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Analysis of Adoption Gaps and their Causes in Major Crops Grown in Basti District of Uttar Pradesh

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ABSTRACT

The present study was carried out in Basti district of Uttar Pradesh to know the adoption gap and their causes. It was observed that maximum gaps were found in seed treatment, application of micronutrients, plant protection measure and inter cultural practices in the major crops *i.e.* wheat, rice, sugarcane, potato and mustard, except inter culture practices in potato crop. There were no gaps in sowing time, varieties, seed rate, application of FYM, water management, crop harvesting and post harvest technology. Whereas, maximum partial gap was found in methods of fertilizer application. The major causes were unawareness about the technology, lack of skills, poor resources, non- conviction about the technology, unavailability of inputs at proper time and risk orientation.

Key words: Major crops, farmers, technology, adoption gap.

INTRODUCTION

Technology transfer is the complex task which is multi- disciplinary and multi-institutional approach. It calls for close coordination in the functioning of agriculture department's, resources coordination, research organizations, educational institutes and extension agencies. It is a tribute to those involved in technology transfer that the country's food grain production which stood at 50.9 million tonnes when the first plan was launched, has now risen to 255.36 million tonnes more than five fold increase. Besides, India has emerged as the world's largest producer of milk and fruits and second largest producer of vegetables, to cite only a few of the achievement in agriculture and allied sectors. Despite these achievements, there are still many gaps in the agricultural development which need to be bridged. Imbalances in production persist, both crop- wise and region wise, productivity levels in many crops are still far behind the world average. Filling these gaps is a major challenge for the extension machinery, which take the technology to the farming community. The major emphasis has been on improved seed and fertilizers use. The number of other important recommendations in the area of control of diseases and pest, efficient management of soil and water and improved agricultural implements have yet to be communicated to the farmers. With the results, there has emerged a vast technological gap associated with agricultural production, which is reflected in poor production and productivity. Keeping in this view the present study was taken with the objective to analyze the technological gaps and identify the causes of gaps.

METHODOLOGY

The study was conducted in Basti district of Uttar Pradesh. The district comprises of 13 blocks, out of which two blocks were selected based on cropped area and crop productivity. Five villages from each block were purposively selected and than five farmers randomly selected from each village. Thus the total sample size was of 50 respondents. The primary data were collected through personal interview with the help of pre - structured schedule. The data were analyzed with the help of technological gap index and statistical methods for drawing specific conclusion:

Adoption gap: Adoption gap refers to the gap between the recommended technologies and the existing level of technologies being adopted by the farmers. The formula used for measuring the technological gap was as follows:

$$\text{Adoption gap index} = \frac{R - A}{\quad} \times 100$$

Where, R - Recommended technology
A - Technology actual adopted by the farmers

Full gap : It denote complete non adoption of recommended technology.

Partial gap: This refers to the status of technology adoption where some gap remain between recommended existing level of technology.

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No gap: No gap refers to the adoption of 80 per cent recommended technology by the farmers.

RESULTS AND DISCUSSION

Adoption gaps associated with wheat production technology:

The data presented in Table 1 revealed that the none of the respondents were adopting seed treatment and inter cultivation practices in wheat crop production technology practices. This showed full gap in seed treatment and inter culture practices, followed by 90 per cent respondent had full gap in micronutrients, 80 per cent in plant protection measures and 10 per cent in methods of fertilizers application as the full gap in these practices. In case of partial gap methods of fertilizers application maximum 70 per cent respondents followed by 60 per cent in seed rate, 50 per cent application of improved verities, post harvest technology, 30 per cent use of FYM, 24 per cent water management, 20 per cent varieties, 10 per cent plant protection measures, timely harvesting and 6 per cent micronutrients as the partial gap in these practices. While 90 per cent respondents were adopting harvesting operation fully, there were no gap, followed by 80 per cent in showing time, 76 per cent water management, 70 per cent application of FYM, 50 per cent varieties, post harvesting technology, 40 per cent seed rate, 20 per cent methods of fertilizers application, 10 per cent plant protection measures and 4 per cent micro nutrients as the no gap.

Table 1: Adoption gaps associated with wheat production technology.

Practices	Full gap		Partial gap		No gap	
	No. of respondents	Per cent	No. of respondents	Per cent	No. of respondents	Per cent
Sowing time	-	-	10	20	40	80
Varieties	-	-	25	50	25	50
Seed rate	-	-	30	60	20	40
Seed treatment	50	100	-	-	-	-
FYM	-	-	15	30	35	70
Methods of fertilizers application	5	10	35	70	10	20
Micronutrients	45	90	3	6	2	4
Inter culture	50	100	-	-	-	-
Water management	-	-	12	24	38	76
Plant protection measures	40	80	5	10	5	10
Harvesting	-	-	5	10	45	90
Post harvesting technology	-	-	25	50	25	50

Adoption gaps associated with rice crop production technology:

The data presented in Table 2 revealed that the 100 per cent respondents were not adopting seed treatment practice in rice cultivation, this showed full gap, followed by 70 per cent inter culture practices, 60 per cent plant protection measures, 40 per cent post harvesting technology, 10 per cent methods of fertilizers application, use of improved varieties, 8 per cent application of FYM and 4 per cent micro-nutrients as the full gap.

The maximum 60 per cent respondents were showing partial gap in methods of fertilizers application in rice cultivation, followed by 36 per cent FYM, 30 per cent varieties, plant protection measures, harvesting, 24 per cent micronutrients, 20 seed rate, inter culture, 10 per cent showing time, water management and post harvesting technology as the partial gap in these practices.

While maximum 90 per cent respondents were adopting timely sowing and water management practices, this showed no gap, followed by 80 per cent in seed rate, 72 per cent application of micronutrients, 70 per cent timely harvesting, 60 per cent use of improved varieties, 56 per cent use of FYM, 50 per cent post harvest technology, 30 per cent methods of fertilizers application, 10 per cent plant protection measures and inter culture practices as the no gap.

Singh, B. (2007) reported that the majority of the farmers had high technological gap in seed treatment and application of plant protection measures in wheat production technology.

Table 2: Adoption gaps associated with rice crop production technology.

n=50

Practices	Full gap		Partial gap		No gap	
	No. of respondents	Percent	No. of respondents	Percent	No. of respondents	Percent
Showing time	-	-	5	10	45	90
Varieties	5	10	15	30	30	60
Seed rate	-	-	10	20	40	80
Seed treatment	50	100	-	-	-	-
FYM	4	8	18	36	28	56
Methods of fertilizers application	5	10	30	60	15	30
Micronutrients	2	4	12	24	36	72
Inter culture	35	70	10	20	5	10
Water management	-	-	5	10	45	90
Plant protection measures	30	60	15	30	5	10
Harvesting	-	-	15	30	35	70
Post harvesting technology	20	40	5	10	25	50

Adoption gaps associated with sugarcane production technology:

The data presented in the Table 3 showed that none of the respondents were adopting seed treatment practices in sugarcane cultivation, this showed full gap, Followed by 90 per cent application of micronutrients, 80 per cent plant protection measures, 70 per cent post harvesting technology, 10 per cent improved varieties and 4 per cent

proper seed rate as the full gap. The maximum 60 per cent respondents were using proper methods of fertilizers application in sugarcane cultivation, this showed partial gap, followed by 30 per cent harvesting, 24 per cent use of FYM, water management,20 per cent showing time, varieties, seed treatment, 12 per cent post harvesting technology, 10 per cent micronutrients and plant protection measures as the partial gap. The 100 per cent respondents were adopting inter culture practices, followed by 80 per cent timely showing, 76 per cent seed rate, application of FYM, water management,70 per cent using improved varieties, timely harvesting, 40 per cent methods of fertilizers application, 18 per cent post harvesting technology and 10 per cent plant protection measures as the no gap in these practices. Singh, M.P. *et al.* (2009) reported that the respondents of Saharanpur district having more gap about wheat technology and low gap about sugarcane technology as compared to Bulandshahar district and Wangiker, *et al.*(1991) reported that technological gap in plant protection measures was comparatively higher as compared to other practices in sugarcane crop. It is clear from Table 4 revealed that the 90 per cent respondents were not adopting seed treatment, micronutrients, followed by 80 per cent plant protection measures, 40 per cent improved varieties and 10 per cent post harvesting technology in potato crop, this showed full gap in these practices.

Table 3: Adoption gaps associated with sugarcane production technology.

n=50

Practices	Full gap		Partial gap		No gap	
	No. of respondents	Per cent	No. of respondents	Per cent	No. of respondents	Per cent
Showing time	-	-	10	20	40	80
Varieties	5	10	10	20	35	70
Seed rate	2	4	10	20	38	76
Seed treatment	50	100	-	-	-	-
FYM	-	-	12	24	38	76
Methods of fertilizers application	-	-	30	60	20	40
Micronutrients	45	90	5	10	-	-
Inter culture	-	-	-	-	50	100
Water management	-	-	12	24	38	76
Plant protection measures	40	80	5	10	5	10
Harvesting	-	-	15	30	35	70
Post harvesting technology	35	70	6	12	9	18

Adoption gaps associated with potato production technology.

The maximum 46 per cent of respondents were using recommended methods of fertilizers application in potato crop, this showed partial gap, followed by 36 per cent water management, 30 per cent FYM, 28 per cent harvesting, 24 per cent seed rate, 22 per cent showing time, 20per cent post harvesting technology, 16 per cent varieties, 10 per cent seed treatment, micronutrients, inter culture and plant protection measures as the partial gap in these practices. While 90 per cent respondents were adopted inter culture practices in potato crop, followed by 78 per cent showing time, 76 per cent proper seed rate, 72 per cent timely harvesting, 70 per cent application of FYM, post harvesting technology, 64 per cent water management operation, 54 per cent methods of fertilizers application, 44 per cent use of improved varieties and 10 per cent use of plant protection measures as the no gap in these practices.

Adoption gaps associated with mustard production technology.

The data presented in Table 5 indicated that the none of the respondents were adopting seed treatment, micronutrients, followed by 80 per cent plant protection measures and 28 per cent improved varieties in mustard crop, this showed full gap in these practices. The maximum 84 per cent respondents were adopting inter culture practices in mustard crop, followed by 76 per cent post harvesting technology, 48 per cent methods of fertilizers application, 32 per cent improved varieties, timely harvesting, use of FYM, 28 per cent showing time, 16 per cent seed rate, water management and 8 per cent plant protection measures, this showed partial gap in these practices. While, 84 per cent respondents were adopting proper water management operation, followed by 80 per cent seed rate, 72 per cent timely showing, 68 per cent application of FYM, timely harvesting, 52 per cent methods of fertilizers application, 40 per cent application of improved varieties, 24 per cent post harvesting technology and 12 per cent plant protection measures. This showed no gap in these practices.

Table 4: Adoption gaps associated with potato production technology.

Practices	Full gap		Partial gap		No gap	
	No. of respondents	Percent	No. of respondents	Percent	No. of respondents	Percent
Showing time	-	-	11	22	39	78
Varieties	20	40	8	16	22	44
Seed rate	-	-	12	24	38	76
Seed treatment	45	90	5	10	-	-
FYM	-	-	15	30	35	70
Methods of fertilizers application	-	-	23	46	27	54
Micronutrients	45	90	5	10	-	-
Inter culture	-	-	5	10	45	90
Water management	-	-	18	36	32	64
Plant protection measure	40	80	5	10	5	10
Harvesting	-	-	14	28	36	72
Post harvesting technology	5	10	10	20	35	70

Table 5: Technological gap associated with mustard production technology.

Practices	Full gap		Partial gap		No gap	
	No. of respondents	Percent	No. of respondents	Percent	No. of respondents	Percent
Showing time	-	-	14	28	36	72
Varieties	14	28	16	32	20	40
Seed rate	-	-	8	16	42	80
Seed treatment	50	100	-	-	-	-
FYM	-	-	16	32	34	68
Methods of fertilizers application	-	-	24	48	26	52
Micronutrients	50	100	-	-	-	-
Inter culture	-	-	40	80	10	20
Water management	-	-	8	16	42	84
Plant protection measures	40	80	4	8	6	12
Harvesting	-	-	16	32	34	68
Post harvesting technology	-	-	38	76	12	24

Adoption gaps related to wheat production technology:

The data presented in Table 6 revealed that 80 per cent respondents expressed unawareness about the technology as the cause of gap in seed treatment of wheat crop, followed by 50 per cent lack of skill, 48 per cent non conviction about the technology, 30 per cent unavailability of inputs at proper time and 10 per cent poor resources as the cause of gap. In case methods of fertilizers application maximum 38 per cent respondents unawareness about the technology, followed by 36 per cent non - conviction about the technology, 10 per cent unavailability of fertilizers at proper time and 4 per cent lack of skill as the cause of gap.

Unawareness, non conviction, poor resources and unavailability of inputs at proper time were expressed as the cause of micronutrients by 90 per cent , 50 per cent,36 per cent and 14 per cent receptively. similarly 60 per cent wheat growers represented poor resources, 40 per cent unavailability of inputs, lack of skill, 24 per cent risk orientation, 20 per cent unawareness and 10 per cent non conviction about the technology as the cause of gap in inter culture.

While, maximum 66 per cent farmers represented poor resources as the cause of gap in plant protection measures, followed by 54 per cent lack of skill, 44 per cent unavailability of inputs at proper time, 20 per cent unawareness about the technology, risk orientation and non conviction about the technology as the cause of gap.

Table 6: Causes of Adoption gaps related to wheat production technology.

Operation with existing gaps	Unawareess		Lack of skill		Poor resources		Non conviction		Unavailability of inputs		Risk orientation	
	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent
Seed treatment	40	80	25	50	5	10	24	48	15	30	-	-
Methods of fertilizers application	19	38	2	4	-	-	18	36	5	10	-	-
Micronutrients	45	90	-	-	18	36	25	50	7	14	-	-
Inter culture	10	20	20	40	30	60	5	10	20	40	12	24
Plant protection measures	10	20	27	54	33	66	10	20	22	44	10	20

Causes for Adoption gaps related to rice crop production technology:

The data presented in Table 7 revealed that the 80 per cent respondents expressed lack of skill as the cause of gap in seed treatment in rice cultivation, followed by 76 per cent awareness, 60 per cent non-conviction about the technology, 20 per cent poor resources and unavailability of inputs at proper time as the cause of gap.

The maximum 90 per cent respondents expressed unawareness as the cause of the gap in micronutrients, followed by 60 per cent lack of skill, 56 per cent non-conviction about the technology, 40 per cent poor resources and 30 per cent unavailability of inputs at proper time as the cause of gap. In case methods of fertilizers application maximum 60 per cent respondents expressed lack of skill and 50 per cent unawareness about the technology as the cause of gap.

While maximum 60 per cent respondents expressed unavailability of inputs at proper time as the cause of gap, followed by 50 per cent poor resources, 44 per cent lack of skill, 40 per cent unawareness about the technology, 30 per cent non conviction about the technology and 24 per cent risk orientation as the cause of gap in plant protection measures.

Whereas maximum 70 per cent poor resources as the cause in inter culture practices, followed by 44 per cent unawareness about the technology, 40 per cent unavailability of inputs at proper times, 36 per cent lack of skill, 30 per cent non - conviction about the technology and 20 per cent risk operation as the cause of gap.

Table 7: Causes for Adoption gaps related to rice crop production technology.

Operation with existing gaps	Unawareness		Lack of skill		Poor resources		Non conviction		Unavailability of inputs		Risk orientation	
	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent
Seed treatment	38	76	40	80	10	20	30	60	10	20	-	-
Micronutrients	45	90	30	60	20	40	28	56	15	30	-	-
Methods of fertilizers	25	50	30	60	-	-	-	-	-	-	-	-
Plant protection measures	20	40	22	44	25	50	15	30	30	60	12	24
Inter culture	22	44	18	36	35	70	15	30	20	40	10	20

Causes for Adoption gaps related to sugarcane production technology:

The data presented in Table 8 revealed that 70 per cent respondents expressed lack of skill as the cause of gap in seed treatment of sugarcane cultivation, followed by 64 per cent unawareness about the technology, 20 per cent poor resources, unavailability of inputs at proper time and 10 per cent non conviction about the technology as the cause of gap.

In case methods of fertilizers application 68 per cent respondents expressed unawareness about the technology as the cause of gap, followed by 66 per cent lack of skill, 24 per cent non conviction about the technology and 10 per cent poor resources as the cause of gap.

Similarly, in case of micronutrients 80 per cent respondents showed unawareness about the technology, followed by 50 per cent lack of skill, 32 per cent non-conviction about the technology, 24 per cent poor resources and unavailability of input at proper time as cause of gap.

Whereas, 70 per cent respondents expressed unawareness as the cause of gap in plant protection measures, followed by 66 per cent poor resources, 64 per cent non conviction about the technology, 40 per cent lack of skill, 24 per cent unavailability of inputs at proper time and 10 per cent risk orientation as the cause of gap.

While maximum 20 per cent respondents expressed lack of skill as the cause of gap in sugarcane cultivation.

Table 8: Causes for Adoption gaps related to sugarcane production technology.

Operation with existing gaps	Unawareness		Lack of skill		Poor resources		Non conviction		Unavailability of inputs		Risk orientation	
	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent
Seed treatment	32	64	35	70	10	20	5	10	10	20	-	-
Methods of fertilizers	34	68	33	66	5	10	12	24	-	-	-	-
Micronutrients	40	80	25	50	12	24	16	32	12	24	-	-
Plant protection measures	35	70	20	40	33	66	32	64	12	24	5	10
Inter culture	40	80	10	20	-	-	-	-	-	-	-	-

Causes for Adoption gaps related to potato production technology.

The data presented in Table 9 revealed that 50 per cent respondents showed poor resources as the cause of gap in relation to improved varieties seed of potato crop, followed by 40 per cent unavailability of inputs at proper time and 36 per cent unawareness about the technology as cause of gap.

Similarly, 64 per cent lack of skill in seed treatment as the cause of gap, followed by 60 per cent unawareness about the technology, 36 per cent non-conviction about the technology, 20 per cent unavailability of inputs about at proper time and 4 per cent poor resources as the cause of gap.

In case of micronutrients 90 per cent respondents showed unawareness about the technology as the cause of gap, followed by 80 per cent lack of skill, 60 per cent non conviction about the technology, 48 per cent poor resources, 44 per cent unavailability of input at proper time and 10 per cent risk orientation as the cause of gap.

While maximum 60 per cent respondents expressed lack of skill in plant protection measures, followed by 54 per cent unawareness about the technology, poor resources, 24 per cent unavailability of inputs at proper time, risk orientation and 10 per cent non - conviction about the technology as the cause of gap.

Whereas, only 10 per cent respondents expressed inter culture operation as the cause of gap in potato production technology.

Table 9: Causes for Adoption gaps related to potato production technology.

Operation with existing gaps	Unawareness		Lack of skill		Poor resources		Non conviction		Unavailability of inputs		Risk orientation	
	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent
Improved seed	18	36	-	-	25	50	-	-	20	40	-	-
Seed treatment	30	60	32	64	2	4	18	36	10	20	-	-
Micronutrients	45	90	40	80	24	48	30	60	22	44	5	10
Inter culture	-	-	5	10	-	-	-	-	-	-	-	-
Plant protection measures	27	54	30	60	27	54	5	10	12	24	12	24

Causes for Adoption gaps related to mustard crop production technology.

The data presented in 10 revealed that the 40 per cent respondents expressed poor resources about the improved varieties seed as the cause of gap in mustard production technology, followed by 30 per cent unawareness about the technology and 20 per cent unavailability of inputs at proper time as the cause of gap. In case of seed treatment the maximum 90 per cent respondents expressed lack of skill, followed by 46 per cent awareness about the technology, 20 per cent poor resources and unavailability of inputs at proper time as the cause of gap. Whereas maximum 88 per cent respondents expressed unawareness about the technology as the cause of gap in micronutrients, followed by 36 per cent lack of skill, 24 per cent poor resources and unavailability of inputs at proper time as the cause of gap. In case of inter culture operation practices 80 per cent respondents expressed poor resources as the cause of gap, followed by 76 per cent unawareness about the technology and 24 per cent lack of skill as the cause of gap.

Table 10: Causes for Adoption gaps related to mustard crop production technology.

Operation with existing gaps	Unawareness		Lack of skill		Poor resources		Non conviction		Unavailability of inputs		Risk orientation	
	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent	Respondents	Per cent
Improved seed	15	30	-	-	20	40	-	-	10	20	-	-
Seed treatment	23	46	45	90	10	20	-	-	10	20	-	-
Micronutrients	44	88	18	36	12	24	-	-	12	24	-	-
Inter culture	38	76	12	24	40	80	-	-	-	-	-	-
Plant protection measures	36	72	42	84	14	28	-	-	15	30	-	-

While maximum 84 per cent respondents expressed lack of skill as the cause of gap in plant protection measures, followed by 72 per cent unawareness about the technology, 30 per cent unavailability of inputs at proper time and 28 per cent poor resources as the cause of gap.

CONCLUSION

It is concluded from the study that the maximum gaps were found in seed treatment, application of micronutrients, plant protection measures and inter culture practices in wheat, rice, sugarcane, potato and mustard, except in inter culture practices of potato crop. There were no gaps in showing time, varieties, seed rate, application of FYM, water management, crop harvesting and post harvesting technology. partial gap was found in methods of fertilizers application. The major causes were unawareness, lack of skills, poor resources, non-conviction about the technology and unavailability of inputs at proper time. It is necessary to deploy required human resource provide training, field demonstration's and field visits to the farmers. Various government and non-governement agencies need to identifying and remove the causes of gap by identifying and providing suitable remedies/ facilities to minimize the technological gaps.

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