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# INCREASING THE YIELD OF ONION THROUGH IMPROVED PRODUCTION TECHNOLOGY IN KALABURAGI DISTRICT OF KARNATAKA

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**Abstract**

Onion is extremely important vegetable crop not only for internal consumption but also as highest foreign exchange earner among the fruits and vegetables. Krishi Vigyan Kendra, Kalaburagi has made 60 demonstrations in farmers' field at different villages of Kalaburagi district during the period from 2009-10 to 2013-14 to enhance the yield of onion through improved production technology and sustainable development. The result showed that, on an average the highest yield achieved by adopting improved production technology was 247.10 quintals ha-1 whereas the corresponding yield ranges under farmers practices was to 202.60 quintals ha-1 of onion. Adoption of improved production technology will increase the yield 20.30% over farmer practices. The average technological gap, extension gap and technological index were noticed 196.66 quintals ha-1, 44.6 quintals ha-1 and 43.54 % respectively. The economics of data indicated that an average of Rs. 2,26,437 ha-1 was recorded net profit under recommended practices while it was Rs 1,74,750 ha-1 under farmer practices. Cost benefit ratio was 7.09 under demonstration, while was 5.79 under farmer practices. Practicing of improved production technology and sustainable development will improve the farmer socio-economical level and sustain the fertility of soil.

Keywords: Onion, technology gap, technology index, extension gap, economics

## Introduction

Onions are an essential ingredient in many dishes and virtually indispensable for winter stews and casseroles. Onion (*Allium cepa* L) is extremely important vegetable crop not only for internal consumption but also as highest foreign exchange earner among the vegetables. It occupies an area of 1064 thousand ha, with production of 15118 thousand tonnes (Indian Horticulture Database, 2011). The export of onion during 2011 -12 was 13,09,863.26 thousand tons with a value of Rs 1,722.85 crores. It is used either fresh as a salad or in preserved form (Islam *et al*, 2007). Leading countries in onion production are China, India, Pakistan, Bangladesh, Indonesia and Turkey.

The key factors in the successful growing of onions are, planting at the right time, fertilizer application and keeping the weeds down as onions need their full growing season and resent competition from weeds (Kumar *et al*, 2001). Improper methods of farmers' practices, insect pests and diseases are among the major constraints to enhancing production and productivity of onion. In recent years, farmer incomes have been declining particularly due to the rising costs of inputs for plant protection. For each disease, good crop nutrition is mentioned as a means of reducing disease levels. This nutrition generally involves ensuring adequate calcium and probably boron levels to reduce the ease with which fungi can penetrate host tissue, generally adequate nutrients for steady non-stressed growth and the avoidance of excess nitrogen which can increase the easy food value for the fungi as well as contributing to a softer cell wall structure. Crucifers, cucurbits and chrysanthemum are highly attractive to

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onion thrips. Using a trap crop involves planting small strips or patches of the alternative crop within an onion field to attract thrips.

Studies to evaluate and compare farmers' practices strategies are necessary to provide farmers options to manage the crop with improved production technologies through integrated crop management (ICM) according to their preferences and particular situation (Juan *et al*, 2009). The objective of this study was to determine transfer of technology to the farmers and increasing the yield and quality of onion through sustainable production technologies with the use of organic manures and trap crop.

## Material and methods

The present study was conducted by the Krishi Vigyan Kendra, Kalaburagi under University of Agricultural Sciences, Raichur. Based on "seeing is believing" concept, the aim of the increase the yield of onion by adopting improved production technology and sustainable development of land. Improved production technology demonstrate the impact of research emanated production technologies that varieties most suitable the agro climatic conditions and befitting to the existing cropping sequence. The adoption of improved technologies and innovations are the most important tools for enhancing the agricultural production at faster rate and hence it is a crucial aspect under innovation diffusion process. The main objective was to demonstrate the productivity, potential, profitability and sustainability of the soil fertility through latest improved production technology in real farm situation under different and aberrant weather situations to address the following problems were identified.

1. Use of high seed rate with improper method & planting geometry.
2. Lack of concept of crop rotation.
3. Heavy reliability on traditional varieties coupled with inappropriate sowing time.
4. Low use of organic matter and bio-fertilizers.
5. Lack of application of secondary nutrients and rare use of micro nutrients.
6. Improper time of fertilizer application.
7. Heavy infestation of weeds in onion.
8. Lack of intercultural operations by cultivators adopting chemical weed control.

The field trials were conducted for consecutive years during the period from 2009-10 to 2013-14 at different villages of Kalaburagi district of Karnataka. The Kalaburagi District situated between 17° 19' North and 76° 54' East longitude. The soil of farmers field is medium black soil with pH (6.8-7.5) EC (0.24-0.36 $dSm^{-1}$), available N (250-24 kg $ha^{-1}$), available P (75 kg $ha^{-1}$) and available K (390 kg $ha^{-1}$). The treatments T1 (Farmers practices) and T2 (Improved production technology). The whole package approach demonstrated to the farmers through improved production technology field trails included the components like High yielding variety (Bhima super), seed treatment, seedlings are treated with biofertilizers, spacing, integrated nutrient management (Farm yard manure, vermicompost, neem cake, biofertilizers, urea, phosphors, potash, sulphur, zinc, boron and vegetable special) integrated pest and disease management. Vegetable special sprayed 3 times at 20 days with concentration of 2 gm $lit^{-1}$ of water. Radish and chrysanthemum are grown as trap crop. The data generated, in farmers practices and improved technology was utilized for calculating the technological index, technology and extension gaps using the formulae given by Kadian *et al*, 1997.

(1)% YIOFP* = Average demonstration yield - farmer's average plot yield

--------------------------------------X 100

Farmer's avg. plot yield

*YIOFP= Yield increase over farmers practice

(2) Technological gap = Potential yield-Demonstration yield

(3) Extension gap= Demonstration yield-Farmers yield

(4) Technology index = Potential yield –Demonstration yield

------------------------------ X 100

Potential Yield

**Result and discussion**

A comparison of productivity levels between improved production technology in demonstration trials and farmers' practices is shown in table 1. During the study period it was observed that the adoption of improved production technologies in demonstration trials has increased the yield over the farmers' practices.

***Crop performance and yield***: The performance of onion owing to the adoption of improved technologies assessed over a period of five years and presented in table 1 reveal that, the effect of improved technologies earmarks the productivity sustainability of onion production in the black soils region of southern India of Karnataka state. The data in table 1 revealed that the average yield level of 247.10 q ha-1 and 20.30 % yields increased over farmers practice. Similar findings were reported by Funda et al. (2011). Integrated nutrient management (INM) in onion bulb crop improved the quality and yield of onion bulbs through integration of chemical fertilizers along with organic manures (Singh et al., 2001).Increasing the yield of onion may be attributed due to adoption of improved production technologies.

***Yield gaps:*** The data on table 2 indicates that technological gap, extension gap and technological index of onion through improved technologies. The yield gaps in the present study were categorized into technological gap and extension gaps. The average technological gap and extension gap was noticed 196.66 q ha-1 and 44.6 q ha-1 respectively, during the period from 2009-10 to 2013-14 (Ranjeet Singh et al, 2011). Generally, the technological and extension gap appears even if the improved production technology is conducted under the strict supervision of the scientists in the farmers' fields. This may be attributed mainly due to lack of high yielding varieties, irrigation facilities, integrated nutrient management, variation in the soil fertility status, non congenial weather conditions and local specific management problems faced for the attainment of potential and demonstration yields. Therefore, location specific recommendations are necessary to a bridge the gap besides strengthening of irrigation facilities, integrated nutrient management, use of high yielding varieties, in the region. The higher extension gap indicates that there is a strong need to motivate the farmers for adoption of improved technologies over their local practices.

***Technology index:*** Technology index indicates the feasibility of the evolved technology in the farmers' fields. Lower the value of technology index, higher is the feasibility of the improved technology. Technology index varied from 50.30 to 11.60 % in the onion during the period from 2009-10 to 2013-14 five years of the study. This indicates that a strong gap exists between the generated technology at the research institution and disseminated at the farmer`s field. The findings of the present study are similar with the findings of Hiremath and Nagaraju (2009). Introduction of high yielding varieties and integrated nutrient management through improved technology on onion would eventually lead to higher adoption among farmers in the region (Hiremath, 2007).

***Economics of cultivation:*** Data in table 3 reveal that the cost involved in the adoption of improved technology in onion varied and was more profitable. The average net return of demonstration field is 2,26,437 Rs ha-1 where as 1,74,750 Rs ha-1 under farmers practices. The mean B: C ratio was 7.09 and 5.79 for the demonstration field and farmers' practices respectively, were similar findings of Rameez et al. (2014). The economic analysis indicates that use of improved technology in onion would substantially increase the income as well as livelihood of the farming community of Kalaburagi district.

**Conclusion**

It is concluded from the study that there exists a wide gap between the potential and demonstration yields in onion mainly due to technology and extension gaps and also due to the lack of awareness about growing of onion in Kalaburagi district of Karnataka. The study highlights that by adoption of improved production technology, onion productivity and soil fertility can be improved greatly even under farming situations and adverse weather conditions of Kalaburagi district of Karnataka. The improved production technology has also shown potential to increase the yield of onion. It is further suggested that sincere extension efforts are required to educate the farmers for adoption of improved production technology besides strengthening improved technologies, so that resource poor farmers could improve their livelihood, providing employment to their local peoples, diversify their farming systems, and fertility of soil.

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***Table 1:*** *Impact of improved production technology on realization of productivity and potential of onion under real farm situation*

| Year | Area(Ha) | No. of demonstrations | Yield q ha$^{-1}$ | | | % Increase in yield over farmer practice |
|---|---|---|---|---|---|---|
| | | | Potential yield | Demonstration yield | Farmers practices | |
| **2009-10** | 5 | 12 | 450 | 193.40 | 169.0 | 14.43 |
| **2010-11** | 5 | 12 | 450 | 195.50 | 170.0 | 15.00 |
| **2011-12** | 5 | 12 | 450 | 203.00 | 172.0 | 18.02 |
| **2012-13** | 5 | 12 | 450 | 247.30 | 202.7 | 22.00 |
| **2013-14** | 5 | 12 | 450 | 397.50 | 300.0 | 32.50 |
| **Average** | | | 450 | **247.10** | **202.6** | **20.30** |
| **Total** | **25** | **60** | | | | |

***Table 2:*** *Technological gap, Extension gap and Technological index of the respondents*

| Year | Area(Ha) | Technological gap (q ha$^{-1}$) | Extension gap (q ha$^{-1}$) | Technological index (%) |
|---|---|---|---|---|
| **2009-10** | 5 | 226.6 | 24.4 | 50.30 |
| **2010-11** | 5 | 254.5 | 25.5 | 56.50 |
| **2011-12** | 5 | 247.0 | 31.0 | 54.80 |
| **2012-13** | 5 | 202.7 | 44.6 | 45.04 |
| **2013-14** | 5 | 52.5 | 97.5 | 11.60 |
| **Average** | | **196.66** | **44.6** | **43.54** |

***Table 3:*** *Impact of improved production technology on economics of onion under real farm situation*

| Year | Cost of cultivation (Rs ha$^{-1}$) | | Gross return (Rs ha$^{-1}$) | | Net return (Rs ha$^{-1}$) | | BCR | |
|---|---|---|---|---|---|---|---|---|
| | Demo | Farmer practice | Demo | Farmer practice | Demo | Farmer practice | Demo | Farmer practice |
| 2009-10 | 28000 | 28500 | 187500 | 162500 | 159500 | 134000 | 1:6.6 | 1:5.7 |
| 2010-11 | 29000 | 29600 | 173250 | 170600 | 144250 | 141000 | 1:5.97 | 1:5.6 |
| 2011-12 | 30000 | 32000 | 304500 | 258000 | 274500 | 226000 | 1:10.15 | 1:8.06 |
| 2012-13 | 40000 | 42000 | 266437 | 216750 | 226437 | 174750 | 1:7.09 | 1:5.84 |
| 2013-14 | 70000 | 70200 | 397500 | 268200 | 327500 | 198000 | 1:5.67 | 1:3.75 |
| Average | | | | | 226437 | 174750 | 1:7.09 | 1:5.79 |

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## Appendix

Figure 1 General view of field trail in Kalaburagi District of Karnataka