



## A study on adoption of modern agricultural development measures in Aligarh district

Dr. Rajni Sharma

### Abstract

The aim of the present study was to assess the adoption level of agricultural mechanization practiced by the farmers in Aligarh district. The primary data has been used for the study which was collected from 386 selected farmers in the study region. The study revealed that only 9.92 percent and 2.36 percent of farmers were graduate and post-graduate respectively. The maximum size of land holding was covered by marginal farmers, i.e. 34.03 percent. The study also showed that large, medium and semi medium farmers have their own implements of agriculture. The adoption level of new agricultural techniques was poor in the study region due to small size of land holding, low profits, lack of credit, infrequent supervision, lack of conveyance facility and lack of awareness among farmers.

**Keywords:** Mechanization, Irrigation, Size of Land Holding, Credit, Education.

### Introduction

In under-developed countries, such as India, most parts of agricultural land are put to only one round of cultivation during the course of a year. Hence, in these countries considerable agricultural growth can be achieved through the spread of the practice of double or multiple cropping. However, adoption of multiple cropping by farmers would require better irrigation facilities to ensure timely and adequate water supply, application of fertilizers to replenish soil nutrients, use of short duration crop varieties to release land early enough and quicker preparation of land for the next round of cultivation. Thus, significant increase in cropping intensity cannot be expected without some improvement in the system and technique of cultivation in these countries (Bezbaruah, 1994). Sustained growth of agriculture in the long run thus depends ultimately on the improvement of farming technology in the country. A farmer will adopt a new practice or new agriculture technology only if he is convinced of its economic benefits in his farming conditions. The extent of adoption level of new agricultural practices will differ from farmer to farmer depending on the socio-economic and physical conditions.

The mechanization of agriculture is generally used in the sense of using varieties of inputs such as implements, machinery. The appropriate use of agriculture inputs has a direct effect on the profitability of farms, productivity and the quality of life of agriculture worker. (Clarke, 2000; Bishop, 1997).

### Objectives

The main objectives of the present study are:

- 1) to assess adoption level and use of improved practices by the farmers in the region.
- 2) To identify constraints on agricultural production in the study region.



## Materials and methods

The present paper is based on primary sources of data which was collected during the year 2016 on the basis of random sampling. The samples were collected from the selected 12 villages; one village was selected from each block of the district. A sample of 386 farmers comprising 36 respondents from Takipur, 35 respondents from Elampura, 37 respondents from Ainchana, 30 respondents from Tejpur, 28 respondents from Kaithwari, 31 respondents from Boner, 37 respondents from Bistauli, 27 respondents from Pilkhuni, 33 respondents from Taraichi, 31 respondents from Rahmapur, 33 respondents from Ektajpur and 28 respondents from Taharpur were selected. Therefore, a total of 386 households were surveyed.

Information on the general background and farming methods and other details relating to cultivation of each farm household in the sample have been collected by interviewing a senior member of the farm family. For carrying out these interviews and for recording the collected information, a standard schedule of questions was used. Simple percentage method has been used to analyse the data.

## Study Area

Aligarh district is located in the central part of the Ganga -Yamuna Doab region of Western Uttar Pradesh. It lies between latitudes 27°34' N and 28°11' N and between longitudes 77°29' E and 78°38' E. The total geographical area of the district is 3650 square kilometers. It is bounded by the district of Etah in the East, Mathura in the West, Bulandshahr in the North and Hathras in the South. The total population of the district accounted for 29, 92,286 persons (Rural 2,456,698 persons and Urban 1,217,191 persons) and the population density in the region is 1,007 persons per km square (Census 2011) which is more than the state average. The district has been divided into five *tehsils*, namely Atrouli, Ghabana, Khair, Koil and Iglas. These *tehsils* are further subdivided into twelve blocks. They are Atrouli, Gangiri, Bijauli, Jawan, Chandaus, Khair, Tappal, Dhanipur, Lodha, Akrabad, Iglas and Gonda Aligarh district is made-up of fertile alluvium which is remarkable for its uniformity and a leveled surface and the region enjoys a tropical monsoon climate.

## Results and discussion

### Educational Level of Respondents

A detailed account of educational levels in selected villages is given in Table 1. It is seen from this Table that 86.73 percent are literate respondents while the remaining 13.27 percent are illiterates. Out of the total respondents, 30.06 percent have upper-primary level of education. The maximum numbers of farmers, i.e. 44.38 percent have education up to senior-secondary level whereas only 9.92 percent and 2.36 percent farmers were graduate and post-graduate respectively.



**Table 1. Educational Status of Respondents in Selected Villages (2016)**

S.No.	Villages	Illiterates	Literates			
			Upper Primary	Senior Secondary	Graduate	Post Graduate
1	Takipur	16.67	27.78	44.44	11.11	0.00
2	Elampura	8.57	25.72	62.86	2.86	0.00
3	Ainchana	2.70	32.43	54.05	8.11	2.70
4	Tejpur	23.33	43.34	23.34	6.67	3.33
5	Kaithwari	10.71	32.14	39.29	17.86	0.00
6	Boner	16.13	16.13	54.83	12.90	0.00
7	Bistauli	18.92	40.54	37.83	2.70	0.00
8	Pilkhuni	7.41	29.63	51.85	11.11	0.00
9	Taraichi	15.15	33.33	42.42	9.09	0.00
10	Rahmapur	9.68	25.8	45.16	9.68	9.68
11	Ektajpur	12.12	18.18	51.51	9.09	9.09
12	Taharpur	17.86	35.71	25.00	17.86	3.57
	<b>Total</b>	<b>13.27</b>	<b>30.06</b>	<b>44.38</b>	<b>9.92</b>	<b>2.36</b>

Sources: Based on data obtained from field survey, 2016

### Size of Operational Land Holdings

In the developing countries, the pressure of population is high on land; therefore the size of land holdings is generally very small. The small size of land holding is a major problem in adopting modern techniques of agriculture.

Table 2 shows that only 0.46 percent farmers are large farmers and covered 2.70 percent of total land holdings of sampled households. There are 9.35 percent of farmers who belongs to medium size of land holding and they covered 24.33 percent area of total land holding area. The semi-medium farmers are 25.26 percent who covered maximum area out of all classes of land holdings, i.e. 35.21 percent. The percentages of small farmers are 30.90 percent who cover 25.44 percent of the area. The maximum number of farmers (34.03 percent) belongs to category of marginal holdings and they cover 12.33 percent area. The small and marginal farmers are unable to adopt effective utilization of agricultural practices and have little agricultural implements. It is obvious from the Table 2 that the distribution of operational holdings in the region is highly skewed with the concentration of one third of the holdings in the marginal class of below one hectare. It is well known that too small a holding size may render adoption of modern agricultural operations economically unviable (Rao, 1989).

**Table 2 Number and Size of Land Holding in Selected Villages of Aligarh District, 2016**

S. No.	Villages	Large (>10 hectares)		Medium 4-10 hectares		Semi-Medium 2-4 hectares		Small 1-2 hectares		Marginal <1 hectares	
		No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
1.	Takipur	2.78	19.59	11.11	21.74	30.56	32.32	30.56	21.06	25.00	5.29
2.	Elampura	0.00	0.00	8.57	19.75	28.57	41.21	40.00	31.85	22.86	7.19
3.	Ainchana	0.00	0.00	13.51	32.20	29.73	36.18	32.43	25.59	24.32	6.03
4.	Tejpur	0.00	0.00	3.33	9.12	23.33	41.97	40.00	32.66	33.33	16.24
5.	Kaithwari	0.00	0.00	10.71	24.87	32.14	49.74	25.00	18.55	32.14	6.84
6.	Boner	0.00	0.00	6.45	33.99	16.13	27.58	29.03	25.27	48.39	13.17
7.	Bistauli	2.70	12.84	18.92	36.44	21.62	25.12	29.73	20.08	27.03	5.52
8.	Pilkhuni	0.00	0.00	3.70	13.27	7.41	15.31	29.63	34.69	59.26	36.73
9.	Taraichi	0.00	0.00	3.03	18.07	9.09	20.55	27.27	31.85	60.61	29.53
10.	Rahmapur	0.00	0.00	6.45	16.04	38.71	57.09	22.58	17.65	32.26	9.22
11.	Ektajpur	0.00	0.00	12.12	31.17	51.52	54.75	18.18	10.60	18.18	3.47
12.	Taharpur	0.00	0.00	14.29	35.25	14.29	20.65	46.43	35.40	25.00	8.70
<b>Total</b>		<b>0.46</b>	<b>2.70</b>	<b>9.35</b>	<b>24.33</b>	<b>25.26</b>	<b>35.21</b>	<b>30.90</b>	<b>25.44</b>	<b>34.03</b>	<b>12.33</b>

Sources: Based on data obtained from field survey, 2016

### Farm implements

The quantum of irrigation, the size of land holdings, the subsistence or commercial character of agriculture and the farmers' economic status also determine the use of farm implements. All these differences are reflected in the variation in the adoption of agricultural implements. The small and marginal farmers are conservative and being poor, they can not afford improved farm implements.

It is clear from Table 3 that only 38.38 percent farmers have their own tractors. The farmers, who have tractors, most of them have also harrows, cultivators and tillers. There are only 22.07 percent farmers who have their own thrashers. Rotavators are new agricultural implements and found very few in study area. Table 3 shows that only 4.37 percent farmers have rotavators. There are 55.63 percent farmers, who use sprayers and 29.33 percent farmers have own sowing machines. Every farmer of Taharpur village use sprayer because potato cultivation is dominant in this village. The farmers of Takipur, Pilkhuni and Ektajpur villages use more than 75 percent of sprayers because of dominance of vegetables crop. Seed sowing with the help of machineries were adopted for only wheat and potato crops. There are four villages, namely Takipur, Ainchana, Bistauli and Taharpur which are high in agricultural implements due to large and marginal farmers.



**Table 3 Use of Agricultural Implements by Farmers in Sampled Villages of Aligarh District, 2016**

S. No.	Villages	Tractors	Harrow s	Cultivators	Thrasher s	Rotavator s	Tillers	Sprayer s	Sowing Machines
1.	Takipur	63.89	55.56	63.89	33.33	5.56	63.89	75	25
2.	Elampura	22.86	17.14	22.86	8.57	0	17.14	20	11.43
3.	Ainchana	56.76	48.65	56.76	43.24	8.11	56.76	64.86	54.05
4.	Tejpur	20.00	20.00	20.00	16.67	3.33	20	23.33	3.33
5.	Kaithwari	32.14	32.14	28.57	14.29	3.57	32.14	46.43	14.29
6.	Boner	25.81	25.81	25.81	9.68	3.23	25.81	41.94	3.23
7.	Bistauli	81.08	70.27	70.27	56.76	8.11	81.08	37.84	27.03
8.	Pilkhuni	25.93	22.22	25.93	7.41	3.7	25.93	92.59	33.33
9.	Taraichi	21.21	21.21	21.21	12.12	3.03	21.21	48.48	36.36
10.	Rahmapur	19.35	19.35	19.35	9.68	0.00	19.35	32.26	19.35
11.	Ektajpur	27.27	27.27	27.27	3.03	3.03	27.27	84.85	42.42
12.	Taharpur	64.29	64.29	64.29	50.00	10.71	64.29	100	82.14
	<b>Total</b>	<b>38.38</b>	<b>35.33</b>	<b>37.18</b>	<b>22.07</b>	<b>4.37</b>	<b>37.91</b>	<b>55.63</b>	<b>29.33</b>

Sources: Based on data obtained from field survey, 2016

### Irrigation

Irrigation is the most crucial component of agricultural development because its insufficiency is the most powerful constrains in the increasing of production. The use of modern agricultural technology (HYV seeds, fertilizers) for agricultural growth increase in crop yield and cropping intensity depends critically on irrigation. Table 4 reveals that private tube wells are the main source of irrigation in the study region. Only 30.35 percent farmers have their own tube-wells and 28.79 percent farmers hire waters from tube-wells. There are 38.40 farmers who have their own pump-sets and only 2.28 percent farmers hire water from pump-sets. There are only 7.78 percent farmers who take water from government tube-wells. During the field survey, it was found that Govt. tube-wells were not working properly. There are only 19.23 percent farmers who use water from canal for irrigation purposes. Every farmer of Bistauli village use canal irrigation. This village is located in Akraabad block where Upper Ganga Canal passes. It has been found that marginal and small farmers have not their own source of irrigation and they use hiring water for irrigation from private tube-wells and pump-sets. Large, medium and some semi medium farmers have their own tube-wells and pump-sets.

**Table 4 Different Sources of Irrigation in Selected Villages of Aligarh District, 2016**

S. No.	Villages	Pump sets		Tube wells			Canal
		Own	Hired	Own	Hired	Govt.	
1.	Takipur	80.56	0.00	5.56	0.00	0.00	25.00
2.	Elampura	5.71	0.00	34.29	57.14	8.57	0.00
3.	Ainchana	59.46	0.00	48.65	8.11	16.21	27.02
4.	Tejpur	3.33	0.00	16.67	80.00	0.00	3.33
5.	Kaithwari	35.71	10.71	57.14	17.86	10.71	0.00
6.	Boner	38.71	12.90	29.03	19.35	19.35	0.00
7.	Bistauli	94.59	0.00	10.81	0.00	0.00	100.00
8.	Pilkhuni	7.41	3.70	59.26	29.63	0.00	0.00
9.	Taraichi	0.00	0.00	27.27	54.55	18.18	0.00
10.	Rahmapur	19.35	0.00	29.03	64.52	0.00	0.00
11.	Ektajpur	90.91	0.00	0.00	0.00	6.06	57.58
12.	Taharpur	25.00	0.00	46.43	14.29	14.29	17.86
<b>Total</b>		<b>38.40</b>	<b>2.28</b>	<b>30.35</b>	<b>28.79</b>	<b>7.78</b>	<b>19.23</b>

Sources: Based on data obtained from field survey, 2016

### Finance

Capital is essential for improving agriculture conditions. Small and marginal farmers need credit facilities for the adopting new agricultural techniques. There are some government agencies such as Cooperative societies and KCC schemes which provide credit facilities to needy farmers and played an important role in agricultural development programmes. Cooperative societies supply various services to their members with inputs for agricultural production including seeds, fertilisers and agricultural machineries. According to Omotesho (2008), "Cooperative society is one of the most effective vehicles for efficient mobilization of production resources and accelerated agricultural development."

**Table 5****Farmers using Co-operative Societies and KCC in Selected Villages of Aligarh District, 2016**

S.No.	Villages	Cooperative Societies	Kisan Credit Cards
1.	Takipur	19.44	52.78
2.	Elampura	14.29	48.57
3.	Ainchana	21.62	62.16
4.	Tejpur	10.00	30.00
5.	Kaithwari	14.29	42.86
6.	Boner	9.68	35.48
7.	Bistauli	16.22	59.46
8.	Pilkhuni	11.11	25.93
9.	Taraichi	15.15	27.27
10.	Rahmapur	9.68	41.94
11.	Ektajpur	15.15	60.61



12.	Taharpur	17.86	53.57
	<b>Total</b>	<b>14.54</b>	<b>45.05</b>

Sources: Based on data obtained from field survey, 2016

It was observed during the field survey that cooperative societies are not working very effectively. Seeds, fertilizers and other services are not supplied by cooperative societies on time. It can be seen from Table 5 that only 14.54 percent of farmers use services from co-operative societies and 45.05 percent of farmers have Kisan Credit Card. All surveyed villages have only below 20 percent of farmers who got benefit of services from co-operative societies whereas above 50 percent of farmers have Kisan Credit Card, found in Takipur, Ainchana, Bistauli, Ektajpur and Taharpur and other villages have below 50 percent of farmers use Kisan Credit Cards. Size of land holdings, education and nearness of these societies are important factors in determining use of these services.

### Conclusion

The above finding confirms that the adoption level of farm mechanization is determined by a number of factors such as level of education, small size of land holdings, lack of access to credit facilities, lack of support services which act as the main obstruct in the way of development of agriculture. The study shows that small and marginal framers have little assets base and these little assets base hinder them to make optimum use of the modern agricultural technology.

As per the conclusions of the study, the performance of institutional credit system in the regions leaves much to be desired. A study focuses specifically on the credit delivery system and aiming at strengthen it. The task of improving upon the existing technology package to adopt it to specific environment condition of the region calls for co-ordinate research in various branches of agriculture sciences.





**References:**

1. Bezbaruah, M.P. (1994), *Technological Transformation of Agriculture*, Mittal Publication, New Delhi.
2. Bhalla, G.S. and Y.K. Alagh (1979), *Performance of Indian Agriculture: A District wise Study*, Sterling Publications, New Delhi.
3. Bishop, C. 1997. "A Guide to Preparing an Agricultural Mechanization Strategy", *AGSE*. FAO, Rome, Italy.
4. Chauhan, K.S. (1980). "Innovations in Agriculture-Looking at the Grass Roots", *Rural India*, October-November.
5. Clarke, L. J. 2000. Strategies for Agricultural Mechanization Development: The Roles of the Private Sector and the Government. Agricultural Support Systems Division. FAO Publication, Rome, Italy. 8.
6. Gautam, A. (2012). *Agricultural Geography*. Sharda Pustk Bhawan, Allahabad.
7. Ghosh, B. (2010). "Determinants of Farm Mechanisation in Modern Agriculture: A Case Study of Burdwan Districts of West Bengal", *International Journal of Agricultural Research*, Vol. 5, pp. 1107-1115.
8. Gupta, N.S. and Singh, A. (1979). *Agricultural Development of States in India*, Seema Publications, New Delhi.
9. Ometesho, O.A. (2008). Global Food Crises and National Food Security: Strategic Options for Nigeria, Paper Presented at the 2008 Annual Conference on the Development of Finance Department of Central Bank of Nigeria held at Asaba, Delta State.
10. Rasouli, F., Sadighi, H. and Minaei, S. (2009), "Factors Affecting Agricultural Mechanization: A Case Study on Sunflower Seed Farms in Iran", *Journal of Agricultural Science and Technology*. Vol. 11: 39-48
11. Roy and Bezbaruah (2002), *"Agricultural Growth and Regional Economic Development"*, Mittal Publication, New Delhi.
12. Singh, R.K.P. and Singh, K.M. and Kumar, A. (2014), "A Study on Adoption of Modern Agricultural Technologies at Farm Level in Bihar", *MPRA*, Paper No. 73831.