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Comparative Analysis of Effectiveness of Extension Services delivered by State Department of Agriculture, Krishi Vigyan Kendra and Non-Government Organisation of Bikaner District of Rajasthan

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Abstract

Several years before independence public sector or public bodies are functioning extension services in the rural areas for development in the field of agriculture and allied fields. As the globalization and technological transformation occurs, non-government and private bodies also lend a helping hand in boosting the activities of extension. Thus, government and non government are two key organisation for the transfer of technology to the agriculture sector in the country. The identified findings of the study show the significant difference between effectiveness of extension services reported by 180 beneficiaries of the sample, 60 farmers or beneficiaries (women and men) each from State Department of Agriculture, Krishi Vigyan Kendra and Non-Government Organisation of Bikaner district of Rajasthan. The ex-post facto Research design was used for this study. Arithmetic mean, F-test (ANOVA) and post hoc test was used to identify significant difference between effectiveness of extension services are some statistical tools used in this study. It was found from the study that there is a significant difference between the means of delivery of extension services by SDA, KVK and NGO.

Keywords: SDA= State Department of Agriculture, KVK=Krishi Vigyan Kendra, NGO=Non Government Organisation

Introduction

India's development mainly depends on development of agriculture. Moreover, agriculture is considered as main pillar of India, where around 70 per cent of the population is dependent on agriculture and allied areas for their lively hood. The extension has been playing a significant role in agriculture development for a long time particularly during the early period of India's first Green Revolution (Babu *et al.* 2013) ^[1] and extension services also develop a bridge of knowledge gap between researchers, policymakers, and farmers, ultimately leading to improved agricultural practices and livelihoods. Through several years before independence public sector or public bodies are functioning extension services in the rural areas for development in the field of agriculture and allied fields. As the globalization and technological transformation occurs, non-government and private bodies also lend a helping hand in boosting the activities of extension. Both public and private extension bodies had greater enthusiasm and capability to mobilize community resources. Several successful cases of NGOs in agriculture and rural development had resulted in coming out of many more NGOs in agriculture and rural development in different parts of the country. The specific features of the NGOs are that their part has been changed from time to time depending upon the development needs of the rural community. Thus, government and non

government are two key organisation for the transfer of technology to the agriculture sector in the country. This research aim to assess the effectiveness of extension services delivered by government and non-government organizations in Bikaner District of Rajasthan, by examining the delivery mechanisms, content, outreach strategies and impact of these services.

Objective

To examine the significant difference between the effectiveness of extension services of State Department of Agriculture, Krishi Vigyan Kendra and Non Government Organisation.

Methodology

The present study was conducted in Bikaner district of Rajasthan. For the present research study three organisation were selected namely State Department of Agriculture of Bikaner division, Krishi Vigyan Kendra and Non Government Organisation (URMUL Seemant Samiti) of Bikaner district of Rajasthan to identify the different working of extension services in this region. The ex-post facto Research design was used for this study. A list of farmers (women and men) or beneficiaries was procured from the organisation, which had direct contact and had membership of the organisation. From the list sixty

beneficiaries from were selected from each organisation for the investigation. Thus, total 180 beneficiaries were selected for the study. The data were collected from 180 beneficiaries through personal interview method and with a well-structured interview schedule. To determine the significant difference between the effectiveness of extension services of State Department of Agriculture, Krishi Vigyan Kendra and Non Government Organisation, effectiveness of extension services was analysed and questions were asked from the beneficiaries regarding need based extension services of specific area, weaker sections of society, SC/ST, social welfare, women, etc, extension services in major areas as agriculture management, livestock management, health and hygiene, women empowerment and entrepreneurship development, utilization of communication facilities viz., individual contact method, group contact method and mass contact method by the organisation, extension activities for example, demonstration, training, campaign, field days, field trips and tours, group discussions, meeting, seminars, etc, Human resource of the extension organisation, Other factors affecting extension services like infrastructural facilities, unbiased participation, team work and contact with research institute, monetary benefits earned from extension services during last three years, adequate, relevant and timely delivery of extension services like content, training, inputs, etc, change in behavior of beneficiaries at personal, family and societal level and satisfaction level of beneficiaries. The questions were evaluated from the experts of the field. The question was scrutinize with the answer in agree, undecided and disagree and the mean was computed to analysed mean difference.

Statistical tool

1. Arithmetic mean (X)

Arithmetic mean is the measure that results when all objects in the series is divided by the number of objects (N). Arithmetic mean is used to calculate results knowledge of beneficiaries regarding extension services by calculating the formula:

$$X = \frac{\sum X}{N}$$

Where,

X - Mean

X - Sum of each individual score

N - Total number of items

2. ‘F’ test (ANOVA)

Analysis of variance (ANOVA) is used to test for the significant difference between more than two sample means

or more than two variables. By using ANOVA, intrusion can be made about whether the different samples have been taken from the population having the same mean. ANOVA includes determining one approximation of the population variance from the variance between the sample means and second guess of the population variance from the variance within the sample. Further both guesstimates are compared and if both the guesstimate are approximately equal in value, then the null hypothesis is accepted (sample means do not vary significantly). These two estimated of the population means are compared by calculated their ratio, called F statistics.

F= between the column variance/within column variance

Degree of freedom for numerator= (Number of sample-1)

Degree of freedom for denominator= (Total sample size- Number of samples)

The significance of calculated “F” values was tested at five per cent and one per cent levels of probability to ascertain the difference between the means of effectiveness of extension services of the different organizations.

3. Post Hoc Test (LSD)

The “F” test is measure to determined mean difference and Post Hoc test or multiple comparison tests is applied to analyse pair wise numerous comparisons or the difference between each pair of means at an alpha level of 0.05. Multiple comparisons test can be used to determine means difference range which identifies harmonized subsets of means that are not different from each other. Fisher’s LSD (Latin Square design or least significant difference) was used to perform all pair wise comparisons between group means of effectiveness of extension services of State Department of Agriculture, Krishi Vigyan Kendra and Non-Government Organisation. No adjustment is made to the error rate for multiple comparisons.

$$LSD_{A, B} = t_{0.05/2,DFW} \sqrt{MSW \left(\frac{1}{n_A} + \frac{1}{n_B} \right)}$$

t= critical value from the t-distribution table

MSW= mean square within, obtained from the results of your ANOVA test

n= number of scores used to calculate the means

Results and Discussion

A. Mean difference of effectiveness of extension services between State Department of Agriculture, Krishi Vigyan Kendra and Non Government Organisation

Table 1: Mean difference of effectiveness of extension service of SDA/KVK/NGO N=180

S. No.	Effectiveness	Mean			F value (ANOVA)	Sig.
		SDA (n=60)	KVK (n=60)	NGO (n=60)		
1.	Effectiveness of extension service delivered					
(i)	Need based extension services	49.35	57.75	55.65	8.861	0.000
(ii)	Extension services in following areas					
a)	Agriculture management	11.76	13	12.33	3.513	0.032
b)	Livestock management	5.1	7.18	9.43	73.448	0.000
c)	Health and hygiene	4.46	6.13	10.51	382.910	0.000

d)	Women empowerment	6.5	8.71	14.16	160.568	0.000
e)	Entrepreneurship development	3.2	4.48	6.66	78.818	0.000
(iii)	Communication facilities	40.63	39.6	42.28	8.861	0.000
(iv)	Activities of extension services	52.25	55.05	56.78	9.515	0.000
(v)	Human resources	26.36	27.36	27.65	5.095	0.007
(vii)	Other factors affecting extension services	12.95	13.5	11.83	8.048	0.000
2.	Effectiveness in terms of monetary benefits	12.93	14.41	15.26	26.072	0.000
3.	Effectiveness in terms adequate services, information, content, activities and input.	30.6	44.75	55.51	491.158	0.000
4.	Effectiveness in terms of relevant services, information, content, activities and input.	32.16	44.3	50.03	512.966	0.000
5.	Effectiveness in terms of timely services delivered	32.13	43	52.4	579.427	0.000
6.	Effectiveness in terms of change in behavior	29.76	27.96	29.35	5.261	0.006
7.	Effectiveness in terms of satisfaction	9.71	9.95	10.61	3.905	0.022
Degree of freedom: between groups= 2, within groups= 177, Mean difference is significant at 0.05% level						

1. Mean difference of effectiveness of extension service delivered by State Department of Agriculture, Krishi Vigyan Kendra and Non-Government Organisation

a. Mean difference effectiveness of need based extension service delivered

The data in the Table 2 reveals that significant F-test ($p=0.000$) for need based extension service delivered showed that there was a significant difference between mean of three organization with F value 8.861 (df 2, 177), where the means of Krishi Vigyan Kendra (57.75) is more than mean of Non Government Organisation (55.65) and mean of State Department of Agriculture (49.35).

b. Mean difference of effectiveness of extension services in development area

It can be seen from the Table 2 that maximum mean value was observed for Krishi Vigyan Kendra (13) and minimum was observed for State Department of Agriculture (11.76). ANOVA was used to find whether there was significant variation across the three organizations in term of effectiveness in development area agriculture management. Calculated F value came out to be 3.513 (df 2, 177). Result of ANOVA indicates that there was a significant difference ($p=0.032$) across means of the three organizations in terms of effectiveness of extension services in agriculture management.

Visualization of the table also shows the mean difference of effectiveness of extension services in livestock management and reveals that maximum mean observed for Non Government Organisation (9.43) and minimum mean observed for State Department of Agriculture (5.1). ANOVA was calculated and showed that there is significant difference ($p=0.000$) among the means of the three organization, in terms of effectiveness of extension services in livestock management with F value 73.448 (df 2, 177).

Data in the table reveals that maximum mean value was observed for Non Government Organisation (10.51) and minimum mean was observed for State Department of Agriculture (4.46). ANOVA was used to find whether there was significant variation across the three organizations in term of effectiveness in development area health and hygiene. Calculated F value came out to be 382.910 (df 2, 177). Result of ANOVA indicates that there was a significant difference ($p=0.000$) across means of the three organizations in terms of effectiveness of extension services

in health and hygiene.

Similarly, data in the table showed that maximum mean value was observed for Non Government Organisation (14.16) and minimum mean was observed for State Department of Agriculture (6.5). Calculated F value came out to be 160.568 (df 2, 177). Result of ANOVA indicates that there was a significant difference ($p=0.000$) across means of the three organizations in terms of effectiveness of extension services in women empowerment.

Data of the table also shows that the mean difference of effectiveness of extension services in entrepreneurship development and reveals that maximum mean observed for Non Government Organisation (6.66) and minimum mean observed for State Department of Agriculture (3.2). ANOVA was calculated and showed that there is significant difference ($p=0.000$) among the means of the three organization, in terms of effectiveness of extension services in livestock management with F value 78.818 (df 2, 177).

c. Mean difference of effectiveness of communication facilities of extension services

The result of ANOVA clearly indicated that there was a significant difference ($p=0.000$) between the effectiveness of communication facilities of the extension service of State Department of Agriculture, Krishi Vigyan Kendra and Non Government Organisation with F value came out was 8.861 (df 2, 177). Where the maximum mean was observed was of Non Government Organisation (42.28) and minimum mean observed for Krishi Vigyan Kendra (39.6).

d. Mean difference of effectiveness of activities of extension services

Significant F test showed in the Table 2 and the data in the table reveals that there was a significant difference ($p=0.000$) between the mean of State Department of Agriculture (56.78), Krishi Vigyan Kendra (55.05) and Non Government Organisation (52.25) with the computed F value came out was 9.515 (df 2,177).

e. Mean difference of effectiveness of human resource of extension services

Significant F test presented in the table for effectiveness of human resource of extension services and the data in the table reveals that there was a significant difference ($p=0.007$) between the mean of State Department of Agriculture (26.36), Krishi Vigyan Kendra (27.36) and Non

Government Organisation (27.65) with the computed F value came out was 5.095 (df 2,177).

f. Mean difference of effectiveness of other factors affecting extension services

The table also depicted the ANOVA for other factors considered for effectiveness of extension services and reveals that maximum mean was observed for Krshi Vigyan Kendra (13.5) and minimum mean was observed for Non Government Organisation (11.83). The computed F value came out from comparing the means of three organization was 8.048 (df 2,177). Result of the ANOVA showed that there was a significant difference (p=0.000) among the mean of three organisations.

2. Mean difference of effectiveness of extension services in term of monitor benefits

Significant F test presented in the table for effectiveness of extension services in terms of monitory benefits and the data in the table reveals that there was a significant difference (p=0.000) between the mean of State Department of Agriculture (12.93), Krishi Vigyan Kendra (14.41) and Non Government Organisation (15.26) with the computed F value came out was 26.072 (df 2,177).

3. Mean difference of effectiveness in term of adequate extension services

Data in the table reveals that maximum mean value was observed for Non Government Organisation (55.51) and minimum mean was observed for State Department of Agriculture (30.6). ANOVA was used to find weather there was significant variation across the three organizations in term of effectiveness of adequate services, information, content, activities and input. Calculated F value came out to be 491.158 (df 2, 177). Result of ANOVA indicates that there was a significant difference (p=0.000) across means of the three organizations in terms of effectiveness of extension services in health and hygiene.

4. Mean difference of effectiveness in term of relevant extension services

Perusal of the Table 2 reveals that there is a significant difference (p=0.000) among the mean of State Department of Agriculture (32.16), Krishi Vigyan Kendra (44.3) and Non Government Organisation (50.03) with the calculated F value came out was 512.966 (df 2,177) for the effectiveness of extension services in terms of relevant services, information, content, activities and input.

5. Mean difference of effectiveness in term of timely delivery of extension services

Significant F test in the table expressed for effectiveness of extension services in terms of timely service delivered and the data in the table reveals that there was a significant difference (p=0.000) between the mean of State Department of Agriculture (32.13), Krishi Vigyan Kendra (43) and Non Government Organisation (52.4) with the computed F value came out was 579.427 (df 2,177).

6. Mean difference of effectiveness in term of change in behavior due to extension services

Data of the table also shows that the mean difference of

effectiveness of change in behavior of beneficiaries due to extension services and reveals that maximum mean observed for State Department of Agriculture (29.76) and minimum mean observed for Krishi Vigyan Kendra (27.96). ANOVA was calculated and showed that there is significant difference (p=0.006) among the means of the three organization, in terms of effectiveness of change in behavior with F value 5.261 (df 2, 177).

7. Mean difference of effectiveness in term of satisfaction from extension services

The result of ANOVA indicated that there was a significant difference (p=0.022) between the effectiveness of satisfaction due to extension service of State Department of Agriculture, Krishi Vigyan Kendra and Non Government Organisation with F value came out was 3.905 (df 2, 177). Where the maximum mean was observed was of Non Government Organisation (10.61) and minimum mean observed for State Department of Agriculture (9.71). Finding of the study is comparable with the finding of Chiru (2020) [2], who conducted a study on effectiveness of extension services of public and private extension system in Meghalaya and founded that majority of the beneficiaries from KVK were with 0.58 mean and SD 0.19 for extend of delivery, 0.79 mean and SD 0.1for change in behavior and 0.80 mean and SD 0.12 for level of satisfaction to analyze the effectiveness of KVK services. Whereas, major contributors form RRTC were with 0.63 mean and SD 0.22 for extend of delivery, 0.82 and SD 0.15 reported for change in behavior and 0.85 mean and SD 0.198 reported for the level of satisfaction to analyze effectiveness of the extension services delivered by RRTC.

B. Multiple comparison of effectiveness of extension services between State Department of Agriculture, Krishi Vigyan Kendra and Non Government Organisation

Fisher’s LSD (Least Significant Difference) analysis was used for the Post Hoc test and to define the significant difference between three variables. Post hoc analysis refers to the statically analysis which is used to identity exactly which group is different from each other. Therefore, such test is also called multiple comparison tests.

Table 2: Post Hoc test for effectiveness of need based extension service

	(I) Effectiveness	(J) Effectiveness	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	8.400*	0.864	0.000
		NGO	2.100*	0.864	0.016
	SDA	KVK	-8.400*	0.864	0.000
		NGO	-6.300*	0.864	0.000
	NGO	KVK	-2.100*	0.864	0.016
		SDA	6.300*	0.864	0.000

*The mean difference is significant at the 0.05 level.

Table 2 presents the results of the Post Hoc test (LSD) for comparing the effectiveness of need-based extension services provided by KVK (Krishi Vigyan Kendra), SDA (State Departments of Agriculture), and NGO (Non-Governmental Organizations). The results indicate that KVK are significantly more effective than SDA, with a

mean difference of 8.400 (p=0.000) and moderately more effective than NGO, with a mean difference of 2.100 (p=0.016). In contrast, SDA are significantly less effective than NGO, with a mean difference of -6.300 (p=0.000) and less effective than KVK, as reflected by the reverse comparison -8.400 (p=0.000). Similarly, NGO are less effective than KVK, with a mean difference of -2.100 (p=0.016), but perform significantly better than SDA with mean difference 6.300 (p=0.000). All mean differences are statistically significant at the 0.05 level.

Table 3: Post Hoc test for effectiveness in development area Agriculture Management

	(I) Effectiveness	(J) Effectiveness	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	1.233*	0.466	0.009
		NGO	0.667	0.466	0.154
	SDA	KVK	-1.233*	0.466	0.009
		NGO	-0.567	0.466	0.225
	NGO	KVK	-0.667	0.466	0.154
		SDA	0.567	0.466	0.225

*The mean difference is significant at the 0.05 level.

Perusal of the Table 3 represents the result of Post Hoc test (LSD) for comparing the effectiveness of development area of agriculture management provided by KVK (Krishi Vigyan Kendra), SDA (State Departments of Agriculture), and NGO (Non-Governmental Organizations). The data in the table reveals that KVK are significantly more effective than SDA, with mean difference of 1.233 (p=0.009) and moderately less effective than NGO, with mean difference 0.667 (p=0.154). In contrast, SDA is significantly more effective than KVK, with mean difference -1.233 (p=0.009) and somewhat less effective than NGO, with mean difference -0.567 (p=0.225). With reverse comparison, it can also be seen from the table that NGO is significantly less effective than KVK, with mean difference -0.667 (p=0.154) and less effective than SDA, with mean difference 0.567 (p=0.225). Further all the means are statistically significant at 0.05 level.

Table 4: Post Hoc test for effectiveness in development area Livestock Management

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	2.083*	0.358	0.000
		NGO	-2.250*	0.358	0.000
	SDA	KVK	-2.083*	0.358	0.000
		NGO	-4.333*	0.358	0.000
	NGO	KVK	2.250*	0.358	0.000
		SDA	4.333*	0.358	0.000

*The mean difference is significant at the 0.05 level.

Visualization of the Table 4 shows the Post Hoc test for the effectiveness of extension service in development area Livestock Management with mean differences between the three organisations as KVK (Krishi Vigyan Kendra), SDA (State Departments of Agriculture), and NGO (Non-Governmental Organizations). The comparative analysis in the table showed that KVK is significantly more effective than SDA, with mean difference 2.083 (p=0.000) and less

effective than NGO, with mean difference -2.250 (p=0.000). Similarly, SDA is more effective than KVK, with mean difference -2.083 (p=0.000) and more effective than NGO, with mean difference -4.333 (p=0.000). Likewise, NGO is significantly more effective than KVK, with mean difference 2.250 (p=0.000) and SDA, with mean difference 4.333 (p=0.000). Further all the means are statistically significant at 0.05 level.

Table 5: Post Hoc test for effectiveness in development area Health and Hygiene

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	1.667*	0.226	0.000
		NGO	-4.383*	0.226	0.000
	SDA	KVK	-1.667*	0.226	0.000
		NGO	-6.050*	0.226	0.000
	NGO	KVK	4.383*	0.226	0.000
		SDA	6.050*	0.226	0.000

* The mean difference is significant at the 0.05 level.

Glance of the Table 5 showed the Post Hoc test for effectiveness of three organization in the development area Health and Hygiene and observed that KVK are significantly more effective in health and hygiene area than SDA, with mean difference 1.667 (p=0.000) and statistically less effective than NGO, with mean difference, -4.383 (p=0.000). Further, the table reveals that SDA is significantly less effective than NGO, with mean difference -6.050 (0.000) and KVK, with mean difference -1.667 (0.000). In contrast, NGO is more effective than KVK, with mean difference 4.383 (0.000) and more effective than SDA, with mean difference 6.050 (p=0.000). All the means are statistically significant at 0.05 levels.

Table 6: Post Hoc test for effectiveness in development area Women Empowerment

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	2.217*	0.440	0.000
		NGO	-5.450*	0.440	0.000
	SDA	KVK	-2.217*	0.440	0.000
		NGO	-7.667*	0.440	0.000
	NGO	KVK	5.450*	0.440	0.000
		SDA	7.667*	0.440	0.000

*The mean difference is significant at the 0.05 level.

With respect to LSD analysis for effectiveness in development area of Women Empowerment, it can be inferred from the Table 6 that KVK are significantly more effective than SDA, with mean difference, 2.217 (p=0.000) and significantly less effective than NGO, with mean difference, -5.450 (p=0.000). Further, the table reveals that SDA is significantly less effective than NGO, with mean difference -7.667 (0.000) and KVK, with mean difference -2.217 (0.000). In contrast, NGO is more effective than KVK, with mean difference 5.450 (0.000) and more effective than SDA, with mean difference 7.667 (p=0.000) with respect to effectiveness in development area women empowerment. All the means are statistically significant at 0.05 levels.

Table 7: Post Hoc test for effectiveness in development area Entrepreneurship Development

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	1.283*	0.279	0.000
		NGO	-2.183*	0.279	0.000
	SDA	KVK	-1.283*	0.279	0.000
		NGO	-3.467*	0.279	0.000
	NGO	KVK	2.183*	0.279	0.000
		SDA	3.467*	0.279	0.000

*The mean difference is significant at the 0.05 level.

Post Hoc analysis through LSD pertaining to effectiveness in development area Entrepreneurship Development is presented in Table 7. The result in the table reveals that KVK is significantly more effective than SDA, with mean difference 1.283 (p=0.000) and is statistically less effective than NGO with mean difference -2.183 (p=0.000). Further it can also be seen from the table that, SDA is significantly less effective than NGO, with mean difference -3.467 (p=0.000) and moderately less effective than KVK, with mean difference -1.283 (p=0.000). Similarly, NGO is more effective than SDA, with mean difference 3.467 (p=0.000) and KVK, with mean difference 2.183 (p=0.000). It can be concluded from the table that all the means are statistically significant at 0.05 levels.

Table 8: Post Hoc test for effectiveness of communication facilities of SDA, KVK and NGO.

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	-3.417*	0.855	0.000
		NGO	-2.683*	0.855	0.002
	SDA	KVK	3.417*	0.855	0.000
		NGO	0.733	0.855	0.392
	NGO	KVK	2.683*	0.855	0.002
		SDA	-0.733	0.855	0.392

*The mean difference is significant at the 0.05 level.

Table 8 clearly divulges that KVK is significantly more effective in communication facilities than SDA, with mean difference -3.417 (p=0.000) and moderately more effective than NGO, with mean difference -2.683 (p=0.002). Likewise, in contrast SDA is less effective than KVK, with mean difference 3.417 (p=0.000) and statistically least effective than NGO with mean difference 0.733 (p=0.392). Further, NGO is significantly less effective than KVK, with mean difference 2.683 (p=0.002) and more effective than SDA with mean difference -0.733 (p=0.392). It can be concluded from the table that some of the means of the three organisations are statistically significant at 0.05 levels.

Table 9: Post Hoc test for effectiveness of activities of extension services of SDA, KVK and NGO.

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	2.800*	1.049	0.008
		NGO	-1.733	1.049	0.100
	SDA	KVK	-2.800*	1.049	0.008
		NGO	-4.533*	1.049	0.000
	NGO	KVK	1.733	1.049	0.100
		SDA	4.533*	1.049	0.000

* The mean difference is significant at the 0.05 level.

Glance of the Table 9 shows the result related to Post Hoc analysis of activities of extension services of State

Department of Agriculture, Krishi Vigyan Kendra and Non Government Organisation. The result in the table revealed that KVK is significantly more effective than SDA, with mean difference 2.800 (p=0.008). Similarly, NGO is more effective than SDA, with mean difference 4.533 (p=0.000). Likewise, SDA extension service activities is statistically less effective than NGO, with mean difference -4.533 (p=0.000) and KVK, with mean difference -2.800 (p=0.008). However, there is no statistically significant difference between KVK and NGO activities, with mean difference -1.733 (p=0.100). Thus, it can be concluded that NGO and KVK are performing better in activities of extension service.

Table 10: Post Hoc test for effectiveness of human resource of extension services of SDA, KVK and NGO.

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	1.000*	0.422	0.019
		NGO	-0.283	0.422	0.503
	SDA	KVK	-1.000*	0.422	0.019
		NGO	-1.283*	0.422	0.003
	NGO	KVK	0.283	0.422	0.503
		SDA	1.283*	0.422	0.003

*The mean difference is significant at the 0.05 level.

Data in the Table 10 represents Post Hoc analysis for effectiveness of human resource of extension services of State Department of Agriculture, Krishi Vigyan Kendra and Non Government Organisation. Data showed that KVK is significantly more effective in human resource than SDA, with mean difference 1.000 (p=0.019). Correspondingly, NGO is more effective than SDA, with mean difference 1.283 (p=0.003). Further, the table also depicted that SDA is significantly more effective than NGO, with mean difference -1.283 (p=0.003) and somewhat less effective than KVK, with mean difference -1.000 (p=0.019). Moreover, KVK is not significantly effective than NGO with mean difference -0.283 (p=0.503). Thus, it can be concluded that NGO and KVK are better in human resource of extension service.

Table 11: Post Hoc test for effectiveness of other factors affecting extension services of SDA, KVK and NGO.

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	0.550	0.378	0.148
		NGO	1.500*	0.378	0.000
	SDA	KVK	-0.550	0.378	0.148
		NGO	0.950*	0.378	0.013
	NGO	KVK	-1.500*	0.378	0.000
		SDA	-0.950*	0.378	0.013

*The mean difference is significant at the 0.05 level.

Data pertaining to Table 11 represents the Post Hoc analysis of other factors affecting extension services delivered by the three organisations and showed that KVK is significantly highly effective than NGO with mean difference 1.500 (p=0.000), similarly SDA is slightly high effective than NGO, with mean difference 0.950 (p=0.013). Further, NGO sound less effective in other factors than KVK, with mean difference -1.500 (p=0.000) and SDA, with mean difference -0.950 (p=0.013). It can also be seen from the table that KVK is not significantly effective than SDA, with mean

difference 0.550 (p=0148). It can be concluded from the table that some of the means of the three organisations are statistically significant at 0.05 levels.

Table 12: Post Hoc test for effectiveness of extension services of SDA, KVK and NGO in terms of monitory benefits.

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	1.483*	0.327	0.000
		NGO	-0.850*	0.327	0.010
	SDA	KVK	-1.483*	0.327	0.000
		NGO	-2.333*	0.327	0.000
	NGO	KVK	0.850*	0.327	0.010
		SDA	2.333*	0.327	0.000

*The mean difference is significant at the 0.05 level.

It can be apparent from Table 12 that KVK is significantly less effective than NGO with mean difference of -0.850 (p=0.010) in terms of monitory benefits, while, KVK is more effective than SDA, with mean difference of 1.483 (0.000). Moreover, it can be seen from the table that NGO are more significantly effective than SDA, with mean difference 2.333 (p=0.000) and KVK with mean difference 0.850 (p=0.010). In the same way, it can also be seen from the table that SDA is less effective than KVK, with mean difference -1.483 (0.000) and NGO with mean difference -2.333 (p=0.000). The table concluded that all the means are significant at 0.05 level of significance.

Table 13: Post Hoc test for effectiveness of extension services of SDA, KVK and NGO in terms of adequate services, information, content, activities and input.

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	14.150*	0.797	0.000
		NGO	-10.767*	0.797	0.000
	SDA	KVK	-14.150*	0.797	0.000
		NGO	-24.917*	0.797	0.000
	NGO	KVK	10.767*	0.797	0.000
		SDA	24.917*	0.797	0.000

*The mean difference is significant at the 0.05 level.

Table 13 depicted the LSD analysis of adequate extension service provided by the three organisations and observed

Table 15: Post Hoc test for effectiveness of extension services of SDA, KVK and NGO in terms of timely delivery

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	10.867*	0.596	0.000
		NGO	-9.400*	0.596	0.000
	SDA	KVK	-10.867*	0.596	0.000
		NGO	-20.267*	0.596	0.000
	NGO	KVK	9.400*	0.596	0.000
		SDA	20.267*	0.596	0.000

*The mean difference is significant at the 0.05 level.

Glance of the Table 15 depicted the data related to Post Hoc test for effectiveness of extension services of State Department of Agriculture, Krishi Vigyan Kendra and Non Government Organisation in terms of timely delivery of service and revealed that KVK is significantly less significant than SDA with mean difference 10.867 (p=0.000) and more effective than NGO with mean difference -9.000 (p=0.000). Moreover, SDA is extremely less significantly effective than NGO with mean difference -20.267 (p=0.000) and less

that all the means are significant at 0.05 level of significance. Further, the data in the table depicted that with respect to adequate services, information, content, activities and input, KVK is significantly more effective than SDA, with mean difference 14.150 (p=0.000) and less effective than NGO, with mean difference -10.767 (p=0.000). Moreover, SDA is less effective than KVK, with mean difference -14.150 (p=0.000) and NGO, with mean difference -24.917 (p=0.000). Likewise, NGO is significantly more effective than KVK, with mean difference 10.767 (p=0.000) and SDA, with mean difference 24.917 (p=0.000).

Table 14: Post Hoc test for effectiveness of extension services of SDA, KVK and NGO in terms of relevant services, information, content, activities and input.

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	12.133*	0.570	0.000
		NGO	-5.733*	0.570	0.000
	SDA	KVK	-12.133*	0.570	0.000
		NGO	-17.867*	0.570	0.000
	NGO	KVK	5.733*	0.570	0.000
		SDA	17.867*	0.570	0.000

*The mean difference is significant at the 0.05 level.

Table 14 reveals the data related to LSD analysis of effectiveness of extension services of State Department of Agriculture (SDA), Krishi Vigyan Kendra (KVK) and Non Government Organisation (NGO) in terms of relevant services, information, content, activities and input. The data in the table showed that all means are significant at 0.05% level. Further, KVK is significantly less effective than SDA, with mean difference 12.133 (p=0.000) and more effective than NGO, with mean -5.733 (p=0.000). It can also be concluded from the table that SDA is least significantly effective than NGO with mean difference -17.867 (p=0.000) and less effective than KVK with mean difference -12.133 (p=0.000). Contrarily, NGO is statically more effective than SDA with mean difference 17.867 (p=0.000) and fairly high than KVK with mean difference 5.733 (p=0.000). from the table it can be observed that NGO and KVK extension service are more relevant than services of SDA.

effective than KVK with mean difference -10.867 (p=0.000). On the other hand, NGO is more statistically effective than KVK with mean difference 9.400 (p=0.000) and extremely more effective than SDA with mean difference 20.2677. It can be concluded that all the means are significant at 0.05 level and NGO and KVK are more active in delivering extension service timey rather than SDA.

Table 16: Post Hoc test for effectiveness of extension services of SDA, KVK and NGO in terms of change in behavior.

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	-1.800*	0.581	0.002
		NGO	-1.383*	0.581	0.018
	SDA	KVK	1.800*	0.581	0.002
		NGO	0.417	0.581	0.474
	NGO	KVK	1.383*	0.581	0.018
		SDA	-0.417	0.581	0.474

*The mean difference is significant at the 0.05 level.

It can be observed from the Table 16 that KVK is statistically more effective than SDA with mean difference -1.800 (p=0.002) and NGO with mean difference -1.383 (0.018) in terms of change in behavior of beneficiaries. Whereas, SDA is significantly less effective than KVK, with mean difference 1.800 (p=0.002) in term of change in behaviour. Similarly NGO is more effective in change in behavior than KVK with mean difference 1.383 (p=0.018). Further, from the table it can be concluded that SDA is not significant with NGO with mean difference 0.417 (p=0.474). Thus, some of the means are significant at 0.05 level.

Table 17: Post Hoc test for effectiveness of extension services of SDA, KVK and NGO in terms of satisfaction.

	(I) factors	(J) factors	Mean Difference (I-J)	Std. Error	Sig.
LSD	KVK	SDA	0.233	0.334	0.486
		NGO	-0.667*	0.334	0.048
	SDA	KVK	-0.233	0.334	0.486
		NGO	-0.900*	0.334	0.008
	NGO	KVK	0.667*	0.334	0.048
		SDA	0.900*	0.334	0.008

*The mean difference is significant at the 0.05 level.

It can be inferred from the Table 17 that KVK is statistically less effective than NGO with mean difference -0.667 (p=0.048). Likewise SDA is less effective than NGO with mean difference -0.900 (p=0.008) with respect to providing satisfaction to beneficiaries through extension services of State Department of Agriculture, Krishi Vigyan Kendra and Non Government Organisation. Whereas, NGO is significantly more effective in terms of satisfaction than KVK with mean difference 0.667 (p=0.048) and more effective than SDA with mean difference 0.900 (p=0.008). Therefore, it can be seen from the table that KVK is not statistically significant with SDA with mean difference 0.233 (p=0.486). Thus all the means are significant at 0.05 levels except some mean.

Conclusion

It was concluded from the present study that there is a significant difference between the means of effectiveness of extension services between SDA, KVK and NGO about need based extension services, extension services in development area, viz., agriculture management, livestock management, health and hygiene, women empowerment and entrepreneurship development, communication facilities, activities of extension services, human resources, other factors affecting extension services, effectiveness in terms of monetary benefits, adequacy, relevancy, timely delivery, change in behavior and satisfaction. Further the study also

reveals that NGO beneficiaries perceived significant difference of effectiveness of delivery of extension services by their organisation than KVK beneficiaries. Moreover, both NGO and KVK beneficiaries perceived significant difference of effectiveness of extension services than SDA beneficiaries.

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