

**RECENT ADVANCES IN SUNFLOWER DEVELOPMENT IN INDIA**

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In the paper presented by the author at the Fifth International Sunflower Conference held at Clermont-Ferrand in France from July 25—29, 1972, the prospects of Sunflower as a potential oilseed crop of India were discussed. Feasibility trials carried out with four sunflower varieties of Russian origin. viz., (i) VNIIMK, (ii) Peredovik, (iii) Armavirskij and (iv) Armavirets along with „Sunrise selection“ (reported to be of Canadian origin) during 1969 and 1970 under the aegis of the Indian Council of Agricultural Research and the large scale demonstrations laid out on farmers' fields by the extension organizations led to the conclusion that the crop could not only be cultivated successfully in the country but has in addition the following attributes :

- i) Short growth period (85—110 days)
- ii) Photo-insensitivity which enables the crop to be raised in any season
- iii) Does well both in sandy loams and black loams
- iv) High level of production of oil per unit area and per unit time
- v) Drought resistance or drought evading ability
- vi) Ease of crushing and extraction of oil
- vii) High quality oil for edible purpose because with its high degree of PUFA content, the oil has non-cholesterol and anti-cholesterol properties
- viii) Seed rate being low, the seed multiplication ratio is high (1 : 100) facilitating rapid increase in area.

The feasibility trials and the demonstrations also helped to identify the seasons, areas of adaptability and varieties for different regions of the country. It was, therefore, considered that sunflower has the potentialities of rapidly augmenting the edible oil supplies in the country.

**DEVELOPMENT SCHEMES**

The climatic conditions of the southern states of India were found favourable for the cultivation of the crop throughout the year and

consequently the potentialities for rapid growth of the crop were expected to be large in these states. A crash programme for the rapid expansion of the area under the crop, was, therefore, first launched in the southern States of Andhra Pradesh, Tamil Nadu and Karnataka from the crop year 1972—1973. Based on the results of research, the varieties EC 68414 (Peredovik) and EC 68415 (Armavirskij) of Russian origin were selected for spread. As against the target of 180,000 hectares for the year 1972—1973, the area brought under sunflower during the year is estimated at 118,620 hectares. Due to unprecedented drought conditions in Andhra Pradesh and Karnataka and non-availability of adequate quantities of quality seed, larger area could not be brought under the crop during 1972—1973. However, the fair measure of success achieved in the implementation of the crash programme during the first year (1972—1973) itself, even though a high target of 180,000 hectares had been fixed, testifies to the popularity of the crop and the potentialities for its establishment as an important oilseed crop in the southern States. Demonstrations conducted in the other States of the country as also the research carried out at various centres during the year have led to identification of potential situations for the introduction of sunflower in the northern, western and eastern States also. The future role of sunflower in our cropping patterns has been determined as :

- i) a main oilseed crop replacing a low economy traditional oilseed or other crop, particularly in dry land agriculture.
- ii) a crop following potato, rape seed (*Brassica campestris* var. *toria*) or wheat in high economy rotational patterns
- iii) an inter-crop along with long duration crops like sugar-cane.

Keeping all these facts in view, the Government of India planned on a still bigger programme of covering 300,000 hectares under sunflower during the agricultural year 1973—1974. The area of operation was extended to the Western States of Maharashtra and Gujarat in addition to the three Southern States. The reports so far available indicate that an area of 150,000 hectares has been brought under sunflower mostly during the monsoon (June-September) season. Since winter (October-January) season is still current and the summer (February-May) season is yet to commence, indications are that sunflower area during 1973—1974 may reach about 250,000 hectares.

The success achieved in extending the cultivation of sunflower has, in a large measure, been made possible by the absence of marketing problems during 1972—1973, the first year of implementation of the Sunflower Development Programme. Due to severe drought conditions, there was a lean harvest of groundnut crop, the major oilseed of the country, with the result that demand built up for sunflower from the oil crushing industry and a fair degree of price stability for sunflower was achieved. The current prices per ton of sunflower seed range from Rs. 2,000 to 2,500 (Dollars 270 to 340) as against Rs. 2,500 to 2,800 (Dollars 340 to 380) of groundnuts-in-shell.

## PROBLEMS AND SOLUTIONS

It would appear that sunflower could become an important oilseed crop in Indian Agriculture. However, whether the initial momentum gained in favour of the crop would be sustained depends a good deal on the maintenance of the oil content of the seed and also of yield levels of at least 1 ton/hectare under rainfed conditions. Efforts are being made to maintain the oil content of the seed (undecorticated) above 45% and upgrade the yield potential of the crop.

Top priority is being given for production of quality seed under selection pressure. Five centres located in different regions of the country are being set up for production of superelite and elite seed of sunflower to ensure maintenance of oil content of seed above 45 percent using NMR technique as it is this attribute of Russian varieties that has revived interest in sunflower crop in India.

The research work on sunflower has been strengthened to develop the technology to take sunflower yields beyond one ton per hectare under rainfed conditions because the crop will continue to be cultivated predominantly under such conditions. The average yield level of sunflower grown on large scale during the past two years was about eight quintals per hectare which may not be very remunerative if prices were to decline to levels below Rs. 2,000/ton. The main reason for the low yield of sunflower is the high incidence of hollow and incompletely filled seed in most plots all over the country and the lack of uniform maturity. There are some indications of practical solutions to this problem. Plantings of sunflower at higher altitudes in Tamil Nadu, one of the southern States, had no problem of non-filled seeds. This indicates the temperature factor to be operating and plantings are proposed to be so adjusted in the plains to coincide with the most favourable temperature period. Further, at the Dry Farming Research Centre in the Western Region of the country, the problem of hollow seed was negligible in sunflower plots located near bulk plots of safflower (*Carthamus tinctorius*) during winter (October-January) season. This indicates the intensity of pollen foraging insects to be a deciding factor and efforts are being made to popularise the practice of planting safflower as a border crop around sunflower fields during the winter season and also to encourage installation of beehives in the field. Simultaneously, on the research side, significant action is being taken to improve the production potentialities of sunflower. Enriching the germplasm of sunflower and study for promising varieties has made good progress and the Romanian variety Romsun Record has been found to do well in Tamil Nadu and its seed is being multiplied for distribution to farmers. Plans have been drawn up to develop synthetics and upgrade the yield performance of sunflower. Work in this direction will start from the next planting season. Building up of hybrids and intensifying disease resistant programmes are also receiving attention under a separate research project for sunflower. Systematic work in fabricating improved dehulling

equipment, establishment of better extraction processes and the technology of sunflower oil are also under way.

### FUTURE PROGRAMME

Keeping in view the success so far achieved with sunflower cultivation in the country, a five year programme for development of the crop has been drawn up which envisages bringing one million hectares under sunflower by 1978—1979. The yearwise programme stated for the next five years in different States of India is given in the following table.

**Programme of Sunflower Development for the Five Year Period  
1974—1975 to 1978—1979 (area : hectares)**

Region/States	1974—75	1975—76	1976—77	1977—78	1978—79
<i>Southern</i>					
1. Andhra Pradesh	110,000	125,000	150,000	175,000	200,000
2. Karnataka	65,000	75,000	85,000	100,000	120,000
3. Tamil Nadu	115,000	140,000	160,000	180,000	200,000
<i>Western</i>					
1. Gujarat	60,000	70,000	80,000	90,000	100,000
2. Maharashtra	60,000	80,000	100,000	120,000	140,000
3. Madhya Pradesh	10,000	15,000	20,000	25,000	30,000
<i>Northern</i>					
1. Uttar Pradesh	15,000	20,000	30,000	40,000	60,000
2. Punjab	15,000	20,000	30,000	40,000	50,000
<i>Eastern</i>					
1. Orissa	10,000	20,000	30,000	40,000	50,000
2. West Bengal	10,000	21,000	30,000	40,000	50,000
<b>Total</b>	<b>460,000</b>	<b>585,000</b>	<b>715,000</b>	<b>850,000</b>	<b>1,000,000</b>