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EFFECTIVENESS OF PUBLIC AND PRIVATE EXTENSION SERVICES IN OILSEED FARMING

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ABSTRACT

The study was conducted to evaluate the effectiveness of public and private agricultural extension systems in supporting oilseed farmers in Mahabubnagar district, Telangana. The objective of the study was to assess the timeliness, usefulness, and relevance of extension services provided to groundnut and castor growers. Data were collected from 120 farmers across 12 villages using a pre tested interview schedule. The study measured farmers' perceptions on effectiveness of key service dimensions, including advisory support and input delivery, from both public and private extension providers. Results revealed that both systems were perceived as moderately effective and z value of 3.43 reveals that there is a significant difference was observed, with public services being more effective in advisory roles and private services are effective in timely input delivery. A collaborative approach integrating public and private extension services carries strong policy and extension implications, strengthening institutional linkages and promoting wider technology adoption among oilseed farmers.

Keywords: *effectiveness, oilseed farmers, public and private extension systems*

INTRODUCTION

Oilseed crops are vital to both the global and Indian economy due to their significant contributions to the agricultural and industrial sectors. India is one of the major producers of oilseed crops in the world, with its vegetable oil economy ranking as the fourth largest after the USA, China, and Brazil. Oilseeds account for 13% of the Gross Cropped Area, 3% of the Gross National Product, and 10% of the total value of all agricultural commodities (DA&FW, 2023). Despite increases in area and production, productivity remains low compared to other countries. Moreover, India continues to meet nearly 57% of its domestic edible oil demand through imports (PIB, 2024), highlighting the urgent need to achieve self-sufficiency in oilseed production to strengthen food security and reduce import dependency. The major cause of low productivity is the limited adoption of pre- and post-harvest management technologies at the field level (Gogoi *et al*., 2024, Gorfad *et al*., 2018).

Various organizations are involved in providing agricultural extension services to farmers in India, with considerable diversity in their objectives, funding, and manpower. The pluralistic nature of extension systems comprising public and private actors has expanded outreach, but the perceived effectiveness of these services varies widely (Glendenning *et al*., 2010; Harikrishna et al., 2021). Farmers generally perceive successful extension systems as those offering adequate, high-quality advisory support delivered by responsive and knowledgeable staff (Ragunath *et al*., 2023). Effective extension services are essential for improving productivity and sustainability, though challenges persist due to financial constraints, cultural barriers, and inconsistent policy support (Anil *et al*., 2024). Tailored, location-specific interventions and enhanced capacity-building of extension personnel are critical for ensuring successful technology dissemination (Hossain and Mukhopadhyay, 2024). Public extension systems primarily include state government departments of agriculture, horticulture, and animal husbandry, along with SAUs' first-line extension systems, ICAR research units, cooperatives, and marketing boards. While public institutions play a vital role in training and advisory services, private organizations have increasingly taken the lead in supplying critical inputs such as seeds, fertilizers, and pesticides (Bhumireddy *et al*., 2022; Sathish, 2015). Consequently, farmers often depend on both systems public for technical guidance and private for input supply demonstrating the need for better convergence and coordination (Antwi and Stringer, 2021; Mukherjee and Maity, 2015).

Research gap

Despite the growing pluralism in agricultural extension services, limited empirical evidence exists on how effectively public and private systems meet the specific needs of oilseed farmers, particularly those cultivating groundnut and castor. This gap in comparative understanding of the two

systems' effectiveness in promoting technology adoption, improving productivity, and enhancing farmer income highlights the need for further investigation. Addressing this gap is crucial to optimize extension delivery and ensure efficient technology transfer. Since extension effectiveness depends on how well services align with farmer needs, especially in terms of usefulness, timeliness, and relevance, assessing these dimensions can generate valuable insights for designing more responsive and impactful extension strategies for oilseed farmers.

OBJECTIVE

To analyze the effectiveness of public and private extension services in oilseed farming

METHODOLOGY

The study was conducted in Mahabubnagar district of Telangana State, which was purposively selected based on the Relative Spread Index (RSI) and Relative Yield Index (RYI) values for groundnut and castor crops among the districts of Telangana. Out of the 15 mandals in the district, four mandals namely Koilkonda and Mohammadabad for groundnut, and Koilkonda and Addakal for castor, were purposively chosen based on the highest area under these crops. From each selected mandal, three villages were randomly chosen, resulting in six villages for groundnut and six for castor. From each village, ten respondents were selected using simple random sampling, making a total of 120 oilseed farmers, including 60 groundnut and 60 castor growers.

The research design was ex post facto, as the factors influencing extension effectiveness and adoption had already occurred and could not be manipulated. The study followed a mixed-methods approach, combining quantitative data from structured interviews with qualitative insights gathered through focus group discussions with selected farmers. This integration of methods helped capture both measurable and contextual aspects of extension services effectiveness. The study adopted a cross-sectional time horizon, collecting data at a single point in time to assess existing patterns of service delivery and adoption behavior. Data were collected using a pre-tested interview schedule administered through personal interviews. The interview schedule developed contained 18 statements related to the timeliness, usefulness, and relevance of technologies and services provided by different extension systems. Responses were recorded on a three-point continuum of agree, undecided, and disagree, assigned scores of 3, 2, and 1 respectively. Mean scores were used to rank the statements and determine overall system effectiveness. The effectiveness of the extension system was defined as the ability of public and private extension services to strategically mobilize institutional, technical, and human resources to deliver timely, relevant, and useful information that meets the needs of oilseed farmers. It reflects the system's competence in technology dissemination, informed decision-making, and promotion of sustainable agricultural productivity. Respondents were categorized as public and private extension users based on their major source of agricultural services such as input supply, training, demonstrations, and advisory support, whether obtained primarily from public institutions like the Department of Agriculture, SAUs, and ICAR units, or private agencies such as agribusiness firms, input dealers, and consultants. Of the total 120 respondents, 75 were identified as public extension users and 45 as private extension users.

The collected data were classified, tabulated, and analyzed using descriptive and inferential statistics, including frequency, percentage, mean, standard deviation, Z-test, to draw meaningful interpretations in line with the study objectives. Data analysis was carried out using IBM SPSS Statistics and Microsoft Excel for computation and tabulation.

RESULTS AND DISCUSSION

Perceived effectiveness of public and private extension system

The results from Table-1 indicate that, based on farmers' perceptions regarding the effectiveness of both extension systems, the public and private extension services were generally perceived to fall under the medium effectiveness category. For the Public Extension System, under Timeliness, most farmers perceived that the needed advisory services were provided at the right time (Rank I), followed by solutions to field problems at the right time (Rank II) and dissemination of required market information at the right time (Rank III). Under Usefulness, the majority of farmers perceived that the agro-advisory services provided were useful (Rank I), led to the adoption of improved technologies (Rank II), and that information on credit, source of inputs, and incentives was useful (Rank III). Regarding Relevance, most farmers agreed that technologies suited field conditions (Rank I), training courses were relevant to the socio-economic situation (Rank II), and advisory services were relevant to specific crop practices (Rank III). For the Private Extension System, farmers similarly perceived it to be moderately effective across key dimensions of service delivery. Under Timeliness, the needed advisory services were perceived as being provided at the right time (Rank I), followed by timely solutions to field problems (Rank II) and timely supply of inputs such as plant-protection chemicals, fertilizers, and planting materials (Rank III). For Usefulness, agro-advisory services were considered useful (Rank I), information on credit and inputs was valuable (Rank II), and the services contributed to adoption of improved technologies (Rank III). Under Relevance, technologies were suited to field conditions (Rank I), advisory services were relevant to crop practices (Rank II), and demonstrations of new technologies were relevant to the farming community (Rank III).

Table 1: Distribution of farmers according to statement wise perceived effectiveness of public and private extension system (n=120)

Sr. No.	Indicators	PUBLIC (n=75)		PRIVATE (n=45)	
		Mean Score & SD	Rank	Mean Score & SD	Rank
1	**Timeliness**				
a	The needed advisory services are provided in right time.	2.49± 0.53	I	2.40± 0.58	I
b	The needed inputs like plant protection chemicals, fertilizers and planting materials are provided in right time.	2.09 ± 0.67	IV	2.33 ± 0.56	III
c	Disseminating the required market information in right time.	2.13 ± 0.64	III	2.32 ± 0.57	IV
d	Maintaining regular contact with all the client farmers.	2.00 ± 0.71	VI	1.92 ± 0.74	VI
e	Providing solutions to their field problems at right time	2.30 ± 0.59	II	2.07 ± 0.68	II
f	Conducting training and demonstration up-to-date	2.06 ± 0.66	V	1.08 ± 0.82	V
B	**Usefulness**				
a	The agro-advisory services provided are useful to the farmers	2.43± 0.49	I	2.33± 0.65	I
b	Provided information on credit, source of inputs, incentives are useful	2.24 ± 0.61	III	2.27 ± 0.59	II
c	Provides up to date information related to new technology	2.06 ± 0.66	VI	1.95 ± 0.71	VI
d	Provides access to electronic information to the farming community	1.93 ± 0.74	VIII	1.88 ± 0.76	VII
e	Whether the provided agro advisory services resulted in increase in yield and income	2.21 ± 0.63	IV	2.17 ± 0.65	IV
f	Whether the agro advisory services provided are resulted in adoption of improved technology	2.28 ± 0.60	II	2.22 ± 0.62	III
C	**Relevance**				
a	The technologies provided are suited to the field conditions.	2.41± 0.61	I	2.40± 0.53	I
b	Is the system is providing climate resilience and sustainable farming modules	2.02 ± 0.68	VII	2.13 ± 0.64	VI
c	The information provided is cost-effective	2.05 ± 0.67	VI	1.92 ± 0.74	VII
d	Advisory services or practices provided are relevant to the specific crop practices.	2.29 ± 0.60	III	2.43 ± 0.53	III
e	Training courses conducted for the farmers regarding new technologies were relevant to the socio-economic conditions.	2.40 ± 0.55	II	2.17 ± 0.65	V
f	Demonstration of new technologies was relevant to farming community.	2.18 ± 0.63	IV	2.20 ± 0.62	IV

The analysis reveals that both systems were moderately effective, with relatively higher satisfaction in timeliness, showing that farmers value prompt responses and timely availability of services and inputs. The findings are consistent with previous studies reporting moderate effectiveness of extension systems and similar patterns of farmer perception (Chiru *et al*., 2021; Simelane *et al*., 2019; Wairoma, 2010; Ali *et al*., 2017).The findings further reveal that while both public and private systems perform well in basic service delivery, they face challenges in meeting diverse farmer needs. The public system excels in training and technical support but requires improvement in market-oriented and location-specific services (Maake & Antwi, 2022; Loki *et al*., 2020). The private system is more efficient in timely input delivery but has limited reach among small and marginal farmers (Amungwa, 2009; Adejo *et al*., 2012; Bawa *et al*., 2009). Enhancing coordination between both systems, ensuring inclusiveness, and strengthening extension personnel capacity are therefore essential to increase effectiveness and sustainability (Sylla *et al*., 2019; Sennuga *et al*., 2020; Chimaroke & Nwafor, 2022; Patel *et al.,* 2023; John *et al,* 2021; Gajera *et al*., 2022; Manjusha et al., 2021; Jalu et al., 2023; Prajapati et al., 2025). Overall, these results underline that timeliness, usefulness, and relevance remain core dimensions of extension effectiveness. A balanced and coordinated approach between public and private systems can improve technology dissemination, adoption, and productivity in oilseed farming.

Table 2: Difference in the effectiveness of public and private extension systems in outreach to groundnut and castor farmers (n=120)

Variables	Respondents	Two sample Z- test		
		Mean	Sample	"Z" Value
Effectiveness of extension systems	Public extension system	35.14	75	3.43
	Private extension system	33.33	45	

*Significance at 0.05%

The results from (Table-2) that there was significant difference between public and private extension systems in effective outreach to groundnut and castor farmers. The probable reason might be public extension system was consistently delivered timely agroadvisory services and offered structured, locationspecific training on crop management. Private extension system, in contrast, focused primarily on supplying inputs such as seeds, fertilizers, and agrochemicals and conducted few handson training sessions. The findings in lined with the study conducted by Goswami and Bezbaruah, 2017. This significant difference reflects their different roles and incentives: public agencies receive government funding and are judged by impact measures (practice adoption, yield gains, farmer satisfaction), which drive them to emphasize sustainable intensification and farmer learning; private firms depend on input sales for revenue and therefore prioritize commercial targets. To leverage the strengths of both systems, we propose joint training programs financed by public and private stakeholders, the adoption of common performance metrics across providers, and the development of integrated digital advisory platforms that combine public research expertise with private distribution networks to enhance both knowledge transfer and input delivery.

CONCLUSION

The perceived effectiveness of both extension systems highlights the need to strengthen scalable and inclusive delivery mechanisms that reach a wider base of oilseed farmers at an affordable cost. Farmers emphasized that extension services should promote the development and dissemination of climate-resilient technologies capable of enhancing crop resistance to abiotic and biotic stresses while improving productivity levels. Ensuring that technologies remain locally relevant and field-validated is crucial, as the adoption of context-specific innovations has already demonstrated tangible benefits to farmers (Adejo *et al*., 2012). Scaling such benefits requires a convergence approach, where public and private extension systems collaborate in delivering need-based, timely, and accessible services to farmers. Strengthening institutional linkages and participatory mechanisms will facilitate the effective utilization of extension services and ultimately enhance productivity and income in the oilseed sector (Mukherjee & Maity, 2015; Debnath *et al*., 2016).

RECOMMENDATIONS

Public and private extension services should be strengthened through coordinated, inclusive approaches to enhance the timeliness and relevance of advisory support. In the short term, focus should be on training in climate-resilient oilseed technologies, improving access to quality inputs, and integrating ICT tools such as mobile apps for real-time advisories. In the long term, policies must promote gender-responsive extension programs, institutional convergence, and strong monitoring and evaluation mechanisms to ensure effective, inclusive, and sustainable service delivery. Strengthening community participation and feedback systems will further help refine extension strategies and improve adoption outcomes.

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CONFLICT OF INTEREST

Authors have declared that no competing interests exist.

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