PERENNIAL OILSEED PLANTS COCONUT AND OIL PALM

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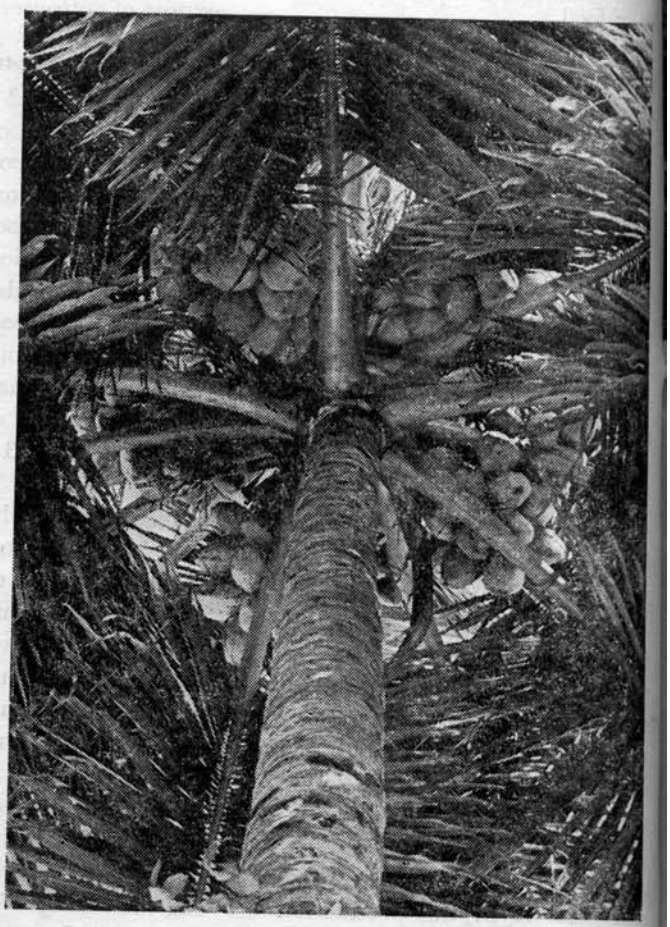
Dwarf tall hybrid coconut



A super palm

Of all the oil-yielding plants the highest yield of oil per unit area is obtained from the two perennial oilseed plants, the oilpalm and coconut. They give about 4-7 times more oil compared to groundnut, the most popular oilseed of the country. In view of the fact that the soil and climatic conditions prevailing in large parts of India are highly suitable for the cultivation of these two crops they deserve special consideration in the overall research and development programmes of oilseeds of the country.

Coconut

The production of coconut oil now estimated to be about 3 million tonnes per annum, ranks sixth in the world production of about 36 million tonnes of edible vegetable oil. The coconut production in the last two decades remained static all over the world. In India the production went up from 3,448 million nuts in 1949-50 to 5,677 million nuts in 1980-81 mainly because of an increase in area from 0.596 to 1.08 million hectares during the same period. The per hectare yield was 5,250 nuts in 1980-81 compared to 5,785 nuts in 1949-50. Thus, the yield of nuts per hectare has declined.

Though a crop of the humid tropics, coconut can be grown under varying soil and climatic conditions from saline sea coasts to an elevation of almost 1,000 metres. It is an important crop in the states of Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Orissa, Maharashtra, Assam, West Bengal, Goa, Andamans and Lakshadweep Islands. Recent trials in Bihar have shown the potential for its growing in this state

Coconut, cocoa, pepper and pineapple

as well. Coconut can be grown under situations such as backwater areas of sea coast, paddy fields bunds, embankments, irrigation canal bunds, river banks subjected to inundation, etc. When planted on bunds the fibrous root system which binds the soil helps to strengthen the bunds.

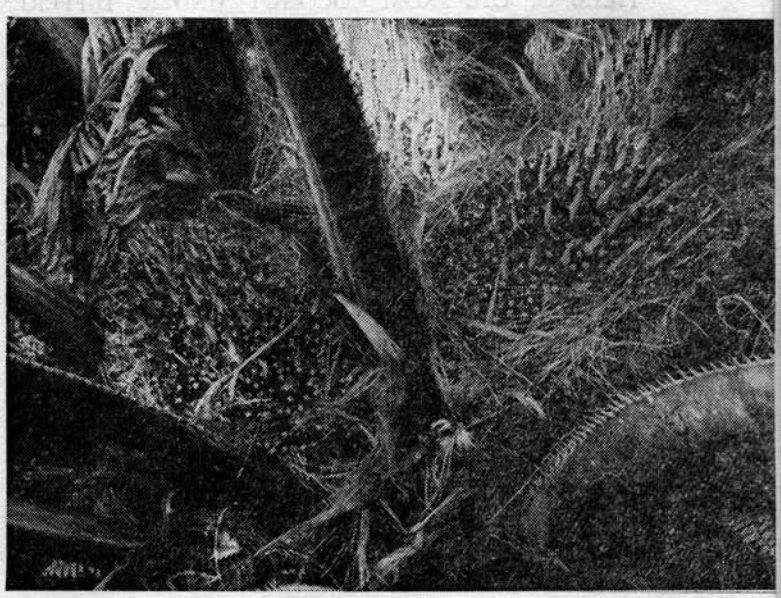
High Response to Good Management and Oil Yield

Coconut responds to good management particularly with irrigation. By resorting to regular cultivation and manuring the production can be doubled from the present national average of 30 nuts/palm/year. The yield can be almost trebled if the plants are irrigated, manured and mix-cropped with cocoa (Table 1). While the popularly cultivated tall variety ('WCT') can yield 1.5—2 tonnes of oil/ha under good management, the dwarf tall hybrid (D × T) and tall × dwarf (T × D) can give double this yield. Similar high yield of about 20,000 nuts per hectare has also been realised by a number of farmers. While this is the best realised average yield, the potential calculated on the basis of a single super palm tree yield of 600 nuts per year reported from Thazhava comes to 1,05,000 nuts per ha per year working out to a per hectare oil yield of 11.25 tonnes. Exploitation of this yield expression shown by a single tree is still not possible in the absence of a suitable tissue culture technique for propagating such palms. All the same research work going on in this direction at the Central Plantation Crops Research Institute, Kasargod holds out considerable promise for production of plantlets from such palms in the near future.

Oilpalm

Oilpalm is by far the most productive oil tree in the world. The average yield of oil per unit area from oilpalm is 2.5 tonnes per ha which is twice the yield from coconut. It is a good edible oil and is in fact considered as good as groundnut oil and compares well with coconut oil.

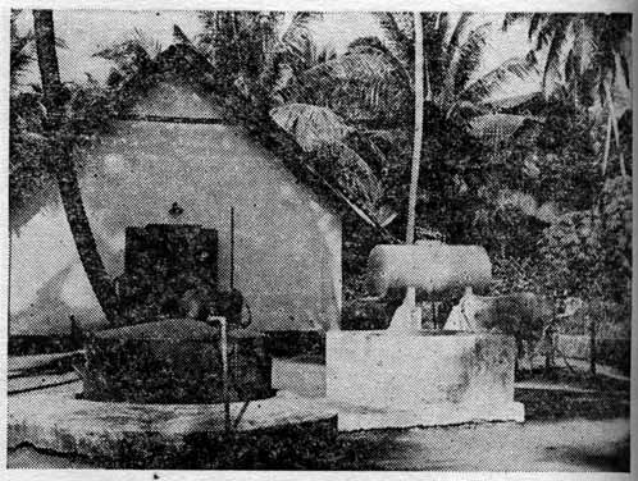
For the successful cultivation of oilpalm the climatic conditions should be favourable for its growth and development. A mean maximum temperature of 28-30°C, mean minimum temperature of 22-24°C, a minimum of 5 hours sunshine per day, and well-distributed rainfall of about 2000 mm per annum, and absence of marked dry seasons are essential. Though these conditions are not prevalent in many states of India, some of the southern states particularly Kerala and Andaman and Nicobar Islands have conditions favourable for its cultivation. The recent efforts in Malaysia to cultivate oilpalm under irrigated conditions have been reported to be highly successful. The yield under such situations has reached 8.55 tonnes of oil per ha per year in the Tenera hybrid. The possibility of bringing oilpalm under irrigated system of cultivation in the new irrigation project areas of the southern states of India may be worth consideration. In Sri Lanka, about 12,000 ha has been grown with oilpalm under the Mahavali irrigation project. India was hitherto importing the entire quantity of Tenera hybrid seeds required for planting from other countries. However, research efforts in this directions have made it possible to produce these seeds within the country itself.



Oilpalm

In India the only large-scale plantation available is at Anchal (Kerala) managed by Oilpalm India Ltd., planted over an area of 3000 ha. An additional equal area has also been proposed to be brought under this crop in the same tract. The present yield of 1.4

Coconut, grass and pepper



Coconut, grass and dairy

YIELD OF OIL FROM COCONUT UNDER DIFFERENT MANAGEMENT LEVELS

Management	*Mean yield nuts/palm*	*Oil yield*	
		Tonnes/ha	*per ceni increase over national average*
National average	30	0.56	—
WCT—rainfed			
(a) Cultivation alone	38	0.71	26.79
(b) Cultivation and manuring with organics and inorganics	62	1.16	107.14
(c) Irrigated and manured (12 years old)	75	1.76	214.29
(d Mixed cropping with cacao under irrigation and manuring	111	2.60	364.29
D×T—Rainfed (mean yield for 9 years old)	112	2.93	423.21
T×D—Irrigated (20 years old)	130	2.89	416.07

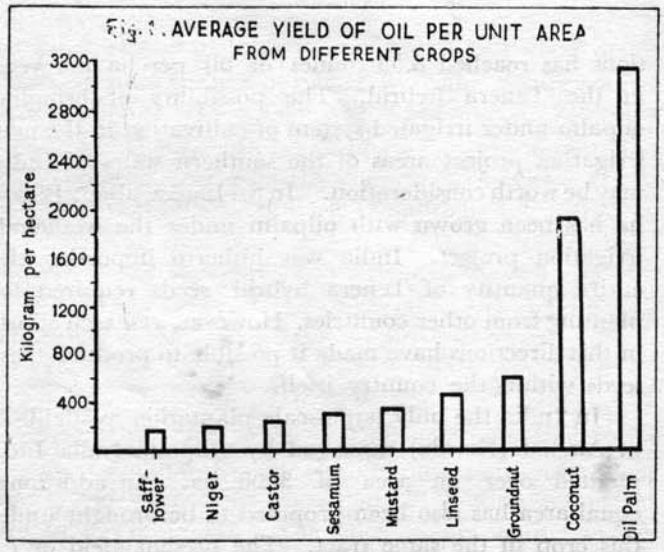


Fig. 1

tonnes of oil per ha per year of this plantation indeed does not indicate the potential of oilpalm under southern Indian conditions. With better management such as proper pruning of the trees, bench terracing of the palm base and mulching the same, split application of fertilizers and cover cropping the inter-space, a yield of 2 tonnes per ha could be easily achieved. However, it has to be borne in mind that the fruits of oilpalm have to be processed within 24 hours of their harvest for which a factory is required if kernel oil also is to be extracted. Oilpalm, thus cannot be a substitute for coconut in any of the areas where the latter is now being cultivated both as a food-cum-cash crop. However, through large-scale undertakings it should be possible to bring sizable area under this crop in new forest clearings and irrigation project areas.

Projected Oil Production

In view of the high oil yielding ability of both coconut and oilpalm, there is an absolute need to increase the productivity of both from existing areas under these crops and also to extend their cultivation to fresh areas. The approximate area available in different states where favourable soil and climatic conditions (including those where irrigation can supplement drought conditions) exist, has been estimated to be about 4 lakh ha. Assuming that even half of this area can be brought under coconut in the next five years under good management systems an oil yield of two lakh tonnes can be expected by the 90's at 50 per cent of the nuts being converted to copra. Side by side removal of the existing constraints on production such as (a) lack of credit, (b) deficiencies in input supply, (c) uncertain markets and prices, (d) lack of necessary institutional infrastructure, and (e) socio-cultural problems, should enable doubling of the present production of 2.1 lakh tonnes of coconut oil in the country. Thus, even on a modest estimate the contribution that coconut alone could make to the edible oil deficit of

the country is substantial. In this context it is also to be remembered that 64 per cent of the total coconuts produced in the country though do not come to milling as copra, indeed they meet the fat and oil needs of the people indirectly as it forms part and parcel of food in those states where this crop is grown.

In the case of the area that can possibly be brought under oilpalm crop has been estimated at 25,000 ha, mostly in Andamans. With good inputs, a production of 85,000 tonnes of palm oil and 10,000 tonnes of kernel oil can be expected from this area. If a similar area having irrigation facility could be brought under oil palm with good management an additional quantity of one lakh tonnes oil can be produced. Coconut and oil palm can thus, produce annually an additional quantity of about 0.6 million tonnes of oil.

Other Advantages

Unlike annual crops, coconut and oilpalm when once planted in the field remain in productive phase at least for half a century. The removal of the constraints on production if ensured, the production of oil will be highly consistent with year to year and will, therefore, help to stabilise oil availability in the country. Equally important is the possibility of maximising the production in small units of land particularly with coconut through multi-species cropping. In addition, integration of animals into the total system is also possible. Cocoa and pepper can also be used as mixed-crops along with oil palm. For enhancing overall productivity, higher employment generation, and making smaller holdings viable these crops can well play a vital role.

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COTTONSEED OIL

TABLE 4. YEARWISE PRODUCTION OF COTTON AND COTTONSEED

	1976-77	1977-78	1978-79	1979-80	1980-81
1. Production of cotton ('000 bales)	5,839	7,103	7,958	7,898	7,803
2. Production of cottonseed ('000 tonnes)	1,986	2,426	2,734	2,642	2,601
3. Actual crushing ('000 tonnes)	1,037	964	1,700	1,650	1,600
4. Production of cottonseed Oil ('000 tonnes)	140	142	180	200	195
5. Production of cottonseed Cake ('000 tonnes)	750	877	1,030	1,200	1,190
6. Production of cotton Linter ('000 tonnes)	16	16	27	30	30

another 20 per cent to 25 per cent of the total seed production if all the seed, except that required for cultivation purposes, can be diverted to oil mills and the farmers advised to use only cottonseed meal instead of whole cottonseed for cattle feeding. If, in addition, the oil industry adopts modern processing techniques to improve oil recovery to an average of 16 per cent of seed weight (it will be lower for *desi* cottons and higher for American types), the production of cottonseed oil can be stepped up from the present level of about 2.0 lakh tonnes to about 3.5 lakh tonnes per year. This will be very helpful in reducing to a great extent the amount of foreign exchange now used for importing other edible oils. In addition, the increased availability of cottonseed meal will help in earning additional foreign exchange for the country through export.

At present, the programme of research on cotton is mainly directed towards production of increased quantity of fibre of required quality levels. In view of the importance of cottonseed as a source of edible oil, it may be desirable to investigate the feasibility of evolving new strains with higher oil content in the seeds but without any adverse effect on yield and quality of fibre. It may be also worthwhile taking up studies on the improvement of keeping quality of cottonseed oil so as to make it more acceptable for use directly as a cooking medium.

OILSEED RESEARCH

THE Indian Council of Agricultural Research is organising research on different oilseed crops under the following projects and programmes.

1. All-India Co-ordinated Research Project on Oilseeds with 83 crop-based research centres.
2. All-India Co-ordinated Research Project for Soybean Improvement with 18 research centres.
3. National Research Centre for Groundnut, Junagarh.
4. National Training and Communication Centre, Hyderabad.
5. Indo-Swedish Collaborative Research Project on Processing and Utilisation of rapeseed-mustard meal at 5 locations.
6. Intensification of Research on Safflower, Rapeseed-mustard, Sesamum and Linseed with 4 research centres.
7. Irrigated command area research programme with 16 centres.
8. Extension education research programme with 27 centres.
9. Elite and super elite sunfflower seed production programme.
10. Breeder's seed production programme on oilseeds.
11. A few ad-hoc research schemes from ICAR Cess funds.

In addition, the Indian Agricultural Research Institute, New Delhi and Dry Farming Research Project as well as State Agricultural Universities have also research programmes on oilseeds improvement.