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# PRODUCTIVITY ENHANCEMENT OF WHEAT THROUGH FRONT LINE DEMONSTRATIONS IN HILLY AREAS – A STUDY IN UTTARKASHI DISTRICT OF UTTARAKHAND

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## ABSTRACT

The study was conducted in three villages of Uttarkashi district of Uttrakhand by selecting 60 respondents to know the effect of frontline demonstrations of wheat in the yield. Results sevcahed that majority of the respondents were medium adoptiers. Apprecation of organic measure was adopted do the top position, However only few farmers have used herbidides in their field. Annual income, Mass media exposure, extension agency contact & scientific orientation have emerged out to be major determinents of level of adoption.

## INTRODUCTION

Wheat cultivation is thought to have originated in Euphrates valley as early as 10,000 B.C., and it is a staple food and important part of daily diet for millions. Wheat can be successfully grown in most parts of the world, both in tropical and temperate. It is the second most important food crop and contributes nearly 1/3$^{rd}$ of the total food grains production in our country. The grain is mostly used in the form of *Chapati* and its straw is used for feeding livestock. Wheat in Uttarakhand state is grown widely as an important *rabi* crop. Agriculture is considered to be the primary occupation to provide employment to more than 70 per cent population of the state. The farmers in hilly areas practice the traditional method of cultivation like mono cropping and still unaware about the scientific techniques in farming.

The state has 1.07 per cent of wheat growing area in our country with a contribution of 1.51 per cent i.e., 802.57 ('000 MT) towards national production and a productivity of 2.04 tonnes per ha. The area under wheat has increased from 3.97 lakh ha to 4.00 lakh ha. during the year (2008 – 09). The ICAR institutes / State Agricultural Universities (SAU's) are playing a significant role to increase the quality and yield of the wheat crop and further there has been a constant effort by them to promote the use of Improved High Yielding Variety (HYVs) seed by farmers. The availability, access and usage of improved high yielding variety are the biggest hurdle for the farmers in increasing the crop production. It is advised that the farmers in hilly areas should try to fully utilize and multiply the improved varieties developed by the ICAR institutes / Agricultural universities in their field in shortest time to achieve the real benefits of agricultural research. Further the scientific technologies developed by the institute viz., High Yielding Varieties (HYVs), Time and Method of Sowing, Adoption of Proper Seed Rate, Seed Treatment, Application of Fertilizers, Irrigation practices, Herbicide application and Proper Plant Protection measures were provided to the farmers for their acceptance and adoption. Practicing the modern scientific sustaining techniques in hills by farmers will definitely increase their income and restore the soil fertility status.

To demonstrate the production potential and its importance in attaining food security the institute had developed many improved varieties in wheat. Out of them, the 3 varieties in wheat namely VL Gehun 738, VL Gehun 804 & VL Gehun 829 along with their production technologies had been disseminated to the institute adopted villages of Uttarakhand during 2005 – 06 to 2007 – 08 through Front Line Demonstrations (FLDs). The production data generated through the front line demonstrations clearly indicated that by adopting appropriate scientific interventions will certainly help in increasing the produc-

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tion and productivity of Uttarakhand in general and Uttarkashi in particular.

## RESEARCH METHODOLOGY

The study was conducted in an area of 3.56 ha during 2005 – 06 to 2007 – 08 in the institute adopted villages namely Tuliyara, Hathiyari & Chinyali in Uttarkashi district of Uttarakhand. A sample of 60 farmers was drawn through random sampling method. A total of 10 independent variables viz. age, education, farming experience, farm size, annual income, social participation, mass media exposure, extension agency contact, fatalism-scientism & scientific orientation and one dependent variable namely adoption of improved scientific production technologies were taken for the study.

Data collection was done with a well-constructed interview schedule. The data were collected by the researcher from the farmers personally and special attention was paid by the researcher to get authentic information. From the collected data an adoption index was developed to categorize the farmers into low, medium and high adopters. The data thus collected were subjected to statistical analysis and meaningful inferences were drawn.

## RESULTS AND DISCUSSION

### I. Socio personal characteristics of farmers

It is always important for a researcher to study the socio-personal characteristics of the respondents to see their adoption behaviour. It has been found that the majority (66.67%) of the respondents belonged to middle-age group (35 – 54 years). A large number of the respondents (81.67%) were educated up to middle class ($8^{th}$ Class), where as 3 per cent were graduate and only 15 per cent were found illiterate. An analysis of the farming experience indicated that 76.67 per cent of the farmers had medium level of experience, 15 per cent with low level and 3 per cent with high level of farming experience. About 51.67 per cent of the farmers owned only a marginal land (up to 1acre), 31.67 per cent had small land size (1.1 – 2.5 acres) and only 15 percent farmers possessed a medium size land holding i.e. (>2.5 acres). The annual income was medium (Rs. 4801 – 23800) for 65 per cent of the respondents, low (Rs. <4800) for 18.33 per cent and high (Rs. >23800) for 15% of the farmers. The results of social participation revealed that majority (73.33%) of farmers had medium level of participation. Only 20 per cent of the farmers had low level of participation.

More than half of the respondents reported that they had medium level of mass media exposure and extension agency contact. It could be stated that almost 66.67 per cent of the respondents had medium level of scientific orientation followed by low level (21.67%) and high level (11.66 %). Further it is noted that almost more than half (58.33%) of the respondents had medium level of scientism – fatalism followed by 21.67% of the respondents with low level.

### II. Overall adoption of improved scientific production technologies (ISPT)

To have a comprehensive idea about the overall adoption of improved scientific production technologies, an adoption index was worked. out by giving a score of one for each improved scientific production technology for wheat. The scores for all the items were added for each respondent and the individual scores were arrived. Based on the scores, the respondents were classified into low, medium and high by using the formula $\overline{X} \pm$S.D.

**Table 1: Distribution of respondents on the basis of adoption of improved scientific production technology (n=60)**

| Level of Adoption | Frequency | Percentage |
|---|---|---|
| Low (1) | 19 | 31.67 |
| Medium (2-6) | 31 | 51.67 |
| High (>6) | 10 | 16.66 |

It is evident from Table 1 that more than half (51.67%) of the respondents possessed medium level of adoption followed by low (31.67%). Only 10 per cent of the respondents had high level of adoption. In order to enhance the adoption level, there is a greater need from the government to open KVKs, Village Knowledge Information Centers and Kisan Gyan Kendras (KGK) for information dissemination about the new improved scientific production technologies.

### III. Yield increase through adoption of improved scientific production technologies (ISPT)

Front Line Demonstrations of wheat were conducted at the institute-adopted villages of

Uttarakhand during 2005 – 06 to 2007 – 08 (3 years) to demonstrate the production potential and to solve the problem of food security. The results revealed that the wheat yield could be enhanced by adoption of improved high yielding varieties along with the location specific improved scientific production technologies.

**Table 2: Per cent increase in farmers field through adoption of improved scientific production technologies (n = 60)**

| Crop | Year | Variety | No. of Demo | Area (ha.) | Yield of Demonstration (Qtl/ha.) Highest Yield | Lowest Yield | Average Yield | Farmers Practice | % increase in farmers |
|---|---|---|---|---|---|---|---|---|---|
| Wheat | 05-06 | VL 738 | 20.0 | 1.06 | 20.6 | 12.5 | 15.0 | 11.0 | 36.36 |
| | 06-07 | VL 829 | 20.0 | 1.0 | 19.0 | 13.75 | 16.21 | 11.0 | 47.36 |
| | 07-08 | VL 804 | 20.0 | 1.5 | 40.0 | 14.4 | 30.94 | 20.3 | 52.41 |

From Table 2 it can be stated that 3 wheat varieties viz., VL Gehun 738, VL Gehun 829 & VL Gehun 804 provided yield increase of 36.36 per cent to 52.14 per cent higher than the local check. The highest performed variety was VL Gehun 804 (30.94 Qtl/ha) followed by VL Gehun 829 (15Qtl/ha) VL Gehun 738 (16.21Qtl/ha).

An increasing trend of wheat yield against local check was found over a period of 3 years. Until there is an assured quality wheat seed it is almost impossible to increase per hectare wheat production and productivity. It could be possible only by developing "seed village programme" and also by participatory seed production at farmers' fields.

**IV. Technology wise adoption of improved scientific production technologies (ISPT)**

In order to ascertain the extent of adoption of the improved scientific production technologies the collected responses from the farmers were ranked according to their preferences. The data from Table 3 revealed that the majority of the farmers (61.67%) adopted the application of organic manure and ranked it first in their order of preference followed by 58.33 per cent for adoption of High Yielding Variety. Required seed rate ranked third in adoption (43.33%) followed by the time and method of sowing, which comes fourth in adoption (36.67%). The plant protection measures obtained fifth rank as it is adopted by only 35 per cent of farmers.

**Table 3: Technology wise adoption of improved scientific production practices (n = 60)**

| Sl.No. | Name of the Improved Scientific ProductionPractices | Frequency | Percentage | Rank |
|---|---|---|---|---|
| 1 | Application of Organic Manure | 37 | 61.67 | I |
| 2 | High Yielding Variety (HYV) | 35 | 58.33 | II |
| 2 | Time and Method of Sowing | 22 | 36.67 | IV |
| 4 | Required Seed Rate | 26 | 43.33 | III |
| 5 | Seed Treatment | 8 | 13.33 | VIII |
| 6 | Application of Fertilizer | 13 | 21.67 | VII |
| 7 | Irrigation Practices | 17 | 28.33 | VI |
| 8 | Application of Herbicides | 6 | 10.00 | IX |
| 9 | Plant Protection Measures | 21 | 35.0 | V |

About 28.33 per cent had adopted the irrigation practices at sixth followed by 21.67 per cent preferred to adopt the application of fertilizer on seventh. Whereas 13.33 per cent of the respondents adopted seed treatment at eighth and the adoption of application of herbicides came at last.

**V. Relationship between socio-personal characteristics and adoption of improved scientific production technologies (ISPT)**

Assuming that the various socio-personal characteristics of the respondents may have relationship with their adoption of improved scientific production technologies, Pearson product correlation 'r' was computed and compared. The results are presented in Table4 given below.

**Table 4: Relationship between socio-personal characteristics and adoption of improved scientific production practices (n = 60)**

| Variables | Name of the variables | Values | | | Coefficient of correlation (r) |
|---|---|---|---|---|---|
| | | Mean | S.D. | Range | |
| X1 | Age(yrs.) | 44.35 | 10.67 | 24-68 | 0.191* |
| X2 | Education | 3.8 | 1.45 | 1-6 | -0.041 |
| X2 | Farming Experience (yrs.) | 19.43 | 8.08 | 6-41 | -0.123 |
| X4 | Farm Size (acres) | 0.99 | 0.50 | 0.35-2.6 | 0.192* |
| X5 | Annual Income (Rs. In 000) | 14.125 | 9.34 | 2.5-42.0 | 0.251** |
| X6 | Social Participation | 0.45 | 0.97 | 0-4 | 0.192* |
| X7 | Mass Media Exposure | 8.83 | 2.56 | 4-16 | 0.252** |
| X8 | Extension Agency Contact | 3.7 | 2.36 | 0-7 | 0.350** |
| X9 | Fatalism – Scientism | 5.96 | 1.03 | 4-9 | 0.219* |
| X10 | Scientific Orientation | 21.41 | 4.18 | 13-29 | 0.489** |

** - $p < 0.01$; * - $p < 0.05$

A critical scrutiny of results presented in Table 4 revealed that out of 10 independent variables pertaining to socio-personal characteristics, four viz., annual income, mass media exposure, extension agency contact and scientific orientation were found to be positively and significantly associated with the adoption of improved scientific production technologies at 1 per cent level of probability. The other variables namely farm size, social participation and fatalism – scientism were also found significant at 5 per cent level of probability. However, the age was found to be negatively correlated with the adoption, which infers that the young age farmers are more willingly to take risk compared to the old aged ones.

## CONCLUSION

Based on the discussions made earlier, it is important to understand the nature and degree of relationships between the socio – personal characteristics and adoption. It could be concluded that annual income, mass media exposure, extension agency contact and scientific orientation emerged to be major determinants of level of adoption of improved scientific production practices. Further the study reveals that the majority of the farmers are found to be medium adopters, this in turn could be converted into high adopters if appropriate measures are taken into consideration.

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