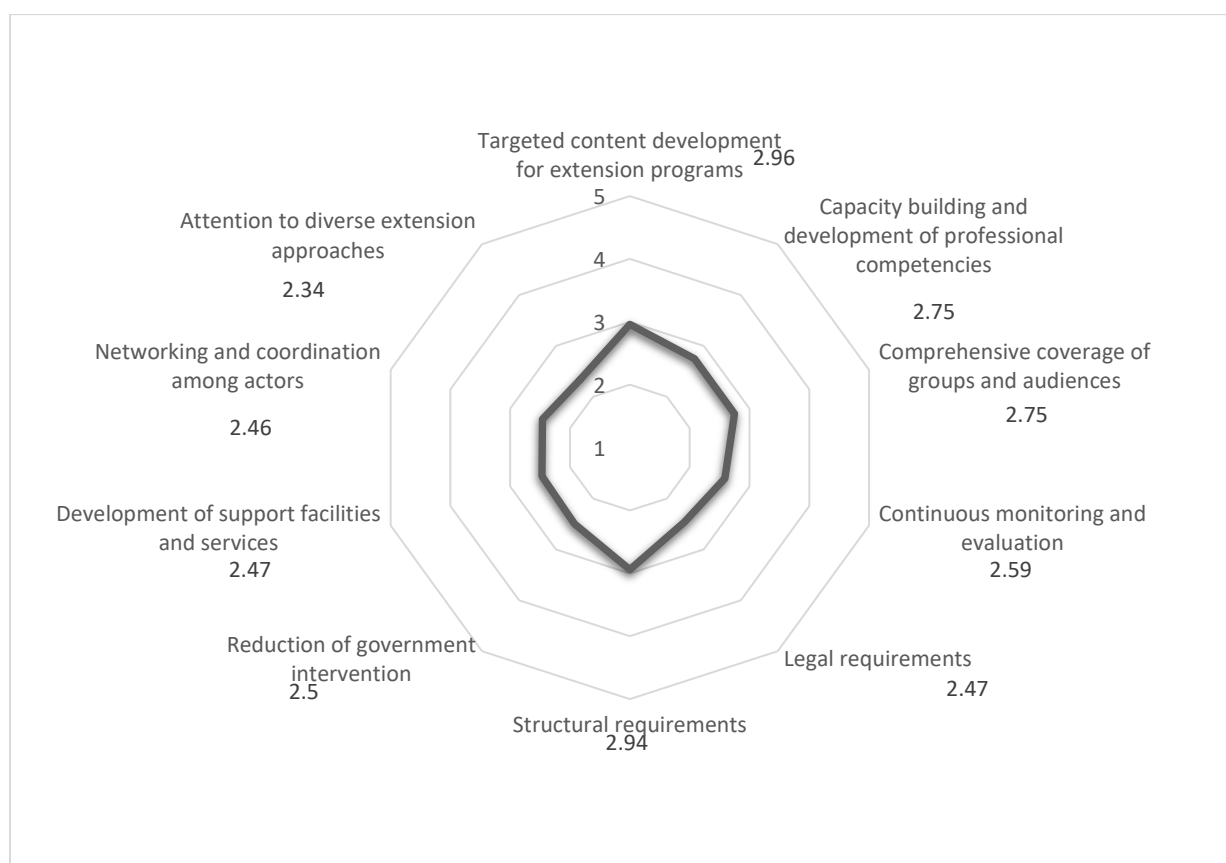
<i>Component</i>	<i>Mean Rank</i>	<i>Component Rank</i>	<i>Test Statistics</i>
<i>Audience</i>	8.55	1	$\chi^2 = 421.531$, df= 11, p = 0.001
<i>Content and Subjects</i>	8.48	2	
<i>Organizational Structure</i>	8.40	3	
<i>Organization and Management Method</i>	7.98	4	
<i>Information Resources</i>	6.79	5	
<i>Institutional Relations and surrounding Environmental</i>	6.21	6	
<i>Financial Resources</i>	6.01	7	
<i>Extension Agents</i>	5.90	8	
<i>Methods and Communication Channels</i>	5.47	9	
<i>Policies and Strategies</i>	5.47	10	
<i>Monitoring and Evaluation Methods</i>	5.13	11	
<i>Approaches</i>	3.61	12	

B) Requirements of a Pluralistic Agricultural Extension System In this section, similar to the assessment of the components, a **one-sample t-test** and its assumptions were used to evaluate the current status of the requirements of a pluralistic agricultural extension system in Iran. Based on the results presented in Table 4, most of the requirements examined were **below the average level**. These include: attention to diverse extension approaches, comprehensive coverage of groups and audiences, continuous monitoring and evaluation, development of support facilities and services, structural requirements, **reduction of government intervention**, legal requirements, networking and coordination among actors, and **capacity building and development of professional competencies**. Only one requirement, **targeted content development for extension programs**, was at the **average level**. Furthermore, the overall status of the requirements of the pluralistic agricultural extension system in Iran was also found to be **below the average level** (Table 4).

Table 4. Results of the Assessment of the Requirements of the Pluralistic Agricultural Extension System in Iran.

<i>Requirement</i>	<i>Mean</i>	<i>t-Statistic</i>	<i>Significance Level</i>	<i>Mean Difference</i>	<i>Status</i>
<i>Attention to diverse extension approaches</i>	2.34	-10.330	0.001	-0.685	Below Medium
<i>Comprehensive coverage of groups and audiences</i>	2.75	-3.101	0.002	0.252	Below Medium
<i>Continuous monitoring and evaluation</i>	2.59	-4.742	0.001	-0.406	Below Medium
<i>Targeted content development for extension programs</i>	2.96	-0.476	0.635	-0.039	Medium
<i>Development of support facilities and services</i>	2.47	-9.068	0.001	-0.533	Below Medium
<i>Structural requirements</i>	2.94	-0.512	0.644	0.062	Medium
<i>Reduction of government intervention</i>	2.50	-8.084	0.001	-0.503	Below Medium
<i>Legal requirements</i>	2.47	-7.685	0.001	-0.529	Below Medium
<i>Networking and coordination among actors</i>	2.46	-7.747	0.001	0.535	Below Medium
<i>Capacity building and development of professional competencies</i>	2.75	-3.568	0.001	-0.245	Below Medium
<i>Overall requirements</i>	2.54	-8.194	0.001	-0.459	Below Medium

To better illustrate the distinctions, the results from Table 4 are also presented in a radar chart (spider diagram) (Figure 2).

**Figure 2.** Status of pluralistic agricultural extension system requirements in Iran.

Similar to the evaluation of the components, the Friedman test was used to rank the requirements of a pluralistic agricultural extension system in Iran to provide a clearer view of their status (Table 5). Given the significance of the Chi-square test at the 0.001 level, it can be stated that a statistically significant difference existed among the means of the 10 requirements examined. Accordingly, these 10 requirements were then ranked based on their mean rank values (Table 5). The results indicated that the highest rank belonged to the requirement of "Targeted content development for extension programs," while the lowest rank was associated with "Attention to diverse extension approaches" (Table 5).

Table 5. Final ranking results of the requirements of a pluralistic agricultural extension system in Iran.

Requirement	Mean Rank	Requirement Rank	Test Statistics
Targeted content development for extension programs	6.99	1	Chi-square value = 109.256df = 9Sig. = 0.001
Capacity building and development of professional competencies	6.52	2	
Comprehensive coverage of groups and audiences	6.16	3	
Continuous monitoring and evaluation	5.45	4	
Legal requirements	5.13	5	
Structural requirements	5.12	6	
Reduction of government intervention	5.11	7	
Development of facilities and support services	5.02	8	
Networking and coordination among actors	4.95	9	
Attention to diverse extension approaches	4.54	10	

DISCUSSION

Transitioning toward a pluralistic agricultural extension system is a response to the complexities of contemporary agriculture rather than a mere structural adjustment. As Kumar (2025) emphasizes, this shift aims to integrate traditional knowledge with modern science and local insights with global trends by engaging diverse stakeholders, thereby transcending the limitations of single-provider models.

However, an assessment of Iran's extension system reveals significant integration gaps. While the components of "Content and Subjects," "Organizational Structure," and "Audiences" perform above average, and "Organization and Management Method" remains at an average level, eight critical areas—including Policies and Strategies, Financial Resources, Approaches, Institutional Relations and surrounding Environmental, Information Resources, Extension Agents, Methods and Communication Channels, and Monitoring and Evaluation Methods —fall below average.

Friedman ranking further highlights this disparity, with “Audiences” ranked highest and “Approaches” lowest. These findings suggest that while Iran has made progress in outreach and content dissemination, it has yet to achieve the institutional integration necessary for genuine pluralism.

The relative success of “Content and Subjects” is driven by recent advancements in knowledge management, such as the deployment of digital media, knowledge-based packages, and the “Agricultural Knowledge and Technology Extension Hall.” Similarly, the decentralization of Jihad-e-Keshavarzi centers and the strategic placement of local extension agents have improved “Organizational Structure” and stakeholder engagement. Nevertheless, echoing IFAD (2022), these improvements must be matched by greater organizational diversity and the active inclusion of non-state actors, such as NGOs, farmer organizations, and private service providers, to ensure a truly effective extension system.

A significant weakness within Iran’s “Policies and Strategies” component is the absence of clear coordinating frameworks among various actors. Kumar (2025) observes that while pluralistic systems offer diverse knowledge and region-specific solutions, they introduce challenges in defining distinct stakeholder roles and ensuring equitable representation. Iran’s context, characterized by public-sector dominance and ambiguous labor division, hinders the development of a truly collaborative ecosystem. Establishing a clear vision, mission, and defined governmental role is crucial for service sustainability (Global Forum for Rural Advisory Services, 2012). Effective transition necessitates clear protocols and formal communication channels (Kumar, 2025), elements currently lacking in Iran’s fragmented landscape.

Research by Abdu-Raheem & Worth (2016) and Alizadeh et al. (2018) underscores the importance of policy reform for transforming Iran’s extension system, advocating for coordinated national policies to implement a pluralistic model. Realizing this approach requires decentralization, targeted privatization, demand-driven extension, and institutional incentives within the public sector (Richardson, 2006; Bett & Secretary, 2017). Furthermore, a strategic shift in service delivery is essential, with Private Extension Service Providers (PESPs)—including commercial entities, input suppliers, and NGOs—playing a vital role in addressing needs often unmet by public services, such as climate change adaptation, nutrition, and business development (Saha, 2025). IFAD (2022) posits that due to financial and operational constraints, public extension alone is insufficient, making pluralism a structural necessity rather than an optional complement.

From an institutional and behavioral perspective, Iran's persistent centralization stems from a misalignment between the 'rules of the game' and 'incentive mechanisms.' Current institutional structures prioritize bureaucratic control over facilitation, leading to the 'statization of private capacities,' where non-state actors conform to government hierarchies for survival. Behaviorally, incentive systems focus on 'compliance-based' metrics rather than 'outcome-based' impacts, steering agents away from participatory methods towards routine tasks. A shift in governance architecture from controlling agents to fostering performance-based and networking incentives is critical for overcoming these profound structural and behavioral challenges in transitioning to a pluralistic system.

As the role of extension agents shifts from pure technology transfer to facilitating agricultural innovation, new strategies and capacities are imperative (Sulaiman & Davis, 2012). Currently, Iran's "Extension Agents" and "Institutional Relations and Surrounding Environment" components remain suboptimal, hampered by public-sector dominance, unclear labor division, and weak inter-actor synergy, which lead to resource duplication. Furthermore, the low ranking of "Approaches" and "Methods, and Communication Channels" highlights significant concerns regarding information quality. As Kumar (2025) notes, uncoordinated dissemination across multiple providers risks undermining the credibility of the entire system.

International evidence suggests that public services are often underfunded and overly focused on production, neglecting the multifaceted needs of modern farmers (Saha, 2025). In Iran, the failure to integrate informal actors into policy design and evaluation reflects a broader lack of institutional cohesion (Alimirzaei et al., 2019). Drawing on lessons from South Africa, success in pluralistic systems relies on transparency, effective feedback, and robust public-private collaboration (Mudzielwana, 2022). Consequently, Iran's limited engagement with NGOs and producer organizations represents a significant missed opportunity for improving advisory coverage and quality (IFAD, 2022).

The "Approaches", and "Methods, and Communication Channels" components currently rank among the lowest in the system. This failure is driven by an over-reliance on traditional governmental models, the uncritical adoption of external frameworks, and a lack of expert competency in facilitation and educational methodology. Furthermore, extension agents are often burdened by administrative tasks, such as input distribution and paperwork, which compromise service quality. Given that information technology is essential for efficient exchange (Singh et al.,

2013), and that pluralistic systems must cultivate diverse technical, business, and social skills (Saha, 2025), these structural deficiencies are critical.

Ultimately, the lack of transparent feedback loops negatively impacts farmer performance, as highlighted by Mudzielwana (2022). To transition toward a responsive system, governance must shift from static, top-down models to flexible frameworks that foster resilience (Kumar, 2025). As IFAD (2022) emphasizes, true pluralism requires more than just increasing the number of providers; it demands the integration of diverse delivery modes, organizational forms, and knowledge systems. Therefore, targeted diagnostic efforts and professional training are essential to enhance the competencies of extension agents and bridge these systemic gaps.

The “Monitoring and Evaluation (M&E) methods” component remains suboptimal, despite the fact that effective M&E and organizational learning are fundamental to pluralistic systems (Bett & Secretary, 2017) and essential for service sustainability (GFRAS, 2012). In Iran, weak M&E arrangements limit the capacity of actors to generate feedback and make evidence-based adjustments to shifting local conditions. This aligns with Odongo et al. (2023), who noted that pluralistic systems suffer when performance criteria are poorly defined and supportive infrastructure is inadequate. Consequently, establishing adaptive, systematic M&E frameworks is vital for enhancing accountability and systemic effectiveness.

Similarly, “Financial Resources” constitute a major constraint, as respondents indicated a lack of diverse and suitable funding channels. This mirrors global trends where public extension services are frequently incapacitated by insufficient funding and staffing (Saha, 2025), a challenge previously identified as a barrier to reforming Iran’s extension system (Rezaeimoghadam & Fatemi, 2017). Furthermore, Odongo et al. (2023) attribute weak system performance to insufficient funding and inadequate policy frameworks. Given that public providers alone cannot meet all advisory needs, diversified funding and shared resource mobilization are critical to ensuring system resilience (IFAD, 2022).

Ultimately, successful pluralism requires coordination among government, private, and civil society actors to leverage their complementary capacities (IFAD, 2022). Therefore, Iran’s transition should be treated not as a mere organizational rearrangement, but as a comprehensive ecosystem reform aimed at simultaneously strengthening institutional coordination, financial diversification, and evaluative capacity.

Transitioning to a pluralistic agricultural extension model requires multifaceted reforms across legal, institutional, managerial, infrastructural, and human resource dimensions. This study reveals that the current status of these requirements in Iran is generally below average. While **targeted content development for extension programs** reached an average level, all other dimensions—including **attention to diverse extension approaches, comprehensive coverage of groups and audiences, continuous monitoring and evaluation, development of support facilities, structural requirements, reduction of government intervention, legal requirements, networking and coordination among actors, and capacity building and development of professional competencies**—remain in an unfavorable state. This underscores a critical gap: as IFAD (2022) notes, pluralism succeeds only when institutionalized collaboration enables diverse actors to contribute resources and expertise, rather than merely appending them to a state-led structure without redefining their roles.

A fundamental challenge within Iran's government-led system is the limited access of farmers to effective services, a constraint highlighted in numerous studies, including Keshavarz Bahaghighat et al. (2021). As Swanson and Rajalahthi (2010) observed, government-centric models often fail to achieve their objectives. This study confirms that pervasive government proprietorship has stifled the role of the private sector and non-governmental organizations (NGOs). For instance, the 2015 initiative to recruit private-sector experts failed to reduce state involvement; instead, it undermined pluralistic principles by effectively converting private capacities into governmental ones.

True pluralism necessitates more than just a diversity of actors; it requires reducing direct government intervention in favor of a strengthened regulatory role. International evidence, such as Swanson's (2008) research, suggests that bureaucratic and inefficient structures often impede such institutional reforms. Consequently, establishing a pluralistic system in Iran requires a fundamental redefinition of the government's role, a re-evaluation of macro-strategies, and systemic transformation across legal, institutional, logistical, and cultural dimensions. This aligns with IFAD (2022), which posits that the public sector must shift from a primary provider to a facilitator and coordinator, allowing NGOs, farmer organizations, and private providers to expand service reach and responsiveness.

The **development of support facilities and services** is currently inadequate. The effectiveness of extension systems hinges on actor collaboration, funding, and infrastructure development (Ragasa

et al., 2016). Farmers' limited access to services is often due to a shortage of necessary facilities and resources, not a lack of willingness (Agbaro & Benjamin, 2013). Obstacles such as limited operational budgets, insufficient transportation, and low agent motivation hinder extension services, consistent with findings in Iran regarding infrastructural prerequisites for decentralization (Masangano & Mthinda, 2012; Moradi Kafraj et al., 2013). Operational pluralistic extension requires resource pooling and shared support mechanisms across institutions (IFAD, 2022).

Similarly, **networking and coordination among actors** lack efficiency. Coordinating diverse organizations presents a significant challenge, often leading to conflicting advice and farmer confusion without effective cooperation (Qamar, 2005). In Iran, this has resulted in service duplication, particularly within the non-governmental sector. Strengthening public-private interaction and local coordination can enhance system performance (Alimirzaei, 2016), but inappropriate structures, weak regulations, and bureaucracy impede effective networking. International studies echo this, noting a lack of stakeholder collaboration in extension program planning and implementation (Bitzer et al., 2016; Garforth et al., 2013). Coordinated pluralism is crucial for reaching vulnerable communities, as no single provider can meet their multifaceted needs alone (IFAD, 2022).

Finally, **attention to diverse extension approaches** is precarious. Inappropriate methods are a major barrier to effective service delivery (Agbaro & Benjamin, 2013; Davis & Terblanche, 2016). The inefficient use of extension approaches has reduced system efficiency; selections must align with audience, content, and technology characteristics (Birner et al., 2009). The absence of participatory, facilitative, and interactive evaluation methods has hindered pluralistic goals, necessitating a transformation in extension methodologies. Pluralistic advisory systems should integrate multiple providers and modalities to enhance service quality and reach, especially when public extension faces structural constraints (IFAD, 2022).

The results imply that without deliberate and profound structural reforms, the transition to a genuinely pluralistic and effective extension system is unlikely to succeed. Moving forward requires a multi-pronged strategy grounded in national resolve and inter-sectoral collaboration, prioritizing three core areas of reform:

1) Legal and Policy Reform: Revising frameworks to reduce government proprietorship and create an enabling environment for non-governmental and knowledge-based actors. **2) Financial and Infrastructural Development:** Developing supportive financial mechanisms to ensure the

sustainability and quality of services provided by diverse actors. 3) **Capacity Building:** Investing in the professional development of extension agents to facilitate a shift from traditional, top-down methods to participatory and facilitative approaches. The contributions of this research are threefold:

- **Empirical Contribution:** It provides the first comprehensive, evidence-based, and systematic mapping of the readiness and requirements for a pluralistic extension transition within the Iranian context.
- **Conceptual Contribution:** The study advances the theoretical understanding of pluralistic transitions by providing an empirical model of the systemic and interconnected barriers encountered in a highly centralized context.
- **Managerial and Policy Contribution:** It offers a critical diagnostic tool for policymakers to identify the misalignment between legislative intent and institutional capacity. Furthermore, it provides a strategic blueprint for restructuring the governance of advisory services, emphasizing the need for integrated coordination among state, private, and knowledge-based actors.

To build upon these findings, future research should adopt more diverse and holistic approaches. Specifically, multi-actor comparative studies could examine the nuances of pluralism across different provinces or institutional types. Furthermore, incorporating participatory assessment methods and mixed-method research designs—combining quantitative findings with qualitative depth—would provide a more grassroots perspective by including the voices of farmers and end-users. Ultimately, the success of pluralistic extension in Iran is less a technical challenge and more a test of genuine institutional commitment to transforming a centralized apparatus into a responsive, collaborative, and participatory agricultural innovation ecosystem.

Despite the significant findings of this study, several methodological and operational limitations should be acknowledged. First, concerning sampling and generalizability: although a national-level approach was adopted, the inherent diversity and extensive geographical dispersion of state and non-state actors within the Iranian extension system presented significant logistical challenges. Specifically, this vast geographical scope, combined with the structural complexity of non-governmental actors, hindered comprehensive coverage. This may have introduced potential sampling bias, as the final sample could not fully encompass the entire spectrum of specialized or highly decentralized stakeholders. Furthermore, regarding the quantitative phase, challenges

related to low participation rates emerged, as the reluctance of certain target experts to complete the questionnaires prevented the collection of more comprehensive data. Finally, the scope of this study primarily focused on the structural and policy-oriented components of the system. Consequently, behavioral and cultural dimensions—such as the stakeholders’ cognitive readiness to shift toward a pluralistic paradigm—were not explicitly examined. Future research should integrate these socio-cultural factors and employ longitudinal designs to better understand the dynamic nature of the transition process.

CONCLUSIONS

“This study evaluated the readiness of Iran’s agricultural extension system for transitioning toward a pluralistic model. The findings reveal a profound structural paradox: while significant potential exists in terms of content and audience engagement, these strengths are effectively neutralized by systemic deficiencies in foundational components. The research demonstrates that the primary challenge extends beyond resource scarcity, stemming instead from a fundamental **misalignment** between the envisioned multi-actor ecosystem and its operational reality. Although baseline capabilities in subject management and localized structures are evident, they remain fragmented and insufficient due to the absence of diverse approaches, supportive policies, and robust financial mechanisms. Specifically, the weakness in ‘extension approaches’ underscores a rigid adherence to centralized methodologies, which stifles the emergence of a pluralistic environment. Consequently, a successful transition requires moving beyond superficial content updates toward a fundamental paradigm shift in governance, policy-making, and decentralization to foster a truly collaborative agricultural innovation ecosystem.”

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