OILSEED PRODUCTION
Constraints and Opportunities

Editors:

DR. H.C. SRIVASTAVA
DR. S. BHASKARAN
DR. BHARTENDU VATSYA
DR. K.K.G. MENON

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18. Prospects of Increasing Edible Oil Availability through Enhanced Coconut (Cocos nucifera) Production

K.V.A. BAVAPPA*

Of all the oil yielding crops, next to oilpalm the highest yield of oil per unit area is obtained from the perennial oilseed plant, the coconut (Fig. 1). India, the third largest coconut producing country in the world

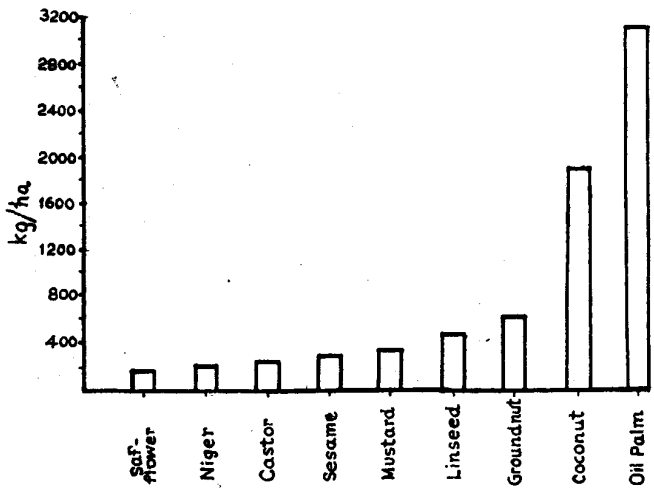

Fig. 1. Average yield of oil per unit area from different crops.

has an area of about 1.08 m ha under coconut producing about 5,700 m nuts annually. With an oil yield up to 65 per cent, copra or dried coconut kernel is, perhaps the richest material for vegetable oil extraction followed by oilpalm kernels yielding about 46 per cent as against 44 per cent from shelled groundnuts and 16-18 per cent from soybeans. Compared to the annual oilseed crops raised in the country, coconut has a much higher

*Central Plantation Crops Research Institute, Kasaragod 670124, Kerala.

unit productivity. The relative importance of these crops is given in Table 1. It will be observed from the table that in general, coconut yields about

Table 1: Oilseeds and vegetable oil production by source, 1978/79 (in %)

	% of Oilseed Cropped Area	% of Domestic Oil Production	Oil Yields kg/ha
Groundnut	28	47	201
Rapeseed/Mustard	13	18	161
Sesame	9	5	82
Safflower	3	1	104
Niger	2	1	n.a.
Soybean	2	1	120*
Sunflower	1	1	275*
Cottonseed	30	8	44
Coconut	4	5	615
Linseed	7	5	88
Castor	2	3	183
Oilpalm	n.a.	n.a.	2,000

*Yield per hectare assumed to be 800 kg of seed
Source: Ministry of Agriculture, World Bank estimates.

three times more oil compared to groundnut, the most popular oilseed of the country. It will also be observed that coconut contributes about 5 per cent to the domestic oil production, on par with linseed and sesame. In view of the fact that the soil and climatic conditions prevailing in large parts of India are highly suitable for the cultivation of this crop and also due to its high oil yielding potential coconut deserves special consideration in the overall research and development programmes of oilseeds of the country.

Production of coconut

The production of coconut in the country has been showing a declining trend during the last one decade. The production reduced from 6,124 m nuts in 1971-'72 to 5,677 m nuts in 1980-'81. The existence of large number of senile and unproductive palms, exhaustion of soil caused by continuous cultivation of the crops without proper agronomic care, the widespread prevalence of debilitating diseases such as root wilt of Kerala, Tanjavoor wilt of Tamil Nadu, stem bleeding etc., inadequate availability of superior planting material particularly hybrids, non-availability of easy credit and lack of efforts to modernise products diversification and by-product utilisation are some of the major factors responsible for the slow

but steady decline in production. However, productivity in some of the coconut growing States such as Tamil Nadu is substantially high (Table 2). Since the productivity is low in most of the States, considerable scope exists for increasing coconut production in the country through better management of the existing areas.

Table 2: Mean productivity of coconuts (nuts/ha) in the different States (Period: 1972-'82)

State	Productivity
Andhra Pradesh	4,175
Assam	4,903
Karnataka	5,125
Kerala	4,811
Maharashtra	5,554
Orissa	4,819
Tamil Nadu	9,926
West Bengal	4,584
A. & N. Island	3,579
Goa	5,083
Lakshadweep	7,550
Pondicherry	9,500
All-India	5,309

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 as well. Coconut can be grown under situations such as backwater areas of sea coast, paddy field 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.

It has been observed that under the existing field conditions nearly 5 per cent of the coconut plants in productive growth phase irrespective of their age are genetically poor yielders. In the absence of regular replanting, extensive areas are under senile stands of coconut. In tracts where underplanting is being practised, old trees are rarely cut and removed; thus adversely affecting the productivity of the plantation. Removal of unproductive and old palms and replacement with high yielding varieties form part and parcel of any coconut development project.

High yielding varieties

Crop improvement research undertaken in coconut during the last three decades has enabled evolution of high yielding varieties and hybrids (Table 3). Of the different varieties, Kappadam, an indigenous selection

Table 3: Performance of high yielding coconut cultivars and hybrids (CPCRI, Kasaragod)

Cultivar/Hybrid	Mean yield			% Increase over National average
	nuts/palm/year	Copra (g/nut)	Oil (tonnes/ha)	
1. National average	30	150	0.51	—
2. Laccadive ordinary—Good management	127	169	2.44	378
3. Kappadam—Good management	90	299	3.06	500
4. Andaman giant—Good management	110	181	2.26	343
5. S.S. Green—Good management	97	189	2.09	310
6. Philippines ordinary—Good management	110	198	2.48	386
7. CDO×WCT—Good management	130	215	3.18	524
8. WCT×CDO—Good management	114	187	2.42	375
9. WCT×Gangabondam—Good management	86	191	1.87	267

gives 500 per cent more yield over the national average while the Chowghat Dwarf Orange×West Coast Tall hybrid gives 524 per cent more yield. In general, varieties and hybrids give 267 to 524 per cent more yield compared to national average. The emergent need to make available seedlings of these high yielding varieties and hybrids to the farmers for future plantings and the substantial increase in production that can be obtained are thus apparent.

Better management

Coconut responds well to good management. 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 more than trebled if the plants are irrigated, manured and mix-cropped with cocoa (Table 4). While the popularly cultivated tall variety (WCT) can yield 1.2 to 2.6 tonnes of oil/ha under good management, the dwarf×tall hybrid (D×T) can give 3.18 tonnes of oil/ha. High yields of about 20,000 nuts per hectare per year in the WCT variety 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

Table 4: Performance of coconut under different management conditions

Type of management	Mean annual yield		% Increase over National average
	(nuts/palm)	Tonnes of oil/ha	
1. National average	30	0.51	—
2. West Coast Tall-rainfed-Kerala			
a) Farmers' practice	27	0.50	—
b) Farmers' field-manured	58	1.08	112
c) Experimental Farm—cultivation alone	38	0.71	39
d) Experimental Farm—cultivation and manuring with organics and inorganics	62	1.16	127
e) Experimental Farm – irrigated and manured (12 year old)	75	1.76	245
f) Experimental Farm—mixed cropping with cacao under irrigation and manuring	111	2.60	410

nuts per year reported from Thazhava comes 1,05,000 nuts per ha per year working out to a per hectare oil yield of 11.25 tonnes. Exploitation of such high yield expression shown by single trees seems to be now possible through tissue culture technique being perfected at the CPCRI, Kasaragod. The recent finding that CDO × WCT hybrid gives almost double the yield of West Coast Tall for the same level of NPK inputs is a point highly in its favour for the large scale recommendation of this hybrid in areas having good soil depth and not subjected to undue moisture stress.

Area expansion

Although considerable expansion of area under coconut has taken place in the country during the last two decades, additional area suitable for coconut cultivation is still available in many States for further utilisation. The additional area available for the purpose is estimated at about 380,000 ha which is more than 30 per cent of the area under coconut in the country. In the context of the prevailing remunerative price of coconut there is every possibility of further rapid expansion of coconut cultivation in these potential areas. While taking up this programme it may be advantageous to bring more areas in the States of Tamil Nadu, Maharashtra, Pondicherry, etc., for a faster increase in production of coconut in the country.

Projected oil production

Due to the widespread demand for varied edible end uses in the form of raw nuts and edible copra, only about 45 per cent of the total production of coconut is utilised for copra manufacture and subsequent oil extraction. Thus, the annual production of coconut oil in the country is only

210,000 tonnes as against the potential of about 500,000 tonnes. The possibility of substantially increasing the production of coconut from the existing areas is evident from the response that the coconut palms have shown to different management practices. 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. Assuming that even half of the estimated 3.8 lakh ha can be brought under coconut in the next five years under good management systems, an oil yield of one lakh tonnes can be expected by the 90's at 50 per cent of the nuts being converted to copra. 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, 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.

Other advantages

Unlike annual crops, coconut 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 from 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 coconut land through multispecies cropping. In addition, integration of animals into the total system is also possible. Thus, in addition to enhancing oil production in the country, coconut crop based farming systems have also the advantage of higher employment generation, higher productivity per unit area and ensuring better economic stability to the farmers.