



Research Article

IMPACT ASSESSMENT IN YIELD GAPS OF CLUSTER FRONT LINE DEMONSTRATION UNDER PULSE PRODUCTION IN KOHIMA DISTRICT

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Abstract: Pulse is a highly valued field crop required for our consumption. Its productivity can be increased through proper land planning and scientific interventions. Farmers are the backbone of agriculture and have to be motivated to go for double cropping. All means have been employed to enhance the productivity yet the production remains low. To minimize the yield gaps and maximize production, Front Line Demonstration on pulse (pea) production is being conducted by Krishi Vigyan Kendra, Kohima from the year 2015-16 to 2018-19 at various villages of the district. The result from these demonstrations revealed a significant improvement in yield over farmers' practice. The yield superiority ranged from 17.85 % to 36 %. A yield overall advantage of 28 percent was also recorded in Technology Demonstrated. Yield gap between 15% to 26.7% was observed over the years with an average yield gap of 25.75 percent. Overall Technical knowledge of the farmers was low, followed by medium and high. Maximum number of farmers (98%) had the knowledge about the intercropping operation followed by method of sowing (92%), seed treatment (48%), varieties (44%), disease control (38 %) and time of irrigation (36 %) respectively.

Keywords: Pulses, Yield gap, Technical knowledge, Front Line Demonstration, Rabi

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Introduction

Pulses are leguminous crops capable of fixing biological nitrogen and enhance climate change mitigation. It is also a high source of dietary protein. Pulses are generally harvested as dry grain and those harvested as greens are better known as vegetables [1]. India is a global leader in terms of pulse production and consumption. These high demands for pulses make India the leading importer of pulses due to the fact that Indian by and large is vegetarian in dietary habit. In Nagaland, pulses are mainly grown during the Rabi season in small pockets and major demands are made from import. The daily dietary requirement of pulses for Kohima district would be 40gm/day/head which would require 17112.52 MT of pulses production if only 4079 ha area could be made available for pulse production [2]. To achieve this mammoth task, double cropping is being encouraged to increase the area thereby doubling the farmer's income as well.

However, there seem to be many lacunas in production of pulses in the district as the field could be available only after harvesting of paddy, as harvesting sometimes extends up to November and early parts of December. Therefore, to minimize the yield gap in limited available production area the present study was undertaken with the following objectives.

- To assess the Yield gap during the past four year
- To identify the Technical Knowledge gap on pulses production.

Materials and Method

Front Line Demonstration (FLD) on Pulses (Rabi) was conducted by Krishi Vigyan Kendra Kohima from the year 2015-16 to 2018-19. Improved Pea varieties of HODP-15, Prakash and Aman were demonstrated at the farmers' field in participatory mode. The beneficiaries were selected in cluster mode, where the area coverage varied from 0.4 to 0.75 hectare [3]. Kohima district was purposively selected as the jurisdiction of the Krishi Vigyan Kendra was confined to the district itself.

The villages covered under the CFLD programme included Tesophenyu, Tsemnyu, Ziphenyu, Botza, Kigwema, Phesama, Nerhe Pheza, Phenweny, Rengma Pani and Chunlikha respectively. Fifty (50 Nos) beneficiaries were selected based on proportionate stratified random sampling method from the 107 Nos of Front-Line Demonstration Programme representing each village. For collection of information and data questionnaire cum schedule was prepared, and for measuring the percentage yield gap-II the following formula was used.

Demonstrated Yield - Farmers yield x 100/Demonstrated Yield

Yield gap in actual sense is the difference between the Demonstrated yield and the Actual yield of the crop, which represent the exploitable yield gap. Hence to minimize the exploitable gap, the adaptability of the crop shall depend much on availability of nutrients, non-limiting water supply, pest and diseases effectively controlled. To assess the technical knowledge gap of the farmers, technologies demonstrated under Front Line Demonstration were taken into account viz. varieties, seed treatment, method of sowing, time of irrigation, intercropping operation, disease control.

Result and Discussion

During the last four years of demonstration, 107 Front Line Demonstration under Rabi-pulses were conducted over an area of 80 ha covering various villages under Kohima district. The demonstrated result revealed that a substantial increase in yield of improved technology over the farmers' practice was recorded. Over the years, improved varieties recorded an average yield increase of 16.5 q/ha as compared to 12.88 q/ha obtained by farmers practice [Table-1] under the same field situation. The yield superiority of improved varieties during the demonstration period ranged between 17.85 percent to 36 percent. Overall yield advantage of 28 percent was recorded in technology demonstrated.

Table-1 Yield Gap analysis under Front Line Demonstration of Rabi Pulses (pea) at farmers' field

Year	Variety	No. of Demonstrations	Area under Demonstration (ha)	Average yield in Demonstration (q/ha)	Average yield in farmers practice (q/ha)	Percentage yield increase	Percentage Yield gap
2015-16	HODP-15	15	10	19	14	35.7	26
2016-17	HODP-15	25	20	16.5	14	17.85	15
2017-18	Prakash	45	30	15.5	12.5	24	19
2018-19	Aman	22	20	15	11	36	26.7
Total/Average		107	80	16.5	12.88	28	25.75

Table-2 Technical knowledge gap of farmers about various scientific practices in pulse crop production

Practices	Technical knowledge about pulse production technology (N=50)							
	Low		Medium		High		Total	
	Nos.	%	Nos.	%	Nos.	%	Nos.	%
Varieties	16	32	5	10	1	2	22	44
Seed treatment	23	26	1	2	-	-	24	48
Method of sowing	37	74	7	14	2	4	46	92
Time of irrigation	12	24	4	8	2	4	18	36
Intercultural Operation	2	4	34	68	13	26	49	98
Disease control	17	34	2	4	-	-	19	38

Yield Gap

Yield gap of 15 percent to 26.7 percent was observed over the years and location. On an average the yield gap was 25.75 percent [Table-1]. The yield gap was lowest (15 %) during 2016-17 and was highest (26.7 %) during 2018-19. Such gap might be attributed to adoption of improved whole package technologies in demonstration which resulted in higher yield than the traditional practice. These findings were also similarly reported by Anil Kumar Chaudhary, (2013) [4], Anuradha Bhartiya, *et al.*, (2017) [5] and Gireesh, *et al.*, (2019) [6].

Technical Knowledge Gap

Technical knowledge gap is to know the level of technical knowledge adopted by the farmers in pulse production process. Six important practices were recommended and information pertaining to such practices was obtained. The overall knowledge level was very low [Table-2]. Practice wise the responses of farmers vary from 4 to 74 percent who had low level of technical knowledge followed by medium and high technical knowledge in which the responses varied from 2 to 68 percent and 2 to 26 percent respectively. Of the total, maximum number of farmers (98%) had the knowledge about the intercultural operation followed by method of sowing (92%), seed treatment (48%) and varieties (44%). A minimum number of farmers had the technical knowledge about disease control (38 %) and time of irrigation (36 %) respectively. The results are also in consonant with the finding of Mahesh Pal, *et al.*, (2018) [7] and Kumar, *et al.*, (2018) [8].

Conclusion

From the findings it can be concluded that the yield gap in *Rabi* pulse production can be minimized under Kohima district. For which farmers need to be made aware about various recommended practices in pulse production with special reference to new varieties, seed treatment, disease control etc. Technologies developed by ICAR, SAU and Agricultural Research Institute needs to be location suitable and farmers friendly.

Application of research: Study of Pulse Production in Kohima District

Research Category: Front Line Demonstration

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Study area / Sample Collection: ICAR-Krishi Vigyan Kendra, Kohima, 797109, Nagaland, India

Cultivar / Variety / Breed name: HODP-15, Prakash, Aman

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Ethical Committee Approval Number: Nil

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