

# Technology mission on coconut - A retrospection

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Coconut Development Board has been implementing Central Sector Scheme, 'Technology Mission on Coconut' (TMO) since 2001-02 as a part of the ongoing programmes for integrated development of coconut industry in India and to address serious problems faced by the coconut industry in a strategic manner. The project has been formulated with a view to converge and synergize all the efforts through vertical and horizontal integration of existing programmes and to address the problems and bridge the gaps through appropriate programmes in a mission mode to ensure adequate, appropriate, timely and concurrent action. The programme aims at increasing the productivity of coconut to generate higher income at farm level, creating opportunities for product diversification and value addition, improving marketing infrastructure and market promotion of coconut & its by-products both in national and international markets in order to cope up with the present era of change and to make coconut industry more competitive. Under

the Mission focused attention was given for the development and adoption of new technologies and their promotion especially in respect of insect pest and disease management, product diversification and market research and promotion.

The programme is implemented on project basis and consists of the sub components. Management of insect pests and disease affected coconut gardens, processing and product diversification, market research and promotion, technical support and external evaluation and emergent requirements on need basis. Efforts were made with focused attention on awareness creation and market promotion increased the demand and consumption of coconut and value added products. During the initial periods thrust was mainly on pests and disease management due to sudden outbreak of various pests and diseases and resultant problems. But at present there is a paradigm shift to product diversification and establishment of coconut based processing units.

Since coconut and its byproducts have attained high demand recently, the scope for establishment of units for coconut products viz desiccated coconut, virgin coconut oil, spray dried milk powder, preserved and packed tender coconut water as well as shell charcoal and activated carbon have increased considerably.

The implementation of Technology Mission on Coconut programme by the Board has helped to solve production constraints to a great extent besides developing many technologies for product diversifications, byproduct utilization and their commercial adoption. Under the various sponsored research projects, Board has developed the technology for packed and preserved tender coconut water in association with DFRL, Mysore and the technology for virgin coconut oil, spray dried milk powder, coconut oil blends and coconut water beverages in association with CFTRI, Mysore which has been transferred to many interested entrepreneurs.



*Kovai Agro Foods, a desiccated coconut powder unit based at Pollachi*



*Nexus Frozen Fruit Containers and Foods, a unit manufacturing ice cream cup out of coconut shell*



*Pure Tropics, a tender coconut water unit*

### The status

During 2012-13 Board has extended support for 96 projects under the scheme with an assistance of Rs.764.577 lakhs for 42 new projects and 54 ongoing projects under the four sub components of TMOC. This includes establishment of 29 new coconut processing units with infrastructure facilities worth Rs.33.635 crores and with a capacity to process 163.38 million nuts and 22,611 MT shells per year by extending financial assistance to the tune of Rs.6.259 crores for value addition and by-product utilization. This is 40.64 % higher achievement than the previous year. Seven virgin coconut oil production units with a capacity to process about 21.75 million nuts per year, 11 desiccated powder units to process 121.95 million nuts per year, One tender coconut preserving and packing unit having capacity to process 4.5 million nuts per year, two coconut oil units to process 15 million nuts per year, three ball copra units to process 1.83 lakh nuts per year one shell powder units having a capacity to produce 1800 metric tones per year, three shell charcoal unit to produce 4737 MT per year and one activated carbon unit with a

capacity to produce 1200 MT per year have been established. Under the scheme for adoption of technologies for setting up coconut processing units back ended capital subsidy of 25% limited to 50 lakhs is provided for infrastructure development, establishment or modernization and up gradation of coconut based processing units.

One of the main focussed areas of the mission is Research and development in areas of management of pests and disease affected coconut gardens and processing and product diversification. The eligible institutions for taking up research projects are ICAR/ State Agricultural universities, State Agri./ Horti. Departments and private organizations having the capability for conducting research. Board has been continuously promoting research under various components through research institutions such as Central Food Technological Research Institute (CFTRI), Defence Food Research Laboratory (DFRL), Central Plantation Crops Research Institute (CPCRI), Kerala Agricultural University, Tamilnadu Agricultural University, Central Coir Research Institute, Central Institute of Fisheries Technology, etc.

Board has also supported various State Governments/ Agriculture/ Horticulture Departments in demonstrating/ adopting control measures for pests such as coconut eriophyid mite, Black headed caterpillar and diseases such as root wilt and bud rot. Board has also entrusted research studies to National Institute of Nutrition, Hyderabad and Amrita Institute of Medical Sciences, Kochi to address the health concerns arising out of coconut oil consumption.

Central Coir Research Institute (CCRI), Kalvoor, Alappuzha has been entrusted with research studies pertaining to development of machineries and techniques for composting tender coconut husk during 2007-08. Five machines namely; tender coconut husk slicer, hand operated chopping machine, power operated chopping machine, tender coconut husk shredder and mini beater has been developed and the commercialization of these machines are being taken up by RAIDCO and KAICO. Further, CCRI is undertaking projects on diversified uses of coconut wood and development of technology for preparation of particle boards & diversified products from tender coconut waste. The studies have revealed that coconut wood has the potential for being used as raw material for cellulose extraction, micro crystalline cellulose (MCC), lignosulphonates, bio ethanol, particle boards etc. At present, 48 research projects are ongoing under the various components of TMOC.

### The major research projects being completed during the current year

The project Soil and plant health management through organic

### The component-wise expenditure of TMOC projects

Component	Expenditure 2011-12 (Rs. Lakhs)	Expenditure 2012-13 (Rs. Lakhs)
Pests and Disease Affected Gardens.	52.582 (15)	39.255 (12)
Processing and Product Diversification.	416.562 (63)	601.455 (67)
Market Research and Market Promotion	43.415 (10)	28.167 (8)
Technical Support, External Evaluation and Emergent Requirement	31.079 (8)	95.700 (9)
<b>Total</b>	<b>543.637 (96)</b>	<b>764.577 (96)</b>

recycling in coconut based production system sanctioned to CPCRI, Kayamkulam demonstrated location specific technologies for organic recycling aiming at developing sustainable organic production system in coconut growing areas and has developed low cost crop residue recycling systems to produce high quality vermi-compost and vermi-wash for soil health management in coconut based organic production system. The study has also assessed the efficacy of vermi-wash as bio pest repellent and as prophylactic agent for disease and soil health stimulant and also evaluated the feasibility of crop diversity management in organic coconut based production system through intercropping. All farmers in the project area are producing vermicompost and vermiwash using biomass available in their farm. The total quantity of vermicompost ranged from 2.25 to 3.5 tonnes in Tamilnadu, while it is 0.75-1.75 tonnes in Kerala. Vermiwash production ranged from 100 to 350 litres in Tamil nadu and 65-135 litres in Kerala

Another project field demonstration of integrated disease management technology for management of coconut leaf rot disease including bio control agent sanctioned to CPCRI, Kayamkulam has assessed and demonstrated the latest technologies (involving chemical and bio-control agents in a comparative manner) on integrated management of coconut leaf rot disease with farmer participation. Field application of Contaf, and talc based bio agents such as Bacillus, Pseudomonas, and Trichoderma were demonstrated to the farmers.

The project synthesis and characterization of value added products from coconut oil” sanctioned to Indian Institute of Science, Bangalore focused on developing coconut oil based grease and metal cutting oils for commercial application and setting up of pilot plant for coconut oil based cutting fluids is under progress.

Development of nutrient management strategy for improving the health of the palm to build resistance to pests was undertaken by College of Agriculture, OUAT, Bhubaneshwar. The project has evolved a cost-effective nutrient management strategy for adoption in the IPM of major pests of coconut and for enhancing the production of healthy coconuts.

Tender coconut punch cum splitter and hand opener was development by Apex Design Center, Coimbatore. A refined punch cum splitter and tender coconut opener which can punch and split 300 to 500 tender coconuts per hour has been developed. The product has been launched and is available in the market @ Rs.4500.

A pilot study on development of a nutraceutical preparation using nut water was sanctioned to Amrita School of Pharmacy, Kochi wherein tender coconut water was fortified

with different concentrations of guva extract, pomegranate juice and amla extract and analyzed for their nutraceutical properties. The formulation containing tender coconut water with 10% pomegranate juice and added vitamin C and  $\beta$ -carotene was found to have high nutritional value, good acceptance as well as stability and antioxidant potential of 4 months. Pomegranate provided best fortification with good taste

#### Major research projects initiated by Board during 2012-13

A research Project under the component processing and product diversification namely development of Nutra coconut oil rich in  $\omega$ -3 &  $\omega$ -6 fatty acids and health protective phytochemicals is sanctioned to CFTRI, Mysore. The project envisages to isolate nutraceutical concentrates and their aqueous mixture from flax, sesame, sunflower, cottonseed etc. and to fractionate these oils to isolate the  $\omega$ -3 and  $\omega$ -6 fatty acid rich glycerides and other phytochemicals, incorporate the above two factors in to the coconut oil to develop a nutra-coconut oil. The study will also analyse the nutritional and stability aspects of nutra-coconut oil and shall prepare traditional snacks in nutra-coconut oil which will be studied for their chemical and sensory attributes.

Under the component management of insect pests and disease affected coconut gardens a project titled refinement of production technology of green muscardine fungus and participatory field validation of integrated biocontrol technology against rhinoceros beetle of coconut has been sanctioned to CPCRI, Kayamkulam with an objective to integrate and optimize bio-intensive pest management for the coconut rhinoceros beetle, *Oryctes rhinoceros* linn using green muscardine fungus (*Metarhizum anisopliae*), *Oryctes rhinoceros* virus and pheromone trap. It is further proposed to validate and assess the technology through farmer participatory large area demonstration in Alappuzha.

Under the subcomponent technical support and emergent requirement, a project entitled region based recommendation to improve coconut production in Tamilnadu through remote sensing and GIS' has been sanctioned to the Department of Remote sensing and GIS, Directorate of Natural Resource Management, Tamilnadu Agricultural University. The objective of the project is to map coconut growing areas region wise in Tamil Nadu through remote sensing and GIS techniques, to create soil database using GIS for coconut growing areas of Tamilnadu, to identify the soil based production constraints and to recommend ameliorative measures to augment coconut production in Tamil Nadu.

A project improving coconut production in Kerala using soil data through remote sensing and GIS techniques has been entrusted to Remote sensing and wireless sensor

networks division, Amrita Viswa Vidya Peetham University, Coimbatore to identify and map the coconut growing areas of Kerala and the project is progressing.

Through TMOC, the Board has extended support for 480 projects since 2001-02 received from various institutions / enterprises with a total financial assistance of Rs.105.55 crores and amount of Rs.85.27 crores has been released to various State Governments, Research Institutions, Co-operative Societies, entrepreneurs, etc. to address the issues like; productivity improvement through management of pests and diseases, product diversification and by-product utilization and market research and market promotion. This was for establishment of 220 Integrated Coconut Processing Units with infrastructure facilities worth Rs.212.84 crores and with a capacity to process 1287.04 million nuts per year by extending financial assistance to the tune of Rs.37.417 crores for value addition and by-product utilization. An additional employment of one lakh man days per annum could be generated.

### **The Impact**

The impact of the programme is that the Board could develop the technologies in collaboration with various research institutes for virgin coconut oil, defatted coconut powder, coconut water based vinegar, coconut water and milk based beverages like pinacolada, convenience based foods – nata-de-coco, jelly, chips, ready-to-eat sweet snack coconut bite, coconut lessi, coconut water based fruit juice, coconut honey from mature coconut, coconut whey proteins, coconut souffle, snow ball tender coconut, minimally processed tender

coconut, automobile lubricant from coconut oil, coconut wood based joineries, particle boards, door frames etc. New products developed are coconut oil based bio-diesel, blended oil, machinery for ball copra making, refinement of packaging for snow ball, chips, minimally processed coconut, edible copra, handicrafts, tender coconut punching & shaping machine, utilization of tender coconut husk for making compost and hardboard and dehusking machine. Under the market promotional activities, Board could participate in various national and international exhibitions and fairs. The impact created is for trade facilitation, creation of marketing network and consistent growth in exports.

### **Future Thrust**

The future thrust for the programme during the next five year plan is to give more emphasis on establishment of more coconut processing units for product diversification. Technologies are yet to be developed for diversified value added products from coconut and its by products. The other area is to attract investment in coconut processing sector, to take up studies on nutritional and health aspects of coconut products including clinical trials in collaboration with reputed research / academic institutions.

The farmers, farmer groups, entrepreneurs, manufacturers etc should avail the facilities extended by the Board to their advantage for catering to the growing domestic demand and emerging international avenues. In the current five year plan enhanced allocation for TMOC programme is also envisaged which would result in horizontal and vertical growth in the coconut economy in the country.