Coconut Production and Productivity

M. K. Nair * and M. K. Rajesh**

ABSTRACT

World production of coconut during the year 1999 is estimated at 54,129 million nuts from an area of 12 million hectares. Nearly three fourth (72.7%) of the world production is contributed by India, Indonesia and Philippines. Sri. Lanka with about 5.22% of the production occupies fourth position. Taking 1961 as the base year the growth over the period (1961-99) in area has been 146.6% and 107.53% in production. But there has been a declining trend in productivity inspite of tremendous advancement made in coconut research. Among major producing countries, Thailand and India have recorded excellent growth in production during the last decades. In the early nineties, India ranked third in the world in area and production among 86 coconut growing countries. The latest estimation for 1999 indicates that India has achieved first position in production (14,925 m nuts) and productivity (7822 nuts/ha).

Availability of high yielding varieties and hybrids, identifying optimum dosage of fertilizers and water requirement under different agro-climatic regions, management of important pests and diseases and developing a protocol for field collection, transportation and culturing of coconut embryos are the major technological breakthroughs achieved in promoting coconut culture. Various production constraints identified include failure to effectively manage diseases like root (wilt), lethal yellowing, cadang cadang, Ganoderma wilt and stem bleeding, non availability of adequate planting materials of improved varieties, general neglect of home stead garden where coconut is a major component crop, lack of effective IPM technology for major pests, lack of specific input technologies to suit small holdings and different farming situations and effective developmental strategies to rejuvenate and rehabilitate existing poor yielding coconut plantations. Strategies and recommendations for improving production and productivity are discussed below.

COCONUT PRODUCTION - PRESENT STATUS

World production of coconut (1999) is estimated at 54,129 million nuts from an area of about 12 million hectares. Nearly three-fourth of the production (73%) is contributed by India, Indonesia and Philippines. Sri Lanka with about 5.22% of the production occupies fourth position (*Table 1*).

Table 1. Area, production and productivity of coconut inmajor coconut growing countries (1999)

Sl No.	Country	Area ('000)ha	Percentage share	Production (Million nuts)	Percentage share	Produc (Nuts
1	India	1908	16.02	14925.00	27.57	78
2	Indonesia	3712	31.17	13946.00	25.76	37
3	Philippines	3077	25.84	10504.00	19.41	34
4	Sri Lanka	442	3.71	2828.00	5.22	63
5	Mexico	153	1.28	1628.13	3.01	106
6	Thailand	372	3.12	1108.00	2.05	29
7	Vietnam	173	1.45	1044.00	1.93	60
8	Papua New Guinea	260	2.18	1020.00	1.88	39
9	Brazil	248	2.08	941.15	1.74	37
10	Mozambique	105	0.88	543.75	1.00	51
11	Tanzania	310	2.60	437.50	0.81	14
12	Ghana	54	0.45	387.88	0.72	71
13	Myanmar	32	0.27	328.21	0.61	102
14	Ivory Coast	30	0.25	241.25	0.45	80
15	Dominican Republic	37	0.31	230.55	0.43	62
16	Others	996	8.36	4015.50	7.42	40
	Total	**11909**	**100.00**	**54128.91**	**100.00**	45

Source : APCC Statistical Year Book, 1999

Estimate (1999) shows that India is the largest producer of coconut with 14,925 million nuts closely followed by Indonesia with 13946 million While India accounts for 27.57 p of production in the world, it h 16.02 per cent share in area. In leads in area with 3.71 million h (31.17 per cent) under coconu its share in production is 25.76 p Philippines ranks second in area per cent) and third in productio 10,504 million nuts (19.41 pe (*Fig. 1*). Among the four l coconut producing countries, In the highest productivity with 78 ha followed by Sri Lanka (63 ha). Among coconut growing co in the world, Mexico has the h productivity (10,641 nuts/ha), fo by Myanmar (10,256 nuts/ha) an

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ast (8,042 nuts/ha). The average ductivity of Philippines (3414 nuts/ and Indonesia (3757 nuts/ha) is less n the average world productivity of 5 nuts/ha.

Coconut plays an important and vital le in the socio-economic life of large mber of small and marginal farmers the peninsular India. It is estimated t more than 10 million people in India dependent of coconut, as they are gaged in coconut cultivation, cessing, marketing and other related ivities. With an annual production of ost 14,925 million nuts, coconut's re to the GDP of the country is over 000 million rupees ($1,550 million). the coastal tracts of India, majority people depend on coconut for their tenance. However in most of the ll and marginal holdings, coconut is ajor component crop of the farming stem as the farmer has to commodate fruits and vegetable crops meet the day-today requirement of the mily.

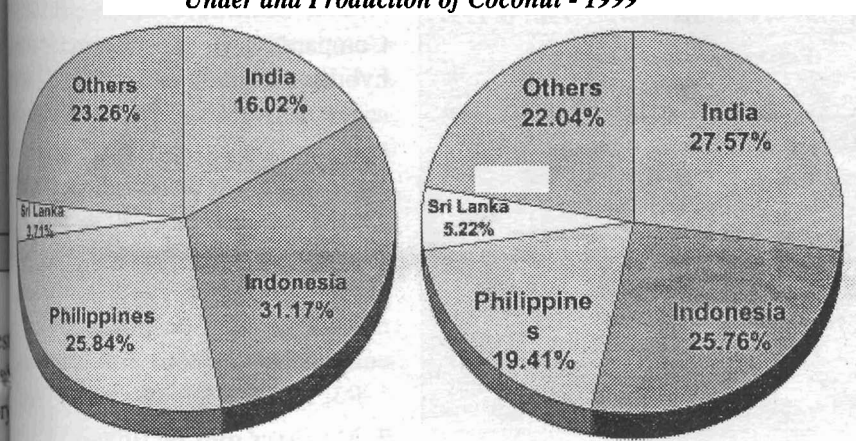
RODUCTION AND PRODUCTIVITY N DIFFERENT STATES OF INDIA

Area under coconut as well as duction has been showing a steady increase during the last five decades. Area under coconut was 0.63 million nuts during 1950-51 which increased to 1.91 million ha during 1998-99. During the same period production increased from 3282 million nuts to 14925 million nuts and productivity from 5238 nuts/ha to 7821 nuts/ha. Growth over the period 1950-51 to 1998-99 was 204.58% in area, 354.79% in production and 49.31% in productivity. An analysis of percentage shows that the decade 1985-86 to 1994-95 was the peak period (*Table 2*). The tremendous increase in area, production and productivity during the period can be attributed to remunerative price, availability of improved inputs including quality planting materials and results of developmental work initiated by the Coconut Development Board.

Kerala, Tamil Nadu, Andhra Pradesh and Karnataka are the major coconut producing states in India and together accounts for more than 80 per cent of area and production in the country. Among the four states, Kerala accounts for largest area and production sharing 56.50 per cent of area and 44.70 per cent of production. This is followed by Karnataka with 15.08 per cent area and Tamil Nadu with 20.75 per cent of production. Among the four southern states, Andhra Pradesh tops in productivity with 19,573 nuts/ha followed Tamil Nadu with 11620 nuts/ha. Karnataka has the lowest productivity of 5195 nuts/ha among the four southern states. Kerala which contributes to maximum production has a productivity of 6188 nuts/ha. The maximum productivity of 15020 nuts/ha has been reported from Maharashtra, though its share to overall production in the country is only 1.5 per cent since the area in the state is only 15100 ha (*Table 3.*)

There has also been tremendous increase in coconut area and production globally during the last four decades. The area under coconut during 1961 was 4.853 million ha with a production of 26.239 billion nuts. The increase in coconut area from 1961 to 1999 was slow but steady, the latest area estimate being 11.909 million ha. During the period, production also showed a steady increase reaching 54.129 billion nuts during 1999. However, the decade between 1971 and 1980 there was a declining trend in production in spite of area increase. This has been attributed to a declining trend in productivity. In fact the declining trend in productivity is observed throughout the four decades. A productivity of 5407 nuts/ha during 1961 came down to 4545 during 1999. While there was an increase of 145.39 per cent in area and 106.29 per cent in production during the period 1961 to 1999, the productivity showed a negative trend (-15.94%) (*Table 4*).

Fig 1. Share of Major Coconut Growing Countries in Area Under and Production of Coconut - 1999



Area - 11909 thousand ha

Production - 54129 million nuts

FACTORS RESPONSIBLE FOR INCREASING PRODUCTION AND PRODUCTIVITY

1. High yielding varieties and hybrids

One of the major factors responsible for increasing the productivity and in

Table 2. Changes in area, production and productivity of coconut in India (1950-51 to 1998-99)

Period	Percentage increase		
	Area	Production	Productivty
1950-51 to 1954-55	2.15	29.95	27.21
1955-56 to 1959-60	9.20	12.81	3.30
1960-61 to 1964-65	18.15	8.70	-8.00
1965-66 to 1969-70	16.93	16.18	-4.71
1970-71 to 1974-75	6.77	-0.75	-7.04
1975-76 to 1979-80	0.55	-2.87	-3.40
1980-81 to 1984-85	9.23	16.34	6.49
1985-86- to 1989-90	20.12	38.23	15.08
1990-91 to 1994-95	13.20	37.11	21.12
1995-96 to 1998-99	6.28	6.85	0.54
Growth over the period 1950-51 to 1998-99	204.58	354.79	49.31

Table 3. Area, production and productivity of coconut in India - 1998-'99

States	Area ('000 ha)	Production (Mil. Nuts)	Productivity (Nuts/ha)	Share of area (%)	Share of production (%)
Andhra Pradesh	98.20	1922.10	19573	5.15	12.88
Karnataka	287.80	1495.10	5195	15.08	10.02
Kerala	1078.20	6672.00	6188	56.50	44.70
Maharashtra	15.10	226.80	15020	0.79	1.50
Orissa	54.50	795.10	14589	2.85	5.33
Tamil Nadu	266.50	3096.70	11620	13.97	20.75
West Bengal	24.60	318.20	12935	1.29	2.13
Others	298.40	625.6	--	15.64	4.19
India	**1908.2**	**14924.8**	**7821**		

Table 4. Changes in area, production and productivity of coconut (World) (1961 to 1999)

Period	Percentage increase		
	Area	Production	Productivity
1961 to 1965	12.67	1.56	-9.88
1966 to 1970	13.39	5.05	-7.35
1971 to 1975	6.45	-7.75	-13.33
1976 to 1980	14.69	-1.87	-14.43
1981 to 1985	5.55	2.93	-2.48
1986 to 1990	22.69	23.56	0.72
1991 to 1995	7.42	17.70	9.57
1996 to 1999	2.85	0.99	0.19
Growth over the period 1961 to 1999	145.39%	106.29%	-15.94%

turn the production is the availabili quality planting materials from sele varieties and hybrids. Systen evaluation of varieties over the several years resulted in the sele three high yielding varieties for co growing tracts of India. The compar performance of these three varieties Lakshadweep Ordinary, Benau Green Round and Philippines Ordi are given in *Table 5.* (Nair *et al.* 1

Hybrid vigour in coconut reported for the first time in Indi Patel in 1937. He found that hy seedlings of crosses between West C Tall and Chowghat Green Dwarf r in 1932 at Coconut Research Stat Nileshwar (now under Ke Agricultural University) showed e germination, increased collar girth higher leaf numbers compared to b parent (WCT). This finding paved way for exploitation of hybrid vige coconut, not only in India, but al other coconut growing countries subsequent years' field trials, Dwa mother palm was found to be sup to both the parents, as well as t reciprocals in yield of nut and copr turn. More than 80 hybrid combina have been evaluated over the yea India and so far eleven hybrids released for establishing seed gar and commercial cultiva Comparative yield performance of hybrids are given in Table 6. It coul seen that the cross combinat between Dwarf and Tall are not precocious, but also high yielders yields of hybrids in terms of production were much higher (9 more nuts/palm/year) compare around 80 nuts produced by the cultivar WCT. (Nair and Nampo 1993; Iyer and Dhamodaran, 1994

2. Manures and fertilizers

Standardization of nut requirement of coconut palms thr

-ilocation trials for a number of years :d application of these results have :ntributed to increasing the

In large scale fertilizer trial in the West Coast of India, yield increase of 35 per cent in nut production and 44 per cent in copra yield was obtained with 0.3 kg N,0.34 kg P_2O_5 and 0.68 kg K_2O/palm/year (John and Jacob, 1969)

Nelliat *et al.* (1984) demonstrated that palms growing without fertilizer inputs under total neglect in laterite soil conditions can be revived by applying double dose of fertilizer in the first two years followed by recommended doze of 500 g N, 320 g P_2O_5 and 1200 K_2O/palm/year respectively with a cost benefit ratio of 1:2.53 (*Table 8*).

Results of field trials in India has indicated that application of phosphatic

Table 5. Performance of released Indian coconut cultivars

Cultivar	Mean yield/ palm/year		Copra yield		
	No	% over WCT	Mean/nut (g)	Mean/palm/year (kg)	Per cent over WCT
Lakshadweep Ordinary	97	21.2	195	18.9	32.3
Samawali Green Round	151	88.8	152	22.7	57.6
Philippines Ordinary	110	37.5	198	21.8	57.9
West Coast Tall (WCT)	80	-	180	14.4	-

-ductivity. For sustained productivity, palms are to be manured from the year of planting itself. Productivity palms is adversely affected when the ntation is neglected in the beginning. a later stage, even if fertilized, the ms do not respond to achieve the el of productivity expected. The imum dose of fertilizer recommended an adult coconut palm is 0.5 kg N, 2 P_2O_5 and 1.2 kg K_2O/palm/year ied in two split doses as detailed in le 7 (Nelliat, 1972).

It has to be ensured that fertilizer is lied under the optimum soil moisture dition. Application of 1/3rd of the ilizer is recommended immediately r the onset of South-East monsoon d the remaining 2/3rd towards the end the monsoon (*Table 7*). A shallow ch (20-25 cm) of 1.8 to 2 m radius is en around the base of the palm, ilizer applied evenly in the trench and ered with organic matter and soil. lication of organic matter (farm yard nure) at the rate 50 kg/palm is ired to supplement the fertilizer. In dition to improving soil condition, anic manure also increases water ding capacity and also supply uired micro nutrients. The same cedure is followed during the second e of fertiliser application.

Table 6. Performance of released Indian coconut hybrids

Hybrids	No. of nuts/ palm/ year	Copra yield		Oil content (%)	State for which recommended	Institute/ University responsible for release
		Mean/ nut (g)	Mean/ palm (kg)			
Chandrasankara (COD x WCT)	116	215	24.9	68	Kerala	CPCRI
Kerasankara (WCT x COD)	108	187	20.2	68	Kerala, Maharashtra, Andhra Pradesh	CPCRI
Chandralaksha (LCOT x COD)	109	195	21.2	69	Kerala	CPCRI
Lakshaganga (LCOT x GBGD)	108	195	21.1	70	Kerala	KAU
Anandaganga (ADOT x GBGD)	95	216	21.5	68	Kerala	KAU
Keraganga (WCT x GBGD)	100	201	20.1	69	Kerala	KAU
Kerasree (WCT x MYD)	130	216	28	66	Kerala	KAU
Kerasoubhaghya (WCT x SSA)	130	195	25	65	Kerala	KAU
VHC - 1 (ECT x CGD)	98	135	13.2	70	Tamil Nadu	TNAU
VHC - 2 (ECT x MYD)	107	152	16.3	69	Tamil Nadu	TNAU
Godhavariganga (ECT x GBGD	140	150	21.0	68	Andhra	APAU
WCT	80	176	14.1	68	Check variety	

fertilizer can be skipped for a few years if the available phosphorus is more than 20 ppm. (Khan *et al.* 1990) Basin cultivation of green manure crops like *Calapagonium* and *Mimosa invisa* during monsoon can generate upon 25 kg of green matter which can be incorporated into the basin. (Thomas and Shantharam, 1984).

Water transpired by coconut is estimated to range from 28 litres/palm/day to 200 litres per palm per day (Reyne 1948). In conventional basin irrigation in coastal Kerala and Karnataka, 200 litres of water once in four days has been recommended. Among the different methods of irrigation, drip irrigation has been found to economise water and improve the efficiency of water use. For drip irrigation about 30-40 litres of water per day is found to be adequate under West Coast condition. Sprinkler or perfo irrigation is recommended in coconut plantations with inter or mixed crops. Mulching with coconut husk, coir dust, green leaves and dry coconut leaves, not only improves water retention, but also reduces soil erosion (Yusuf and Vardan, 1993).

Table 7. Fertilizer recommendation (g/tree) for West Coast of India

Age	May-June			Sept-Oct		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O
First year	-	-	-	50	40	135
Second year	50	40	135	110	80	270
Third year	110	80	270	220	160	540
Fourth year	170	120	400	330	200	800

3. Irrigation and productivity

Response of coconut palms to irrigation is location specific and depends on climate, soil, topography, ground water table etc. Efficient water management aims at making adequate soil moisture available for the crop, through irrigation and soil conservation. Effect of moisture stress is reflected in the reduction of yield due to reduction in number of bunches, number of female flowers/inflorescence, setting percentage and shedding of tender nuts. The size of nut and copra content are also reduced due to moisture stress.

4. Inter cultivation and productivity

Inter cultivation is an important operation in the management of coconut plantations, next to irrigation and manuring. Inter cultivation alor found to increase yield substant compared to plantation without cultivation. A common practice in is ploughing the interspaces in coconut garden, once in an year or in two years. Inter cultivation help controlling weeds and conserving moisture. However excessive i cultivation is reported to cause depreciation of soil organic ma through enhanced decomposition adversely affects soil structu Response of West Coast Tall palm different management practice CPCRI, Kasaragod is given in *Table*

Table 8. Response of WCT palms grown under neglect (laterite soil) to fertilizers

	Treatments	Cumulative yield of nuts/palm/year (five years)
T1	Farmers' practice (Neglected conditions)	101
T2	1/3 of recommended doze in the 1st year and 2/3 dose afterwards	179
T3	50% doze in the 1st year and full doze afterwards	231
T4	Recommended doze*	221
T5	Double the recommended doze in the 1st year and the recommended doze in subsequent years	265

** Recommended doze : 500g N, 320 P_2O_5, 1200 K_2O/palm/year*

5. Management of Diseases and P to Increase Productivity

i) Disease management

Different parts of coconut, nam crown, stem and roots are affecte various fungal species. Among fungal species reported from coc only a few cause serious dise problems (Joseph and Radha, 1978): rot, basal stem rot (Ganoderma w leaf rot and stem bleeding are impor coconut diseases of fungal aetiolog India. In Indonesia *Phytophthora* stem bleeding and leaf spots responsible for losses (Sitepu Darwis, 1989). The extent of crop caused by some of the important fu diseases is given in *Table 10* (Nam and Rawther, 1993). Fortunately co measures are available for mos fungal diseases. Phytosanitation bes timely prophylactic and cura measures can prevent the crop losses thereby increase the production productivity.

ii) Non-fungal disease of coc causing production loss

A number of diseases in coconut caused by phytoplasma and vir resulting in considerable crop loss. S

these diseases are debilitating and hers are lethal. Available information n these diseases is furnished in ble 11.

iii) Pest Management

Coconut palm is prone to infestation a large number of insect and non-ect pests. These pests cause damage various parts of the crop causing nsiderable crop loss. Abraham (1994) imated that about 620 million nuts are

Table 9. Response of West Coast Tall palms to different management practices at CPCRI Kasaragod

Treatments	No. of nuts/palm/ year
Organic manure + inorganic manure + tillage	110
Inorganic manure + tillage	97
Inorganic manure + forking basin	91
Tillage only	53
Weed control using herbicide	27
No manure, no tillage	8

Table 10. Crop loss caused by important fungal and nematode diseases of coconut

Disease	Causative organism	Country	Loss/incidence (%)	Control measures	References
Bud-rot or fruit rot	*Phytophthora palmivora*	India Jamaica Philippines Indonesia Ivory Coast Sri Lanka	0.1 to 10 2.5 6.7 50 (in hybrids) 50 Minor disease	Early stages-removal of infected tissues and application of Bordeaux paste 10%	Radha & Joseph (1974) Joseph (1974) Nowell (1925) Rillo & Palmoa (1989) Sitepu & Darwis (1989) Quilec *et al.* (1984) Mahindapala (1989)
Basal stem rot	*Ganoderma lucidum;* *G. applanatum* *G. boninense*	India (Tamil Nadu) Sri Lanka	2.6 to 13 Not a major disease	Isolation of disease palm through trenches, application of neem cake and Aureofungin or Calixin (0.1%).	Rethinam (1984) Mahindapala (1989)
Stem bleeding	*Thielaviopsis paradoxa*	Indonesia India	Not serious 8.8	Application of coal tar/Bordeaux paste to affected part, application of neem cake, application of 0.5% Calixin to the affected part	Sitepu & Darwis (1989) Anonymous (1990)
Leaf rot	*Colletotrichum gleosporides;* *Exerohilum rostratum*	India Papua New Guinea	Leaf rot occurs along with root (Wilt) disease	Spraying Dithane M-45 (0.3%) and Calixin 1%	Sreenivasan and Gunasekharan (1999) Gallasch (1974)
Lethal bole rot	*Marasmiellus cocophilus* *M. inodermo*	Kenya Tanzania, Solomon Is., Malaysia	 Not serious		Bock *et al.* (1974) Jackson & Firman (1979)
Red ring disease	Nematode *Bursaphelenchus cocophilus*	Mexico, South Caribbian Is., Central and Northern South America	-	-	Dean (1979) Griffith (1987)

lost annually in Kerala state alone due to pest attack. Rhinoceros beetle (*Oryctes rhinoceros* L.), red palm weevil (*Rhynchophorous ferrugineus* F.), coconut leaf eating caterpillar (*Opisina arenosella* Wlk.) and cockchafer beetle (*Leucopholis coneophora* Burm) are the major pests occurring in coconut growing tracts and, affecting not only the yield but also the life span of coconut. Available information on the extent of crop loss, and control measures being adopted in major coconut producing countries is given in *Table 12*. In the past, effective management strategies using pesticides for important pests had been formulated to reduce the crop loss. In recent years increasing awareness on the side effects of pesticides has resulted in the development of Integrated Pest Management (IPM) strategy to combat the pest problem. Use of botanical pesticides, ecofriendly chemicals, attractants and pheromons, are becoming increasingly popular in Integrated Pest Management strategy for coconut.

Table 11. Important phytoplasma and viroid diseases of coconut

Sl. No.	Diseases	Causative organism	Country	Crop loss/ incidence	Authority
1.	Root (wilt) disease	Phytoplasma	Kerala (India)	968 million nuts	Anonymous (1989) Solomon *et al.* (1983)
2.	Tatipaka	Phytoplasma	Andhra Pradesh (India)	8,179 palms	Rajamannar *et al.* (1993)
3	Cadang Cadang disease	Viroid (CCCVd)	Philippines	NA	De Leon (1951)
4	Foliar decay	Virus (CFDV)	Vanuatu	NA	Hanold *et al.* (1988) Rohde *et al* (1990)
5	Coconut Tinangaja	Viroid (Cti VD)	Guam	NA	Keese *et al* (1988) Hanold & Randles (1991)
7	Blast	Phytoplasma	Africa	NA	Julia (1979)
6	Lethal Yellowing	Phytoplasma	Bahamas, Cuba, Cayhman Islands, Haiti, Jamaica, Dominican Republic, Mexico & USA	NA	Dabek *et al* (1976) Howard (1983)

PRODUCTION CONSTRAINTS

1. Planting materials-Need and availability

It is of interest to examine the requirement of planting materials of improved varieties/hybrids and their actual availability. The annual planting materials of coconut in India is estimated around 15 million. On the other hand the annual production of quality seedlings is estimated as 1.2 million hybrids and 4.5 million talls. Thus, there is a wide gap between demand and supply of quality seedlings and this situation is being exploited by nurseries supplying poor q planting materials. The develop agencies will have to step in h make earnest attempts to establi gardens and production of q planting materials to meet the d In India the attempts made so far Govt. agencies have been fa satisfactory. Probably this is a f for private entrepreneurs to step only to exploit the situation but meet the genuine requirement quality planting materials. How word of caution–steps need to b by the Govt. agencies for quality so that private agencies do not b unscrupulous and supply poor q seedlings.

2. Holding size

At least in India, it is a misno classify coconut as a plantation c southern Kerala the size of the co holdings is found to vary from 0. 3.6 ha with 95 per cent of the h having less than 0.80 ha (Jacob and 1995). In all these holdings, coco not a monocrop, but only one component crops, so that the farm his basic requirement of nut vegetables, tubers and even fuel the holding. Due to the small size holdings adequate income is generated to support the family obviously leads to neglect of the co crop and farmer opts for more in generating alternatives. Negle coconut in the homestead garde to low productivity and high c production.

Another feature of the negl small homestead garden is the density of coconut palms combine a number of crop combinations p without proper spacing. Cro smallholdings with poor manag results in low productivity. A

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the fertilizer schedule for alluvial soils of East Coast with expected productivity of 300 nuts/palm/year.

A similar argument holds good for irrigation schedule also. Response of coconut palms to irrigation is location specific and depends on climate, soil topography, ground water levels etc. While the quantum of irrigation water and method of irrigation have been standardized for West Coast condition, recommendation for location specific water requirement based on yield potential is not available.

4. *Production constraints due to pests and diseases*

Production loss due to major pests and diseases has been described earlier. Besides, damage is also caused by rodents and nematodes. Among 8 different species of rodents reported in coconut plantations, *Rattus rattus wroughtoni* alone causes about 14-20 per cent damage to tender coconuts. Damage intensity to coconut is more (28.5 per cent) in coconut-cocoa mixed cropping systems (Keshava Bhat *et al.* 1993). Two species of nematode, namely burrowing (*Radopholus similis*) and the root-knot (*Meloidogyne incognita*) attack roots of coconut, causing heavy rotting of roots resulting in loss or vigour, stunting, yellowing of leaves, delay in flowering and reduction in yield. (Koshy *et al.*, 1993).

STRATEGIES FOR IMPROVING PRODUCTION AND PRODUCTIVITY

1. Establishing seed gardens to produce adequate seedlings using already proven varieties/hybrids.
2. Identifying varieties suitable for different agro-climatic conditions.
3. Evolving hybrids and varieties tolerant to important diseases. Two examples are the Lethal yellowing disease tolerant hybrid evolved in Jamaica and Chowghat Green Dwarf x West Coast hybrid evolved at CPCRI during the last decade.
4. There is need to develop location specific fertilizer and irrigation recommendations according to targeted yield levels, taking into consideration soil characteristics and nutrient status, rainfall distribution, temperature, relative humidity, ground water level, etc.
5. An integrated approach incorporating more efficient methods will be the most effective and economic way of managing the coconut diseases.
6. Though Integrated Pest Management technologies have been formulated for major pests of coconut, efforts are to be continued to refine these techniques to reduce the crop loss. Efficient use of biopesticides and synthetic pheromones and cheap and efficient pesticide application methods would greatly help towards this goal.

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