# Coconut in Maharashtra

## Interventions of RCRS, Bhatye

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Coconut occupies a vital position in coastal agriculture, which has great economic significance by way of its contribution to food and nutritional security in the country.

### Coconut sector in Maharashtra

Maharashtra occupies the 7th place in area and the 9th place in production with the annual production of 209.87 million nuts. Over a period of 33 years from 1986-87 to 2018-19, the area under coconut has increased from 6900 ha to 43320 ha and production from 76.32 million nuts to 209.87 million nuts. The maximum area under coconut is in Sindhudurg district followed by Ratnagiri.

**District wise Area, Production and Productivity of Coconut in Maharashtra State**

| Sr. No | Districts | Area (ha) | Production (Lakh nuts) | Productivity (Nuts/ha) |
|---|---|---|---|---|
| 1 | Sindhudurg | 17929 | 1457.0 | 4845.0 |
| 2 | Ratnagiri | 5556.0 | 406.0 | |
| 3 | Raigad | 2248 | 107.0 | |
| 4 | Thane | 1161.7 | 8.0 | |
| 5 | Palghar | 1473.9 | 16.0 | |
| 6 | Other | 14852 | 96.0 | |
| | Total | 43320 | 2098 | |

### Regional Coconut Research Station, Bhatye

The Regional Coconut Research Station, Bhatye was established on 1st July 1955 by the Indian Central Coconut Committee and administratively controlled by the State Department of Agriculture. With the formation of the State Agriculture University, the administrative control was taken over by the Mahatma Phule Krishi Vidyapeeth, Rahuri on 3rd June 1969. The administrative control now rests with Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth since its inception on 18th May, 1972. Initially it started with central assistance from the Indian Central Coconut Committee and the State of Bombay on 50:50 basis. Since 1970 the station was fully financed by the Indian Council of Agricultural Research (ICAR) New Delhi under the scheme, All India Co-ordinated Coconut and Arecanut Improvement Project. Later in 1972 it continued operating on 75: 25 basis by the ICAR and the Govt of Maharashtra, respectively.

The Research Station is situated on the coast of the Arabian Sea on the western outskirts of village Bhatye and linked with the southern borders of city Ratnagiri by the Bhatye creek-bridge on the mouth of river Kajali. The total area of the research station is 25.84 ha with area under cultivation of about 22.50 ha and the remaining area is nursery, road and buildings.

Konkan region of Maharashtra is a long narrow strip of 720 kms, running North to South along the West coast of Maharashtra. The region comprises of Thane, Raigad, Ratnagiri, Sindhudurg and Greater Mumbai districts. It is characterized by hilly terrain receiving heavy rainfall ranging from 3000 to 4000 mm per annum usually during four months from June to September. The climate is warm and humid almost throughout the year.

## Present scenario of coconut

It is very clear that the area under this crop in Maharashtra is increasing rapidly and the tendency of planting coconut in non-traditional area is increasing over a period of time. During the last year, due to increased and extended monsoon, high moisture content and less sunshine hours, the crop failed to produce the spadix in the months of September to December. Hence little reduction in the yield was experienced.

| Problems of coconut cultivation in Konkan region |
|---|
| Fragmented holding |
| Scattered production |
| The homestead nature of cultivation |
| Lack of skilled manpower for climbing and harvesting. |
| Incidence of pest and disease especially Rugos spiralling white fly spreading rapidly in Konkan region and across. |
| Unorganised marketing of nut and other products. |
| Lack of appropriate mechanisation for harvesting |
| Lack of adoption of scientific cultivation practise. |

## Coconut pest status during 2019-20 in the Konkan region

The coconut pest attack of Rhinoceros Beetle(RB), Red Palm Weevil (RPW), Rugos spiralling white fly (RSW) and Black headed caterpillar (BHC), was studied in five districts of the region. It was observed that the infestation of RB was noticed in all palms irrespective of age. The maximum incidence of 8.86 percent was noticed in Sindhudurg district.

The incidence of RPW was observed more (0.86 percent) in Raigad district. However, the Rugos spiralling white fly incidence was observed in all the districts of Konkan region. The maximum incidence was found in Sindhudurg district (13.51%). The intensity of RSW was in the range of 3.45 to 5.27%. The highest was recorded in Palghar district of Maharashtra.

***Variety released from AICRP on palm centre Bhatye, Ratnagiri***

The total germplasm strength of coconut of this centre is 48 genotypes of which 17 are exotic. From this strength, the centre has released the following two varieties.

### ▶ *1) Pratap*

This is section from WCT (Green Round Banavali) flowering during 6-7 years. The average nut yield is 140-145 per palm/year, with oil per cent of 68%. This variety is popular in Maharashtra and was developed during 1987.

### ▶ *2) Konkan Bhatye coconut hybrid 1 (GBGD x ECT)*

This is a hybrid variety released during 2007. It takes 4.5 to 5 year to start flowering. The average nut yield is 120-122 with 67.1% oil percentage.

***Soil Health Management***

We know that coconut palm is a perennial crop which bears nut for more than six to seven decades after the commencement of flowering. Sound health management strategies is adopted to ensure sustainable yield. A fertilizer dose of 1000 g nitrogen, 500 g phosphorus and 1000 g of potash per palm per year in three splits (June, October and February) is recommended for coconut cultivation in sandy soils of the Konkan region of Maharashtra state.

| Fertilizer requirement for Regular varieties | | | | | |
|---|---|---|---|---|---|
| Sr. No. | Age | Quantity of FYM kg/ palm | NPK kg/palm/year | | |
| | | | N(g) | P2O5 (g) | K2O (g) |
| 1. | 1st | 10 | 200 | 100 | 200 |
| 2. | 2nd | 20 | 400 | 200 | 400 |
| 3. | 3rd | 30 | 600 | 300 | 600 |
| 4. | 4th | 40 | 800 | 400 | 800 |
| 5. | 5th | 50 | 1000 | 500 | 1000 |

### *B) Fertilizer requirement for hybrid palms*

On the basis of cumulative yield and economics the following dose was recommended for hybrid coconut palms as shown in the table below.

| Fertilizer requirement for hybrid coconut | | | | | |
|---|---|---|---|---|---|
| Sr. No. | Age of the palms | Quantity of FYM kg/ palm | NPK kg/palm/year | | |
| | | | N(g) | P2O5 (g) | K2O (g) |
| 1. | 1st | 10 | 200 | 100 | 400 |
| 2. | 2nd | 20 | 400 | 200 | 800 |
| 3. | 3rd | 30 | 600 | 300 | 1200 |
| 4. | 4th | 40 | 800 | 400 | 1600 |
| 5. | 5th | 50 | 1000 | 500 | 2000 |

### ▶ *C) Fertilizer application through micro-irrigation technique*

Application of 1 kg N, 0.5 kg P2O5 and 1 kg K2O per palm per year (recommended dose) is recommended through drip irrigation in eight splits from October to May.

### ▶ *D) Micronutrient application*

Application of recommended dose (1:0.5:1 Kg NPK/palm/year) with 1.5 Kg Ormichem Micronutrient complex ( Zn 3.15 %, Mg 1.8 %, Cu 0.65 %, Fe 1.97 %, Mn 2 %, Mo 0.05 % and B 0.68 %) recorded the maximum yield (129 nut/palm/year) in coconut and also the percentage increase in yield was higher in post treatment period yield when compared with pre-treatment period yield.

Therefore the application of recommended dose of fertilizer with 1.5 Kg Ormichem micronutrient in three splits is recommended for adult coconut palm.

## Irrigation Management

### ▶ *a) Effect of water quality on survival and growth of coconut seedling*

An experiment was conducted to assess the influence of quality of irrigation water on growth of one year old newly planted West Coast Tall coconut seedling in coastal sandy soil. Irrigation with sea water had detrimental effects, at any growth phase throughout the duration of the experiment, due to primary salt stress, which was responsible for membrane disintegration and disturbance in metabolic process. The dilution of seawater with sweet water reduced the extent of primary stress injury but imposed salt injury causing decrease in uptake of mineral elements, which resulted in the poor growth of seedling.

### *b) Irrigation to coconut palms by drip method*

The drip irrigation with 30 litres water /palm/ day during October and January and 40 liters during from February to May with six drippers placed at a distance of 1.25 m. away from the bole in the sandy loam soils of Konkan region is recommended for adult coconut palm.

### *c) Fertilizer application through micro- irrigation technique in coconut*

For better growth and yield in palm , application of recommended dose 1 kg N, 0.5 kg P2O5 and 1 kg K2O per palm per year is recommended through drip irrigation in eight splits from October to May.

## Coconut based Cropping System

### ▶ *a) Intercropping of chilli in coconut*

The cultivation of Chilli (variety "Jawala" and "Konkan Kirti") is recommended due to the higher yield and best net return as inter crop in coconut orchard.

### ▶ *b) Intercropping of vegetables in coconut*

On the basis of economic return obtained per man days per hectare, Dolichus bean could be rated as the most remunerative vegetable crop, whereas tomato cultivation provided better employment opportunities and gave attractive yield.

### ▶ *c) Intercropping of rainfed vegetables in coconut*

Rainfed vegetables such as ridge gourd, cucumber, snake gourd and bitter gourd are recommended in coconut plantation during rainy season.

### ▶ *d) Mixed cropping of spices in coconut*

The excellent growth and good bearing capacity of cinnamon, nutmeg, black pepper and clove planted in coconut as intercrops proved that these crops can be cultivated on a commercial scale in the Konkan region of Maharashtra.

It is also recommended that by planting spice crops as intercrop in coconut plantation, the average yield of coconut per palm has increased from 25 to 93 percent at the end of 26$^{th}$ year as compared to the average yield of previous four experimental years.

A study conducted during 2006-07 revealed that nutmeg (of 22 years age) proved as the best intercrop in coconut plantation. Nutmeg and coconut together gave Rs. 93,578/- as net return per hectare whereas coconut as a monocrop recordingly a net net profit of Rs. 25,987/- per hectare. On the basis of the net economic returns released, it is recommended to interplant nutmeg, cinnamon and clove in well spaced coconut garden in the Konkan region of Maharashtra state.

## Concept of increasing farmer's income through cropping system approach (HDMCS)

The regional coconut research station Bhatye, has propagated the 'Lakhi Baug' concept, the intercropping of spices particularly Cinnamon, Nutmeg and Black pepper in coconut orchard. From one acre of this type of system, a farmer can get one Lakh rupees and this system is called 'Lakhi Baug' which includes different models.

### ▶ *Economics of HDMSCS*

| Treatment | Cost of cultivation | Gross returns (Rs/ha) | Net returns (Rs/ha) | B:C |
|---|---|---|---|---|
| HDMSCS | 105185.2 | 283456 | 131605.8 | 2.69 |
| Monocrop | 63639.0 | 102374 | 38735 | 1.60 |

## Converting waste to wealth

Coconut palm is truly a 'Kalpvraksha' because the large quantities of biomass residues produced can be recycled and used for improving soil, plant and human health. Approximately 18.5 MT of recalcitrant biomass waste is produced annually from coconut palm which can be converted to wealth. The earthworm is related (*Eudrilas sp*) and is being used for converting phenol and lignin rich coconut leaves in to granular vermicompost. Two and half months are required to convert coconut material to vermicompost. The output is 3500 kg from 175 palms.

## Area Expansion Programme

Since 1990, the Government of Maharashtra has launched the Employment Guarantee Scheme (EGS) for a number of horticultural crops which includes coconut plantation also. During 1990, the area under coconut was 8300 hectares, which increased to 43320 hectares during 2018-19.

The Regional Coconut Research Station, Bhatye Ratnagiri during the last 65 years has developed and recommended many varieties and standardized a number of package of practices. This has helped in increasing the area in the region as follows.

## Area expansion

| No. | Year | Area expansion (ha) | Increase over previous (ha) | % Increase |
|---|---|---|---|---|
| 1 | 1990 | 8300 | - | - |
| 2 | 2000 | 12400 | 4100 | 49.39 |
| 3 | 2010 | 21670 | 9270 | 74.75 |
| 4 | 2020 | 43320 | 21650 | 99.90 |
| | Total area increased over 1990 | 35020 | | |

| | Seed/ planting material supplied from the Centre | | |
|---|---|---|---|
| No. | Year | Seedling supplied | Seed nuts Supplied |
| 1 | 2009-10 | 17344 | 29600 |
| 2 | 2010-11 | 16346 | 23200 |
| 3 | 2011-12 | 17951 | 21500 |
| 4 | 2012-13 | 22426 | 27340 |
| 5 | 2013-14 | 26226 | 30050 |
| 6 | 2014-15 | 31248 | 31000 |
| 7 | 2015-16 | 33164 | 36500 |
| 8 | 2016-17 | 33244 | 42000 |
| 9 | 2017-18 | 36339 | 56000 |
| 10 | 2018-19 | 34538 | 68000 |
| 11 | 2019-20 | 37656 | 73000 |
| | Total | 273238 | 438190 |

Out of the seed/planting material supplied from the centre, if 80% survival is considered, we can estimate 218000 seedlings which covers 1250 ha. under coconut cultivation and if 40% nuts are considered as saleable materials it can bring 1002 ha under coconut cultivation thus making the total area under coconut cultivation to 2252ha during the last decade which is under the perview of the station.

## Encouragement for establishing sales counter for tender coconut water in Konkan

Tender coconut water is rich in vitamins, minerals and electrolytes. There is great demand from the public for this natural drink due to the electrolyte lost from the body due to over exertion and sweating. The centre is giving guidance and other neccessary trainings to prospective, entrepreneurs to establish tender coconut units.

| Sr.No. | District | Quantity sold |
|---|---|---|
| 1 | Ratnagiri | 200000 |
| 2 | Sindhudurg | 150000 |
| 3 | Raigad | 100000 |
| 4 | Thane | 400000 |
| 5 | Palghar | 500000 |

These units are located near big and famous temples, tourist places, central market, hospitals and sea beaches where it can be easily sold. The average sales rate is Rs.30/nut

| Public & private Nurseries in the region | | | |
|---|---|---|---|
| District | Public | Private | Seedling produced during 2019 |
| Sindhudurg | 06 | 09 | 7830 |
| Ratnagiri | 11 | 08 | 31890 |
| Raigad | 03 | 06 | 2200 |
| Palghar | 04+1* | 05 | 24000 |
| Total | 24 | 28 | 65920 |

CDB, DSP Farm Nursery at Dapoli, Dist- Palghar (MS) to whom RCRS, Bhatye is supplying seed material regularly@10000 nuts per anum since 2016.

## Coconut processing units in the region

This station and CDB is jointly helping to establish coconut processing units in the region. Timely guidance is given to taking help from CPCRI, Kasaragod also.

| Sr. No. | Units | Sindhudurg | Ratnagiri |
|---|---|---|---|
| 1 | VCO | 01 | 02 |
| 2 | COIR | 5+1* | 01 |
| 3 | Dried Copra | 01 | - |
| 4 | Desiccated copra | 01 | - |

This centre through various special days celebration, weekly advisory, need based moble contact, kisan mela and television and Radio programmes has been giving advisory to the farmers of the region.

## Extension activities

Following various on farm extension activities were conducted.

| Sr. No. | Types of training conducted | Numbers | Partici-pants |
|---|---|---|---|
| 1 | Training to extension functionaries | 33 | 519 |
| 2 | Rural youth (Ratnagiri, Rajapur,Lanja tahasil) | 129 | 7016 |
| 3 | SHG (Bachat gats) | 24 | 654 |
| 4 | Special day celebration (Coconut,Soil,Forest,-Woman and Food day) | 17 | 524 |
| 5 | Bee keeping | 2 | 66 |
| 6 | FOCT | 6 | 118 |
| 7 | Demonstrations | 11 | 852 |

## Mechanized harvesting, an effort of DBSKKV, Dapoli

The continuous increase in the yield and production rate of coconut orchards has urged the need for mechanization of coconut harvesting in India. The average yield, production and area of coconut is increasing since the last thirty four years. The drudgery in manual coconut harvesting, lack of climbing labours and the operational and safety problems in availing manual climbers have necessitated the need for the mechanization of coconut harvesting. Coconut growers are facing practical difficulty in coconut harvesting due to the height of the tree. The tractor mounted hydraulic elevator (TMHE) develoed by Dr. B.S. Konkan Krishi Vidyapeeth Dapoli is a fully automatic harvesting device for harvesting tall coconut orchard. The further development and testing of this elevator is in progress. The coconut harvesting capacity of TMHE is observed as 4524 coconuts/day.

## Important features of the hydraulic climber

1) The tractor Mounted Hydraulic Elevator is suitable for harvesting of coconut up to a maximum height of 14 meters using traditional harvesting pole.

2) It takes very less lifting and lowering time for coconut harvesting spraying and cleaning operation.

3) The machine can be operated by any agricultural worker with training.

4) The efficiency of this machine is much more compared to manual harvesting

## Coir industries in Maharashtra

Maharashtra occupies 7$^{th}$ place in area and 9$^{th}$ place in coconut production with the annual production of 209.87 millon nuts. It occupies 1.99%

# Government declares Minimum Support Price for Mature Dehusked Coconut

Government of India has declared Minimum Support Price for mature dehusked coconut for the season 2020 at Rs. 2700/- per quintal, thus hiking the MSP by 5.02% from Rs. 2571/- per quintal during season 2019.

Union Minister of Agriculture & Farmers' Welfare, Rural Development and Panchayati Raj Shri Narendra Singh Tomar said that the Government of India under Prime Minister Shri Narendra Modi has given utmost importance to the interests of farmers growing all kinds of crops throughout the country. The hike in the MSP for mature dehusked coconut facilitates procurement of fresh coconut thereby ensuring that the benefit of MSP reaches the millions of smallholder coconut farmers.

Shri Tomar said that coconut being a small holder's crop, aggregation and arranging copra making facility at farmer's level is not common. Even though MSP for milling copra is Rs. 9960/- per quintal for 2020 crop season, declaration of higher MSP for dehusked coconut ensures immediate cash to the small farmers, who are unable to hold the product and who are having insufficient facility for copra making. This will be a relief to the coconut farmers who are already affected by the pandemic and the consequent disruption in the supply chain. *Source: https://pib.gov.in/*

share in area and 0.98% share in production. The average productivity is 4845 nuts/palm/year (*175 palms/ha), which is 28 nuts per palm/year. The total nut production of Maharashtra is 209.87 million nuts (20.09cr nuts).

## Estimation of husk production

The average husk production of West Coast Tall (Banawali variety which is commonly grown) is 216 gm per nut. Hence total husk production from 209.87 million nuts would be 45331 tonne. A small processing unit requires 1000 kg husk per day as raw material.

## The status of coir industry in Maharashtra

Maharashtra has a coastline of about 720 km. Coconut is predominantly grown in the coastal belt especially in Sindhudurg and Ratnagiri districts of Konkan region alongwith other parts of the state. The annual availability of coconut husk is about 45000 MT. An increasing trend is observed in coconut production. Coir industry of the state is at fledgling stage with an estimated husk utilization of only 1% much below the national average.

## Reasons for non availability of husk for coir purpose

***1. Unorganised sector of coconut marketing***

Marketing of nut is not centrally sponsored, no hubs with no co-operative market sectors which hinders the availability of husk from a single point.

***2. Under utilization of husk for productive purpose***

Most of the nuts are being utilized for domestic purpose and whatever husk obtained is used for fuel purpose and for smudging purpose (mosquito

repellent smoke). A small quantity is used for composting purpose by the farmer.

***3. High cost involved in collection and storage***

Though it can be made available, the bulky nature of produce requires more cost for collection, loading and transportation rather than actual cost of produce

***4. Limiting factor for husk collection***

The small garden size and sporadic nature of the garden are other limiting factors of husk collection.

***5. Lack of awareness about importance of husk and its use***

***6. No proper marketing channel for husk***

## Tourism and Coconut

Tourism and coconut has a very strong bonding in attracting people. It has been estimated that the tourism industry is growing at the rate of 4% a year. However the Maharashtra tourism is growing at a higher rate.

| | Tourist places in Konkan | | |
|---|---|---|---|
| **No.** | **District** | **Sea beaches (no)** | **Tourist unit (no)** |
| 1 | Sindhudurg | 24 | 4.0 |
| 2 | Ratnagiri | 36 | 6.0 |
| 3 | Raigad | 32 | 10.0 |
| 4 | Thane | 02 | 3.0 |
| 5 | Palghar | 16 | 12.0 |

Coastline belt along with coconut plantation adjacent to see shore are now the prime spots for tourism. Most of the AICRP centres are also located on beach which is an attraction for tourism. ■