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FARM TECHNOLOGY IMPROVEMENT AND ITS IMPACT ON SOCIAL NORMS: A STUDY OF ALIGARH DISTRICT (UTTAR PRADESH)

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ABSTRACT

This research article is based primarily on primary data. During a field visit to the Aligarh district, 400 household samples were collected to know the level of technology penetration in the agricultural farms. Both urban and rural household samples were analyzed to find out the exact level of ownership regarding farm machines. It has been found that most of the agricultural farm machines are owned by rural people. Few urban households were found owning farm machines, but these households were in the tehsil towns. As per the definition of the Census of India, tehsil towns are considered urban areas. The subsequent results have been discussed in this article.

Keywords: Farm, Technology, Social Norms, Aligarh District, Tractor, Trasher, Tubewell

1. INTRODUCTION

The scientific temperament and technological advancements are ongoing processes. It has never stopped since the origin of life on Earth. This technological advancement has always shaped the history of the world. Accordingly, social behaviors evolved. For example, Carl Taylor (1933) in his study said that twenty-odd years ago, rural, and urban people could be contrasted in the way they used money to contribute to their status. He stated that in the city, the level of living determined social position, the house they lived in, the clubs they belonged to, the car driven by they drove, and their manner of dress. In rural areas, social position was determined by the amount of accumulation of property they owned and paid for, and the money they had in the bank. But according to M.E. John (1958), with the new rural attitudes toward work, leisure, and comfort, rural people are taking on the status values of urban society. All these are contributing to adding more machines in their day-to-day life instead of manual labour. Agricultural farms are not exception for this.

The selection of machine which going to be use, depends upon the social mobility and people's awareness about its usefulness. Social mobility is, therefore, a movement within the social structure. By social mobility, one can understand that "any transition of an individual or social object or value- anything that has been created or modified by human activity from one social position to the other" (Sorokin 1927, 133). Clark (1957) says that values are socially defined criteria that "control the selection of everyday means and ends". According to Sorokin (1927) and Bertrand (1967), social mobility or shifting is chiefly of two kinds- horizontal and vertical. Horizontal mobility denotes the transition of an individual or social object from one position to another within the same stratum. Movement up or down from one stratum to another is termed as vertical social mobility. Following the direction of the transition, upward mobility is also called "Social climbing" "ascending" or "elevation" (Krishna 1987, 18-19). Hence, social mobility defined the uses of technology, and subsequently technological advancement further altered the altitude of social mobility. Gradually, the social norms of that area start changing for the welfare of humans. This paper studied all these changes in the social norms of the Aligarh district and found interesting facts.

2. LITERATURE REVIEW

There are some studies have been conducted regarding the agricultural development, which has been discussed in this section. Shrivasatava (1994) holds that for sustainable agricultural development, efforts should be made to bring science and technology closer to the farmers through education, training, and extension set-ups. Ecologically sound methods of arable farming, an increase in the water retaining capacity of agricultural regions, a reduction in soil erosion and fertility depletion, an increase in the human vegetable intake and a resulting reduction in resources of gobbling animal farming will all have to play a part in an ecological revolution in agricultural production throughout the world.

Pilgeram (2011) in his article analyzes the complex sustainability of sustainable agriculture. The author used both interviews and participant observation methods in eight farms of the Pacific Northwest. Findings reflect that farmers of this area are highly aware and respond to the class politics of sustainable agriculture. They also know about the class system that restricts their access to sustainable farming as an occupation. The labour of the farmer is often exploited to regulate prices. Farmers express a desire to make their goods more accessible and affordable. They even want to market their foods to upper-middle-class consumers. In this development, education and often lucrative off-farm income provide help to the farmers. To justify their exploitation, they use their own idealism. The study concluded that there is a negotiation established between farmers, social ideals, and the actual practice of sustainable agriculture in a capitalist system.

The analysis of Marc et.al. (2011) demonstrates that heterogeneous farming strategies and their synergies at the community level should be carefully assessed. They conclude that ex-ante integrated assessment and creating an enabling environment can enhance space for sustainable community-based biofuel production and use. It may provide insights into the opportunities and constraints for different types of smallholders, and promote the development of adequate policy mechanisms to prevent biofuels from becoming a threat rather than an opportunity for smallholders.

In a regional study, Angeles and Torbotton (2001, 112) studied agriculture sustainability in Ladakh and suggested 'the burden of preserving sustainable agriculture should not be placed solely on the shoulders of Ladakhi women and "Third World" farmers but also on other global civil society forces, governments in both rich and poor countries, international agencies, and agro-industrial corporations, which must refrain from using their own power in order to keep the powerless from having a voice in matters that affect their lives. Personal and political change and organizing efforts of like-minded individuals around the world, who would bring this change and commitment to their workplace and communities, are the keys to the flourishing of counter-development models that bring to light the diversity, instability, and disunity of capitalist practices.

Ho and Cheung (2011) based on a survey of 1076 Chinese migrant and native mothers living in three low-income communities in Hong Kong, China, examined linkages between neighborhood walkability, which means that the workplace, daycare center, and community organization are within the residents' walking distance, and social sustainability. Importantly, neighborhood walkability facilitates some of the migrant mother's social sustainability and reduces the disadvantages of being a migrant woman. The results of the study strengthen the need for redesigning the facilities for the low-income community to improve their socioeconomic sustainability, as walkable distance to workplaces, daycare centers, and community organizations reduces the cost of transportation.

3. RESEARCH OBJECTIVE/QUESTION

Based on the above arguments and literature review, this study tries to enquire about, what are the effects of technological advancement on the rigidity of social norms. Do they become strong or liberal or disappear over time?

4. METHODOLOGY AND DATA SOURCES

For finding the answer to the above research question, a methodology and data sources have been prepared. Both primary and secondary data sources have been utilized to achieve the objectives of the research. The secondary data about the physical, social, and economic aspects of the Aligarh district have been collected from the following sources:

1) Primary Census Abstracts of Uttar Pradesh and India
2) Administrative Atlas of Uttar Pradesh
3) Gazetteer of Aligarh district
4) Reports of the Government and International organizations
5) Journals, articles, and books
6) Newspaper and other sources of print media
7) Internet and related websites

The primary data has been collected with the help of both quantitative and qualitative research techniques. For primary data, personal interviews, case studies, and observation methods through a participatory approach were used. For personal interviews, a detailed questionnaire has been prepared, and this questionnaire includes various queries regarding culture, beliefs, nature of work, habitation economic indication, etc. Structured personal interviews of respondents have been conducted. Case study and observation methods have been used for in-depth inquiry. The primary data collection is divided into various stages.

First Stage: A pilot visit to the study area had been done before starting extensive data collection and marked the very first step in the primary data collection. This pilot visit helped in knowing the general structure of the society, the type of social groups dwelling in the district, who can be the key respondents during primary data collection, etc.

Second Stage: A short report has been prepared based on information gathered from the pilot visit. Subsequently, the structure of the questionnaire had been finalized. The next step is marked with the finalization of the sample size for primary data collection. The sample size for primary data collection is based on a statistical method. That statistical method is as follows:

How the sample size has been determined

$$n = \frac{N}{1 + N\,(e)^2}$$

Where n is the sample size

N - is the population size

e – is the level of precision

1. $n = \frac{3{,}673{,}849}{1 + 3{,}673{,}849\,(0.05)^2}$ (Population of Aligarh District according to 2011 census)
2.

= 399.95 samples at 5% confidence

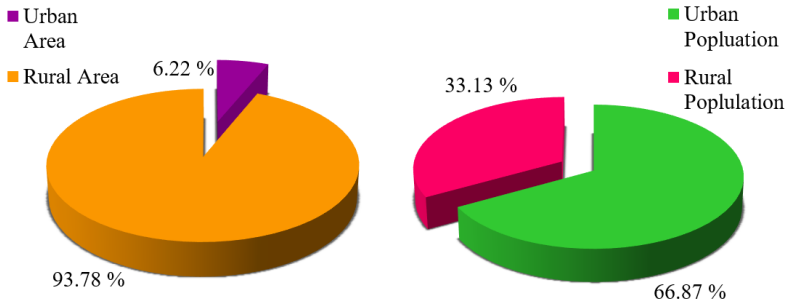
= 400 samples in round figures

These 400 samples were further divided according to the proportion of the rural, urban, male, and female population in the total population of Aligarh district in the 2011 census. Samples have been distributed through stratified random sampling and cover both rural and urban areas of the Aligarh district. Since a society consists of various economic classes, religions, rural-urban populations, genders, etc. In stratified random sampling, the population is divided into several groups/layers and sub-groups/layers that are individually more homogeneous than the total population of the study area. Subsequently, samples from each stratum according to the objectives of the study have been selected. Table 1 shows the rural, urban, male, and female population and their percentage in the corresponding total population of the Aligarh district.

Table 1 Total Population of Aligarh District of Uttar Pradesh in the 2011 Census

	Total population Person	Per cent (%) Person	Total population Male	Per cent (%) Male	Total population Female	Per cent (%) Female
Rural	**24,56,698**	**66.87 %**	**13,08,923**	**67.06 %**	**11,47,775**	**66.66 %**
Urban	**12,17,191**	**33.13 %**	**6,43,073**	**32.94 %**	**5,74,118**	**33.34 %**
Total	**36,73,889**	**100 %**	**19,51,996**	**100 %**	**17,21,893**	**100 %**

Source http://www.censusindia.gov.in/pca/default.aspx



Source District Census Handbook Aligarh, Series- 10, Part- XII – A, Census of India 2011

Figure 1 Comparison between Rural-Urban Area & Rural-Urban Population

Based on the above proportion of the population, a total of 400 sample sizes is divided into strata of rural males, rural females, urban males, and urban females. Out of 400 sampled households, 267 are from rural households and 133 are from urban households. Out of 267 rural households, 143 are rural male's households, and 124 are rural female's households. Similarly, out of 133 urban households, 71 are urban male's households and 62 are urban female's households. A household is usually a group of people who live together and take meals from a common kitchen. Persons in a household may be related or unrelated, or a mix of both. However, if a group of unrelated persons live in a census house but do not take their meals from a common kitchen, then they are treated as a separate household for each person. The important link in finding out a household is a common kitchen/common cooking (District Census Handbook Aligarh, Series- 10, Part XII-B, 2011, iii). From the flow chart one can easily understand the overall base of division for surveyed households.

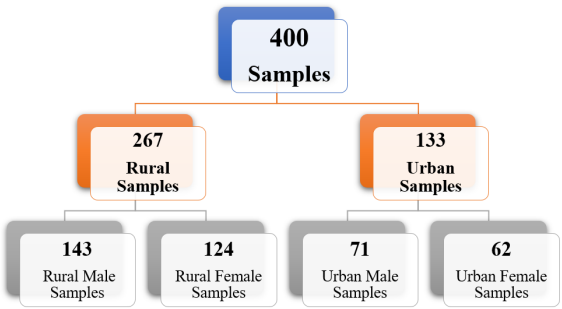


Figure 2 Flow Chart Representing the Division of Samples

All the divisions of sample classes, the size of the sample from each class, the questionnaire structure, and other relevant works related to data collection have been finalized in this stage. Both urban and rural households are considered for data collection because most of the agricultural farm machines are hired by rural people, and the ownership of these machines could also be found in urban areas of the district. Hence, the collection of samples from urban areas is also needed to determine the benefits.

- **Third Stage:** In this stage, extensive data have been collected with the help of a questionnaire.
- **Fourth Stage:** In this stage, the primary data has been arranged according to the different strata- rural males-rural females, urban males-urban females. The primary data has been entered into an Excel sheet on the computer.
- **Fifth Stage:** After entering primary data into an Excel sheet, a printout was taken for further calculation. The total number of respondents in various categories and their percentage have been calculated in this stage. Once all the calculations are over for the primary data, it has been analyzed. The outcome of the data has been discussed in the findings section of this article.

5. FINDINGS AND DISCUSSION

Indian agriculture has undergone some profound changes since independence. From 1950-51 to 1975-76 agricultural output recorded the unprecedented growth rate of 2.6 percent per annum compared with the miserable rate of 0.8 percent registered during the first half of the century. It is generally agreed that the application of modern science and technology has played a crucial role in the transformation of agriculture in the irrigated parts of India (Bhalla, 1979).

When a farmer invested in his production processes, it was done under the justification that it would pay for itself. When an investment is made in the house by adding a modern convenience as running water, electricity, or central heating, it is done to raise the level of living by adding to comfort. The motive for financial investment on the farm and in the house was quite different (John, 1958). The expectation from investment made in farm technologies is for more economic benefits, while investment in household technologies is made for more comfort in living and social status. Tractor, tubewell, thrasher for rice cultivation, and a combined harvester for wheat cultivation are the farm technologies which has been found in the agricultural farms of Aligarh district and studied during the field visit.

Tractor: Primary data illustrates that the maximum number of rural people do not purchase a tractor. They prefer to hire a tractor for tillage as hiring is more cost-effective than purchasing one. Table 2 shows detailed numbers and percentages of households owning a tractor by households.

Table 2 Total Number & Percentage of Respondents Owning Tractors in Aligarh

	Male				**Female**			
	Urban Male		**Rural Male**		**Urban Female**		**Rural Female**	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Yes	1	1.41	12	8.39	--	--	12	9.68
No	**63**	**88.73**	54	37.76	**59**	**95.16**	**57**	**45.97**
Hired	7	9.86	**77**	**53.85**	3	4.84	55	44.35
Total	71	100	143	100	62	100	124	100
	Total Urban		**Total Rural**		**Total Male**		**Total Female**	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Yes	1	0.75	24	8.99	13	6.07	12	6.45
No	122	91.73	111	41.57	117	54.67	116	62.37
Hired	10	7.52	132	49.44	84	39.25	58	31.18

Source Primary data collected with the help of a questionnaire and field survey, 2013-16

Note: The primary data on owning a tractor reported in urban areas is respondents who are living in the tahsil towns.

Table 2 and Figure 4 elaborate on the ownership of tractors in the Aligarh district. Primary data accounted for 88.73 percent of urban male respondents, 37.76 percent of rural male respondents, 95.16 percent of urban female respondents, and 45.97 percent of rural female respondents who do not own tractors in their households. Only 1.41 per cent of urban male respondents, 8.39 per cent of rural male respondents, 0 per cent of urban female respondents, and 9.68 per cent of rural female respondents have ownership of a tractor in their households. The rest of the farmers are doing farming by hiring a tractor for their agricultural farms i.e., 9.86 per cent of urban male respondents, 53.85 per cent of rural male respondents, 4.84 per cent of urban female respondents, and 44.35 per cent of rural female respondents.

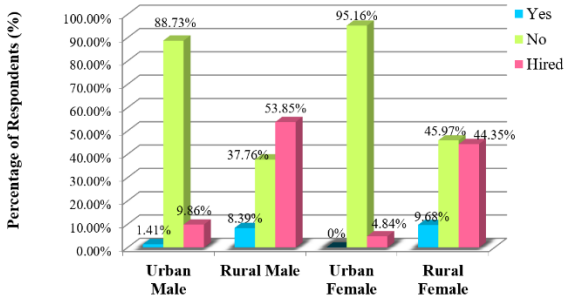


Figure 3 Percentage of Respondents Owning Tractors in Aligarh District

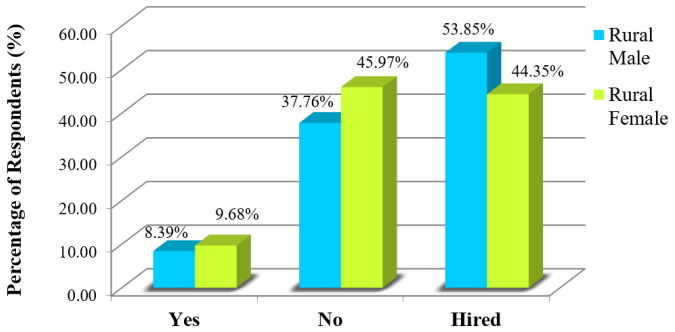


Figure 4 Percentage of Respondents Owning Tractors in Aligarh District

Plate- 1: Farm Technologies in Aligarh District (Tractor & Tube-well)

Thrasher for Rice Cultivation: Thrasher for rice cultivation is used when a paddy crop is harvested. This segregates rice and its cover leaves. The use of thrasher for rice segregation is not very popular in the district. Primary data tabulated in Table 3. Data indicates 94.37 percent of urban male respondents, 77.63 percent of rural male respondents, 95.16 percent of urban female respondents, and 80.64 percent of rural female respondents do not use thrasher for rice cultivation. Only 1.41 percent of urban male respondents, 6.29 percent of rural male respondents, 4.84 percent of urban female respondents, and 4.84 percent of rural female respondents use/own a thrasher. The educational qualification is not high among the trasher owners. Many of them are educated up to an intermediate level. Only two owners were graduates and post-graduates. Although all of them are from higher castes and are economically affluent from past generations. One owner of the thresher was the Pradhan of his village.

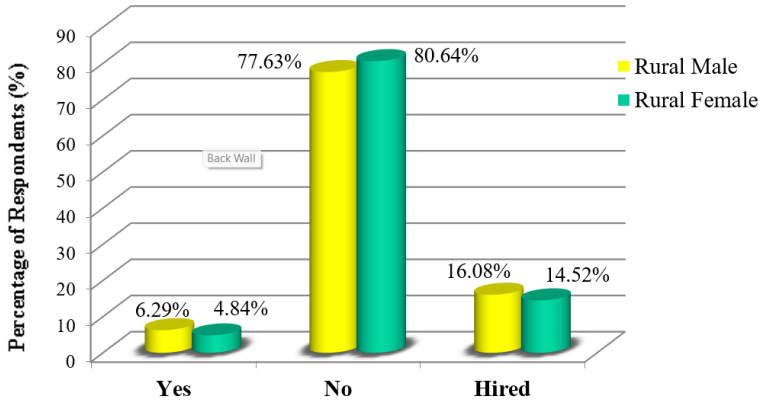
Hiring a thresher for rice cultivation is also not convenient for farmers of the district. The reason they gave was that the quality of rice degrades if they use machines for the segregation process. Farmers find the manual segregation process more efficient and fruitful than mechanization for this crop. Only 4.22 percent of urban male respondents, 16.08 percent of rural male respondents, 0 percent of urban female respondents, and 14.52 percent of rural female respondents hire a thrasher for rice cultivation.

Table 3 Total Number & Percentage of Respondents Using Thrasher for Rice Cultivation in Aligarh District

	Male				**Female**			
	Urban Male		**Rural Male**		**Urban Female**		**Rural Female**	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Yes	1	1.41	9	6.29	3	4.84	6	4.84
No	**67**	**94.37**	**111**	**77.63**	**59**	**95.16**	**100**	**80.64**
Hired	3	4.22	23	16.08	0	0	18	14.52
Total	71	100	143	100	62	100	124	100
	Total Urban		**Total Rural**		**Total Male**		**Total Female**	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Yes	4	3.01	15	5.62	10	4.67	9	4.84
No	126	94.74	211	79.03	178	83.18	159	85.48
Hired	3	2.25	41	15.35	26	12.15	18	9.68

Source: Primary data collected with the help of a questionnaire and a field survey, 2013-16

Note: The primary data on using the thrasher for rice cultivation reported in urban areas is from respondents who are living in the tahsil towns.



Source: Primary data collected with the help of a questionnaire and a field survey, 2013-16

Note: Primary data of urban areas is removed in this bar diagram for more clarity.

Figure 5 Percentage of Respondents using Thrasher for Rice Cultivation in Aligarh


Plate 2: Photographs showing Manual Labour for Rice Cultivation in the farms of Aligarh

Combined Harvester for Wheat Cultivation: The combined harvester does all the work of wheat cultivation when wheat is ready to harvest. This machine cuts the crop and segregates wheat from its chaff. A combine harvester is not in use in the rural areas of the district. Rather, rural people use a cutter for separating wheat from chaff. Primary data reported in Table 4 and Figure 6 indicate nominal use of the combined harvester.

None of the respondents in urban and rural areas of the district own or hire a combine harvester for wheat cultivation. The data indicates 0 per cent for rural male, female, and urban male and female respondents. 92.96 per cent of urban male respondents, 62.94 per cent of rural male respondents, 100 per cent of urban female respondents, and 66.13 per cent of rural female respondents do not use/own a combined harvester for wheat cultivation.

Table 4 Respondents owning/using Combined Harvester for Wheat Cultivation

	Male				**Female**			
	Urban Male		**Rural Male**		**Urban Female**		**Rural Female**	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Owning	*--	--	--	--	--	--	--	--
No	**66**	**92.96**	**90**	**62.94**	**62**	**100**	**82**	**66.13**
Hired	4	5.63	18	12.59	--	--	8	6.45
Owning of Cutter	1	1.41	35	24.47	--	--	34	27.42
Total	71	100	143	100	62	100	124	100
	Total Urban		**Total Rural**		**Total Male**		**Total Female**	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Owning	--	--	--	--	--	--	--	--
No	128	96.24	172	64.42	156	72.9	144	77.42
Hired	4	3.01	26	9.74	22	10.28	8	4.3
Owning of Cutter	1	0.75	69	25.84	36	16.82	34	18.28

Source: Primary data collected with the help of a questionnaire and a field survey, 2013-16

Note: The primary data of the combined harvester for wheat cultivation reported in urban areas are those respondents who are living in the tehsil town.

*No respondent falls in this category for the corresponding column.

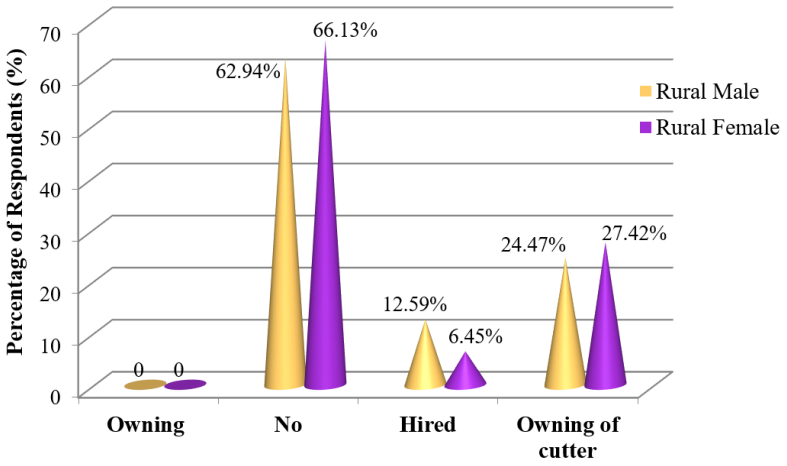


Figure 6 Percentage of Respondents using Combined Harvester for Wheat Cultivation in Aligarh

The respondents own or hire a cutter for wheat cultivation rather than a combined harvester. They fit the cutter to the tractor and segregate wheat from chaff. For harvesting wheat, they do it manually. Only 1.41 percent of urban male respondents, 24.47 percent of rural male respondents, 0 percent of urban female respondents, and 27.42 percent of rural female respondents owned a cutter. The rest of the respondents hire a cutter for completing the wheat cultivation, i.e., 5.63 percent of urban male respondents, 12.59 percent of rural male respondents, 0 percent of urban female respondents, and 6.45 percent of rural female respondents. The farm technologies are making a great impact on the means of livelihood of rural people. The older belief of having more sons and engaging them in farm operations is disappearing. Farmers prefer to hire or use farm technology rather than manual labour.

6. CONCLUSION

At last conclusion can be derived that rural areas of the district still have a long way to go to achieve technological advancement. Penetration of a few technologies in agricultural farming is not changing social values that much, and mostly this technology is used for economic gain, and their effects are based on input input-output ratio. Though it has been noticed that technological advancement is altering the thinking of people and social norms from one generation to another. Rural areas are continuing with the rigidity of social norms, due to less technology penetration.

CONFLICT OF INTERESTS

None.

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