



# Promoting bio-diversity and byproduct utilization in coconut for inclusive and sustainable growth

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“Confidence grows at the rate a coconut tree grows and falls at the rate a coconut falls”

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## PART -I

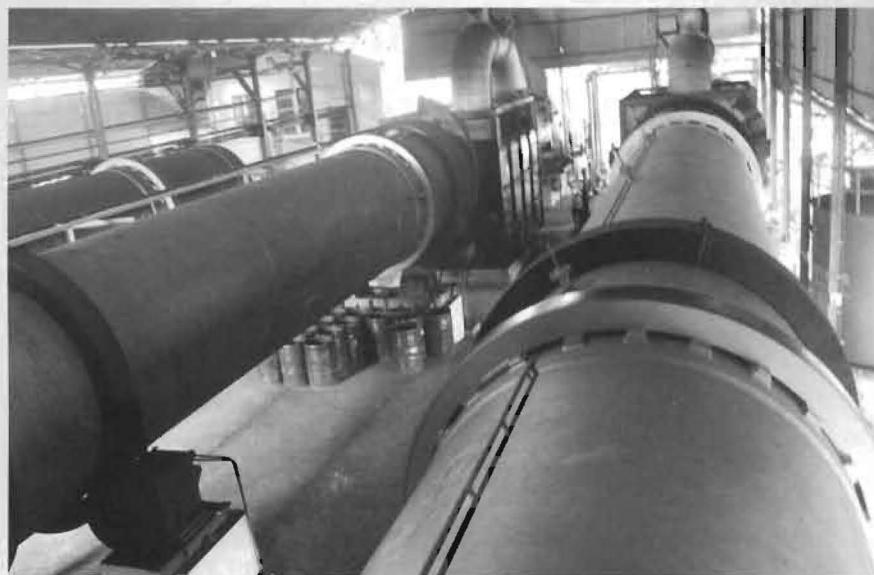
### Introduction

The integrated development of coconut cultivation and industry coupled with a stable market are the determining factors for the sustainability of coconut economy of the country in general and the rural economy of many states in particular. The climate change on account of global warming and the resultant epidemic and endemic out break of pests and diseases, prolonged drought etc have been causing considerable damages to coconut crops. The opening of the domestic market for global players for market exploitation, acute shortage of labours due to the displacements of agricultural labours for more wage oriented activities like constructions, sand mining etc, price crash at the time of peak production season due to surge in the import of cheap substitutes, and the resultant agrarian distress are the other major factors attributed to coconut

economy being pushed towards a situation of abject economic situation. Many pathological agents responsible for causing different diseases are often confined to local isolated regions. The root (wilt) in Kerala, basal stem rot of Karnataka and Tamil Nadu are such diseases that cause irreparable damages to the crops and significant reduction in the yield. Leaf rot, bud rot and stem bleeding are the other diseases responsible for weakening the health of the palms that ultimately lead to considerable yield loss. The rampant infestation of coconut-fruits by eriophyid mite has resulted in significant dip in the production of coconut both at micro and macro-level. Many coconut based industries have been adversely affected due to shortage of raw materials, low recovery of output etc. on account of this aberration. The out break of black headed leaf eating cater pillar in Karnataka and Tamil Nadu, phenomenal increase of red palm weevil attack due to lack of field sanitation and abnormal

**Coconut Development Board has adopted a holistic approach for the revival of the domestic coconut economy by taking into consideration its wide and varied avenues for cultivation and business**

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Activated Carbon Plant assisted by the Board in Kerala

climate change, emergence of new pests like slug caterpillar etc. are also causing substantial reduction in the yield and concern among the farmers. The lack of interest and confidence in the proper management of gardens due to resource exhaustion further aggravated the sector and manifested in restricted farm activities. In the context of this prevailing socio-economic situation, the Coconut Development Board has adopted a holistic approach for the revival of the domestic coconut economy by taking into consideration its wide and varied avenues for cultivation and business. Among the various measures initiated, demonstration of scientific management of coconut palm and bringing in mutually benefited biodiversity in coconut holdings by establishing viable coconut based farming system and promoting farm level processing are important. In order to make the domestic coconut industry globally competitive, it is necessary to adopt these mitigation

strategies and restore dynamism in coconut cultivation and industry.

### **Sustainable development: the perfect foundation for growth of coconut economy**

Practicing mono culture is the general feature of coconut gardens in the country. Soil and weather factors are congenial to adopt economically and environmentally viable coconut based farming

system with diverse crop combinations in most of the places, where the coconut is grown successfully. However, the growing diminution in the size of operational holdings and the persistence of large number of homestead gardens are the major hurdles for adopting viable coconut based farming system. Scarcity of land and water are already looming large due to the growing trend in urbanization and the real-estate activities leading to the filling of natural ponds, tanks and paddy fields which have considerably reduced the natural water reservoirs. Acute shortage of farm labours in many traditional coconut growing states has prevented the growers from undertaking proper and timely care and management of the gardens. A glimpse of physical features of coconut holdings in these states revealed that majority of the coconut gardens are kept fallow without undertaking any cultural operations and intercropping. As a result of this total negligence, many of the gardens that are located in high rainfall zones,



A coconut shell powder unit assisted by the Board



particularly in the state of Kerala, are piled up with static stock of other tree species casting heavy shade to coconut palms. The fading interest and exhausting resources restrained the farmers from any investment even for the average management of the gardens. The declining trend in the productivity of coconut holdings due to lack of investments, optimum utilization of interspaces, unpredictable and uncertain rainfall pattern, absence of rational use of available natural resources like; water and sun light and non-adoption of soil and moisture conservation are the prime reasons for making the domestic coconut industry unremunerative and uncompetitive.

The recurring nature of violent price fluctuations due to the copra-coconut oil centered price dependency of the industry often jeopardize the interest of farmers and those involved in allied business activities. An observation on the market behaviour of domestic coconut industry revealed that at times of price uncertainties, particularly on the occasion of

continuing fall in prices of copra and coconut oil, the primary copra processors and small millers who form the main link between farmers and the periphery markets exit from their business activities to avoid unpredictable losses which in turn lead to the problem of disposal of coconut at the farm gate.<sup>1</sup> The shortage of harvesters coupled with the low demand for coconut from the copra processing units often delays the harvests in many gardens. As a result of this equivocal phenomenon the incidents of over-mature nut fall from all gardens has been increasing considerably that ultimately lead to pilferage of nuts. The absence of secondary agriculture, the primary level processing of the farm produces and initial value addition, at the farm level trim down value realization of farm produce. The withering of farm income on account of price crash during the peak production seasons and absence of value addition at the primary level are the major challenges faced by the Indian coconut farmers. The product

diversification, byproduct utilization and value additions of coconut is therefore one of the core areas of development for inclusive growth and sustainable development of the industry. Comparing to countries like, Philippine, Indonesia, Thailand and Vietnam, the product diversification in our country is in the nascent stage. The by-products such as husks, coconut fronds, coconut timber and other renewable raw materials offer immense scope for commercial utilization which at present is either wasted at farm level or underutilized. The studies conducted by the Coir Board revealed that only 25-30 per cent of the coconut husks produced in the country is utilized for the production of fiber and balance is either being wasted at farm gate or used as fuel in farmers' kitchen. It was also revealed that our country holds monopoly in the world export of coir and coir products. The production and export of these commodities are increasing tremendously since the globalization of our economy. The total estimated production of coir



Manufacture of shell charcoal through waste heat method: Heat generated is the major source energy for the DC industry



Manufacturing of Coconut wood particle board at EIL, Islampur



and coir products during the year 2008-09 was 11.303 lakh MT and the export earnings from these products was Rs 640 corers which was recorded an increase of 8 per cent over in 2007-08.

Coconut shell of mature coconut is another important potential byproduct that offers immense scope for value addition. It is the main raw material for coconut shell charcoal, shell based activated carbon and shell powder. It is estimated that India annually produces about 15 lakh MT of shell out of which only 20-30 per cent of shell is utilized commercially for value addition. Coconut Shell Flour has good



High priced coconut handcraft at the Manado Airport Shopping complex



Utilization of hard wood of fully mature coconut: An item from Manado

durability characteristics, high toughness and abrasion resistant properties and is similar to hard woods in chemical composition having high lignin content and low cellulose content. The product finds extensive use in plywood and laminated board industry as a phenolic extruder and as filler in synthetic resin glues, mosquito coils and agarbathis. Coconut shell powder is preferred to other alternate materials available in the market such as bark powder, furfural and peanut shell powder because of its uniformity in quality and chemical composition, better properties in respect of water absorption and resistance to fungal attack. The product is manufactured in sizes ranging from 80 to 200 mesh. Activated Carbon is another important product from coconut shell which is in great demand globally. It is a non graphite form of carbon which could be produced from any carbonaceous material. Coconut shell based activated carbon is considered superior to those obtained from other sources due to its small macro pore structure

which renders it more effective for the adsorption of gas/vapor and for the removal of color and odor of compounds. The shell based activated carbon is extensively used in the refining and bleaching of vegetable oils and chemical solutions, water purification, recovery of solvents and other vapors, recovery of gold, and in gas masks for protection against toxic gases. In view of the emerging demand for coconut shell powder and activated carbon from various sectors, the Coconut Development Board is aggressively promoting the setting up of shell powder and activated carbon manufacturing units in many parts of the country by extending technical support and financial assistance. So far, the Board assisted the establishment of about 6 coconut shell powder manufacturing units with a total annual production capacity of 22,000 MT of shell powder and an equal number of shell based activated manufacturing units with a total annual production 21000 MT of activated carbon in various states of the country.



Coconut wood and fronds are the other waste products neither being used for any value addition nor finding any commercial applications. When coconut trees are cut in small numbers, they aren't a liability because they get consumed in the village itself, either by way of furniture or rafters holding roofs or simply leaving in the farm for natural degradation. In case of wood utilization for the manufacture of building materials and house hold utilities, only high density portion of the tree, i.e. 1/3<sup>rd</sup> of the bottom part of aged coconut tree, is utilized. The remaining bulk portions seldom find any utility. Two thirds of wood from such old trees constitutes "Soft Wood" which can neither be seasoned nor cured like hard wood. Being high in alkalis, it can't be used as firewood either. A study undertaken by the Hinustan News Print Ltd., Piravam Road, Kottayam Dist Kerala revealed that the coconut soft wood is not good for paper pulp. But, when the removed trees are available in large quantities as a result of the launching of CDB's new scheme "Replanting and Rejuvenation of coconut holdings", they can't be consumed locally for the production of traditional products. Hard wood can be converted into furniture, wood panels, floorings, etc. Precisely in the absence of advantages ensuing from therein, they will become a huge liability. Accumulation of huge quantities of such wood due to large-scale felling may hinder not only the cultural operations but will also aid pest and disease multiplications also. Thus the

commercial utilization of coconut wood including the waste-wood portion and coconut frond and their value addition is important and definitely pave way for the enhancement of farm income besides ensuring a new avenue for industry and employment generation. Knowing that the natural forest cover is depleting alarmingly and wood is becoming very scarce and valuable, the coconut wood and fronds can be leveraged as an additional profit to farmers, the Coconut Development Board in association with M/s Ecoborad Private Ltd.(EIL) Pune developed a technology to produce quality particle boards using coconut hard, soft & bark wood and fronds under a sponsored project. The trial production carried out at Islampur factory of EIL in Maharashtra with its plant and machinery successfully manufactured 3 layered particle boards which satisfied the BIS and Inter National standards.

In the context of the above opportunities and the strength of the Indian Coconut industry a paradigm change by making use of the available options and the selection of best method of production of all alternatives currently available for the sustainable development of coconut cultivation and industry in the country is the need of the hour. The domestic industry should be made globally competitive which will help to promote technical efficiency by operating at the right scale of production that ensures the minimization of average cost of production with a higher rate of

marginal rate of return. To achieve these goals in a perspective manner it is necessary to re-engineer and revitalize both coconut cultivation and industry by promoting bio-diversity with high value horticulture crops in the existing static gardens and to achieve cent per cent by-product utilization and its value additions particularly, coconut wood, coconut fronds, shell and husk such that the total revenue from the sector is increased many fold which in turn encourage more investments and employment generation.

*Part II will be continued in the Indian Coconut Journal, November 2010 issue.*

#### Notes and References

<sup>1</sup>The price of coconut is moving in accordance with the price of copra and coconut oil. The seasonal indices for the whole-sale prices of copra and coconut oil were always high during the lean production period and below normal during the peak production period. See for more details Thomas Mathew, M (1994) "Economics of Marketing of coconut in Kerala" (M.Phil. Dissertation, JNU Delhi.

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