Coconut productivity improvement in Car Nicobar Island

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Blessed with bountiful natural resources with a group of 572 islands, the A & N Islands enjoy a tropical and humid climate and undulating topography. The climate is congenial for plantation crops especially for coconut. But the productivity is low due to the presence of old and senile palms, overcrowding in the coconut growing areas, sparse population in other areas, non adoption of proper scientific methods of coconut cultivation, no proper field sanitation, improper harvesting etc.

In order to address these issues and to improve the quality of life of the people who solely dependent on coconut and to bring in a much visible changes in the coconut based industries, Strategies in the Mission mode approach namely Coconut Mission was undertaken in the Car Nicobar Island. Before the initiation of the mission or before inducting the scientific technologies to bring in a paradigm shift in coconut production, a bench mark survey was taken up to assess the status and subsequently after three years, assessment of increase in productivity of coconut was made.

Objective

The productivity assessment was conducted in Car Nicobar Island with the specific objective of assessing the present area covered, production & productivity of coconut in Car Nicobar, documentation of the traditional cultivation practices, identification and analysis of the process of production, identifying the intervention strategy through implementation of Horticulture development programmes in a Mission Mode and the impact Assessment of the Mission Programmes.

Background

Car Nicobar Island with a total geographical area of 126.9 Sq km is remarkably flat except for some cliffs in the North and Hilly areas in the interior. This Island is dominated by the Nicobari tribals who follow a system of joint living or the "Tuhet" system. Due to the tropical climate prevailing here, coconut is the main crop grown in these Islands. The staple foods of these people are coconut and are of such importance that their day to day social and religious life is woven around coconut.

The agriculture production system is mainly rainfed and at subsistence level. Out of the total area 9026 ha is under coconut cultivation, but the productivity is low due to low level of utilization of improved agriculture technologies, poor connectivity to this Island and limited scope of area expansion under coconut.

In order to address these issues, the Andaman & Nicobar Administration launched the Flagship programme as Coconut Mission in Car Nicobar Island integrating all the different schemes under one umbrella to improve the productivity of coconut from 22 nuts to 60 nuts per palm.

Package of Practices followed under Car Nicobar Coconut Mission

With the ultimate objective to improve the productivity of coconut various scientific technologies including human resource development was adopted under the mission programme.

Training & Exposure visits

Human resource development through training and demonstration is an integral part of success of any programme and under the National Horticulture Mission various awareness programmes like trainings/ demonstrations/exposure visits etc (both on and off- campus) was conducted for the tribal farmers, field level workers and entrepreneurs to bridge the gap of knowledge and skill, both managerial and technical especially on coconut and its diversification. Also training on Bee keeping and its maintenance

was imparted to tribal farmers along with extension functionaries.

Integrated farming for Coconut productivity improvement

Integrated farming approach increases the benefits derived from crop production by efficient utilization of natural & socio economic resources. For implementation of various activities under the Coconut Mission, the requirement of manpower was dovetailed with MGNREGA. Under CDB programme, demonstration plots were laid out in the existing coconut garden by adopting scientific package to improve the productivity. A model demonstration plot was laid out by fencing the area with wire mesh to avoid stray animals like goats, cattle, pigs etc. Basins around the palms were prepared and bio fertilizers, bio pesticides and bio composting culture were applied.

Mulching with agri waste and coconut fronds/ leaves/husk around the base of the tree was carried out. To control insect pest and diseases crown cleaning & bio pesticides application was done. Organic inputs such as neem manure, multi micronutrient, pseudomonas florescens, Trichoderma viridi, VAM, bio composting culture, pheromone trap and lure for rhinoceros beetle were provided to the beneficiaries.

To increase the soil fertility, green manure crops such as Cowpea, Dhaincha seeds (Sesbania rostrata) etc. were grown as cover crop. Interventions like intercropping was done in coconut garden by integrating with NHM Scheme Area Expansion of Fruits, wherein fruit crops like pineapple, banana, papaya and root crops/ vegetables etc. showed tremendous impact on the increase in productivity of coconut per unit area in the demonstration plots.

Integrated Nutrient Management / Integrated Pest Management

Under CDB programme, organic manure production units were established which facilitated the recycling of plantation waste. For rodent management, mechanical rat traps were supplied. Aluminum sheets were provided as coconut tree guard/ band to manage rat menace. For biological control of rhinoceros beetle, pheromone traps with lure were installed in the coconut gardens. Under RKVY, high density polythene vermibeds were installed in the farmers' fields for the production of Vermicompost.

Augment pollinators through Bee keeping:

Under the NHM Scheme, bee colonies were installed in various villages of Car Nicobar, which has shown increased production of coconut and other crops in the vicinity of colonies due to assisted pollination by bee. In addition to this yielded honey and wax as additional income.

Soil & Water Conservation Measures

Under RKVY catch pits of length 1.5m length x 0.5m width x 0.5m depth was dug out. This pit was partially filled with coconut husk, providing enough space so that the eroded soil gets collected. R.C.C. ring wells were constructed in every village to create water sources.

Post Harvest Management

Under Tsunami Rehabilitation Programme, harvesting poles, coconut dehuskers, crowbars and coconut climbing devices were distributed to the tribal farmers. As a Pilot demonstration unit, improved model of copra dryer of 1000 nuts capacity from Sevasharam Angamali, Kerala was installed with the support of NABARD and the District Administration. Copra dryer of 300 nuts capacity was installed in all the 15 villages' for preparing quality copra.

Replanting & Rejuvenation of Coconut Garden

Senile/ diseased coconut palms were cut and removed in all the villages of Car Nicobar. For rejuvenating the coconut gardens, crown cleaning, basin making mulching and application of organic inputs were carried out in each demonstration plot.

Organic Certification

In view of the growing demand for organically produced agriculture food items, the natural advantage of Car Nicobar Island being default, efforts have been taken for organic certification through Participatory Guarantee System (PGS) to declare the whole Island 'Organic'.

With the interventions of these scientific technologies after a lapse of three years, the increase in production of Coconut was recorded at Car Nicobar. To generate further information on the productivity of coconut, a productivity assessment by Random Survey was conducted in Car Nicobar.

Sampling Methodology

The assessment was conducted by a random survey method in Car Nicobar. The sampling for the study was drawn from across the 294 Tuhets of Car Nicobar. All the 15 villages of the Island were covered under these sampling. The Tuhets of Car Nicobar Island was arranged in alphabetical order by generating random numbers from http: / www.randomizer.org/form.htm. Nicobar being the third district, tuhets were randomly selected from third column.

In each village for the survey of the selected Tuhets, either the captain or the Tuhet heads were approached for identifying the plots. On identification of the plots total number of palms was ascertained and the interval of palms in which the productivity assessment has to be conducted has been selected as per the pattern given below.

Total palms	Interval
0100	05
101150	10
151300	15
301400	20
401600	25
601800	30
>800	40

For a plantation having 100 palms, every sixth coconut palm has been selected leaving five palm interval. Similarly for the plantations with 101-150 palms every eleventh palm was selected leaving 10 palm intervals for productivity assessment and so on. The number of nuts and bunches per palm were counted in each selected palm

A. Assessment before the interventions

Random No.	Tuhet	Village	Total Plams (nos)	Interval	Total nuts (nos)	Average (nos)
166	Looram	Chuckchua	593	25	510	21.25
233	RaAngta	Chuckchua	275	15	363	20.16
57	Hannan go	Lapathy	334	20	350	20.59
149	Kukun	Kinyuka	238	15	320	20.03
40	Yin	Perka	490	25	400	20.00
					Average	**20.40**

Results & Discussion

Below given is the example for five selected Tuhets in which productivity assessment was conducted. In similar methodology the productivity assessment was conducted for other selected palms in selected tuhets.

A statistical tool (Chi-square test) was applied for the analysis of data to find out the goodness of fit between the observed and expected values. The hypothesis

Tuhet No	Total Nuts (Observed Value=O)	Expected Value(E)	(OE)2	X=(OE)2/E
2	191	204	169	0.83
36	225	204	441	2.16
42	195	204	81	0.40
43	219	204	225	1.10
51	218	204	196	0.96
72	199	204	25	0.12
79	188	204	256	1.25
84	125	204	6241	30.60
93	169	204	1225	6.00
99	142	204	3844	18.84
110	181	204	529	2.60
111	170	204	1156	5.70
113	227	204	529	2.60
128	235	204	961	4.71
160	171	204	1089	5.33
175	241	204	1369	6.71
176	213	204	81	0.40
186	233	204	841	4.12
189	209	204	25	0.12
208	278	204	5476	26.84
216	234	204	900	4.12
227	198	204	36	0.18
247	204	204	0	
250	196	204	64	0.31
251	248	204	1936	9.50
267	224	204	400	1.96
269	203	204	1	0.005
276	192	204	144	0.71
284	187	204	289	1.42
Total	**5915**		**28529**	**X2=139.89**

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that the random samples drawn are not the true representative of the actual population was taken into consideration for calculating.

As per the Chi-square Test the null hypothesis is rejected because as the calculated value (139.89) is more than the table value (41.30) at 5% level of Significance and thus the random samples drawn are more significant and true representative of the actual population.

Similar methodology was adopted for the random sampling in the demonstration plots (Implementation of Coconut Mission) and Chi-square Test was applied for finding out the result.

The random productivity assessment revealed that the average productivity of coconut at Car Nicobar Island could be increased from 20.40 nuts/palm / year to 39.11 nuts/palms after the intervention of the proven technologies in a mission mode. Since coconut palm will take minimum 3 years to respond fully for the treatments; it should be continued for another 3 years and observe the periodical increase for a reliable assessment. Once this is done, then a wider adoption of these technologies will increase the productivity considerably and bulk of raw materials will be available for processing needs.

B. Assessment in demonstration plot (after implementation)

Random No	Tuhet	Village	Total Palms (Nos)	Interval	Total nuts (Nos)	Average (Nos)
166	Looram	Chuckchua	593	25	938	39.73
233	RaAngta	Chuckchua	275	15	719	39.19
57	Hannango	Lapathy	330	20	644	39.05
149	Kukun	Kinyuka	230	15	598	38.99
40	Yin	Perka	480	25	741	38.55
		Average				**39.11**

Courtesy: Dr. P. Rethinam, Plantation Crops Management Specialist, Coimbatore, Tamil Nadu for his valuable suggestions during the editing of the text, Dr.G.S.Pandey,Joint Director (Soil), Directorate of Agriculture, A & N Islands, Shri.Dilip Kumar, Shri Anoth Ram, Shri.Ramesh Kumar, Asst Directors (Agri),Dept of Agriculture, A & N Islands, Shri.Sounderrajan, & Shri. Navasakhti Agri Officers, Dept of Agriculture, A & N Islands for the survey and assessment of productivity of Coconut in Car Nicobar.