Effectiveness of Extension Agencies: A Case of Cotton Farmers in Akola District of Maharashtra, India

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ABSTRACT

The present study was carried out in Akola block of Akola district of Maharashtra among thirty randomly selected cotton farmers. The purpose was to identify the comparative effectiveness of selected extension agencies *viz.*, Department of Agriculture, KVK, Input agencies and NGOs against selected indicators. Seventeen indicators under seven dimensions namely 'access', 'assurance', 'empathy', 'reliability', 'responsiveness', 'tangibility' and 'timeliness' were used for comparison of agencies using Analytical Hierarchy Process (AHP). The comparison of overall effectiveness of the selected agencies showed that input dealers were found to be most effective followed by department of agriculture and KVK. NGO was perceived to be least effective by the farmers.

Keywords: AHP, Comparative effectiveness, Extension agencies

INTRODUCTION

Agricultural extension is an important link in the agricultural innovation system for transferring the knowledge and information to the end users. Overtime the scope of extension was found to be broadening encompassing all the information and services needed and demanded by farmers and other actors in rural settings to assist them in developing their own technical, organizational, and management skills and practices so as to improve their livelihoods and well-being (Sulaiman and Davis, 2012). Addressing the varying extension needs of the farmers is a herculean task. It is imperative to understand the contribution of extension to the well being of the cultivators. Agricultural extension system in India at present is not monolithic in nature. A large numbers of agencies-in public, private NGO and civil society sectors-evolved overtime for the provision of information, advisory and support services to farming community. Weakening of public extension, diverse nature and changing demands of farming community and the scope for new entities were the major determinants of such a transformation. Pluralism in agricultural extension *per se* acknowledges the existence and potential of all these entities (Ponnusamy and Pachaiyappan, 2018). Since the pluralism has become the norm, the next question is about their comparative effectiveness in addressing the extension priorities of the farmers. The different actors will have varying strength in diverse arenas. For example, strength of KVKs lies more in training, capacity development and frontline demonstration; but with limited out reach. So, it is important to compare the agencies on indicators which are related to quality of service provision. Such a comparison can help in identifying areas of strength and weakness of the selected agencies with respect to effectiveness of service provision.

Cotton is an important commercial crop in India. India is the second largest producer of cotton in the world contributing to 36.5 per cent of world's cotton production

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and has highest area under cotton in the world. Still there exist vast potential to improve the production and productivity of cotton in India. To sustain the momentum in cotton production there should be remunerative income for the farmers. It depends on many aspects like increase in production, decrease in cost of cultivation, better price realization, reduced transaction cost, timely availability of inputs, access to market etc. To make gains of most of it, farmers need quality information, advisory and support services in right time. Being a cash crop, cotton is an information intensive crop. Cotton farmers require information advisory and support services across the value chain. Information is required not only in relation to production, but in the context of post-harvest and marketing activities also. In Akola district of Maharashtra, where cotton is the major crop, farmers were found to access different sources to address their extension priorities. Effectiveness of these agencies in terms of their service quality is an important concern with respect to effective solution of farmers' extension needs.

METHODOLOGY

The present study was carried out among thirty randomly selected cotton farmers in Akola block of Akola district of Maharashtra. Before assessing the comparative effectiveness of extension agencies, it is important to analyse the efficiency enhancing role of extension as a whole. First, technical efficiency of cultivation was found out by data envelopment analysis (DEA) using cost of cultivation data. Then, the technical efficiency at constant return to scale was subjected to tobit regression with number of covariates including index for extension.

Data Envelopment Analysis was initiated by Charnes *et al.* (1978) to facilitate the evaluation of relative efficiencies of comparable production units. It is a non-parametric method and requires no prior assumption with respect to the relationship between inputs and outputs. In the present study the technique was used to assess the production efficiency of farmers. Further the determinants of efficiency were analyzed using tobit regression.

To assess the comparative effectiveness of extension agencies, four agencies namely Department of Agriculture, Krishi Vigyan Kendra (KVK), Input dealers and Non Governmental Organizations (NGO) were selected. Analytical Hierarchical Process (AHP) was used for comparison of effectiveness. Indicators of extension effectiveness was used as criteria and extension agencies (Department of Agriculture, Krishi Vigyan Kendra, Non-Governmental Organizations and Input dealers) were identified as options in the prioritization calculation in AHP. The 17 items in the SERVQUAL inventory developed by Parasuraman *et al.* (1988) and further modified by Rana *et al.* (2013) for increasing their relevancy to agricultural extension were used as indicators of effectiveness. It has seven dimensions *viz.*, access, assurance, empathy, reliability, responsiveness, tangibility and timeliness.

The Analytical Hierarchy Process (AHP) is a decision making tool in complex situations with multiple criteria. The AHP was proposed by Thomas Saaty (1980), to develop priorities for making most suitable decisions. During the process, a set of criteria are evaluated against set of options in pair-wise manner. Before pair-wise comparison, weights were generated for each criterion based on the importance perceived by the decision makers. In the next step, scores for each option is generated by pair-wise comparison of criterion. The option with higher score for a particular criterion will be the most suitable choice for that criterion. Final score for each option is calculated from criteria weight and option score. In effect, the process involves the derivation of ratio scale from pair-wise comparison through eigen vector calculation. Following Indicators (dimension) were used for comparison of the selected agencies

Access: Access involves approach, ability and ease of contact. It involves ease of approach and interaction. This measure consists of two items.

Assurance: It is the confidence of farmers in the service of agencies that agencies have required skill, expertise, resource and infrastructure to meet their requirements. It has four items.

Empathy: It is the measure of the interest and concern of the agencies towards individual needs and context of the farmers. It comprises of two items.

Reliability: It is the ability to provide relevant and quality service in an accurate and cost effective manner. It includes 4 items.

Responsiveness: It is the measure of concern and supportive service of agencies. It consists of two items.

Tangibility: It implies the physical facilities and materials for benefit of farmers. It has 2 items.

Timeliness: It is the measure of timely provision of response and service. It includes one item.

RESULT AND DISCUSSION

Initially, an effort was made to assess whether extension was contributing to the technical efficiency of crop production. For this, Data Envelopment Analysis was used to find out technical efficiency of crop production at first. Technical efficiency so calculated was subjected to tobit regression analysis with number of covariates including an index for extension which is formulated based on the number of sources accessed and frequency of contact. As per the results of the tobit analysis, extension was found to be a determinant of technical efficiency in case of Cotton cultivation in Akola. Calculation of

technical efficiency answerers the question how best the technological inputs are used in terms of output generation. The present level of technical efficiency is higher (0.797) pointing out that 80 per cent of input use was efficiently utilized. Present level of production can be maintained even by reducing 20 per cent of input usage. The determinants of the technical efficiency play the role of enhancing or disenchanting the process of optimal utilization of inputs (Charnes *et al*., 1994). Hence it can be argued that information derived from various sources has facilitated the optimal use of inputs for output maximization in both the regions. Similar findings were observed by Hussain (1999) and Amaza *et al*. (2006). In addition to extension, level of education and area under irrigation were the determinants of technical efficiency of cotton production in. Cotton being a commercial crop, adoption of scientific farming practices is inevitable to achieve the efficiency in production and obviously the level of education of farmers will have greater role in comprehension and adoption of new technologies and practices. Further, the crop being water intensive in nature, increase in the area under irrigation will substantially improve productivity and efficiency (Table 1 &2).

It was widely observed during the survey that farmers' access to extension agencies both in public and private spheres is influencing the adoption of scientific farming practices. Glimpse at the results of Analytical Hierarchical Process for thirty randomly selected cotton farmers of Akola revealed that consistency ratio was

Table 1: Technical Efficiency of Cotton Cultivation in Akola

Cotton	Mean
TE (Constant return to scale)	0.776
TE (Variable return to scale)	0.972
Scale efficiency	0.797

Table 2: Determinants of Technical Efficiency of Cotton Cultivation in Akola

	Coef.	SE	t	P>|t|	[95% of C.I]	
Age	-0.00323	0.001526	-2.12	0.043	-0.00635	-0.00011
Education	-0.00518	0.002684	-1.93	0.054	-0.01067	0.000312
Farming experience	0.00118	0.001145	1.03	0.311	-0.00116	0.003521
Family size	-0.00182	0.002433	-0.75	0.462	-0.00679	0.003161
Irrigated area	0.004618	0.001656	2.79	0.009	0.00123	0.008005
Land holding	-0.01495	0.025187	-0.59	0.557	-0.06646	0.036565
Cotton area	-0.00148	0.00454	-0.33	0.746	-0.01077	0.0078
Extension Contact	0.00851	0.000987	8.62	0.01	0.006492	0.010528
_cons	0.505203	0.0932	5.42	0	0.314588	0.695819
/sigma	0.068758	0.008339			0.051704	0.085812

more than 0.2 in case of three respondents. The scores obtained for the remaining twenty seven respondents for the seventeen items were used to draw the priority for seven dimension namely reliability, assurance, access, empathy, responsiveness, tangibility and timeliness as well as final priority of the farmers with respect to various agencies. Geometric mean of individual scores was used to arrive at the dimension- wise and over all priority. In Akola District, Krishi Vigyan Kendra received the highest score for the dimensions namely Reliability and Tangibility; while for all other dimensions of input dealers obtained highest score.

In case of dimensions like reliability, access, empathy, responsiveness and timeliness second preference was for State Department of Agriculture. Input dealers were accorded second preference in case of tangibility dimensions also. Further comparison of overall effectiveness of the selected agencies showed that input dealers were most effective followed by department of agriculture and KVK. NGOs were found to be least effective by the farmers.

Highest score of KVK in 'reliability' dimension shows that the farmers have immense credibility in the Krishi Vigyan Kendra and consider the information and other services provided by KVK as authentic. It can be further attributed to the subject matter expertise of the KVK staff which is reflected in their advisories. In case of 'Tangibility' dimension also, KVKs provide tangible information products or 'take away information' like printed advisories, seeds, biofertilizers etc. Second highest score of Department of Agriculture for 'reliability' dimension further add to the human resource quality of the public extension system in terms of technical expertise. Resources and infrastructural constraints notwithstanding, the department was found reaching out to the farmers through visits of Agricultural officers and Agricultural assistants ('Krishi Sahayaks'), through weekly and fortnightly visit to the villages. Personnel of the Department make visit to each village at least once in a fortnight and interact with the farmers. They inform farmers with various schemes and input provision programmes apart from advisory provision. Further the feedback from the farmers is passed on to the higher ups in the hierarchy. They also oversee the timely provision of inputs to the eligible farmers. This is translated to the second highest score of department in the dimensions like access, empathy, responsiveness and timeliness. Input dealers were found to be most accessible to the farmers, as the 'Krishi Seva Kendras'-accredited input suppliers were operating in the vicinity of the villages. Apart from ensuring timely provision of required inputs, they provide plant protection advisories also. Since the operators are from the locality they better understand the problems of the farmers and act in a responsive manner. But many a time, lack of subject expertise constrains them from making correct recommendations as perceived by the farmer community (Table 3).

The finding adds to the results of the Situation Assessment Survey by NSSO (2005), which have revealed that 'input dealers' were the second most important source of information for farmers following other 'progressive farmers'. Also, those received information on improved seeds/varieties from input dealers, 63 per cent were from Maharashtra. Moreover, more than half of the respondent farmer households opined that information received from input dealers, extension agents, and progressive farmers were good and most of them had in fact tried the information so received.

Situation Assessment Survey of 2013, further pointed out that private commercial agents (including input dealers) were the important source of information following progressive farmers and ICTS (both traditional and modern). They were rated high in terms of usefulness of information also along with the information received from extension agents, KVKs and progressive farmers (NSSO, 2014). Provision of extension services by input agencies is a part of their marketing activity and very often it is the marketing personnel that handle the extension related activities. Considering the importance of input dealers in the extension domain, it is very much important to orient them in respect of quality information provision. This recognition has led to the initiation of one year Diploma In Agricultural Extension Services for Input Dealers (DAESI) programme in distance education mode

Table 3: Comparative effectiveness of selected extension agencies as perceived by cotton farmers in Akola (n=30)

	DoA	KVK	NGO	Private	γmax	Consistency Index	Consistency Ratio
Reliability							
Extension services (information, advisory, training etc.) are highly relevant and suitable to the condition of the farmers.	0.961	1.085	0.353	1.749	4.148	0.05	0.055
Extension services (information, advisory, training etc.) are of high quality	0.9524	2.214	1.118	0.373	4.0796	0.0275	0.0294
Services are cost effective	1.497	1.087	1.186	0.453	4.223	0.074	0.083
Information provided are accurate	1.483	1.483	0.448	0.632	4.046	0.015	0.017
Total	1.194	1.403	0.677	0.658			
Assurance							
Extension services (information, advisory, training etc.) are highly useful to the farmers	0.834	0.912	0.318	1.98	4.043	0.014	0.016
Since the service of the agency is highly efficient and of good quality, I am willing to pay for it if needed	0.979	0.972	0.29	1.916	4.156	0.053	0.058
The agency has sufficient expertise and skill to give required service in time	0.876	1.692	0.450	1.109	4.127	0.043	0.047
Have enough capital resources and infrastructure management skills to solve the problems	0.782	1.84	0.447	1.065	4.134	0.045	0.05
Total	0.865	1.289	0.369	1.455			
Access							
Personnel of agencies are easily approachable	1.145	0.615	0.335	2.092	4.186	0.062	0.069
Quick feedback mechanism	1.119	0.5703	0.218	2.259	4.166	0.055	0.061
Total	1.132	0.592	0.27	2.174			
Empathy							
Involve regular interaction with farmers and give personalized attention	1.16	0.701	0.313	2.028	4.201	0.067	0.075
Localized solutions are given	0.943	0.125	0.502	1.483	4.053	0.018	0.02
Total	1.046	0.296	0.396	1.735			
Responsiveness							
Personnel/officers are highly service minded and always willing to support the farmers	0.852	1	1	1.209	4.061	0.0204	0.023
They inform farmers when service will be provided	0.956	0.865	0.37	1.821	4.01	0.004	0.004
Total	0.903	0.93	0.608	1.48			
Tangibility							
Physical facilities are provided	0.968	1.602	0.683	0.801	4.055	0.018	0.020
Good communication materials on usage & process of technologies are provided	0.653	1.340	0.286	1.938	4.216	0.073	0.0806
Total	0.795	1.466	0.441	1.246			
Timeliness							
Consistent response within promised time frame is provided	0.92	0.546	0.315	2.254	4.034	0.016	0.013
Total	0.92	0.546	0.315	2.254			
Overall	**0.911**	**0.699**	**0.440**	**1.593**			

by National Institute for Agricultural Extension Management (MANAGE), Hyderabad. The concept was to augment the knowledge and awareness of input dealers in agriculture and legal implications of input trading. Cotton farmers' preference for the Department of agriculture also goes in line with the findings of NSSO in various rounds information provided by the personnel was mostly related to different schemes and programmes rather than advisory services.

CONCLUSION

Farmers' preference for extension agencies depends on the perceived attributes of the agencies in relation to service provision. Along with technical expertise and resource availability, aspects like timely provision of accurate and reliable services were also perceived as important by farmers. Similarly, easiness of access and service mindedness of the agencies also matter. Farmers' preference for input agencies is the clear reflection of these facts. Even though the outreach was limited, KVK was rated high in terms of the reliability of the information and services provided. The major reason is the expertise of the subject matter specialists and facilities available with the KVK. Hence it is important to increase the outreach of KVKs through various linkage partnerships with public, private and civil society organizations. New Information and Communication Technologies like mobile phones, interactive video calls etc. could further facilitate this. Public extension agencies need to introspect and reinvent their approaches and strategies to serve the farmers more effectively. Improvement in the service quality of different actors in their respective areas of strength can add to the effectiveness of pluralistic extension system. This, in turn can promote the convergence of agencies with delineated roles and activities.

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