Impact of National Food Security Mission – Pulse on Chickpea Productivity in Hamirpur District of Uttar Pradesh

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ABSTRACT

Pulses play an equally important role in rainfed and irrigated agriculture. Under rainfed condition U.P. Bundelkhand is well suited for pulses especially gram production due to the unique agroclimatic condition.The NFSM–Pulse scheme is also running in UP Bundelkhand including district Hamirpur for increasing productivity. On this background level of gram productivity among trained and untrained farmers were assessed and analysed the relationship between dependentand independent variables as well as find out the adoption scenario of recommended gram technology among trained farmers.For this purpose the study was conducted in purposively selected district Hamirpur during 2012-2013. The four villages were selected randomly out of 8 villages of NFSM – Pulse coverage area, where gram was extensively grown and all necessary inputs and training were provided to selected farmers. 60 trained and 60 untrained farmer's productivity performance was assessed. The result was found that productivity level of gram was higher in trained farmers than untrained farmers. Majority of the trained gram farmers i.e, 43.33 per cent were observed under medium productivity level i.e, 10-20 q.ha while 40 per cent achieved higher productivity level i.e, more than 20 q/ha gram yield in their field. This impact was the combination of technological package including training and critical monitory and non-monitory inputs. The adoption scenario indicates that low gram productivity was the result of either poor knowledge or faulty/non adoption or the combination of both.The productivity level also depends upon several independent variables associated with farmers adoption related to recommended gram technology.

Key words: *National Food Security Mission – Pulse (NFSM-P); Chickpea; Productivity; Impact assessment;*

A variety of pulses is grown in India under a wide range of agro-climatic conditions. Presently, India is producing about 18.4 million ton of pulses from an area of about 24 million hectare with 786 kg/ha productivity and contributing about 21 per cent into global production. However, about 2 – 3 million ton of pulses are imported annually to meet the domestic consumption requirement. It is well known fact that pulses are inseparable ingredients of vegetarian diet and one of the cheapest source of dietary protein for Indians.

Bundelkhand region of Uttar Pradesh is also known as bowl of pulses. There is greater variation in productivity under different farming environment/ situations. This region is compreses seven districts namely Banda, Jalaun, Jhansi, Lalitpur, Hamirpur, Mahoba and Chitrakoot in central plateau and hill agro-climatic region of India. This region has two broad groups of soils namely; red soils (*Rakar*&*Parwa*) and Black soils (*Mar*and *Kabar*) (*S.K. Chaturvedi, N. Nadarajan, SK Singh, 2010*). It has semi arid climate with average annual rainfall of 800 mm and temperature ranging between 3.0°C to 47.8°C. The cropping intensity is about 126% with maximum area under mono-cropping, sown during rabi season. Pulses are predominant crops in this tract with poor productivity. On the basis of suitability several pulse crops pockets are developed on the basis of soils, and trend set by farmers like Urd and Moong are in Lalitpur and Jalaun followed by Hamirpur district; Lentil is well suited for Hamirpur, Mahoba and Banda districts, while Arhar and gram are well suited for Hamirpur districts especially Sarila, Gohand, Rath and Muskara blocks; likewise greenpea is in Jalaun and Jhansi district.

To increase the production and productivity of pulses government of India launched a mission named as National Food Security Mission – Pulses (NFSM – P). Generally this mission is implemented by selected Non-Governmental Organization (NGOs) with the help of State Department of Agriculture. The main objective of this mission is popularization and habitualization of pulse production and protection technology among farmers for higher production and productivity. For this purpose training as well as required kit of inputs were also provide to farmers. The kit has several eco-friendly inputs necessary for production and protection of pulse crop. Among several pulses, gram or chickpea (*Cicer arietinum* L.) is considered for the study in terms of productivity because it is the main rabi pulse crop in the study area with poor productivity (9.7 q/ha) in Hamirpur district as compare to western Uttar Pradesh (*Agriculture Statistics at a glance 2006*). On this background the present study was undertaken during 2012-2013 with the following specific objectives namely to find out the level of gram productivity among trained and untrained farmers, to identify the adoption scenario of recommended gram technology among trained farmers and to analyse the relationship between dependent variable (productivity level) and independent variables of trained farmers.

METHODOLOGY

All the seven districts of Bundelkhand region of Uttar Pradesh, only one district Hamirpur and its block Rath were selected purposively due to poor productivity level of gram while *Mar* soil is best suited forgram cultivation. Out of eight villages under coverage area of NFSM-Pulse, in Rath block only four villages were selected randomly. From the selected villages two lists of trained and untrained farmers were prepared. From each list 15 farmers were selected randomly. The information pertaining to the objectives were collected through well structured schedules from 60 trained (beneficiary farmers of NFSM – Pulse) and 60 untrained (non-beneficiary) farmers from the selected four villages. Thus, the total sample size was 120 chickpea growers. The independent variables, viz., age, caste, education, farm size, number of training received, scientific orientation, knowledge of production and protection technology, adoption of production and protection technology, utilization of information sources and contact with development agency, i.e. NFSM-P team were included to analyse their influence on adoption of recommended technology related to gram. To know the response of gram farmers on adoption of recommended technology adoption scenario was recorded and presented under ten components.For analysis statistical tests i.e. frequency, percentage, mean and correlation coefficient were used for analyzing and interpreting the data.

RESULTS AND DISCUSSION

Level of gram productivity among farmers : Training was organized to the participating farmers on different aspects of production and protection technology related to gram cultivation. The detail of training is given here.

Training of farmers: Table 1 indicates that a majority of participating farmers i.e, 46.67 per cent attended all the four training, 33.33 per cent farmers joined 2 to 3 training while 20 per cent participated in only one training organized by NFSM-P team on gram cultivation.

Table 1. Details of training received by farmers

No. of training	No.	%
Only 1 training	12	20.00
2 to 3 training	20	33.33
All 4 training	28	46.67
Total	60	100.00

Assessment of production level among farmers : Table 2 revealed that a majority of 43.33 per cent of trained farmers (with input supply) were observed under medium productivity level (10 – 20 q/ha), 40.00 per cent achieved higher productivity i.e. > 20 q/ha, and 16.67 per cent received lower productivity level i.e. < 10 q/ha. Whereas, in untrained farmers (without input supply) 58.33 per cent received lower productivity (<10q/ha), 28.33 per cent farmers had medium productivity (10-20 q/ha) and only 13.33 per cent had higher productivity (> 20 q/ha) level in gram. In terms of mean value trained farmers had more mean value (1.11) than untrained farmers i.e, 0.77. Study of *Shivaran, et al (2011)* also concluded that improved production technology of gram gave enhancement of 10.20 per cent in yield over farmers practices.

Adoption scenario of recommended gram technology among trained farmers: The ten components of the recommended gram technological practices were appropriate soil moisture at sowing time, use of DAP@100kg/ha at sowing time, use of sulphur @20kg/ha, use of 2% DAP/urea solution as foliar spray

Table 2. Comparative study between trained and untrained farmers according to their productivity of gram (N = 120)

Categories of farmers	No.	Productivity level of gram			Mean value
		L	M	H	
Trained farmers with input supply	60 (100)	10 (16.67)	26 (43.33)	24 (40.00)	1.11
Untrained farmers without input supply	60 (100)	35 (58.33)	17 (28.33)	08 (13.33)	0.77
Gap (1 – 2)	-	-	15%	26.67%	-

L=Low level (<10 q/ha) M=Medium level (10-20 q/ha)
H=High level (> 20 q/ha)
Data given in parenthesis indicate percentage.

in rainfed condition, use of *Rhizobium* culture 20 g/kg of gram seed, use of preemergence herbicide, seed replaced by farmers, use of insecticide as seed treatment, use of *Trichoderma*, and use of pheromene trap at appropriate time in field. An attempt was made to know the responses of trained farmers about adoption (as recommended/ faulty, and nature of faulty) and non adoption with causes. The data related to the above aspects were presented in frequency and percentage.

Data in Table 3a reveals that farmers achieving high level of productivity (>20 q/ha) adopted all the ten components as such as recommended by NFSM-P programme. Table (3b) indicates response of trained farmers achieving low and medium level of productivity. It showed that about 89 per cent trained farmers replaced their seed followed by 75 per cent useing *Trichoderma*, 58 per cent seed sown at appropriate soil moisture level, about 53 per cent use insecticide as seed treatment & use pheromone trap at appropriate time in field, about 42 per cent trained farmers adopt pre-emergence herbicide while 36 per cent use DAP@100 kg/ha at sowing time. Only about 28 per cent trained farmers use *Rhizobium* culture @ 20 g/kg of seed and 25 per cent use sulphur @20kg/ha in their field. Response under non adoption side showed that 100 per cent trained farmers do not adopt 2% DAP/ Urea solution as foliar spray in rainfed condition while use of sulphur, rhizobium culture, DAP at sowing time and pre-emergence herbicide were also showed higher per centage of non adoption by trained farmers. Study of *Singh, et al (2003)* also proved that farmers had not at all adopted seed treatment with fungicides, rhizobium culture and recommended sowing and spacing. They also concluded that extent of adoption of plant protection measures was observed to be poor.

Out of the ten components of recommended gram technology, farmers had not at all fully adopted. The data indicate that 10.84 per cent trained farmers adopted faulty technological practices while 35 per cent adopted recommended out of 45.84 per cent of total trained farmers (who achieved medium and low level of productivity). Under non adoption scenario 54.16 per cent trained farmers do not uses recommended technology due to several causes including without any satisfactory reason which was a major cause of poor (low and medium) gram productivity (Table 3b).

Table 3a. Adoption, scenario of recommended gram technology among trained farmers (N = 24)

Recommended Technology	No.	%
Appropriate soil moisture at sowing time	24	100
Use of DAP @ 100 kg/ha at sowing time	24	100
Use of sulphur @ 20kg/ha	24	100
Use of 2% DAP/Urea solution as foliar spray in rainfed condition	24	100
Use of Rhizobium culture @ 20g/kg of gram seed	24	100
Use of pre emergence herbicide	24	100
Seed replaced by farmers	24	100
Use of insectside as seed treatment	24	100
Use of Trichoderma	24	100
Use of Pheramon trape at appropriate time in field	24	100

Table 3b. Adoption scenario of recommended gram technology among trained farmers [N = 10 (low level) + 26 (medium level = 36].

Technology	No.	%
Appropriate soil moisture at sowing time	21	58.34
Use of DAP @ 100 kg/ha at sowing time	13	36.12
Use of sulphur @ 20kg/ha	09	25.0
Use of Rhizobium culture @ 20g/kg of gram seed	10	27.78
Use of pre emergence herbicide	15	41.67
Seed replaced by farmers	32	88.89
Use of insectside as seed treatment	19	52.78
Use of Trichoderma	27	75.00
Use of Pheramon trape at appropriate time in field	19	52.78

Relationship between independent variables and dependent variable: To analyse the relationship between different independent variables and dependent variable (production level) correlation coefficient was calculated. It showed that caste, education, farm size, number of training received, scientific orientation, knowledge of production and protection technology, adoption of production and production technology, utilization of information source, contact with development agency i.e. NFSM – Pulse team were positively co-related and highly significant with production level. These findings also supported with the work of *Sharma and Singh (2001*). The result of correlation coefficient are reported in Table 4.

Table 4. Correlation between independent and dependent variable of trained farmers

Independent Variables	Dependent variable (Y) (Production level)
Age	-0.189*
Caste	0.360**
Education	0.783**
Farm size	0.305*
Number of training received	0.843**
Scientific orientation	0.640**
Knowledge of production and protection technology	0.802**
Adoption of production and protection technology	0.705**
Utilization of information source	0.732**
Contact with development agency, i.e. NFSM-P team	0.641**

* significant at =P 0.05 ** significant at P = 0.01

CONCLUSION

On the basis of the findings of the study, it can be concluded that productivity level of gram was higher in trained farmers than untrained farmers. About 26.67 per cent gap was found between untrained and trained farmers regarding high productivity level. This was also reported in medium and low productivity level. This impact was the combination of technological package (training and inputs provided by NFSM-P team).

The adoption scenario indicates that poor gram productivity was the result of either poor knowledge or faulty / non adoption of recommended technology or combination of both. Out of the ten components of recommended gram technological practices trained, farmers of the study area were found not adopting 2% DAP/urea solution as foliar spray in gram. In addition, adoption scenario was very poor among trained farmers regarding use of sulphur, rhizobium culture, herbicide and DAP at sowing time. Except above, it was alarming that quantitative share of trained farmers under non adoption category were not adopted sulphur, DAP/urea for foliar spray, *Rhizobium* herbicide, insecticide, *Trichoderma* and pheromone trap due to either without any causes/reason or no satisfactory answer while they received training and related inputs by NFSM–P team. However, they were found to be good in adopting improved seeds, use of Trichoderma, insecticide, phermon trap and sowing during appropriate soil moisture. The productivity of gram also affected by several independent variables like caste, education, farm size, number of training received, scientific orientation, knowledge and adoption of production and protection technology, utilization of information source, contact with development agency, i.e. NFSM-P team.

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