

# Enhancing Productivity of Groundnut by Use of PDKV BBF Planter Cum Inter Row Cultivator in Buldana District of Maharashtra

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**Abstract** — Enhancing productivity level of groundnut crop is very important as productivity level of India is very low. For enhancing productivity of Buldana district the constraints of low productivity and technology solutions have been identified. Broad bed furrow planting is a new idea developed for conservation of water for dry land farming. The placement of seed at correct depth is very important for proper germination and for obtaining optimum plant population per unit area of the crop. The sowing of seed on broad bed improves root rot and provides favorable root growth condition. The application of technology developed by Dr. PDKV for sowing of seed with BBF planter shows increase in yield by 26.66 per cent, seed saving of 37.5 kg/ha and increase in ANR of rupees 36705 per hectare of groundnut crop in comparison with local practice

**Keywords** — Groundnut, Broad Bed and Furrow Planter, Frontline Demonstration

## I. INTRODUCTION

India is one of the largest producers of oilseeds in the world and occupies an important position in the Indian agricultural economy. It is estimated that nine oilseeds namely groundnut, rapeseed-mustard, soybean, sunflower, safflower, sesame, Niger, castor and linseed, accounted for an area of 23.44 million hectares with the production of 25.14 million tonnes [1].

Groundnut is called as the 'King' of oilseeds. It is one of the most important food and cash crops of our country. While being a valuable source of all the nutrients, it is a lowpriced commodity. Groundnut is also called as wonder nut and poor men's cashew nut. Groundnut is one of the most important cash crops of our country. It is a low-priced commodity but a valuable source of all the nutrients. Groundnut is grown on 26.4 million ha worldwide with a total production of 37.1 million metric t and an average productivity of 1.4 metric t/ha [2].

Over 100 countries worldwide grow groundnut. Developing countries constitute 97% of the global area and 94% of the global production of this crop. The production of groundnut is concentrated in Asia and Africa (56% and 40% of the global area and 68% and 25% of the global production, respectively). Area and Production of Groundnut Crop The major groundnut producing countries in the world are India, China, Nigeria, Senegal, Sudan, Burma and the United States of America. Out of the total area of 18.9 million hectares and the total production of 17.8 million tonnes in the world, these countries account for about 69 percent of the area and 70 percent of the production. India occupies the first place,

both in regard to the area and the production in the world. About 7.5 million hectares are put under it annually and the production is about six million tonnes. Seventy percent of the area and seventy five percent of the production has been concentrated in the four states of Gujarat, Andhra Pradesh, Tamil Nadu and Karnataka. Andhra Pradesh, Karnataka, Tamil Nadu and Orissa have irrigated areas primarily during the rabi season. The irrigated areas form about six percent of the groundnut area in India. In these states groundnut production is mainly depends on rainfall. Patel et al examined the price behaviour of groundnut in Gujarat [3].

Climate and Soil Groundnut is grown throughout the tropics and its cultivation is extended to the subtropical countries South and up to an altitude of 1,000 meters. The crop can be grown° North and 35°lying between 45 successfully in places receiving a minimum rainfall of 500 mm and a maximum rainfall of 1250 mm. The rainfall should be distributed well during the flowering and pegging of the crop. The total amount of rainfall required for presowing operations (preparatory) is 100 mm, for sowing it is 150 mm and for flowering and pod development an evenly distributed rainfall of 400-500 mm is required. The groundnut crop, however, cannot stand frost, long and severe drought or water stagnation. Groundnut is grown on a variety of soil types. However, the crop does best on sandy loam and loamy soil and in black soils with good drainage. Heavy and stiff clays are unsuitable for groundnut cultivation as the pod development is hampered in these soils.

### *Scope for enhancing productivity of groundnut crop:*

To enhance productivity of rainfed farming system, it should be accompanied by suitable soil and water conservation practices to mitigate moisture demand when needed. Rainfed Farming system has to eliminate two major rainfall conditions of dry spell which creates moisture stress and heavy rains which creates water logged condition hence there is a vast scope for broad bed furrow planting technique.

Broad bed furrow planting is a new idea developed for conservation of water for dry land farming. The placement of seed at correct depth is very important for proper germination and for obtaining optimum plant population per unit area of the crop. Especially under dry land farming where soil moisture is at greater depth rainfed farming is often reduced due to the lack of soil moisture. It is necessary to adopt suitable technology to conserve the rain water in-situ to ensure adequate moisture during the various growing stages of the crop in rainfed farming.

Table No. 1 : Average Area, Production and Productivity of major crops cultivated in the district

Field Crop	Area (ha)	Prod.(qt/ha)
Sorghum	29690	9.69
Maize	41189	26.67
Greengram	30538	5.17
Blackgram	26085	5.45
Soybean	355848	15.20
Summer ground nut	1100	9.10

**Source:** State Agriculture Department

Abbreviations and Acronyms

BBF: Broad bed and furrow

Kg: kilograms

ha: hectare

hr: hour

mm: millimeter

## II. METHODOLOGY

For enhancing productivity of the district the reasons of low productivity of groundnut in Buldana district has been identified and elaborated as under

### *Improper plant population*

Farmers are using bullock drawn seed drill and mostly tractor drawn seed drill for sowing of various crops seed but these implements have limitations of maintaining only row to row distance but plant to plant distance will not be maintain by these implements. Manual drilling on bullock drawn seed drill have more limitations which results in

increasing cost in gap filling and uneven plant to plant distance.

### *Improper soil and water conservation practices*

Application of in situ soil and water conservation practices suggest by KVK and state agriculture department was less adopted by farmers as they are yield intensive but while application farmer's feedback is they are labour intensive time consuming so most farmers don't follow the soil and water conservation practices

### *Unawareness about new technologies*

#### **Gaps in adaptation of improved technology**

Based on various survey conducted by Krishi Vigyan Kendra and State Agriculture Departments following Gaps were identified

1. There is a gap in adoption of new planting technique as they use traditional sowing practice of sowing with bullock drawn implements and Tractor drawn seed drill.
2. Gaps in availability of proper seed metering implement.
3. Gap in awareness about in situ soil and water conservation practices.
4. Negative mind set about this technology as plant population will be reduced.

Considering the gaps in adoption of improved technology and reasons of low productivity of the district, Krishi Vigyan Kendra Jalgaon Jamod has taken frontline demonstrations to increase the production and productivities of major crops of this District. Krishi Vigyan Kendra Jalgaon Jamod has adopted the

Technology of sowing of Different crops like kharif soybean, rabi bengal gram and summer groundnut on **PKV Broad Bed Furrow planter** developed by Dr. PDKV Akola.

*Use of BBF Planter Developed by Dr. PDKV for various crop productions*

#### **Technical Information about the Implements:**

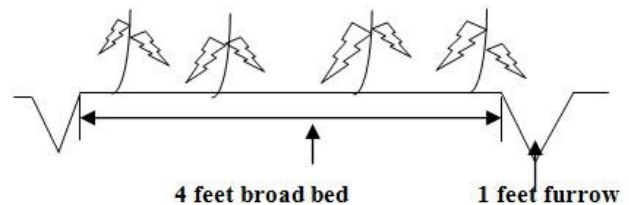
Dr. PDKV Akola developed BBF Planter is made of following components

- 1) Seed cum Fertilizer Box
- 2) Seed plate
- 3) Seed tubes
- 4) Furrow openers 02 no.
- 5) Tines 04 No.
- 6) Frame
- 7) Ground Wheel

#### *Mechanism:*

Ground wheel drives chain drive connected to gear mechanism which rotates seed plates and assures continuous of seed maintaining plant to plant distance dropping through seed tubes and fertilizer through fertilizer mechanism.

#### *Planting Technique :*



#### *Farmers Participation*

Trainings, demonstrations, regular filed visit and display of implements in exhibitions, kisan mobile SMS service and live demonstration under FLD are organized by KVK through various programmes for farmer's participation.



Fig 1. Groundnut crop sown on broad bed and furrow planter

#### *Frontline Demonstrations organized by KVK*

KVK Jalgaon Jamod has Conducted 65 frontline demonstrations on 65 farmers fields of this district in 15 various villages of the district during 2012-13 to 2016-17 covering 26 ha of area as given in Table No. 2 as under.

**Table No. 2.** Year wise frontline demonstration conducted on Groundnut crop by KVK Jalgaon Jamod Dist- Buldana

Sr. No.	Year	No. of Demo	No. Of Farmers	Area (ha)
1	2013	15	15	06
2	2014	25	25	10
3	2015	25	25	10
Total		65	65	26

**Advantages of BBF Method**

1. BBF method improves soil and water conservation of the field.
2. BBF Method works well in dry and wet spell. In dry spell it increases period of wilting of crop by making available conserved moisture and in wet spell it protect crops by draining excess water through furrows maintain proper soil water ratio.
3. It enhances fast rootlet growth as crop is being planted on bed, increasing no. of pod which ultimately results in increased crop production.

4. It improves crop aeration and sunlight results reduce insect pest attack on crops.
5. Inter row cultivator have an added advantage of mechanized intercultural operation in the field sown by BBF planter, thus reducing time of operation cost and labour.
6. Reduces labour cost of thinning and gap filling.
7. Open furrow can be well utilized for installation of sprinkler set.
8. Improves supervision of working operation during spraying due to reduce snake bite event in well grown crops.

**III. RESULTS**

Results of frontline demonstrations use of broad bed furrow planter for sowing of summer irrigated groundnut crop. The groundnut crop was planted on BBF technique under irrigated farming condition on 65 acres on 65 farmer's field and average data on different parameters was presented as under.

**Table No. 6.** Results of demonstration of broad bed furrow planter for groundnut crop

Parameter	Farmer Practice (Tractor Drawn Seed Drill)	Improved Practice (PKV BBF Planter Method )	Increase /Remark
Yield (qt/ha )	39.00	49.4645	Increase by 26.8 %
Net Return (Rs)	138612.5	175317	ANR Rs. 36704.5 per hectare
Seed Rate (kg/ha)	150	112.5	Saving of seed 37.5 kg per hectare
Cost of operation(Rs/ha)	1250/-	1750/-	Higher than Farmer Practice
Intercultural operation Labour Saving (man days/ha)	0	02	Labour Saving of 02 man day/ha
Field efficiency	72.75	68.58	Need to increase

Result confirmed that, yield of groundnut crop increased by 26.8 per cent by intervention of PKV BBF planter practice when compared to farmers practice with ANR of Rs. 36704.5/- per hectare. Seed saving of 25 per cent per hectare was also achieved. PKV BBF planter cum inter row cultivator is associated with inter row tines for intercultural operation which helped in labour saving of two man days per hectare.

**Results overview**

1. The broad bed and furrow planter developed by Dr. PDKV increases crop Yield of groundnut by 26.866 per cent.
2. Farmer's additional net return gained for groundnut crop increased by rupees 36705 per hectare.
3. Seed saving of groundnut crop increased by 37.5 kilograms per hectare.
4. Field efficiency was found lower and cost of operation found higher as compared to indigenous farmers practice.

**IV. CONCLUSION**

The use of PDKV BBF planter cum inter row cultivator for groundnut crop sowing is recommended for farmers as it shows increased production and seed saving when compared to local practice.

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