



## Adoption of Integrated Crop Management in Sesame Brings Improvement in Livelihood of Tribal Farmers of Visakhapatnam District

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### Abstract

Sesame production is an important enterprise that could boost incomes of its producers, thereby improving their livelihoods. In Andhra Pradesh sesame occupies an area of 0.36 lakh ha with an average productivity of 343 kg/ha but the productivity recorded at Visakhapatnam district is only 220 kg/ha. This is because the majority of the sesame growing area in the Visakhapatnam district is in tribal areas, where farmers do not adopt improved technologies. To address this problem 100 Field demonstrations were carried out in 4 clusters over 40 ha during Rabi season by introducing improved sesame variety YLM-66 and integrated crop management in sesame crop in the tribal areas of north coastal zone of Andhra Pradesh i.e. Visakhapatnam district to improve the livelihood of the tribal farmers under Tribal Subplan (TSP). Trainings on “Organic production techniques in sesame”, “Good management practices in sesame” and “post harvest management of Sesame crop” were provided to the selected progressive tribal farmers. Tribal farmers were provided with inputs including biofertilizers, biopesticides, oil expellers, hermetic bags, and inter-cultivation implements in an effort to boost their awareness and flexibility. Results of the demonstration achieved a yield improvement of 35.36 % over the farmer’s regular practice. Adoption of postharvest management practices enabled farmers to retain their harvest and avoid storage losses, and oil expellers enabled them to produce high-quality oil without adulteration. The TSP initiative assisted tribal farmers in the Visakhapatnam district in attaining a higher crop output and enhancing their standard of living.

### Introduction

Sesame has been one of the cash crops produced in India, mostly by small scale farmers, which help them to acquire more income for taking care of their families as well as improving their livelihood assets. The major producing areas in the Country are West Bengal, Madhya Pradesh, Rajasthan, Uttar Pradesh, Gujarat, Andhra Pradesh and Telangana. It is cultivated on over 39,000 ha across Andhra Pradesh for food and oil, with production of 14,000 tonnes and 343 kg/ha productivity during 2021-22 [1]. It has remained popular cash crop among farmers due to its good local and international market potentials.

The agricultural productivity in the tribal areas of Visakhapatnam Dist. is low due to the inherent low fertility, lack of improved varieties and improper crop management practices. Sesame (*Sesamum indicum* L.) is one among the traditional crops grown and used in the daily life like bajra, ragi etc. apart from consumption tribal farmers that boosted incomes of its tribal farmers of Visakhapatnam dist. and in turn help in improving their livelihoods.

Sesame is used for various purposes such as raw materials in agro-allied industries, food, feed as well as means of generating revenue for its producers, marketers and governments. For instance, its seeds are used in confectioneries, biscuits, breads, etc., and may be baked

into crackers, often in the form of sticks [2]. Its oil is used for cooking; medicine for treating ulcer and burns; making aerosols and manufacturing of margarine; its low grade oil is locally used in making soap, paints, lubricants, and illuminants and the by-product obtained from its seeds processing is used in making animal feeds [3]. Sesame products are locally processed and utilized in various forms in States where the crop is cultivated.

### Materials and Methods

The agricultural productivity in the tribal areas of Visakhapatnam District is low due to the inherent low fertility and improper management of soil. Compared to the state (343 kg/ha) average productivity to Visakhapatnam District is very low 220 kg/ha due to scientific mismanagement of soil as well as usage of local variety with high seed rate. The tribal farmers were not aware of the recent crop production technologies and therefore the crop yield is very low. In order to improve the crop productivity, as on farm demonstration, method demonstrations and training programmes on various aspects such as good management practices in sesame, organic production techniques and integrated nutrient management in sesame was conducted. The technologies demonstrated under demonstration and details of farmers’ practices are given in Table 1. In case of local check plots, existing practices being used by farmers

**Table-1 : Particulars showing the details of sesame grown areas under TSP demonstration and farmers practice.**

Particulars	Farmers Practice	Technology intervention	Gap
Variety	Local	YLM-66	Full Gap
Seed rate	10-12 kg/ha	6 kg/ha	Partial gap
Seed Treatment	No seed treatment	Seed treatment by <i>Trichoderma viridae</i> and @ 10 g/kg seed.	Full Gap
Nutrient Management	No FYM applied and biofertilizers and in fertilizers only urea is applied.	Application of FYM 10t/ha, biofertilizers PSB 5lt/ha KSB 5lt/ha and RDF @ 40:20:20 NPK kg/ha, in the form of urea, SSP and MOP.	full Gap
Weed Management	Hand weeding or No weed management	Weeds control by using herbicide Pendimethalin 1kg/ha in 500 liter of water as pre-emergence treatment for effective control of weeds within two days after sowing. + one intercultivation @ 30-35 DAS	Partial Gap
Plant protection	No application of Plant protection chemicals	Need based plant protection chemicals were used.	Full Gap
Post harvest management	No storage measures taken.	Hermatic bags are used to keep commodities safe from deterioration. tarpaline used to sun drying the seed.	Full Gap

**Table-2 : Growth, yield attributes, yield and Economics of sesame under improved and farmers practices in Visakhapatnam district tribal areas.**

Treatments	plant height (cm's)	No. of branches/plant	No. of capsules/plant	Seed yield (kg/ha)	Net returns (Rs./ha)	B:C ratio
Farmers practice	82.5	2.3	61.3	345	13,907/-	1.63
Demonstration	97.6	4.4	86.1	467	27,358/-	2.41

were followed. In general, soils of the area under study were Shallow black soils and medium to low in fertility status.

Method demonstration on seed treatment with *Trichoderma viridae*, biofertilizer application and usage of hermetic bags for storage was conducted at villages. High yielding sesame (*Sesame indicum* L.) variety YLM-66 with integrated crop management in sesame was demonstrated in 4 villages of Jalampalli village (V Madugula mandal) Sammeda, Tamarabba villages (Devarapalli Mandal) Panasalapadu village (Koyyur mandal) of Visakhapatnam dt. A.P. to 100 selected sesame growing tribal farmers with each demonstration was conducted in an area of 0.4 ha and with an adjacent area of 0.4 ha selected for farmers practice. The trained farmers were supported with inputs, post harvest management and technologies through tribal sub plan, adopted the ICM package for cultivation of sesame the productivity of the crop increases to the tune of 35.4% over the regular farmers practice.

In the demonstration, the improved practices including cultivation of high yielding sesame variety YLM-66, integrated nutrient management, integrated pest and disease management practices were demonstrated along with the farmer's practice. Farmers were supplied with bio fungicide *Trichoderma viridae* and neem oil controlled *Macrophomina* dry rot disease and sucking pest in early stages. Liquid biofertilizers Phosphate Solubilizing Bacteria (PSB) and Potassium Solubilizing Bacteria (KRB) basal application enhanced the yield

considerably. Before initiating the demonstration, the beneficiary farmers were trained in all the improved practices in sesame cultivation and followed in the demonstrations. Inter-cultivation implements were also supplied to the tribal farmers which have reduced women drudgery and reduced cost of cultivation compared to regular practice of hand weeding.

Crop harvesting stage trainings were provided to the farmers on post-harvest management and value addition to fetch high market price and reduce post-harvest losses and farmers are provided with tarpaulin sheets, hermetic bags individually and oil expeller was provided to tribal community to sesame growing farmers group.

## Results and Discussion

Although the demonstrated high yielding variety attained maturity 2 weeks later of that the existing local variety. The demonstrated variety YLM – 66 yielded high over the local variety this was mainly attributed to good growth and yield parameters. Besides, the incidence of *macrophomina* dry rot was reported in the demonstrated field and it was 18 per cent in the farmers practice. The plant height, no of branches/plant and number of pods per plant shows there was a highly significant difference between check (local farmers practice) and the demo. This shows that the new variety has a high pod bearing capacity (table. 2), which is one of the positive signs of the demonstration. Average yield recorded in the demonstration plots was 467 kg/ha which was 35.36 % higher than that of farmers practice where the average yield was 345 kg/ha.



Fig-1 : Field day conducted at Jalampalli village.

The net return results showed that the net returns of the check (Rs.13451/-) and the demonstration (Rs. 27358/-) which are significantly different with the additional income for the farmers of Rs. 13907 (103.39% increase over farmers practice). Thus, the increased B: C ratio in the demonstration (2.41) compared to the farmers practice (1.63), which was significantly different.

### Conclusions

farmers were very much convinced with the demonstrated high yielding variety and technology and during the field day (Fig.-1) many farmers from neighbouring village have come forward to adopt the technology for cultivation of sesame crop.

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