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NA Ganai
Krishi Vigyan Kendra, Kupwara SKUAST of Kashmir, Jammu Kashmir, India

AH Hakeem
Krishi Vigyan Kendra, Kupwara SKUAST of Kashmir, Jammu Kashmir, India

SA Hakeem
Krishi Vigyan Kendra, Kupwara SKUAST of Kashmir, Jammu Kashmir, India

Tahir Saleem
Krishi Vigyan Kendra, Kupwara SKUAST of Kashmir, Jammu Kashmir, India

Zahoor Ahmed
Krishi Vigyan Kendra, Kupwara SKUAST of Kashmir, Jammu Kashmir, India

Correspondence
NA Ganai
Krishi Vigyan Kendra, Kupwara SKUAST of Kashmir, Jammu Kashmir, India

Technology transfer for agricultural development through KVK in District Kupwara

NA Ganai, AH Hakeem, SA Hakeem, Tahir Saleem and Zahoor Ahmed

Abstract
A set of demonstrations and testing of technologies were conducted during Kharief 2008 in the selected villages of Langate and Trehgam block through short term research to demonstrate the existing technologies at farmers field for dissemination of improved varieties and enhancing production. The high yielding SKUAST -K released varieties of paddy (SR-1 and Jehlum): maize (C-15 and C-8) and Oil seed (KS-1O1) were introduced under the micro climatic conditions at farmers field. SR-1 recorded maximum yield (72q/ha.) as compared to Jhelum and local check which is attributed to its genetic potential. In Brown Sarson variety KS-101, the yield under demonstration recorded was 8.5q/ha in comparison to check that recorded only 6.5q/ha. An average extension gap of 3q/ha in case of paddy variety SR-1 emphasizes the need to educate the farmers through various extension means for the adoption of improved agricultural technologies. Technology gap imply researchable issues for realization of potential yield while the extension gap implies what can be achieved by transfer of existing technologies. The technology gap of 14q/ha and 20q/ha was observed in C-8 and C-15 respectively. In maize C-8 the extension gap of 20q/ha was observed that can be overcome by adopting the awareness programmes regarding time of sowing and use of improved varieties. An on Farm testing of apple orchard on micro nutrient boron application gave good dividends to the orchardists as the pre harvest spray of boric acid resulted in higher percentage of 'A' grade apples over farmers practice.

Keywords: Technology Transfer, Field Crops, Apple, Livelihood Security

Introduction
Agriculture continues to be the back bone of Indian economy and more than 65% per cent population of country directly or indirectly depends on agriculture for their livelihood. As the largest private enterprise in India, agriculture contributes nearly one –fourth of national GDP (Rai, 2004) [2]. Since post independence, Indian agriculture has got a major phillip in boosting production. Many programmes have been launched from time to time to improve traditional agriculture and programmes through different extension system have always a pivotal position in deciding the technologies to the targeted population (farmers) at gross root level. The aim and objective of all these programmes are meant for upliftment of socio –economic condition of farmers. Krishi Vigyan Kendra Kupwara is operating in the frontier district Kupwara of Jammu and Kashmir state since 2005 and made tangible strides in dissemination of proven technologies as per the local need of farming community. The extension programmes were planned which include Front Line Demonstration, On Farm Testing and different methods like team diagnostic visits, vocational trainings, method demonstration, awareness camps to cater the needs of farmers in achieving specific goals. The system envisaged professionalism, time bound activities, effective linkages and field visits to progressive and contact farmers at the village level. The ultimate aim of these programme was to have an innovative technology demonstration /adoption for the overall agriculture development in the district to know the effectiveness of this system with regard to latest technologies developed by SKUAST-K relating to farming activities and to ascertain its practicality at the farmers field because farmers believe and follow those technologies which show promises under their particular agro- climatic zone. In most of pockets of district traditional agricultural operations like cultivating old varieties coupled with faulty agronomical practices have stagnated the yield because there is a great difference in potential and actual yield. This is due to low yielding traditional varieties, imbalance use of fertilizers, sub-optimal plant stand and heavy weed infestation, use of inadequate irrigation and improper plant protection measures. Apart from this, lack of knowledge about non -monetory inputs is the major constraint which influences the productivity level. Keeping in view these concerns present study was undertaken to introduce new varieties and appropriate production technologies through FLD's, OFT'S trainings and other extension methods for increasing productivity and improving livelihood of farming community.

Material and methods

The present study was conducted in two blocks of the district Kupwara. Two villages from each block Viz., Langate and Trehgam were selected for demonstration on paddy and maize during Kharief 2008. The same villages were provided with oilseed in the rabi season as front line demonstration. On farm testing was laid in the apple orchard of four progressive farmers in two villages of Langate that were selected for the demonstration of fields crops. The trainings were imparted to the farmers on Front line Demonstration, On Farm Testing and technologies available with the Kendra. The villages were purposively selected because of large number of farmers participation in the KVK activities. For the selection of respondents a list of FLD/OFT trainees of KVK was prepared. Out of 250 trainees list, only 50 farmers were selected from KVK adopted villages. The data were collected through personel contacts with the help of well structured interview schedule. The gathered data were processed, tabulated and analysed in light of objectives of the study.

A set of demonstrations and testing of technologies were conducted during Kharief 2008 in the selected villages of Langate and Trehgam block to develop improved technologies through short term research and also demonstrate the existing technologies at farmers field for dissemination of improved varieties and enhancing production. Introduction of high yielding SKUAST -K released varieties of paddy (SR-1 and Jehlum): maize (C-15 and C-8) and Oil seed (KS-1O1) at farmers field under the micro climatic conditions of the blocks. The existing varieties like China 1039 in paddy: local maize were used as check in cereals. Technology was demonstrated on farmers field and all the recommended cultural operations as per the package of practice were followed as and when required. Crops were harvested manually in the last week of September to 1st week of October. A net plot area of 25 ^{m2} for each demonstration was harvested for yield as measurable indicator of output and compared with the farmers practice. The impact of transfer of technology was assessed in terms of per cent increase in yield and extension gap (Samui *et al*, 2000) [1]. On farm testing on apple orchard was conducted at two locations of Langate. The soil texture of experimental orchards was sandy loam to clay loam with pH slightly acidic to neutral, medium to high in O.C, available N and K and medium in P. Twelve trees of Cv. Red Delicious were selected in each orchard for the study. The different treatments applied were:

TI (farmers practice) = Application of FYM @10t/ha.
Urea @ 3kg/tree
DAP @ 1kg/tree
MOP @ 1kg/tree
T2 = boric acid @0.1%+farmers practice
T3 = boric acid @0.2% + full recommended package of practice

The Chemical fertilizer was used as pre-harvest spray at fortnightly interval in the month of July.

Results and discussion

Among the three paddy varieties SR-1 recorded maximum yield (72q/ha.) as compared to Jhelum and local check which is attributed to its genetic potential. Furthermore, the yield under demonstration was highest in both the varieties as compared to China-1039 (check) which can be ascribed to package of practices followed under demonstration. The critical input manifested was number of seedlings /hill and transplanting them in lines that might have augmented the yield. The maize variety C-15 gave the maximum yield 41q/ha. while as the variety C-8 recorded the yield to the tune of 40q/ha. as compared to local check 20q/ha. The technological gap i.e., difference between potential yield and yield of demonstration plots was 19 q/ha. An average extension gap of 3q/ha in case of paddy variety SR-1 emphasizes the need to educate the farmers through various extension means for the adoption of improved agricultural technologies to revert the prevailing trend of wide extension gap in paddy. Mishra *et al.*, 2007 [4] reported an increase in the potato yield by 29.8 q/ha and presented a gap in yield to the tune of 13-19 per cent resulting from treatment of potato seed. Technology gap imply researchable issues for realization of potential yield while the extension gap implies what can be achieved by transfer of existing technologies. The technology gap of 14q/ha and 20q/ha was observed in C-8 and C-15 respectively. In C-8 maize the extension gap of 20q/ha was observed that can be overcome by adopting the awareness programmes regarding time of sowing and use of improved varieties. In Brown Sarson variety KS-101, the yield under demonstration recorded was 8.5q/ha in comparison to check that recorded only 6.5q/ha. In case of oil seed the moisture level at the time of sowing in addition to its sowing before 15th of October resulted in good dividends. Furthermore, the technology gap of 6.5q/ha and extension gap of 2.0q /ha was recorded during the study.

As is obvious from table-2, wide technological gap was observed in maize which is directly attributed to the critical input seed among field crops as the new variety recorded very good yield potential as compared to the existing one. Similarly, in case of maize the wide extension gap was observed which could be ameliorated if proper cultural practices are followed particularly the damage to maize by cutworms was main bottleneck hampering the yield. In case of oilseed the critical input like pre-sowing irrigation, sowing date and application of sulphur resulted in higher yields in demonstration plots as compared to farmers plots (check). Drastic yield reduction was recorded when the sowing date was delayed beyond 30th of October under the micro- climatic conditions of the Langate block of district Kupwara. The technological gap of (6.5q/ha) was solely attributed to agronomical practices as the framers also use the same variety. Similarly, it is affordable to squeeze the extension gap through technological backstopping from the Agricultural University Agricultural Production Department and KVK.

The data revealed that adoption of boric acid with framers practice resulted in higher percentage of ‘A’ grade apples over framers practice alone (Table-3). Such a response to recommended application of nutrients clearly depict that in district Kupwara the percentage of ‘A’ grade apples can be boosted up by combined effect of boric acid with farmers practices. The percentage of ‘A’ grade apple further improved by adopting full package of practices with boric acid spray. Such a response to applied spray of boric acid has put an impressive impact on the orchardists behaviour as the quality was substantially increased.

Trainings were on and off imparted to the farmers regarding the cultivation of field crops and fruits on scientific lines so as to bridge the gap in production and also improve the quality of the produce. KVK also conducted several training camps for field functionaries of allied Development Departments. The objective of these trainings was capacity building /hands on trainings to field functionaries to take these technologies to the farmers field and rural areas so that the end user gets benefitted. In this endeavour, however, line departments of the state governments have to share the responsibility of

technology transfer as the ICAR and SAU's may not have adequate resources to perform the task meticulously (Gupta, 2006) [3]. To find out the success of any training programme a periodic appraisal and evaluation of what is being done is essential so that suitable changes can be incorporated to make training programme much effective. The concept of vocational training programme in agriculture through KVKs grew substantially due to greater demand and awareness regarding new improved technologies by the farmers. The farming community not only require the knowledge and understanding of intricacy of technology but also progressively one or more skills in various complex agricultural operations for adoption at their farm. The training programmes were designed to impart the latest knowledge to the farmers through work experience by applying the principle of 'learning by doing'.

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Table 1: Performance of demonstration on yield of field crops.

Crop	Variety	No. of farmers	Yield q/ha. (Check)	Yield q/ha Demonstration	%increase over check
Paddy	SR-	64	53	72	35.84
	Jhelum		50	68	36.00
Maize	C8	66	20	40	100.00
	C15		25	41	64.00
Brown Sarson	KS-101	34	6.5	8.5	30.76

Table 2: Technological and extension gap of front line demonstration.

Crop	Variety	Yield q/ha. (Check)	Yield q/ha Demonstration	Potential yield q/ha	Technological gap q/ha	Extension gap q/ha
Paddy	SR-1	53	72	75	3.0	19.0
	Jhelum	50	68	70	2.0	18.0
Maize	C8	20	40	60	20.0	20.0
	C15	25	41	55	14.0	16.0
Brown Sarson	KS-101	6.5	8.5	15	6.5	2.0

Table 3: Effect of pre-harvest boron application to improve quality of apple.

Fruit	Variety	Technology assessed	Results of assessment (% A grade apple)
Apple	Red Delicious	T_1= (farmers practice): application of FYM @10t/ha. Urea=3kg/tree DAP=1kg/tree MOP=1kg/tree	32
		T_2= boric acid @0.1%+farmers practice	35
		T_3= boric acid @0.2% + full recommended package of practice	41

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