

CDB initiates concurrent estimation of coconut production and productivity

● V.C.Vasanthakumar, *Statistical Officer, CDB, Kochi-11*

Agriculture sector contributes for about 14% of the nation's GDP. While the sector still accounts for about 54.6 per cent of the total employment (Census 2011), there has been a decline in the absolute number of cultivators from 127.3 million (Census 2001) to 118.7 million (Census 2011). This is indicative of a shift from farm employment to nonfarm employment, causing real farm wages to rise by over seven per cent annually in recent years.

Coconut palm provides food security and livelihood to large size of population in the world particularly in Asia Pacific Countries. Considering the versatile nature

of the crop and the multifarious uses of its products, coconut palm is eulogized as Kalpavriksha (Tree of Heaven). Coconut is a source of food, beverage, medicine, natural fiber, fuel, wood and raw materials for units producing a variety of goods. Coconut is also closely related with the socio economic life of large number of small and marginal farmers in the peninsular India. It is estimated that about 12 million people in India are dependent on coconut and its allied activities. As per the latest statistics available, India ranks first among the coconut growing countries in the world, in production and productivity of coconut.

Coconut is a benevolent tree, a nature's gift to mankind. The coconut crop is grown in about 12.5 Million hectares of land in the world. India contributes about 17.12% in area and 31.46% in terms of production of coconut in the world (Table 1). The major coconut crop area is concentrated in the states of Kerala, Karnataka, Tamil Nadu and Andhra Pradesh, which contributes about 89.33 per cent in area and 89.46 per cent in production of coconut in India. (Table 2)

The official statistics on area and production of coconut is released by the Directorate of Economics and Statistics (DES) in Kerala, Tamil Nadu, Karnataka and Andhra Pradesh. In other states like Maharashtra, Gujarat, Odisha and UTs, coconut production estimation is done by Agriculture or Horticulture Department of State Governments. The All India final estimate of area and production of coconut were officially released by the Directorate of Economics and Statistics under the Ministry of Agriculture & Cooperation, Government of India until 2008-09. Thereafter the mandate was shifted to the Horticulture Division under the Ministry of Agriculture, Government of India

It is observed that the release of official data by the State DES/ Agri/ Hort Departments usually lags from one to two years. Whereas, availability of concurrent data on coconut production is critical for timely decision making on many policy issues related to the crop and its development programmes including recommendation for Minimum Support Price fixation. Hence it was felt appropriate to

Table 1
Area, Production and Productivity in Major Coconut Growing Countries (2013)

Sl. No.	Country	Area ('000 ha)	% Share	Production (Million Nuts)	% Share	Productivity (Nuts/ha)
1	Indonesia	3787.00	30.35	16463.00	22.84	4347
2	Philippines	3550.00	28.45	15353.00	21.30	4325
3	India ^a	2136.67	17.12	22680.03	31.46	10615
4	Sri Lanka	395.00	3.17	2513.32	3.49	6363
5	Tanzania	310.00	2.48	427.51	0.59	1379
6	Brazil	279.00	2.24	3326.57	4.61	11923
7	Papua New Guinea	221.00	1.77	1482.59	2.06	6709
8	Thailand	209.00	1.67	838.00	1.16	4010
9	Mexico	176.00	1.41	1463.74	2.03	8317
10	Vietnam	158.00	1.27	1235.45	1.71	7819
11	Samoa	99.00	0.79	267.00	0.37	2697
12	Malaysia	98.50	0.79	647.00	0.90	6569
13	Vanuatu	92.00	0.74	493.98	0.69	5369
14	Mozambique	70.00	0.56	302.11	0.42	4316
15	Fiji	60.00	0.48	148.00	0.21	2467
16	Ghana	55.00	0.44	362.50	0.50	6591
17	Jamaica	49.00	0.39	296.67	0.41	6055
18	Myanmar	42.00	0.34	425.01	0.59	10119
19	Solomon Islands	38.00	0.30	100.00	0.14	2632
20	Others	653.80	5.24	3269.11	4.53	5000
Total		12478.97	100	72094.58	100	5777

Source: APCC Statistical Year Book 2013
r- Revised

Table 2

Area and Production of coconut

SI No:	STATES	2012-13					
		Area "000" ha	% Share in Area	Production "000" MT	% Share in Production	Production Million nuts	Yield (Nuts /Ha)
1	Kerala	798.16	37.36%	3990.39	25.6%	5798.04	7264
2	Karnataka	513.1	24.01%	4169.9	26.7%	6058.86	11808
3	Tamil Nadu	465.11	21.77%	4760.67	30.5%	6917.25	14872
4	Andhra Pradesh	128.9	6.03%	1330.4	8.5%	1933.07	14997
5	Odisha	54.29	2.54%	262.17	1.7%	380.93	7017
6	West Bengal	29.2	1.37%	254.17	1.6%	369.31	12648
7	Goa	25.71	1.20%	84.45	0.5%	122.71	4773
8	Andaman Nicobar	21.88	1.02%	89.45	0.6%	129.97	5940
9	Maharashtra	28.08	1.31%	129.02	0.8%	187.47	6676
10	Gujarat	21.12	0.99%	221.88	1.4%	322.39	15265
11	Assam	22.15	1.04%	110.26	0.7%	160.21	7233
12	Bihar	15.25	0.71%	97.14	0.6%	141.14	9255
13	Tripura	6.47	0.30%	18.89	0.1%	27.45	4243
14	Lakshadweep	2.57	0.12%	48.8	0.3%	70.91	27591
15	Puducherry	1.95	0.09%	23.18	0.1%	33.68	17272
16	Nagaland	1.3	0.06%	10.4	0.1%	15.11	11623
17	Chhattisgarh	1.41	0.07%	7.87	0.1%	11.44	8113
18	Mizoram	0.02	0.00%	0.06	0.0%	0.09	4500
		2136.67	100.00%	15609.1	100.0%	22680.03	10615

Source : Department of Agriculture and Cooperation (Horticulture Division)

have a concurrent estimation of coconut production and productivity of coconut in major coconut growing states of India, by Coconut Development Board itself. Further collection of statistics on coconut falls within the functions of Coconut Development Board. Accordingly Coconut Development Board took a decision in its 111th Board meeting for undertaking concurrent estimation of production and productivity by conducting a statistical survey in 31 major coconut growing districts of Kerala, Karnataka, Tamil Nadu and Andhra Pradesh for the agriculture year 2012-13. During the year 2014-15, the study was extended to the states of Odisha, West Bengal and Maharashtra. This is the third year that Coconut Development Board is conducting a field survey for the concurrent estimation of coconut production in the major coconut growing states in India. During 2014-15, Gujarat was also covered under the survey. The study was carried out by Coconut Development Board in collaboration with Educational/Research Institutions having

Statistics/Economics departments.

Objectives

To estimate the concurrent production and productivity of coconut in the major coconut growing states in India viz. Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Odisha, West Bengal, Maharashtra and Gujarat for 2014-15 by undertaking field survey and collecting tree wise yield data based on established phenotypic characters of the buttons/nuts.

Methodology and Sample Design

For the estimation of production of coconut in the country, nine major coconut producing states of Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, West Bengal, Odisha, Goa and Gujarat, have been selected as these states account for more than 94 per cent of area under coconut in the country. A multistage Sampling Method is used for the selection of the gardens (samples), for collecting the primary data as detailed below;

- The districts from each state for conducting the survey were purposely selected based on the extent of area. Accordingly minimum cut off area proposed for selecting a district in the state of Kerala was 17,000 ha, 16,000 ha for Karnataka 15,000 ha for Tamil Nadu, 6,000 ha in Andhra Pradesh, 2000 Ha in Maharashtra, 3000 Ha in West Bengal, 4000 Ha in Odisha, 11000 ha in Goa and 2500 ha in Gujarat.
- From each identified district, selection of Blocks were made on the basis of Statistical Sampling techniques based on the extent of area in a block/taluk.
- From each Block, Grama Panchayats were selected on the basis of simple random sampling.
- From each selected Panchayat sample plots having minimum 20 bearing palms in case of Kerala and 40 bearing palms in case of remaining states were selected at random.
- From each plot 10 palms were randomly selected to record the

data.

- From the selected palms number of nuts in bunches of three months old and above is recorded in a chronological order in data collection sheets.

It is assumed that the yield of coconut palm in a particular year is the sum of total harvest undertaken during that period. In most of the Southern states coconut is being harvested at an interval of 45-60 days (during summer months the interval from one harvest to other harvest is 45 days and that of rainy seasons / winter seasons, the same is 60 days). So, in a complete year, 6-8 harvests takes place. It is therefore assumed that button setting is completed in three months old bunches and bunches of three months will be ready for harvest by eight months from the date of the survey. Hence the nuts of three months & above needs to be recorded from 10 palms from the selected holdings, which was done by the Field Investigators with the help of Trained Palm climbers (FoCT), for getting yield data.

Sample size

The study was conducted in 12 districts in Kerala, nine districts in Tamil Nadu, eight districts in Karnataka and four districts each from the states of Andhra Pradesh, Odisha, West Bengal and Maharashtra. Details of samples selected under each district is given in table 3.

Institutions/Universities associated with the survey

Kerala

- Government College, Kasaragod
- Farook College, Farook, Kozhikode
- Sree Keralavarma College, Thrissur
- St. Albert's College, Ernakulam
- Nirmala College, Muvattupuzha
- St. Michael's College, Cherthala, Alappuzha
- St. Thomas College, Palai,

Table 3 Sample Details

States	No: of Districts	No: of Blocks	No: of Palms
Kerala	12	108	12000
Karnataka	8	26	10000
Tamil Nadu	9	22	10000
Andhra Pradesh	4	41	6000
Odisha	4	12	2500
West Bengal	4	19	1500
Maharashtra	4	10	1000
Gujarat	2	4	1000

Kottayam

8. Government College, Attingal, Thiruvanthapuram

Tamil Nadu

- PSG College of Arts and Science, Coimbatore
- Gobi Arts and Science College, Erode
- AVVM Sri Pushpam College, Thanjavur
- Scott Christian College, Kanya Kumari
- Periyar University, Salem
- St. Xavier's College, Tirunelveli

Karnataka

University of Horticultural Science, Bagalkot

Odisha

Orissa University of Agriculture and Technology, Bhubaneswar

Gujarat

Junagadh University, Junagadh, Gujarat

Maharashtra

1. R.P Gogate Arts & Science College, Ratnagiri

Survey in West Bengal was done by State Centre, Coconut Development Board, Kolkata under the supervision of Deputy Director.

Proforma

For collecting field level information from selected holdings, a single proforma was designed, which is divided into four parts. First part relates with general information of the selected holding and second part with personal details of the coconut farmer. Third part is to record information about the coconut

holdings viz. number of bearing and non bearing palms, management practices, cropping pattern etc. and the last part is for collecting bunch wise yield data pertaining to the 10 palms selected.

Concepts and definition

Holding : A coconut cultivated plot (extend of land) owned by a single person is considered as a plot if a minimum of 20 bearing coconut trees in Kerala and 40 in other states, irrespective of their age and variety exists in the plot.

Bearing palms: Coconut palms which have attained fruit bearing stage at the time of enumeration are classified as yielding palms.

Non- Bearing palms : Coconut palms which have not attained fruit bearing stage at the time of enumeration are classified as non-bearing palms

Yield: A measurement of output (coconuts) obtained or harvested from coconut tree.

Palm Density: The number of plants standing within a given unit of area (taken as /Ha).

Yielding Palm Density: The number of Yielding plants within a given unit of area (here the unit area is taken in Ha).

Mono Cropped : In any holding only coconut is cultivated or the major crop is coconut.

Mixed cropped: In any holdings if coconut is grown along with one or

more other crops.

Rainfed and Irrigated: A holding was considered to be rainfed in case the holding solely depends on rainfall to meet requirements of water and considered as irrigated in case water is made available to trees by any method in summer season/in the absence of rain.

Training to FoCT and field investigators

Before the start of the actual survey, one day on field training was imparted to Field Investigators on how to select the palms at random, as well as to FoCTs (Friends of Coconut Tree), on how to identify the bunches and count nuts on a chronological order from three month old bunches to more than eight months old bunches.

Supervision

In order to improve the quality of field work, the enumeration was supervised on a regular basis from the Institution side by Investigator/ Associate and random check done from Head Office/Regional Offices/ State Centres.

Survey period

The enumeration works in all the eight states were done during the month of November 2014 and March 2015.

Estimation

The main purpose of analysis of data was to arrive at estimate of yield per palm and per hectare, which is required for estimating production with a reasonable degree of accuracy. From the observations recorded, the number of nuts ready to be harvested upto June, 2015 (in the Agri. Year 2014-15), only was considered for the estimation of yield. This observations from all the palms surveyed was considered to obtain average yield. This yield was extrapolated to annual yield depending on the month in which the data was recorded. The annual

Survey Results

General details on holding size/Yield per palm and palm density in the states covered under the survey

Table 4

Sl no	State	No: of Holdings	Avg Holding Size	Yield / Palm	Yield/ Ha	Palm Density	Bearing Palm Density
1	Kerala	1200	0.41	53	6042	140	114
2	Tamil Nadu	1000	2.27	77	11319	161	147
3	Karnataka	1000	1.93	109	10900	110	100
4	Andhra Pradesh	600	1.46	47	7614	176	162
5	Odisha	250	0.33	65	9100	156	140
6	West Bengal	150	0.23	109	15260	165	140
7	Maharashtra	100	0.33	50	7400	175	148
8	Gujarat	100	0.37	97	12125	145	125

Estimated Production for 2014-15 in States covered under the survey

Table 5

SL No	States	Estimated Production in Million Nuts	Previous Year Production in Million nuts	Increase/ Decrease over Previous year
1	Kerala	4886	5921	(-17.48%)
2	Karnataka	4126	4337	(-4.87%)
3	Tamil Nadu	4850	4668	(+3.90%)
4	Andhra Pradesh	781	1678	(-53.48%)
5	Odisha	491	410	(+19.75%)
6	West Bengal	442	397	(+11.34%)
7	Maharashtra	187	162	(+15.85%)
8	Gujarat	256	222	(+15.37%)
9	All India			(-9.98%)

Comparison of Estimated Production as per survey and production reported by Dept. of Agri. And Cooperation for last three years

Table 6

Sl no	Year of Survey	All India Production – Million Nuts (Survey Result)	All India Production – Million Nuts (Department of Agriculture And Cooperation)
1	2012-13	13757.65	23351.22
2	2013-14	20156.77	22680.03
3	2014-15*	20416.56	NA

*A decrease of 10% over 2013-14 is estimated in 2014-15

yield divided by number of bearing palms in the sample indicates the yield per palm. Further, yield per Ha. is arrived at by multiplying average yield per palm with yielding palm density. Production for 2014-15 was estimated by multiplying area under coconut with the yield per Ha.

Results

Yield per palm and yield per hectare (productivity) varied from state to state. Highest yield per palm of 109 nuts was recorded in Karnataka and West Bengal and lowest of

47 nuts in Andhra Pradesh. In the remaining states it varied between 50 nuts and 97 nuts. West Bengal is showing the highest productivity of 15260 nuts/hectare and the lowest productivity of 6042 nuts/hectare was estimated in the state of Kerala. It varied between 7400 nuts/hectare and 12125 nuts/hectare in other states covered under the survey.

As per the results of the survey, coconut production in India during 2014-15 (upto August 2015), is estimated to be ten percent less than that of the previous year. In all the

four major coconut growing states of Kerala, Tamil Nadu, Karnataka and Andhra Pradesh, which contributes about 90 percent of the country's production, only Tamil Nadu shows a marginal increase of 3.90 percent in production compared to the previous year. In the remaining three states, production recorded a significant decrease. In Kerala, compared with last year, a decrease of 17.48 percent in production of coconuts is estimated, whereas the decrease in Karnataka and Andhra Pradesh is 4.87 percent and 53.48 percent respectively. Highest decrease in production was observed in Andhra Pradesh.

General reasons attributed for the decline in production reported are insufficient rains and pest and disease attack. The decrease in Andhra Pradesh is the after effect of two cyclonic storms which lashed the state in successive years, viz. Phailin in October, 2013 and Hud-Hud in October, 2014. Remaining four states covered under the survey showed an increase in production. While production estimation for the states of Odisha, showed an increase of 19.75 percent, West Bengal 11.34 percent, Maharashtra 15.85 percent, the increase in Gujarat was 15.37 percent compared to previous year's production.

In Kerala, production showed a decrease in the districts of K Idukki and Kottayam, whereas a significant increase in production was recorded in Alappuzha compared to previous years production. Largest coconut producing district in the state is Kozhikode (1090 Million Nuts). As far as Tamil Nadu is concerned, decrease in production was noticed in Krishnagiri and Thirunelveli districts, while the production increased in Kanyakumari, Tirupur and Thanjavur. Coimbatore is the largest coconut producing district in the state (1229 Million nuts).

In Karnataka, major coconut growing districts of Tumkur and

Hassan and the coastal districts of Uduppi and Dakshina Kannada showed a decrease in production. Tumkur is the district with highest production in Karnataka (8650 Million nuts). As far as Andhra Pradesh is concerned, production decrease is observed in all the major districts covered under the survey, viz. East and West Godawari, Srikakulam and Vizakhapatnam. East Godawari is the district having highest coconut production 4164 Lakh nuts. (See detailed results in Table 4,5 and 6)

Highlights

Kerala - Major decline in production was observed in Idukki, Kottayam and Kollam districts and a significant increase in yield was observed in Alappuzha district.

Tamil Nadu - Krishnagiri and Thirunelveli districts showed a decrease in production over the previous year while Tirupur, Thanjavur and Kanyakumari showed an increase in production.

Karnataka - Major coconut growing districts of Tumkur and Hassan recorded a decline in production, so also the coastal districts of Udupi and Dakshina Kannada.

Andhra Pradesh- All the four major coconut growing districts of East Godavari, West Godavari, Srikakulam and Vizhakapatnam showed a decline in production. The decline is reported to be the after effect of two successive cyclonic storms lashed in Andhra coast during the last two years.

Odisha - Highest yield decrease is reported in Ganjam district which was effected severely by cyclonic storm 'HudHud' in October 2014. Puri and Cuttack recorded an increase, while in Nayagarh, production was almost stagnant.

West Bengal- Murshidabad, Midnapore and 24 Parganas North showed an increase, while 24 Parganas South showed a marginal

decrease in production.

Maharashtra - All the districts of Sindhudurg, Thane, Ratnagiri and Raigad showed an increase in production.

Gujarat – Junagadh and Bhavnagar showed an increase in production.

Conclusion

Over the years from 2012-13, coconut production in four major coconut growing states of Kerala, Tamil Nadu, Karnataka and Andhra Pradesh are showing a decreasing trend. Further to this, export of coconuts and value added products from coconut, viz. dry coconut, virgin coconut oil and desiccated coconut are showing a steady growth from the last quarter of 2013-14 and is expected to keep the trend in the coming months also. Virgin coconut oil alone recorded an increase of 500 percent in 2014-15, compared to the export of the preceding year.

Coupled with this, a close observation of the daily coconut oil price recorded in major markets in Kerala and Tamil Nadu against sixty days moving average price does not foresee a sudden downfall in price. Atleast upto August, 2015, the price is expected to continue steady. In the light of the above facts, there is no need for the farmers to be panic. Farmer Producer Organisations has a major role to play by taking decision on disposal of produce by farmers and also should initiate collective measures to increase productivity under their coconut gardens. ■

Reference:

1. <http://indiabudget.nic.in/es2013-14/echap-08.pdf>
2. Survey Reports submitted by Principal Investigators from districts/ States
3. APCC Yearbook 2013
4. All India Estimate of Coconut –Department of Agriculture and Cooperation (Horticulture Division)