

Modern Trends in Indian Agriculture with Reference to the Cultivation of Oilseed Crops

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India is one of the major oilseeds producing countries in the world and it will not be incorrect to say that oilseeds occupy a very prominent place in the agricultural and industrial economy of the State. The all India acreage is 29.3 million with a production of 53 lakhs tons and the major oilseed crops viz. groundnut, gingelly and castor cover an area of 20.3 million acres, producing 40.5 lakhs tons. In the Madras State they are cultivated in an area of over 20 lakhs acres with an annual production of 8.23 lakhs tons. The area of coconut in India is 1.53 million acres the world acreage being 8.4 million. In this State it is grown in an area of 5.5 lakh acres, producing 1,200 million nuts.

Crop improvement work on the major oilseed crops of this State, is over two decades old. Within this period marked improvement on several aspects of cultivation of the crops has been effected and these may be classified under the following sections. (i) Evolution of improved strains through selection and hybridisation. (ii) efficient agronomic practices, (iii) effective plant protection measures and (iv) development work. A brief review of the achievements in Oilseeds improvement is presented here.

I. Evolution of Improved Strains: (a) *Groundnut*: Four high yielding strains representing long and short duration types have been evolved by pureline selection. Pureline selection undertaken in the bold seeded varieties has resulted in isolating four strains suitable for the table. As a result of hybridisation work undertaken with selected purelines, a dormant bunch strain (A. H. 6481) has also been evolved. Four long duration semispreading cultures, capable of giving more than 20% increased yield over the local spreading variety and suited for mechanical cultivation are under field test. The improved strains are grown by the cultivators in an area of 4 lakhs of acres resulting in an additional income of Rs. 1.5 crores.

(b) *Gingelly*: Three high yielding strains have been evolved by selection and hybridisation suitable to definite tracts and seasons. These strains are grown in an area of about 80,000 acres bringing an additional revenue of Rs. 16.8 lakhs.

(c) *Castor*: Four high yielding strains, three annual types and one perennial type have been evolved by selection and hybridisation. The strain Co. 1 is rich in oil (55%) and thrives best at elevations of 1,500 to 4000. ft. A technique for the maintenance of vigour and purity of the strains has also been evolved. The improved strains are grown in about 4,000 acres and the additional income works out to Rs. 55,000.

(d) *Coconut*: The production of the hybrid between the tall and dwarf varieties is the first attempt in the annals of breeding of the coconut and it has been a great success. The hybrid plants not only come to bearing early, but also bear heavily.

II. Efficient Agronomic Practices: (a) *Groundnut*: The economic spacing for a raifed crop has been determined as 9" x 9" for the spreading type and 6" x 6" for the bunch type corresponding to a seed rate of 80 lb. and 120 lb. respectively. Recent trials by increasing the spacing between rows and reducing the spacing within the rows of the spreading groundnut have shown that the yield is not reduced even if the spacing is either 24" x 3" or 18" x 4" and this modification in spacing facilitates intercultivation with labour saving implements and helps in reducing cost of cultivation. Application of potash and phosphoric acid in higher doses (75 and 50 lb. respectively per acre) over a basal dressing of cattle manure recorded significant increase in yields. Application of 2 to 4 cwt. of lime per acre in lime deficient soils, helped proper development of pods. Growing groundnut mixed with cotton, castor, redgram or cholam is found to be more remunerative than growing groundnut as a pure crop or as a mixture with other crops. Growing cereals in rotation with groundnut was found to be beneficial.

(b) *Gingelly*: The optimum spacing for the rainfed and irrigated crop has been determined as 9" x 9" and 1' x 1' respectively. In a trial to determine the optimum time of sowing of the irrigated (summer) crop, it was found that early sowing (February or early March) results in good growth of the plants and maximum yield.

(c) *Castor*: The economic spacing for the medium and long duration types was found to be 3' x 3' and for the short duration types 1' x 1'. The proper stage of harvest has also been determined.

(d) *Coconut*: The benefits of systematic cultivation and manuring of the crop have been established. A minimum of three ploughings once in April—May for sowing green manure, a second

time in August—September for incorporating green manure and a third time in November—December for ploughing in the ash, should be given. About 10,000 lb. of green manure per acre from a green manure crop grow *in situ*, and for each tree $4\frac{1}{2}$ lb. ammonium sulphate and 20 lb. of ash, or any other potassic fertiliser preferably muriate of potash per year form the optimum manure. *Calapogonium mucunoides* has been found to be an excellent green manure cum cover crop for coconut.

III. Plant Protection Measures: It is very necessary to adopt efficient control measures against pests and diseases. For groundnut dusting with DDT. 5% at 20 lb. per acre twice or thrice has effectively controlled the Surul pest and resulted in higher yields. Spraying $\frac{3}{4}$ % bordeaux mixture or dusting sulphur at 15 lb. has reduced the incidence of Tika leaf spot disease and increased the yields. dusting BHC. 5% at 10 lb. per acre for gingelly was found to be very effective against the shoot webber caterpillar which is the most common and destructive pest of this crop.

The semilooper caterpillar in castor can be controlled by dusting BHC. 10% in the early stages and spraying DDT or BHC when the caterpillars are grown up.

For coconut spraying Gueserol 550 on the crowns of trees has been found to be effective in controlling the black headed caterpillar and to reduce the incidence of Rhinoceros beetle.

IV Development Work: To provide a continuous supply of nucleus seeds of groundnut and castor for organising primary seed farms, four Zonal Nucleus seed farm centres are being run. The nucleus seeds of the four groundnut strains are being multiplied in 190 acres, and castor strains in 10 acres. The Oilseeds Development Scheme envisages an additional production of 70,000 tons of oilseeds at the end of the Second Five Year Plan period by spreading improved strains, by intensive cultivation methods, effective control measures against pests and diseases and by the extension of area.

By adopting the several improvements effected so far, on the four oilseed crops the substantial monetary benefit to the agriculturists of the State that could be achieved has been estimated to be 5.18 crores of rupees as shown below:—

	Additional production in tons.	Value in Crores of Rupees.
1. Spread of improved strains	... 30,000	1.73
2. Intensive cultivation and effective control measures against pests and diseases	... 15,000	0.79
3. Extension of area	... 25,000	1.40
4. Intensive cultivation and manuring of coconut	1.26
	Total	5.18

Based on the criteria fixed for judging mother palms, seednuts and seedlings vigorous selection is practised in the tall variety of coconut which is recognised to be the most economic and safe for large scale planting. Under a special scheme financed by the Indian Central Coconut Committee nearly a lakh of selected seedlings are supplied annually from the nurseries enough to plant 1,400 acres. These seedlings, when they come up to normal bearing, are expected, on a modest estimate, to bring in an additional production of 20 nuts per tree per year or a total additional production of two million nuts valued at 4 lakhs rupees. This additional income of Rs. 4 lakhs per year increases in arithmetic progression due to the planting of one lakh of seedlings each year and thus by the end of 25 years the income to the State through the extension of area under coconuts would reach one crore of rupees.

Work on Improvement of the Crops Taken on Hand and are Awaiting Solution: (a) *Groundnut*: Evolving forage types, white seeded and other economic types, fixing the best cultural treatment involving minimum expenditure are some of the important problems that still await solution on this crop. Cytogenetical and physiological studies initiated recently are expected to throw light on the genomic make up and nutritional requirements respectively. The study of the problem of seed dormancy is another aspect that is being pursued from the physiological and genetical background. For the last three years, work on the devising of suitable machinery for the cultivation of groundnuts has been taken up under a separate scheme financed by the Indian Central Oilseeds Committee.

(b) *Gingelly*: Evolving cosmopolitan and economic types, evolving high yielding long duration types suitable to the central and southern districts, and determining the optimum manurial and cultural treatments are items of investigation that are engaging attention.

(c) *Castor*: Evolution of short duration types and determining optimum cultural and manurial treatments are under way. The exploitation of hybrid vigour in this crop has been successfully utilised in the U. S. A. and a technique of producing hybrid seeds on a large scale has been evolved. This item of work is proposed to be taken up in this State for stepping up production.

(d) *Coconut*: The determination of the best combination of parents capable of giving the most vigorous and economic hybrids is an item of investigation that has been engaging attention.

At the end of the Second Five year plan period, when the results of the schemes are expected to be made available, and the targets in the development programme would have been achieved, the additional income to the cultivators would increase appreciably.