Research Paper
Impact Factor: 3.029
Peer Reviewed & Indexed Journal

IJMSRR
E- ISSN - 2349-6746
ISSN -2349-6738

ASSESSMENT OF YIELD GAP IN CHICK PEA THROUGH IMPROVED PULSE PRODUCTION AND PROTECTION TECHNOLOGY

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Abstract
The Assessment and comparison of yield gap of the demonstrations over farmers practice under IPPPT component. The demonstration was conducted in several village of Jabalpur during year 2008-2011. The average chickpea yield was obtained 16.16 q/ha, which was higher than the farmers practices (11.58 q/ha) and the data observed that max. yield potential of chickpea 20.3 q/ha through Improved Pulse Production Protection Technology (IPPPT). The IPPPT programme was effective in changing attitude, skill and knowledge of recent technology for high yielding varieties, balanced dose of the fertilizer and biological disease management of chick pea including their adoption

Key Words: Chickpea, Agro-Climatic Zone, Yield Gap

Introduction

India is the largest producer of pulses in the world with 25 per cent share in the global production. The area, production and productivity of the pulses in the country are 23.63 million hectare, 14.56 million tones and 6.25 q/-ha, respectively (Masood Ali et *al. 2007-08).* Chickpea *(Cicer arietinum* l.inn.] is an important winter-season food legume having extensive geographical distribution and contributing 39 percent to the total production of pulse in the country. It is a good source of protein (18- 22%), carbohydrate (52-70%), fat (4- 10%), minerals (calcium, phosphorus, Iron) and Vitamins. It is an excellent animal feed. Its straw also had good forage value., Chickpea is the premier pulse crop in India occupying 7.10 million hectares area and contributing 5.75 million tones yield to the national pulse basket. It is grown through out the Country excepting on high altitude of northern and North eastern regions and coastal peninsula. The major chickpea producing states are Andhra Pradesh, Madhya Pradesh, Rajsthan, Uttar Pradesh, Maharastra, Haryana, Karnataka, Gujrat, Bihar and West Bengal. The area, production and productivity of chickpea in the states of Madhya Pradesh are 3043.7 thousand hectares, 3290.3 thousant tons and 10.82 q/ha, respectively. In Madhya Pradesh highest productivity of chickpea has been reported in Chhindwara district (2743 kg/ha) The area, production and productivity of chickpea in the district Jabalpur of Madhya Pradesh are 62.7 thousand hectares, 78.8 thousand tons and 12.57 q/ ha, respectively.

Gram pod borer (Helicoverpa' armigera Hubner), Gram semiloper (Autograph nigrisigna), termite -(Odontotermes obesus Ramb. and Microtermes obesi Heomgr), Cut worm (Agrotis ipsilon Rott), Aphid (Aphis craccivora Koch), Wilt (Fusurium oxysporum f. sp. cicerit, Collar rot (Selerotium rolfsii Sacc.), Black rot (Rhizoctonia solani), Stem rot (Sclerotinia (lib.) Mass.), Ascochyta blight (Ascochyta rabiei Pases Labr) and Botrytis grey mould (Botrytis cinerea Pers. Ex. Fr.) are major biotic stresses in the region. Among these biotic stresses, the gram pod borer (Helicoverpa armigera Hubner) is a major pest accounting for 75per cent pod damage in the crop (Krishna Kant et al., 2007). In spite of these biotic stresses, several other abiotic factors are responsible for declining the yield potential. Though much progress have been made in the field of agriculture research and education, but full benefits of these developments could not be realized by -the farming community because of low adoption of technologies at the user's level. IPPPT demonstration is an introduction by the ICRISAT, Hyderabad with inception of National food security mission of pulse crops during XI plan. The field demonstrations are conducted under the close supervision of scientist. The basic objectives of IPPPT demonstration are to spread the newly introduced high yielding varieties of chick pea speedily and acquaint extension functionaries and local farmers with front line varietals and management technologies. IPPPT demonstrations were undertaken by the Directorate Farms, JNKVV, Jabalpur(M.P.) on the improved package of practices of chick pea in the Jabalpur district during 2008-201l.

Materials and Methods

Improved Pulse Production and Protection Technology demonstration (IPPPT) chick pea was conducted by Directorate Farms, JNKVV, Jabalpur. Madhya Pradesh during the period from 2008- 2011 in twenty two villages viz. Padora, Urdwa, Pipariya, Kevlari, Saliya, Podi, Kaladomer, Jatna, Kohna& Kohni, Bheta, Chati, Singrod of Panager block Ghorakoni, Kingi, Gidorha, Banderkola, Sehora block Imlai, Tikariya, Khandiya Kundam block and Gwari, Chedi of Patan block of Jabalpur district

All total 556 numbers of demonstrations were conducted. The component demonstration of RRFL technology in Chickpea i.e. improved variety JG74, JG16, JG130 balanced dose of fertilizer (18 kg Nitrogen+46 kg P_2 O_5/ ha) and use of

Trichoderma @ 5

gm/kg of seed as seed treatment were taken. Demonstrations were conducted covering 192.8 ha. in Three consecutive years. One control plot was also kept by the side of the demonstration where farmer's practices was carried out. All the production and protection technologies other than interventions were applied in similar manner in demonstrated as well as in farmer's practices. The yield gap was calculated between demonstrated and local check and the results are presented herewith.

Results and Discussion

The details of the intervention on technology demonstrated along with farmers practice have been presented in Table-l. Latest varieties such as JG74, JG16, and JG130 were demonstrated over the farmers' traditional varieties. Similarly; seed treatment with Trichoderma powder @ 5gm/kg of seed and recommended fertilizer i.e. 18 kg N and 46 kg P_2O_5 were demonstrated where the farmers are not applying any fertilizer and practiced seed treatment. Further; monocrotophos 1.5 Iit./ ha at appropriate time were demonstrated against the farmers practice of no use or indiscriminate use of pesticides.

Table 1 : Technical interventions over farmers practice

S.No.	Component	Improved Technology	Farmers Practices
1	Variety	JG74, JG16, JG130	Local
2	Seed treatment	Trichoderma powder @ 5 g/kg of seed	No seed treatment
3	Fertilizer dose	18 kg N and 46 kg p 205 per hectare	No use of fertilizer
4.	Plant Protection measure	Monocrotophos @ 1.5 Iit./ ha at appropriate time	No use or Indiscriminate use

Common production and protection technologies as demonstrated both in the demonstration and control plot have been presented in Table-2. The technologies were seed rate of 75-100/ ha. Line sowing at a spacing of 30 X 10cms with 6 cm depth, two manual weeding i.e. 30 and 60 days after sowing and need based spraying against pod borer as well as disease management.

Table 2 : Common Production and protection technologies applied

S.No.	No of Components	Production and Protection Technologies
1	Seed rate and Sowing Methods	75-100 kg /ha on the basis of seed size Line sowing (R x R 30 cm) (P x P 10 cm) and 6 cm deep
2	Situation and Soil type	Rain fed Sandy loam
3	Weed management	Two mechanical weeding, one at 30 days after sowing and another at 60 days after sowing
4	Plant Protection and Disease Management	Wilt resistant varieties, Bird punchers and need based pesticides spray for pod borer

Common production and protection technologies were applied to assess the impact of variety, seed treatment and spraying of monocrotophos. The results obtained during Three years are presented in Table-3. It is revealed that an average yield of 16.16 q/ ha were obtained in the demonstration plots against the yield of 11.58 q/ha If the farmers practice. The highest yield in the demonstration plot as well as control plot 20.3 q/ha and 12.5 q/ha, respectively during 2009-10 and lowest yield were recorded in 2010-11

Table 3: Gap in grain yield under IPPPT Demonstration during 2008-2011

Year	Under IPPPT Demonstration		Average yield (qt/ha)		Yield gap (qt/ha)	%increase in the yield Over the farmers practices
	No. of Farmers	Total Area (ha)	Demo Plot	Farmers Practice		
2008-09	100	20.0	17.3	12.0	5.3	44.16
2009-10	206	72.8	20.3	12.5	7.8	62.4
2010-11	250	100.0	10.9	10.25	0.65	6.3

The result clearly indicated that the higher average grain yield in demonstration plots over the years compare to local check due to knowledge. and adoption of full package of practices i.e. appropriate varieties such as JG74, JG16 and JG130 etc., timely sowing, seed treatment with Trichoderma @ 5 g/ kg of seed, use of balanced dose of fertilizer (18 kg N and 46 kg P_20_5 ha'), method and time of sowing, timely weed management and need based plant protection. The average yield of chick pea increased 37.62 per cent more over local check while the year wise variation in yield to the tune of 6.3 to 62.4 per cent. The yield of chick pea could be increased over the yield obtained under farmers practices (use of non-descriptive

local variety, no use of the balanced dose of fertilizer, untimely sowing and no control measure adopted for pest management) of chick pea cultivation. Thus, the yield gap of 4.58 q/ha

The IPPPT demonstration produces a significant positive result and provide the researcher an opportunity to demonstrate the productivity potential and profitability of the latest technology (Intervention) under real farming situation, which they have been advocating for long time. This could be circumvent some of the constraints in the existing transfer of technology system in the district Jabalpur of Madhya Pradesh. Similar findings were reported by Kirar *et al*. (2006), Singh *et al* (2012) and Ghosh *et al* 2014.

Conclusion

The IPPPT programme was effective in changing attitude, skill and knowledge of recent technology for high yielding varieties, balanced dose of the fertilizer and biological disease management of chick pea including their adoption. This also - improved the relationship between farmers and scientist and built confidence between them. The demonstration farmers acted as a source of information and pure seeds of wider dissemination of HYV of chick pea for the other farmers. The productivity gain under IPPPT over conventional practices of chick pea created greater awareness. and motivated the other farmers to adopt appropriate recent production and protection technologies in the district. The critical input supplied and farmers participatory approach in planning and conducting the demonstration definitely helped in the transfer of technology to the farmers, Thus, 'it is concluded that fulfill yield gap and extension agencies can also playa significant role to transfer of improved technologies to farming community for better production.

References

1. Klrar, B.S., Norshine, R, Gupta, A. K. and Mukherjee, s.c. (2006). Demonstration: An effective tool for increasing the productivity of Urd. Ind. Res. J. of Ext. Edu. 6(3) : 47-48.
2. Krishna Kant, Kanouiia, K. R. ond Kanaujiya, S. (2007). Role of plant density and abiotic factors on population dynamics of Helicoverpa armigera (Hubner) in chickpea. Ann. PI. Protec. Sci. 15(2) : 303-306
3. Masood Aji, Sanjeev, G. and Basu, P.S.(2007-08). Higher levels of warming in north India will effect productivity. The Hindu Survey of Indian Agriculture, 2009: 44-48.
4. Singh, R. P., Singh, A. N., Dwivedi, A.P., Mishra, A. and Singh, M. (2012). Assessment of yield gap in chickpea through frontier technology, *Journal of Extension Education.*17(1): 85-89.
5. R. Ghosh, S. Pande, R. Telangre, D. Kathal, S. Singh,G. Usmani, A. Patel, S.K. Rao, S. Mishra, A. Pachuri,S. Verma, R.N. Sharma, P.M. Gaur, M. Sharma (2014) Participatory varietal selection of chickpea in rainfed rice fallow lands of Chhattisgarh and Madhya Pradesh in India for sustainable crop production International Journal of Plant Production 8 (2).