Influence of improved agronomical practices on yield and economics of chickpea
(*Cicer arietinum* L.) in grid zone of Madhya Pradesh on farmers field

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**ABSTRACT**

The results of twenty replicated demonstrations on Chickpea Cultivation practices conducted under Harshi command area of district, Gwalior, Madhya Pradesh, were analysed to differences in crop grown under improved package of practice and farmers practice, which explore the potential of farmers for enhancement crop and water productivity of chickpea crop. Sowing on ridge and furrow system with recommended row spacing improved the seed yield of chickpea by 59.38% as compared to narrow sowing on flat land of farmers practices. As compared to fertilizers by farmers practices, recommended dose of fertilizer could enhance the seed yield by 36.20%. Improvement in pest management practices led to 29.41% increase over farmers practices. Similarly, use of improved seed over farm saved seed and appropriate weed management over farmers practices, enhance the yield by 25.41% and 41.25%, respectively. The improved technology gave higher net return and B:C ratio as compared to farmers practices.

**Key words:** Chickpea, Economics, Grid zone, Package of practices.

**INTRODUCTION**

Chickpea is a major crop grown during *rabi* season in rainfed areas of MP. Chickpea occupied 25.61 lakh hectares areas in MP with production of 23.71 lakh tonnes with an average productivity of 927 Kg/ha (Anonymous, 2014). Chickpea yield in Madhya Pradesh and India as a whole, is low as compared to other countries, although the potentials of chickpea varieties in cultivation in India is higher. The productivity of chickpea has fallen due to various constraints such as biotic and abiotic factors. Poor weed management is one of the most important yield limiting factors in chickpea. Under rainfed ecosystem, efficient water use by weed may increase severity of drought and results in a low crop yield. Being slow in its early growth and short statured plant, chickpea is highly susceptible to weed competition and weeds causes upto 75% yield loss (Choudhary *et al.*, 2005). Choice of a suitable geometry, optimum population, adequate and optimum fertilization etc. are the most important factors to enhance productivity of chickpea, low yield of chickpea is mainly attributed to inadequate and imbalances nutrients application. The varieties cultivated by the farmers which are low yielding and susceptible to pests and disease. The high yielding varieties helps increasing the productivity (Meena *et al.* 2015 and Meena and Yadav, 2015.). Hence, on farm trail were conducted on chickpea in Grid zone of M.P., to find out the effect of improved practices evolved by research over farmers practices.

**MATERIALS AND METHODS**

For the present study, 20 farmers field in four villages were selected under command areas of Harshi, District Gwalior(MP) during 2011-12 and 2012-13 for field demonstrations on productivity enhancement of chickpea through improved technology. The demonstrations included five factors, each with two treatment levels of chickpea cultivation to be studied locally. The crop was sown during 20th Oct., 2011-12 and 25th Oct., 2012-13 and harvested on 15th March, 2011-12 and 22nd March 2012-13. The winter rainfall during 2011-12 and 2012-13 was 66.2 mm and 82.4 mm, respectively.

The soil of the experimental sites was clay loam in texture with available moisture contents varying between 13.20 and 14.63 percent. The soil pH 7.9-8.4, EC 0.72 ds per m and available nitrogen 240-275 kg/ha, available phosphorus 8.24-16.64 kg P2O5/ha and available K 165-345 kg K2O/ha. All the demonstrations were laid out in randomised block design with 2 treatments for statistical analysis number of demonstration will be treated as replications (Table 1). The seed yield was recorded by harvesting 5mX5m area from the centre of each plot. Farmers practices were those which in general farmers of the zone are using as given in Table 1.

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RESULTS AND DISCUSSION

The result of the demonstrations based on the mean values for two consecutive years revealed that the improved technology led to higher seed yield as compared to farmers practices. The maximum seed yield in these demonstrations ranged from 1296 to 1965 kg/ha. Mean yield of 20 demonstration worked out to 1358 kg/ha from demonstration whereas the average yield obtained in case of farmers practices was 980 kg/ha. This indicated that the improved production technology collectivelyis capable of enhancing the productivity by 38.46% over farmers practices. Such results were also obtained by Dixit et al. (2015), Pandit et al. (2017), and Chaudhary and Yadav (2017).

Sowing on ridge and farrors system with recommended row spacing improved the seed yields of chickpea by 59.38% as compared to farmers practices, Meena et al. (2015) was also reported that yield increase by 45% due to optimum plant geometry. Similarly improved variety enhanced the yield by 25.41% over farm saved seed. Meena and Yadav (2015) was also reported that the high yielding varieties helps in increasing the productivity of major field crops. Meena and Yadav (2015) was also reported that yield increase by 41.24% over farmers practices, Pandit et al. (2017) and Mishra (1997). They were also reported that weeds caused 38.6% reduction in grain yield of major field crops and insect pest management enhance the yield by 29.41% over farmers practices (Table 1), Meena et al. (2015) and Tripathi et al (2004) obtained similar results.

Economic evaluation brought out that per hectare gross return of ₹ 47530/ha for improved technology worked out to ₹ 39570/ha for improved technology, which was 44.04% over farmers practices.

| Factors | Improved Technologies | Farmers Practice | Additional Yield over farmers practices (kg/ha) | Increase over farmers practices (%) |
|---------|-----------------------|------------------|-----------------------------------------------|-----------------------------------|
| Sowing  | 1822 1562 980 582 59.38 |                   |                                               |                                   |
| Varietal Performance | 1296 1066 850 216 24.41 |                   |                                               |                                   |
| Fertilizers | 1965 1580 1160 420 36.20 |                   |                                               |                                   |
| Weed Management | 1595 1260 892 368 41.25 |                   |                                               |                                   |
| Insect-Pest Management | 1645 1320 1020 300 29.41 |                   |                                               |                                   |
| Mean    | 1665 1358 980 377 38.46 |                   |                                               |                                   |
| SEmaz   | 11.25 23.44 18.24 26.22 2.22 |                   |                                               |                                   |
| CD at 5%| 32.42 70.31 54.71 78.32 6.34 |                   |                                               |                                   |

Table 3: Economic evaluation of improved technologies of Chickpea cultivation (Mean of 2011-12 and 2012-13)

| Particulars | Farmers Practices | Improved Technologies | Actual increased over farmers practices | Percent increase over farmers practices |
|-------------|-------------------|-----------------------|----------------------------------------|----------------------------------------|
| Average Yield (Kg/ha) | 980 | 1358 | 378 | 38.57 |
| Gross return (₹/ha) | 34300 | 47530 | 13230 | 38.57 |
| Cost of cultivation (₹/ha) | 6830 | 7960 | 1130 | 16.54 |
| Net return (₹/ha) | 27470 | 37570 | 12100 | 44.04 |
| B.C ratio | 4.02 | 4.97 | 1.07 | 26.61 |

Note: Crop management practices other than the treatments were constant within sites but variable between sites in accordance with local practices.
higher than farmers practices (₹27470). The B:C ratio under improved practices (4.97) was 26.61% higher over farmers practices (4.02) (Table 3). These finding are in agreement with the findings of Raghuwanshi et al. (2010), Yaduraju and Mishra (2002), Gawai and Pawar (2006).

Studies indicated that adoption of each component of improved production technology imparted to farmers resulted in substantial yield enhancement of Chickpea. During the course of this participatory programme, it was conceived that the farmers need training to improve their cultivation practices and live demonstrations are most effective in this pursuit. Farmers from command area of Gird can optimize their yield levels profitably by adopting important components of improved production technology.

REFERENCES
Anonymous (2014). Commissioner land record, Gwalior, Madhya Pradesh, Website: mpkrishi.org.
Choudhary S. and Yadav J.P.,(2017). Adoption gap of improved mungbean production technology by beneficiary and nonbeneficiary farmers in Nagaur district of Rajasthan. Agric.Sci.Digesh 37(3):241-243.
Dixit, A.K.; Kumar, Sunil.; Rai, A.K. and Kumar, T.Kiran (2015). System productivity, profitability, nutrient uptake and soil health under tillage, nutrient and weed management in rainfed chickpea fodder sorghum cropping system. Indian J. Agron. 60(2) : 205-211.
Gawai, P.P. and Pawar, V.S.(2006). Integrated nutrient management in Sorghum (Sorghum bicolor)- Chickpea (Cicerarrietinum) cropping sequence under irrigated conditions. Indian Journal of Agronomy 51 (1): 17-20.
Mishra, J.S.(1997). Critical period of weed competition and losses due to weeds in major field crops. Farmers and parliament 33 (6): 19-20.
Meena B.K.; Hulihalli U.K. and Sumeriya H.K.(2015). Growth yield attributes and yield of medium duration pigeonpea hybrid KPH-2671 as influenced by fertility levels and planting geometry. Legume Res. 38(6):816-820.
Meena R.S. and Yadav R.S. (2015) yield and profitability of groundnut as influenced by sowing dates and nutrient levels with different varieties. Legume Res. 38(6): 791-797
Nawale, S.S.; Pawar, A.D.; Lambade, B.M. and Ugale, N.S. (2009) yield maximization of chickpea through INM applied to sorghum-chickpea cropping sequence under irrigated condition. Legume Research 32(4): 282-285.
Pandit S.; Rathod,D.I.; Patil,H.D.H. and Dodamani B.M.(2017). Integrated weed management on chickpea (C. Cicer arietinum L.) under rainfed condition of Karnataka, India. Legume Res. 40(3):580-585.
Raghuwanshi, S.R.S.; Raghuwanshi, O.P.S.; Umat, R.; Ambawatia, G.R. and Bhargav, K.S.(2010) productivity enhancement of soybean through improved technologies in farmers field. Soybean Research 8:85-88.
Tripathi, R.S.; Kumar, M.; Pandey, N.; Sonboir, H.L. and Pandey, D.(2004) Establishment, yield and water use efficiency of on farm rainfed chickpea (Cicer arrietinum L.)as influenced by tillage practices. Annals of Agricultural Research 25(1): 35-37.
Yaduraju, N.T. and Mishra, J.S. (2002) Weed management in chickpea challenges and opportunities. Agricultural Situation in India PP. 423-430.