

Lakshadweep, India's smallest Union Territory located in the Arabian sea comprises of 36 tiny coral islands with 32 square kilometers in area and a population of 64,429 (2011 census) in the ten inhabited islands. Coconut is very closely associated with the socio-economic and cultural life of the people of Lakshadweep. Besides fishing, coconut cultivation and production and marketing of copra constitute the major livelihood option of Lakshadweep. Farming activities in these islands are essentially coconut based and hence efforts for improving agriculture sector in the islands need to focus on interventions to enhance the efficiency of coconut based activities.

Coconut farming sector in Lakshadweep: Scenario and strategies for enhancing efficiency

Details of area and production of coconut, as per 2015-16 statistics, in different islands of Lakshadweep are furnished below,

Island	Area (ha)	Production (Lakh nuts)
Kavaratti	402.53	1.22
Agatti	348.14	1.24
Amini	251.83	1.17
Kadmat	310.29	0.73
Kiltan	151.6	0.66
Chetlat	102.21	0.47
Bitra	8.78	0.34
Andrott	472.24	1.58
Kalpeni	266.96	0.92
Minicoy	436.34	0.77
Total	2750.92	9.07

(Source: Department of Agriculture, U.T of Lakshadweep)

Coconut farming in Lakshadweep islands:

Scenario and strategies for development



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Though coconut palms are available in abundance in all the islands, coconut is not cultivated in a systematic and scientific manner due to various socio-economic and other factors. Major constraints to coconut farming in Lakshadweep include: predominance of senile and unproductive palms, overcrowding of palms due to lack of adoption of proper spacing which result in low productivity, lack of adoption of multiple cropping and integrated farming practices, lack of availability of skilled palm climbers, crop loss due to pests like rodents and diseases like bud rot, low level of product diversification, lack of storage and marketing facilities, inadequacy of extension support etc.

The regional station of ICAR- Central Plantation Crops Research Institute (CPCRI) located at Minicoy island has evolved many technological recommendations for enhancing productivity and income from coconut farming in Lakshadweep islands. Similarly, Department of Agriculture, UT of Lakshadweep has been implementing various schemes to improve coconut farming in the islands. Incentives are being provided to farmers for taking up various activities under these schemes.

Some of the strategies suggested for enhancing the efficiency of coconut sector in Lakshadweep islands are discussed hereunder.

i) Conservation and utilization of coconut genetic resources:

Laccadive Ordinary Tall (LCT) is the well



adapted predominant variety of coconut in Lakshadweep islands. Many other distinct coconut accessions have been collected from different islands and conserved at National Gene Bank at CPCRI, Kasaragod and CPCRI, Research Centre, Kidu. Special types such as Micro Talls, Giant coconuts, Sweet husked coconuts, types with higher oil content, lines with putative drought tolerance, dwarf coconuts and Mini Micro nuts have also been collected and

conserved in the gene bank. Utilizing the germplasm lines collected from Lakshadweep, LCT selection was released as Chandrakalpa, suitable for growing under rainfed conditions in the coconut growing areas. Laccadive Orange Dwarf (LCOD) has been identified to be an ideal cultivar for tender coconut purpose with early-bearing palms, orange fruits with water content of over 300 ml. Out of the conserved germplasm from Lakshadweep islands, two accessions namely Laccadive micro Tall, Laccadive mini micro Tall were registered with NBPGR for their unique traits. Based on the nut yield and copra out turn, two hybrids viz., LCGD x LCT, LCOD x LCT were identified and recommended by the Institute Research Committee of CPCRI for commercial exploitation under Lakshadweep conditions.

Cutting and removal of senile and unproductive palms and scientific replanting by maintaining optimum plant density need to be emphasised while formulating schemes for enhancing efficiency of coconut sector in the islands. Coconut genetic resources available in these islands can be effectively utilised for the production and distribution of quality seedlings of suitable coconut varieties as part of coconut rejuvenation schemes to be implemented.

ii) Maintenance of optimum palm density:

The recommended spacing for planting coconut is 7.5 m so that 175 palms can be accommodated in one hectare of land. Maintenance of optimum palm density is essential for realising high productivity in coconut. However, overcrowding of palms without adoption of proper spacing is an important factor resulting in low yield of coconut in all the islands of Lakshadweep. It is observed that on an average of 400-500 coconut palms of all ages is available in one hectare of land. The observations at CPCRI Minicoy research centre revealed that the average yield in the normal density during 1983-2001 was 129 nuts per



Variability observed in the nuts collected from Minicoy (Source: CPCRI Technical Bulletin No.86)



palm per year as against 37 nuts per palm per year in double density of planting. Hence, it is obvious that interventions for restructuring coconut orchards to thin down the palm population to maintain optimum palm density are needed for enhancing coconut productivity in the islands. Such interventions to avoid overcrowding of palms also will reduce the crop loss due to rodent infestation in coconut palms.

iii) Soil health management for improving coconut productivity:

As per the official policy for the UT of Lakshadweep, use of chemicals in farming is prohibited and agriculture in the islands is organic by default. However, lack of availability of quality organic manure is a limiting factor in promoting eco-friendly crop production practices in the islands. The technology for vermicomposting using coconut leaves, which are available in plenty in these islands, has been standardized by CPCRI using *Eudrilus* sp. of earth worms closely related to the African night crawler. This simple technology can be effectively made use of for ensuring availability of quality organic manure required for coconut and other crops. Popularisation of green manure crops can be another intervention to improve soil fertility. Observations made at CPCRI, Minicoy research centre has revealed that Sunnhemp (*Crotalaria juncea*) can be introduced as a green manure crop and its growth under island conditions was excellent and the yield obtained was 11.5 t/ha. The NPK content was 0.75%, 0.12 % and 0.51% and the percentage of contribution was estimated to be 98 for N and 28 each for P and K.

iv) Crop intensification in coconut gardens:

People of Lakshadweep islands mostly depend on the mainland for their requirement of fruits and vegetables. Extent of adoption of inter/mixed cropping in coconut orchards is very low. Further, the overcrowding of coconut palms does not allow

much of inter/mixed cropping also. However, if restructuring of coconut gardens is done to maintain optimum palm density, the potential for profitable cultivation of fruits and vegetables can be effectively utilised. Observations at Minicoy regional station of CPCRI has shown that the most suitable varieties of fruit crops identified for island systems were banana, papaya, sapota and vegetables crops such as tomato, brinjal, chilli, bhindi, amaranth, cabbage, cauliflower, cucurbits and moringa. Improved varieties of tomato (Arka Meghali, Arka Alok, Co 3), brinjal (Arka Anand and Co 2), chilli (Arka Lohit, Arka Harita, and Co 4), bhindi (Arka Anamika), amaranth (Arka Arunima, Arka Samraksha), cabbage (Ankura manas), cauliflower (F 1 Hybrid white), bitter gourd (Ventura), pumpkin (Arka Chandan and Arka Suryamukhi), cowpea (Arka Garima) and moringa (PKM 1) were successfully demonstrated at the centre in an area of about 35 cents of coconut garden using different organic inputs such as poultry manure, cowdung, coconut leaf vermicompost, neem cake and Pongamia cake. It is imperative that appropriate schemes are introduced to popularise coconut based intercropping of vegetables and fruit crops so as to enhance food and nutritional security of island community.

v) Eco-friendly technologies for pest and disease management:

It is estimated that rodent attack causes 33-44% damage to coconut palms in the islands. Major reasons attributed for the increased rat damage in the island are higher density of coconut palms per unit area, inadequate crown cleaning and delayed harvest of nuts, heaping fallen fronds and husks in the farm, absence of predators like snakes, owls etc. in the islands, and improper care provided to the coconut palms. Placing rat cake over the crown was recommended by the CPCRI Minicoy station. CPCRI has also developed a device by which any

number of rat cakes can be placed in the coconut crown from the ground. Rhinoceros beetle or black beetle (*Oryctes rhinoceros*) damage in the islands is less than 5%. *Oryctes rhinoceros nudivirus* was released in Lakshadweep Islands for the first time during 1990's and it was very effective in the bio-suppression of the beetle. To address the problem of lack of availability of skilled palm climbers for harvesting as well as plant protection measures, a scheme on coconut harvesting is implemented by the Department of Agriculture, UT of Lakshadweep through Village Dweep Panchayaths (VDPs). Under this scheme coconut farmers are provided with the service of climbers who are insured under coconut climber's insurance scheme implemented by the department. The climber needs to harvest 15 palms per day. The farmer has to pay an amount of 15/- per palm harvest. The Department will pay the remaining amount of wages/honorarium fixed to the climbers. Department of Agriculture also implements specific schemes for the management of rodents and bud rot disease. The components of rodent management scheme include placing rat cakes on the crown of the palms, using different types of rat traps, crop and field sanitation etc. To prevent the spread of bud rot disease coconut growers are provided with incentives for cutting and removal of dead palms and badly affected palms which are beyond recovery. There was a considerable reduction in the bud rot disease incidence since the implementation of the scheme in the year 2014-15.

vi) Value addition through product diversification:

Copra, coconut oil, coir and coir products, neera (coconut inflorescence sap) and coconut jaggery are the major coconut based traditional enterprises available in the islands. Copra making is done in the traditional method of sun drying. Right from harvesting, dehusking, cutting, drying, deshelling and packing in gunny bags is done manually. It is then transported to the mainland (mainly Mangalore) through local goods ship locally called as 'uru'. Using the money obtained by selling copra all house hold items required for the next season are purchased and brought to the islands. A few small copra milling units are running in the islands to meet the cooking oil requirement. With the government support, five coir fibre factories, five production demonstration centres and seven fibre curling units run in Lakshadweep islands. These



Coconut oil marketed by LDCL

units produce coir fibre, coir yarn, and curled fibre and corridor mattings. Coconut is the key ingredient in all the culinary preparations of the islands. There are a number of recipes using fresh matured kernel, half matured kernel and tender kernel. Besides, sap production and utilization of the sap for fresh consumption and spread/ sugar production is also followed. Many sweets are made from coconut sugar which has unique taste and good shelf life.

Though tremendous opportunities exist for enhancing income from coconut farming through production and marketing of value added products, coconut based processing industries are very meager in the islands. The technology of neera collection and sugar production was demonstrated by CPCRI in the islands and 3-5 tappers were trained for collection of neera using 'Coco- sap chiller'. Department of Agriculture is implementing a scheme for promoting neera tapping in the islands. As part of the scheme, neera tappers are engaged from the village dweep panchayath and the Department pay the honorarium. Neera thus collected is sold to the public in the form of neera, vinegar and jaggery. Lakshadweep Development Corporation Ltd. (LDCL) under the Lakshadweep Administration also promotes traditional products of the islands. LDCL has supported the enterprises on value added products from fish through its canning factory at Minicoy and five coconut processing units located at Kadmat, Amini, Androth, Kalpeni and Agatti. Of late, an entrepreneur from Androth island has started producing coconut oil under the brand 'Dweep fresh' and exporting to the Middle East.

Desiccated coconut unit in Kadmat island under LDCL

Desiccated coconut (DC) unit of Kadmat island was established in 1993. The unit provides employment for 20 workers from the island itself. In this unit monthly 30,000-40,000 nuts are processed for the production of desiccated coconut powder. Production capacity is 1500-1800 coconuts/ day. Coconuts are procured from local coconut farmers. Dehusking, deshelling and testa removing are done manually. There is a machine for cutting and cleaning of the kernel. It is then disintegrated using a disintegrator, followed by drying (45 min/batch), sieving and packing. The co-products generated during processing are well utilized. Coconut husks

DC production: process flow



are sold to the coir manufacturing factory situated in the same island. The shells are used as fuel in the boiler. The testa is dried in a dryer and used for expelling oil. About 90-120 kg desiccated powder is obtained by processing 1500-1800 nuts. Presently it is marketed through the outlet of LDCL, at Kochi. Apart from that, it is sold locally at Rs. 150/ kg. Its maximum retail price is Rs. 210/ kg. During the tourist season (October- March), DC powder has good demand as it is made from organically produced coconuts. The unit also has an oil expelling unit. Filtered coconut oil is sold at Rs. 170 per Litre. In addition to that, small quantity of virgin coconut oil and coconut chips is also processed as and when order comes. Presently LDCL, Kochi is the only outlet for marketing DC powder. However, outlets available for marketing the DC in other localities can also be explored, especially by highlighting the special feature of 'DC processed from organically grown coconuts from the Islands'. The process chain can be completely mechanized for producing export quality DC powder from Lakshadweep.

vii) Promoting Farmer Producer Organisations (FPOs) in coconut sector:

The average land holding size in the islands is only 0.27 ha. Hence, it imperative that group approach is facilitated among the small and marginal farmers of the island to enable them to overcome the resource limitations and to effectively make use of technologies for higher productivity and income from coconut

farming. Currently Department of Agriculture, UT of Lakshadweep has taken steps to initiate nine Coconut Producer Societies in different islands to take up various interventions to strengthen the coconut sector and enhance income from coconut farming. It is necessary that in all the islands of Lakshadweep such coconut growers' collectives are formed to take up coconut production, processing and marketing initiatives. Self help groups of women also need to be supported to take up coconut based microenterprises

viii) Co-ordination among stakeholders:

Interventions for enhancing efficiency of coconut sector in Lakshadweep islands to be effective, need concerted and coordinated efforts of various stakeholders including research institutions like CPCRI, CIARI, KAU, development agencies such as Department of Agriculture of UT of Lakshadweep, Lakshadweep Development Corporation Ltd. (LDCL), KVK, CDB, Local Self Governments (Village Dweep Panchayats), Coconut Farmer Producer Organisations, Women Self Help Groups and private entrepreneurs.

Conclusion

Coconut is very closely associated with the socio-economic and cultural life of the people of Lakshadweep islands. The potential for achieving higher productivity and income from coconut farming has not been fully realized in these islands due to various reasons. Coconut rejuvenation programme to replace the senile and unproductive palms, restructuring orchards to achieve optimum level of palm density, promoting soil health management practices, promoting intercropping of fruits and vegetables, popularising eco-friendly pest and disease management technologies and promoting enterprises on coconut value addition are some of the strategies suggested for improving coconut scenario in the islands. Group approach has to be promoted among coconut growers of the islands to make the coconut based interventions effective. Co-ordinated efforts of various agencies are also essential for effectively implementing the integrated schemes for coconut development in Lakshadweep islands. ■