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Effectiveness of Agri-Clinics in Promoting Paid Extension Services Among Farmers

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ABSTRACT

This study was conducted in Uttar Pradesh to evaluate the farmers' perceived effectiveness of paid extension services provided by Agri Clinic entrepreneurs. Study found that the effectiveness was high among the beneficiary farmers. About fifty per cent respondents perceived that the paid extension services were moderately effective while the rest perceived them to be highly effective. Among the correlates, annual income, social participation, farm machinery owned were negatively and significantly associated. Regression analysis of effectiveness index scores revealed the positive contribution of age, education, farm size and negative contribution of farming experience, annual income and social participation. Among the four components, the contribution of extent of adoption and farmers' satisfaction was very high in farmers' perceived effectiveness of paid extension services provided by Agri Clinic entrepreneurs.

Key words: Agri clinic, adoption, yield, profit, farmers' satisfaction, extension effectiveness index

INTRODUCTION

In order to strengthen the extension services provided to the farmers and at the same time tap the potential of unemployed agriculture graduates to provide them with employment opportunities by making them agripreneurs, the Union Finance Minister announced in the Budget speech on February 28, 2002, about setting up Agri Clinic and Agri Business Centres (ACABCs) by agriculture graduates with the support of National Bank for Agriculture and Rural Development (NABARD). The scheme was launched by the Government of India on 9th April 2002 to supplement the efforts of extension services in the country with the objectives of (i) providing extension and other services to farmers on payment basis (ii) supplementing agriculture development and entrepreneurship; and (iii) promotion of self-employment in agriculture sector.

The starting of Agri Clinics and Agri Business centers in the country to serve the farmers is a welcome step to strengthen the support and extension services in agriculture. Moreover, in this world of globalization and liberalization the transformation of agriculture from subsistence to commercialization is the need of the hour. It is assumed that the scheme will help farmers to improve their farm income and provide them better position in the society. These centers are thus assumed to bring in both social and economic transformation among the farming community.

The success of this scheme is directly proportional to the success of the agripreneurs and farmers. The key objective of the scheme was to provide accountable extension services to farmers on payment basis. The Agri Clinics will succeed only when they perform well and only when they provide useful and relevant extension services to farmers. Hence, it was felt necessary to assess the effectiveness of the paid extension services provided by Agri Clinic entrepreneurs. This paper deals with the effectiveness and its components, and correlates.

METHODOLOGY

The study was conducted in 12 districts of Uttar Pradesh, where Agri Clinics were found to be running with a considerable amount of success. Their effectiveness can be seen in Agri Clinic influence on farmers' extent of adoption of recommended practices, which is reflected to increase the yield of crops and profits for farmers. In general, farmers may also express a sense of satisfaction with the services provided by Agri Clinics. Hence, a sample of farmers was interviewed and primary data were collected to assess the effectiveness of extension services. The effectiveness of the agricultural extension services was measured by an effectiveness index developed for the study which consisted of the following four components.

Extent of adoption

The extent of adoption was measured for the recommended management practices in which the Agri Clinic was rendering integrated extension services. The

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sets of recommended practices were: (1) variety, spacing and major cultural practices, (2) irrigation management practices, (3) nutrient management practices, and (4) plant protection measures. The extent of adoption was measured as percentage of adoption of recommended practices as given below:

$$\text{Extent of adoption} = \frac{\text{Actual practice}}{\text{Recommended practice}} 100$$

Percentage of increase in yield

Increase in yield was calculated by subtracting the earlier yield per hectare per year (*i.e.,* before the intervention of Agri Clinic) from the present yield per hectare per year (*i.e.,* after the intervention of Agri Clinic). The increase in yield was converted into percentage increase in yield using the following formula:

$$\text{Percentage increase in yield (PIY)} = \frac{\text{Increase in yield per hectare per year}}{\text{Earlier yield per hectare per year}} 100$$

Percentage increase in profit

Increase in profit was calculated by subtracting the earlier profit per hectare per year (i.e., before the intervention of Agri Clinic) and present profit per hectare per year (i.e., after the intervention of Agri Clinic). The increase in profit was converted into percentage increase in profit using the following formula:

$$\text{Per cent increase in profit} = \frac{\text{Increase in profit per hectare per year}}{\text{Earlier profit per hectare per year}} 100$$

Farmers' satisfaction

The farmers' satisfaction of extension services was measured by an index developed for the purpose. The scores on 38 statements were obtained on a five-point continuum were added to get client's satisfaction score, which was converted into client satisfaction index score using the following formula:

$$\text{Client satisfaction index} = \frac{\text{The individual obtained score}}{\text{Maximum score}} 100$$

Calculation of extension effectiveness index after finding out the score of the four components of extension effectiveness, the extension effectiveness index was calculated for every respondent based on the following formula:

$$\text{Effectiveness index} = \frac{\text{CSI} + \text{AI} + \text{PIY} + \text{PIP}}{4}$$

Where, EA = Extent of adoption of an individual farmer,
PIY =Per cent increase in yield for individual farmer,

PIP= Per cent increase in profit for each farmer, and

CSI = Client satisfaction index score of an individual.

RESULTS AND DISCUSSION

The results are presented under the following sub-sections: frequency distribution of extension effectiveness index, correlation and regression analysis, frequency distribution of four components of extension effectiveness index, extent of adoption of selected agricultural practices and farmers' satisfaction components.

Frequency distribution of extension effectiveness index

Extension effectiveness index scores were computed as the total score from the percentage scores of all four components. The frequency distribution of the farmers on these scores was presented in Table 1.

Table 1: Frequency distribution of respondents on effectiveness index scores

Effectiveness Index		**n=120**
Mean	79.50	
Std. Deviation	6.53	
Range	67 – 100	
Categories	**Frequency**	**Percentage**
Very Low (0 - 20)	0	0
Low (20 - 40)	0	0
Medium (40 - 60)	61	50.83
High (60 - 80)	57	47.50
Very High (80 - >100)	02	01.67
Total	**120**	**100**

The results reveal that the mean effectiveness score was 79.5, which is very high. The standard deviation was low at 6.53. The scores ranged between 67 to 100. The frequency distribution was highly skewed towards higher end of effectiveness scores.

About 50 per cent of respondents were in medium category, while about 47 per cent of them were in high category of effectiveness index scores. These extension effectiveness index scores of farmers were also put to further statistical analysis of correlation and regression (Table 2).

Table 2: Correlation analysis of effectiveness of Agri Clinics with socio personal characteristics of beneficiary farmers

n=120

Characteristics	Correlation Coefficients
Age	0.129
Education	0.131
Family Size	0.145
Farm Size	-0.054
Farming Experience	0.027
Livestock (cow)	-0.009
Livestock (Buffalo)	-0.008
Farm machinery owned	-0.175*
Annual Income from Agriculture	-0.178*
Annual Income others	-0.100
Total Annual Income	-0.191**
Primary Source of Information	-0.108
Social Participation	-0.186*

*Significant at 0.05 level of probability
**Significant at 0.01 level of probability

The results revealed that total annual income (negatively correlated) were significant with effectiveness index scores of farmers at 0.01 level of probability. Farm machinery owned, annual income from agriculture, and social participation were found to be negatively significant at 0.05 level of probability.

The regression analysis was done to ascertain the contribution made by independent variables to the variance in dependent variable of extension effectiveness of Agri Clinics. The results in the Table 3 revealed that 29.5 per cent of variation in extension effectiveness of Agri Clinics. The F value at 14, 104 degrees of freedom was found to be significant at 0.01 level of probability. Among the variables that positively influenced the extension effectiveness of Agri Clinics were farmers' age, education, and farm size. The variables that showed a negative influence were farming experience, total annual income and social participation of farmers.

Out of fifteen variables fitted in the regression equation, only six were found to be significantly contributing to the variance in extension effectiveness of Agri Clinics. Among the 15 variables, only one variable was significant at 0.05 level of probability, while five others were significant at 0.01 level of probability.

Components of extension effectiveness

An attempt has been made to understand the frequency distribution of respondents on the four component variables of effectiveness index. The scores were computed for all four components. The frequency distributions of the farmers on these scores of four components were presented in Table 4. The results in the table relate to frequency distributions of the four components: the extent of adoption, increase in yield and profit and farmer's satisfaction. The analysis of the data on all the four components was done in order to ascertain the relative strength of the components in contributing to the overall effectiveness of paid extension services provided by Agri Clinics.

Table 3: Regression analysis of effectiveness index of Agri Clinics

n=120

Independent variables	Beta estimate	Std. Error	t value
Constant	38.114	6.665	5.719
Age	0.387	0.112	3.457**
Education	0.826	0.392	2.107*
Family Size	0.865	1.065	0.812
Farm Size	0.364	0.115	3.160**
Farming Experience	-0.358	0.138	-2.593**
Live stock (Cows)	0.150	0.305	0.493
Live stock (Buffaloes)	0.665	1.251	0.532
Farm Machinery	-1.013	0.561	-1.806
Annual Income (Others)	0.568	2.265	0.251
Total Annual Income	-1.381	0.436	-3.169**
Primary Source of Information	-0.009	0.990	-0.093
Social Participation	-1.268	0.457	-2.776**

*Significant at 0.05 level of probability
**Significant at 0.01 level of probability
$R = 0.544 R^2 = 0.295 F_{14, 104} = 3.116$**

Table 4: Frequency distribution of respondents on four components of effectiveness

n=120

Components of Effectiveness	Extent of Adoption (Per cent)		Increase in Yield (Per cent)		Increase in Profit (Per cent)		Farmers' Satisfaction (Per cent)	
Mean	79.50		29.44		46.18		86.51	
Std. Deviation	6.53		13.56		12.60		5.60	
Range	67 -100		9.25 -119.44		21.68 – 82.51		65.56 – 93.33	
Categories	***f***	**%**	***f***	**%**	***f***	**%**	***f***	**%**
Very Low (0 - 20)	0	00.00	27	22.50	0	00.00	0	00.00
Low (20 - 40)	0	00.00	78	65.00	40	33.33	0	00.00
Medium (40 - 60)	0	00.00	13	10.80	64	53.33	0	00.00
High (60 - 80)	94	78.33	02	01.70	14	11.66	10	08.33
Very High (80 - >100)	26	21.66	0	0.00	02	01.68	110	91.67
Total	**120**	**100**	**120**	**100**	**120**	**100**	**120**	**100**

Extent of adoption: It was measured for the recommended management practices in which the Agri Clinic was rendering integrated extension services. The sets of recommended practices were: (1) variety, spacing and major cultural practices, (2) irrigation management practices, (3) nutrient management practices, and (4) plant protection measures.The results reveal that the mean extent of adoption score was 79.5, which is very high. The standard deviation was low at 6.53. The scores ranged between 67 to 100. The frequency distribution was highly skewed towards higher end of adoption scores. About 78 per cent of respondents were in high category, while about 22 per cent of them were in very high category to extent of adoption scores.

Increase in yield: It was calculated by subtracting the earlier yield per acre per year (i.e., before the intervention of Agri Clinic) from the present yield per acre per year (*i.e.*, after the intervention of Agri Clinic).

The results reveal that the mean increase in yield was 29.44, which is very low. The standard deviation was low at 13.56. The increase in yield ranged between 9.25 per cent to 119. The frequency distribution was highly skewed towards lower end of per cent increase in yields. About 65 per cent of respondents were in low category of yield increase, while about 22 per cent of them were in very low category of increase in yield scores.

Increase in profit: It was calculated by the subtracting the earlier profit per acre per year (i.e., before the intervention of Agri Clinic) and present profit per acre per year (*i.e.*, after the intervention of Agri Clinic).

The results reveal that the mean increase in profit was 46.18 per cent, which was at a moderate level. The standard deviation was low at 12.6. The scores ranged between 21 to 82. The frequency distribution was more or less normal but slightly skewed towards lower end of per cent increase in profit scores. About 53 per cent of respondents were in medium category of increase in profit, while about 33 per cent of them were in low category of per cent increase in profit scores and only 11 per cent of them could achieve high per cent of increase in profit from their Agri Clinic enterprises.

Farmers' satisfaction of extension services: It was measured by an index developed for the purpose. It consisted of 38 statements, for which the respondents gave their responses on a five-point rating scale. These scores on all statements were added to get client's satisfaction score, which was converted into client satisfaction index score.

The results reveal that the mean extent of adoption score was 86.5, which is very high. The standard deviation was low at 5.6. The scores ranged between 65 to 93. The frequency distribution was highly skewed towards higher end of farmer's satisfaction scores. About 91 per cent of respondents were in very high category, while about 8 per cent of them were in high category of farmer's satisfaction index scores.

Thus, the results reveal that out of the four components, two components: extent of adoption and farmer's satisfaction were high in their contribution to overall effectiveness of extension services. While the yield increases were low and increases in profit were moderate. These results can be considered as encouraging for the Agri Clinic entrepreneurs.

Extent of adoption of selected agricultural practices

Further analysis of the available data was felt necessary as they give more specific insights in to the adoption behavior and satisfaction of the farmer beneficiaries.

Such an analysis would further boost the morale of Agri Clinic entrepreneurs, in addition to providing useful guides for evolving a strategy for enhancing extent of adoption of improved agricultural practices among the farmer beneficiaries and thereby enhancing their level of satisfaction with paid extension services of Agri Clinic.

It has been observed that a number of agricultural practices were being adopted by beneficiary farmers and so an attempt was made to know what would be the extent of adoption of various agricultural practices recommended by Agri Clinic. The results of such an analysis are presented in Table 5

Table 5: Adoption of selected agricultural practices by the farmer beneficiaries

n=120

Selected agricultural practices	Frequency	Per cent
Bio-Fertilizers	120	100.00
Bio-Pesticides	120	100.00
IPM	120	100.00
Hybrids/ Varieties	120	100.00
INM	120	100.00
Plant Growth Regulators	120	100.00
Soluble Fertilizers	120	100.00
Micro Nutrients	120	100.00
Seed Treatment	119	99.00
Herbicides	119	99.00
Soil Testing	96	80.00
Organic Manures	94	78.00
Farm Machinery	28	23.33
Vermicompost	14	11.60
Bio-Control	1	0.08

A cursory look at the results reveal that all the farmers were adopting the following agricultural practices: hybrids and improved varieties, seed treatment, integrated nutrition management, soluble fertilizers, micro-nutrients, plant growth regulators, bio-fertilizers, integrated pest management, bio-pesticides, and herbicides. Nearly 80 per cent of the farmer respondents were adopting soil testing and organic manures in their fields. Only 23 per cent of them were adopting improved farm machinery, while 11 per cent of them were adopting vermi-composting.

Increase in Yield

Increase in yield was recorded for about 29 crops being cultivated in varying proportions by the beneficiary farmers. Their average per cent increase in yield was computed and the results are presented in Table 6.

Table 6: Average yield in quintals per hectare of different crops grown by beneficiary farmers

n=120

Crop	Before yield	After yield	Yield difference	Per cent increase
	qt/ha	qt/ha	qt/ha	
Rice	45.42	56.56	11.11	24.47
Wheat	31.29	40.90	9.55	30.54
Maize	16.67	21.61	4.94	29.63
Bajra	14.82	20.45	5.63	38.00
Red gram	9.68	14.32	4.64	47.96
Cowpea	19.76	24.70	4.94	25.00
Bengal gram	10.91	15.98	5.06	46.38
Pea	41.20	52.63	11.43	27.75
Groundnut	16.45	22.23	5.75	34.98
Mustard	11.65	17.16	5.48	47.03
Sugarcane	610.09	678.48	68.39	11.21
Onion	234.45	276.44	41.99	17.91
Garlic	76.91	91.39	14.44	18.79
Potato	241.19	272.26	32.01	13.27
Tomato	230.57	268.68	38.08	16.52
Chillies	142.86	172.35	29.49	20.64
Bhendi	36.43	43.22	6.79	18.64
Brinjal	180.82	213.45	32.62	18.04
Bitter guard	86.03	107.02	20.99	24.40
Coccinia	97.56	111.15	13.58	13.92
Capsicum	209.95	247.00	37.05	17.65
Cauliflower	141.90	167.96	26.47	18.66
Carrot	61.75	74.10	12.35	20.00
Guava	234.65	247.00	12.35	5.26
Papaya	123.50	247.00	123.50	100.00
Citrus	222.30	251.94	29.64	13.33
Marigold	444.60	494.00	49.40	11.11
Tobacco	11.73	15.43	3.70	31.58
Mentha	0.49	0.74	0.24	50.00

The yield data was recorded for 29 crops, out of which are four cereals, four pulses, two oilseeds, 12 vegetables, three cash crops and three fruit trees. The yield increase was highest in Papaya and Red gram, and lowest in Marigold and *Coccinia* vegetable.

Increase in Profit

Increase in profit was recorded for about 29 crops being cultivated in varying proportions by the beneficiary farmers. Their average per cent increase in profit was computed and the results are presented in Table 7.

Table 7: Average profit in Rupees per hectare different crops grown by beneficiary farmers

n=120

Crop	Before profit	After profit	Profit difference	Per cent increase in profit
Rice	35355	49081	13691	38.72
Wheat	26488	39670	13105	49.48
Maize	15437	24700	9262	60
Bajra	15526	28933	13409	86.37
Red gram	26280	42978	16598	63.16
Cowpea	39520	54340	14820	37.5
Bengal gram	29380	42639	13258	45.13
Pea	79820	106990	27429	34.36
Ground nut	21407	29640	8232	38.46
Mustard	22679	38396	15605	68.81
Sugarcane	60245	86020	26634	44.21
Onion	80628	111503	30875	38.29
Garlic	67749	82569	14820	21.87
Potato	71583	98276	26599	37.16
Tomato	77980	103386	25406	32.58
Chillies	100748	131949	31460	31.23
Bhendi	20995	30257	9262	44.12
Brinjal	84686	116443	31756	37.50
Bitter guard	76157	102092	25935	34.05
Coccinia	98800	119795	20995	21.25
Capsicum	98800	142025	43225	43.75
Cauliflower	80163	110925	30763	38.38
Carrot	9880	12350	2470	25.00
Guava	96330	143260	46930	48.72
Papaya	148200	227240	79040	53.33
Citrus	130910	182780	51870	39.62
Marigold	51870	74100	22230	42.86
Tobacco	76570	103740	24082	31.45
Mentha	9880	12350	2470	25.00
Average	59371	82726	23186	40.93

The profit increase was quite impressive. While the average increase in profits was 40 per cent, increase in profit was above the average in twelve crops. While increase was higher than 60 per cent in bajra, mustard, redgram and maize, it was lower than 25 per cent in carrot and *Mentha*.

Farmers' satisfaction

Component analysis of the farmer's satisfaction was done to know the specific satisfaction levels of farmers on various components. The results of such an analysis are presented in Table 8.

A cursory look at the results reveal that 85-100 per cent farmers were very highly satisfied with 6 items out of 7 items considered for assessing farmers' satisfaction. All the farmers were very highly satisfied with the fairness and competence of the Agri Clinic entrepreneurs, and their effectiveness in solving field problems. About 91-93 per cent farmers were also very highly satisfied on provision of appropriate technology and supply of proper inputs. While 89 per cent farmers were highly satisfied with training programmes and demonstrations, 85 per cent of them were very highly satisfied with provision of proper advice.

More than 74 per cent of farmers were highly satisfied with timeliness of the extension services.

An overview of the results of the analysis of perceived effectiveness of paid extension services revealed that the effectiveness was very high among the majority of beneficiary farmers, as can be clearly seen from their higher extent of adoption and resultant satisfaction. It only reiterates the need for providing useful and relevant extension services for farmers for enhancing their levels of adoption of improved agricultural practices. Gaining farmers' satisfaction is an important guide for encouraging farmers to pay for the extension services provided to them. The results also emphasize the need for providing timely and competent

extension services, appropriate technology and inputs to needy farmers, as they have clear felt need and clearly understood the efficacy of application of improved agricultural extension services for farmers. Since the Agri Clinic and Agri Business is a new set of approach it is expected that it will strengthen the Indian Extension system and enhance the productivity, income and satisfaction of farmers in years to come.

Table 8: Frequency distribution of respondents on various dimensions of satisfaction

Dimensions of Farmers' Satisfaction	Very Low		Low		Medium		High		Very High	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
Provision of appropriate technology	0	0	0	0	0	0	8	6.6	112	93.34
Supply of proper inputs	0	0	0	0	0	0	10	8.33	110	91.67
Provision of proper advice	0	0	0	0	2	1.67	16	13.3	102	85.0
Timeliness of the services	0	0	0	0	5	4.16	89	74.16	26	21.67
Effectiveness in solving field problems of the farmers	0	0	0	0	0	0	1	0.84	119	99.16
Conducting training and demonstrations	0	0	6	5.0	2	1.67	5	4.16	107	89.16
Fairness and competence of the Agri Clinic entrepreneurs	0	0	0	0	0	0	0	0	120	100.0

CONCLUSION

The study on effectiveness of paid extension services provided useful insights into the four components that make up the effectiveness index. While extent of adoption was very high, the increase in yields was low and increase in profits was moderate. Yet the farmer's satisfaction was very high. The study also brought to light the felt needs of farmers for availability of appropriate agricultural technology, provision of inputs and extension services locally. Generally, the input agencies are located in the cities and farmers are living in remote villages. But Agri Clinic and Agri Business entrepreneurs are from the grassroots of the villages and having their centers in remote villages. It is therefore, concluded that they will better serve the needy farmers locally and timely. Doing so, the cost of cultivation will be reduced to great extent and the level of income will be increased substantially. This will provide much satisfaction to both the farmers and agripreneurs.

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