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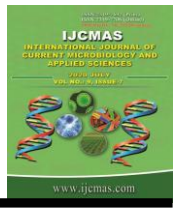

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# Assessment of Relative Impact of Improved Technology and Scientific Interventions on the Income of Sesame Farmers in Tribal Area of Bundelkhand Region

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**A B S T R A C T**

Front line demonstrations are popular way to disseminate the current production technology of crop husbandry among the farmers. AICRP on Sesame, Tikamgarh conducted 100 demonstrations in Tikamgarh block during kharif season of 2015, 2016 and 2017. The substantially higher yields were recorded under Improved Technology (IT) as compared to Farmers Practice (FP) which is almost more than double. The mean Extension Gap (EG) over years was recorded as 304 kg /ha which is almost equal to mean yield under farmers practice (FP). The average TI was calculated as 19.0%. Mean net return was recorded Rs. 39498 under IT while it was Rs. 19642 under FP along with average B: C ratio was calculated 3.45 under IT whereas 2.99 under FP.

## Introduction

Due to the substantial gap between demand and availability of edible oil, India has to rely upon import which entails huge foreign currency load. Present climatic scenario reduces the options of farmers to choose comparatively better input responding crops in low rainfall tracts. Farmers have to dependent on rainfall and have limited option for kharif crop. Sesame is the best option in unpredictable current scenario of climate. Sesame (Sesamum indicum L.) also known as Til or Gingelly, is one of the most important oilseed crop of tropical and temperate regions. It is referred as "Queen of oilseeds" due to its resistance to oxidation and rancidity, also plays an important role as an industrial food crop because of its high nutritional value.

It is widely preferred for its qualities of high drought tolerance during the vegetative stage mainly attributed to its extensive root system. Globally sesame is cultivated in an area of 20 lakh hectares with an annual production of 8.28 lakh tonnes and productivity of 455 kg

ha-1 (INDIASTAT, 2014-2015). In India, it is grown mostly in Uttar Pradesh, Rajasthan, Madhya Pradesh, Andhra Pradesh, Maharashtra, Gujarat, Tamil Nadu and Orissa and Karnataka. This crop covered 1950.88 thousand hectare annual area and produced 850.07 Thousand tons of sesame with average of 436 kg/ ha in 2015-16 (Oilseeds division, DAC, GOI). Sesame is grown in India in *Kharif*, semi-arid, *rabi* and summer season or more than one season in some states. Average sesame production of last five years is 13567 tonnes being cultivated on 34467 ha land in Tikamgarh district.

This study is intended to assess the impact of improved production technology and create awareness among farmers that how modern production technologies can be helpful to harvest good produce under uncertain climate which is regular feature of Bundelkhand region. Further, it is opportunity to understand farmers' constraints and weakness at ground level to frame strategies to overcome future challenges

## Materials and Methods

In total, 100 demonstrations were conducted under rainfed conditions by AICRP on Sesame, Tikamgarh at farmers' field of village Sunoni, Gram Panchayat – Bamori Naka and Bamhori Nakivan, Gram Panchayat-Majana, Block & District – Tikamgarh, MP to create awareness among Bundelkhand's farmers towards modern production technologies for their own benefit during kharif 2015, 2016 and 2017. Each demonstration was planted in 0.4ha area with whole package/improved technology (IT) along with farmers practice (FP).

Further, whole package/ improved technology comprised of HY variety, fertilizers dose, weedicide and insecticides (Table 1). The data had been collected from both improved technology and farmers practice plots. Extension gap, Technology gap, Technology index and Cost- benefit ratio were calculated with the following formulae-

Extension gap ($qha^{-1}$) = (Yield of Improved technology plot ($qha^{-1}$) – Yield of Farmers practice ($qha^{-1}$)

Technological gap (($qha^{-1}$)) = Potential yield($qha^{-1}$) –demonstration yield ($qha^{-1}$)

Technology index (%) = Technology gap x 100 / Potential yield

Additional returns (Rs.) =Demonstration returns (Rs.) –Farmers practice returns (Rs.)

Effective gain (Rs.) = Additional returns (Rs.) – Additional cost (Rs.)

Incremental B:C ratio = Additional returns (Rs.) / Additional cost (Rs.)

## Results and Discussion

The results of this study indicate the substantially higher yields were recorded under Improved Technology (IT) as compared to Farmers Practice (FP) which is almost more than double (Table -2) although, highest yield was harnessed in 2016 under both IT & its corresponding FP which may be effect of rainfall pattern and edaphic conditions. Results of this finding are also in agreement with Kushwaha *et al.,* (2018) and Meena and Dudi (2018).

## Extension gap

The mean Extension Gap (EG) over years was recorded as 304 kg /ha which is almost equal to mean yield under farmers practice (FP). This indicates poor infiltration of Improved Technology (IT) among farmers and holistic approaches would be required for speedy narrow drown this gap. These demonstrations are one of the most effective way to change the perception of farmers towards Improved

Technology (IT). Despite this, farmers' trainings and field visits may change the mindset of farmers. (Dayananad *et al.*, 2012; Katare *et al.*, 2011; Mitra and Samajdar, 2010)

## Technology gap (TG)

The average TG was found 152 kg/ha during three years investigation period. Rain fed condition, marginal and sub marginal soil may be the probable reason for this gap (Meena and Singh 2017 and Singh SB, 2017).

## Technological index (TI)

TI shows the feasibility of IT at field which will be more desirable if value will be low. The average TI was calculated as 19.0%. Findings of the study in accordance with Arvind kumar, (2017), Balai *et al., (2012);* Iqbal *et al.,* (2017), Rao *et al.,* (2011) and Sharma *et al.,* (2016). For economic parameters, cost of cultivation for IT and FP were calculated (Table 3) as per prevailing prices of inputs and outputs. The cost of cultivation under IT ranged from Rs. 14500 to 19934 with average of Rs. 18539 while same was ranged from Rs 8650 to Rs. 11504 with of Rs. 10745 under FP. The average additional cost under IT was Rs.6452 which clearly indicates the poor adoption of IT in Bundelkhand. Therefore, need of hour is to intensify efforts through FLDs, trainings and personal visits to change the mindset of farmers towards improved technologies and scientific interventions.

**Table.1** Components of whole package or Improved Technology of FLDs

| S.No. | Technological Interventions for Whole package/ Improved Technology | |
|---|---|---|
| **1** | HY Varieties | JTS-8 , TKG-55, TKG-306 and TKG -22 |
| **2** | Seed rate | 2.0 kg |
| **3** | Seed treatment | Carbendazim @3g/kg seed |
| **4** | Fertilizers | 60N: 40P:20K |
| **5** | Weedicide | Quizolofop-N- ethyl (Turga Super) |
| **6** | Pesticide (Need based) | Imidacloprid and/or Profenophos |

**Table.2** General details, seed yield and other parameters for gap analyses of FLD on sesame

| S. No. | Year | Number of demonstrations | Area (ha) | | Mean Yield (Kg/ha) | | Percent Increase | Extension gap (kg/ha) | Technology gap (kg/ha) | Technology index (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | IT | FP | | | | |
| **1** | 2015 | 20 | 8.0 | | 624 | 338 | 54.2 | 286 | 176 | 22.0 |
| **2** | 2016 | 40 | 16.0 | | 706 | 395 | 55.9 | 311 | 94 | 11.8 |
| **3** | 2017 | 40 | 16.0 | | 613 | 299 | 48.8 | 314 | 187 | 23.4 |
| **Total** | | **100** | **40.0** | **Mean** | **648** | **344** | **53.1** | **304** | **152** | **19.0** |

**Table.3** Analysis of various economic parameters under IT as well as FP

| Year | Cost of Cultivation (Rs. /ha) | | Mean Gross return (Rs) | | Net return (Rs/ha) | | B:C ratio | | Additional Cost under IT (Rs. /ha) | Additional gross return (Rs./ ha) | Additional net return (Rs./ ha) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | IT | FP | IT | FP | IT | FP | IT | FP | | | |
| **2015** | 14500 | 8650 | 53040 | 28730 | 38540 | 20080 | 3.66 | 3.32 | 5850 | 24310 | 18460 |
| **2016** | 15225 | 10150 | 59976 | 33584 | 44751 | 23434 | 3.94 | 3.31 | 5075 | 26392 | 21317 |
| **2017** | 19934 | 11504 | 49500 | 21600 | 29566 | 10096 | 2.76 | 2.34 | 8430 | 27900 | 19470 |
| **Mean** | **18539** | **10745** | **56051** | **29744** | **39498** | **19642** | **3.45** | **2.99** | **6452** | **26307** | **19856** |

Where IT=Improved technology; FP=Farmers practice; EG=Extension gap; TG= Technology gap; TI=Technology index

Mean net return over study years was recorded Rs. 39498 under IT while it was Rs. 19642 under FP which show huge difference in additional net return for Rs.19856. It is clearly indicates that farmers would have earned double net income if they had adopted IT.

Likewise, Average B: C ratios were 3.45 under IT and 2.99 under FP which is due to high quantum of produce harnessed under IT (Sharma *et al.*, 2017 and Meena & Singh, 2017).

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