



Coconut Research in India

Need of Stakeholders' Synergy for Prosperity

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Introduction

The year 2016 marks the 100th years of coconut research in India. Coconut exerts a profound influence on the rural economy of the country by supporting the livelihood of ten million people in the country. It also contributes to the national agrarian economy, with an annual contribution to the tune of Rs 9000 crores to the GDP and foreign exchange earnings of about Rs 1200 crores, besides supporting the subsidiary industrial development. However, of late coconut is faced with unprecedented crises on account of various macro and micro level factors. The productivity of the crop is constrained by the low input use efficiency in conjunction with other biotic and abiotic stresses which are priority areas of research. The mechanization also deserve adequate importance, considering the scarcity of skilled labour. Above all, the most important facet is value addition, which should be strengthened to mitigate the issue of low profitability of the sector. The post World Trade Agreement (WTA) and ASEAN Treaty regime witnessed integration of plantation economies across the globe that resulted in fierce competition among producing countries. The relevance of a retrospection and introspection of 100 years of research in the coconut sector arises exactly in this context, wherein the institutions strive for technology generation and dissemination to address the challenges and to convert the weaknesses to opportunities, in a concerted and synergized fashion.

Coconut: National scenario

India has produced 20440 million nuts in the year 2015 from an area of 1.97 million ha with a productivity of 10345 nuts per hectare (Table 1). It is predominantly cultivated in small and marginal holdings. Most of these holdings neither provide gainful employment opportunities for the family labour throughout the year nor generate sufficient income to meet the family requirement. Presently coconut growers are more exposed to economic risks and uncertainties owing to the high degree of price fluctuations. In this context it is needless to emphasize the importance of crop diversification in coconut gardens. For brightening the future prospects of a sustainable coconut sector, it is

imperative to delink the sector from the dependency on coconut oil and enhance the production of diversified value added products.

Table 1. Coconut-National scenario

State	Area (000 ha)	Production (mn. nuts)	Productivity (nuts/ha)
Andhra Pradesh	106	1464	13808
Karnataka	515	5141	9982
Kerala	650	4897	7535
Tamil Nadu	465	6917	14873
Other States	240	2021	7295
India	1976	20440	10345

Source: CDB, 2015

Research contributions over a century

It is unique that the coconut sector has been evolved through imbibing the scientific excellence for the past 100 years. The country has rich genetic resources to provide breeders with required genetic stock to tackle future challenges. It maintains the largest collection of coconut germplasm (438 accessions). It is noteworthy that an International Coconut Gene bank for South Asia (ICG-SA) has been established in the country under a tripartite agreement among ICAR-FAO-ITPGRFA. We have a National Coconut Gene Bank (NCGB) that serves as the National Active Germplasm Site (NAGS) for coconut. The focused research efforts to improve productivity and overall profitability to the farmers resulted in the development and release of high yielding varieties and hybrids. Eighteen improved high yielding varieties including twelve selections and six hybrids were released. There is tremendous potential for the released varieties as they are capable of yielding two to six times more than the average yield in different growing regions. The coconut based cropping system (CBCS), and coconut based mixed farming system (CMFS) categorically proved the advantages of the system

approach. The CBCS using multi species cropping of coconut with pepper, banana, nutmeg, pineapple, ginger, turmeric and elephant foot yam generated a net income of Rs 3,62,595 per ha, which is 150% higher than that of coconut monocrop (Rs 1,41,505), while the CMFS wherein the components are coconut, pepper, banana, crossbred cows, poultry birds, goat, and pisciculture generated a net return of Rs. 5,50,214 which is 288% higher than that of coconut monocrop.

Plant growth promoting rhizobacteria (PGPR) based product-Kera Probio has been released for clean and green cultivation of coconut to maintain sustainability. Integrated disease management strategies developed for root (wilt) and leaf rot affected coconut gardens could increase yield by 25-83% depending on severity of the disease. The coconut climbing model developed with the safety attachment has become an effective solution since it could be operated even by women with proper training. This gives much required confidence to the climbers especially the beginners. In an effort towards value addition, Institutes have developed complete package of practices for the production of virgin coconut oil, coconut chips, coconut honey, jaggery and sugar. Besides, the Institutes developed 'Cocó-sap Chiller' for collecting fresh, hygienic and unfermented coconut inflorescence sap called 'neera'. The research system has been producing quality planting materials in coconut for distribution to farmers. Seed gardens of improved varieties have been established at the Institute's level as well as in farmer's garden to augment planting material production.

It is worthwhile to note that coconut based microenterprises run by women SHGs have increased their income by 3-5 times compared to their previous income from copra, securing a steady source of additional income. Equally important, the intervention provided employment opportunities to formerly unemployed and under employed rural women resulting in enhanced self esteem, and economic & social empowerment. It is striking that, trained women serve as 'skilled coconut pollinators' for coconut hybrid production. Coconut climbing and pollination was men's territory so far, since the practice involved considerable drudgery and the risk. Women have learnt the steps in coconut pollination with ease and carry out the work with confidence.

In nutshell, the existing design of the research systems of coconut is well evolved and could be categorized under the sectoral system of innovation frame. The system is essentially a complex one with multitude of inter linkages at various levels of activities. In addition to this, system is also benefited by the coordination and replication functions provided by the All India Coordinated Research (AICRP) on palms. In

the recent period there is a proactive movement to ensure maximum possible participation of the stake holders' through the formation of strategic research clusters. The system has evolved not only as a research hub meant for the productivity growth of coconut, but also as a crucial facilitator of the entire process of technology generation to the technology refinement options pertaining to coconut sector.

However, the changing scenario of coconut sector warrants innovative strategies and approaches to address new challenges and sustain accelerated growth along with competitiveness and sustainability. In the present global scenario, it is evident that coconut requires to be promoted as a food crop for nutrition, health care and environmental services to safeguard the livelihood of millions of people. It is necessary to rope in global partners for collaborative programmes to address the long standing and complex problems in the sector. Efforts have to be intensified to gainfully utilize new frontiers of science and technology, which would include an understanding of structural and functional genomics, long term conservation of genetic resources through cryopreservation, development of varieties for biotic/abiotic stress tolerance and higher resource use efficiency, use of nanotechnology in disease diagnostics and targeted delivery of biomolecules etc.

Impediments in the trade spectrum

The significance of analyzing coconut sector in India in the light of recent policy issues, especially the ASEAN-India Free Trade Agreement (AIFTA) emerges in the context of commodity crisis. The likely impact of AIFTA could not be undermined for three reasons. Firstly, the present context should be seen as a continuation of evolving trade liberalization regime and the effects of such a regime on plantation sector. Secondly, although coconut and coconut oil is put under the negative list, the tariff reduction in palm oil, which is a close substitute of coconut, would turn up detrimental in the near future (Table 2). The surging palm oil imports in the recent years are noteworthy and substantiate this argument. Thirdly, the agreement is evolving one and the tariff rates fixed are ceiling rates (the maximum level to which tariff can be fixed), thus providing adequate flexibility to fix the tariff rates to lower levels. Although coconut and coconut oil are in exclusion list of AIFTA, there is a general commitment under AIFTA to review the exclusion list every year with a view to improve the market access. Obviously, there will be pressure to reduce the number of tariff lines kept in the exclusion list. Therefore, there always exists a threat in the case of coconut, seeing that, the existing price difference may facilitate the cheap imports in case of coconut removed from the exclusion list.

Tariff line	Base rate	2010	2015	2019
Crude palm oil	80	76	56	37.5
Refined palm oil	90	86	66	45
Coffee	100	95	70	45
Tea	100	95	70	45
Pepper	70	68	58	50

Regional trade agreements are becoming inevitable in the growth path of trade liberalization and globalization. The most important aspect in the evolving trade agreements regime is to appropriately reflect the sectoral interests/issues in the national agenda so that the sectoral apprehensions are well represented in the regional/ free trade agreements. In order to materialize this, in-depth sectoral studies in collaborative mode on various facets of coconut economy in India has to be conducted and well chalked out sectoral policy documents should be brought out. It is also necessary to find out the leverage points of the coconut sector wherein we can gain the competitive advantage vis-a vis the other competing countries in the international arena.

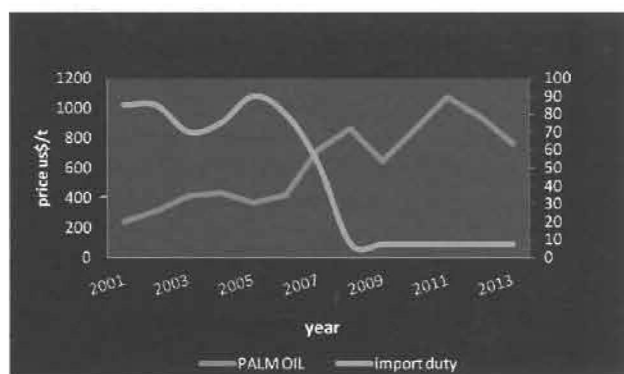
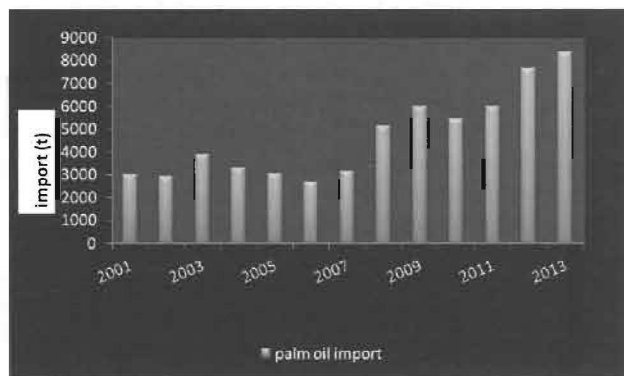
The import duties on edible oils have moved basically in counter-cyclical nature to the level of edible oil prices in global markets. This is a rational policy choice which is required to stabilize edible oil prices in the domestic market. Figure 1 shows the trend in international palm oil prices and correlates it with the Indian import duty structure for palm oil. In 2007-08, the international prices of palm oil were on an uptrend and therefore, the import duties on crude palm oil (CPO) and refined palm oil were reduced drastically to nil and 7.5 percent, respectively wef 1st April, 2008 to moderate the domestic prices of edible oils. But since 2012, the palm oil prices have been declining and the import duty still remains at a low level. In view of fall in international prices of palm oil, the import duty on crude palm oil was increased to 2.5 percent but remains the same for refined palm oil.

The import duty for palm oil has to be dynamically adjusted to its international prices as palm oil prices acts as an anchor to all edible oil prices. A bearish trend in palm oil prices exerts downward pressure on prices of all edible oils with an adverse effect on domestic production and further rise in palm oil imports. Therefore, there is an urgent need to re-calibrate the import duty structure.

For better trade relations among the APCC countries it is imperative to form a regional coconut trade agreement

among the APCC countries. The modalities of such a commodity specific trade agreement should be worked out with utmost care wherein we should end up in a win-win situation. In this respect we need to thoroughly analyze the existing tariff structure of each APCC countries and an unbiased tariff reduction schedule should be proposed. It is also important to consider the existing tariff structures of close substitutes/competing products of each countries and there by arriving at a consensus.

Figure 1. Palm oil imports and tariff structure



The nuances of existing innovation system

We have seen that the current innovation system of coconuts in India has huge strengths on the research front of coconut, but the lack of price stability, inadequate price support mechanism and marketing facilitation are the factors detrimental to the functioning of coconut value chain in the state. The innovation system for coconuts in India is unique wherein several governmental agencies/institutes undertake the research and development for the commodity, with evidently lacking collaborative efforts. Eight components delineated in the sectoral innovation system of coconut are: (i) In the research front, Central Plantation Crops Research Institute (CPCRI), (ii) at the policy level, Coconut Development Board (CDB), (iii) for marketing aspects of coconuts, National Agricultural Cooperative Marketing Federation of India Ltd (NAFED), (iv) the unorganized producers with small

and marginal holdings constitute the fourth component of the coconut innovation system, (v) the evolving Farmer Producer Organizations (FPOs) in the forms of coconut producer's societies, federations and companies, (vi) the intermediaries in the coconut sector operate in a very large grey area forming syndicates, lobbies and also practice the copra/coconut oil hoarding which causes continuous price fluctuations in the market (vii) the state departments of agriculture/horticulture and who are entrusted with the field level transfer of technologies. Besides these seven components, the most important but ironically the most under rated component is the local self governments which systematically operate at the grass root level. The lack of effective group coherence among different stakeholders is still remaining as a problematic facet in the sector. Though, there is huge potential for the collaborative synergy of these different Institutions, as a matter of fact, instead of the convergence, the redundancy of efforts is much more prominent in the sectoral front. It is high time that, especially in the historic centenary year of coconut research, we the researchers, developmental agencies, farmers and all other sectoral agencies/actors come together on the same platform to channelize our strengths, skills, experience and passion towards achieving a common goal-a rejuvenated, vibrant and sustaining coconut sector.

The forms of coordinations among different stakeholders operating to shape up the coconut innovation system are depicted in Figure 2. Here we have categorized the forms of coordination into four categories which are represented by different patterns of lines in the Figure. The forms of coordinations vary from non-significant to strong coordinations. It is interesting to observe that the strong coordination among the important stakeholders

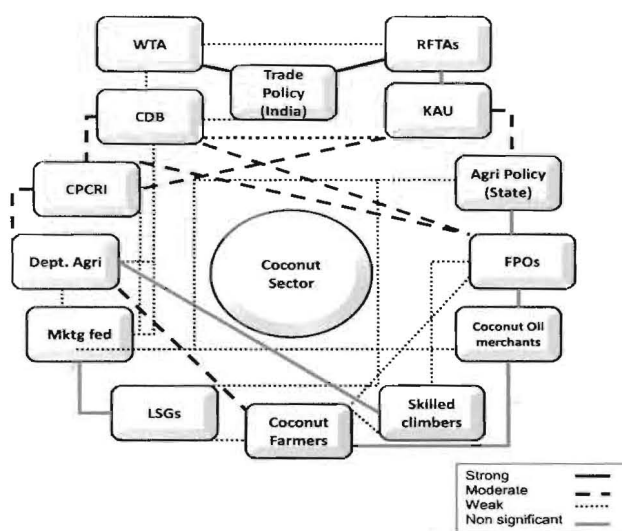


Figure 2. Forms of coordinations in coconut innovation system

are lacking in the system. In general the sectoral system is dominated by weak forms of coordinations, and in this scenario, it is highly imperative to identify the pulse points for corrections in the sectoral innovation system of coconut in India.

At present, the ambience of coconut sector in the domestic arena is positive wherein the horizontal node of the value chain aspect is strengthened by the formation of Coconut Producer's Society at the grass root level to Coconut Producer's Company at the highest level, thereby provides an excellent auxiliary support for the ambitious export orientation programmes. The strategic positioning of developmental and research support (CDB, CPCRI, KAU, NAFED) is another very important factor which will provide the much needed impetus for the sectoral development. Moreover, Indian export sector has become vibrant with very high growth rate since CDB has upgraded to the status of Export Promotion Council (EPC). The initiative taken by government in promoting neera in 2013-14 is also expected to revive coconut economy of the country.

In the future, it is envisaged that globally well connected and highly interlinked commodity chains will evolve, requiring a reorientation of the scope of the research and developmental Institutes to accommodate the restructured commodity chains and changing concept of commodity markets. The Institutes should take a lead role to re-engineer and revitalize the coconut sector in the country by providing adequate emphasis on product diversification and creation of neo-market platform to promote coconut as an organic health drink with Good Management Practices (GMP), Good Agricultural Practices (GAP) and Hazard Analysis and Critical Control Points (HACCP). Institutes should facilitate co-creative, innovative, vibrant social enterprises which will enable to pass on the value creation in coconut sector to farmers in an appropriate manner which reduces the social disparity. With the growing realization of lesser profitability in small farm holdings, producers and farmers should be encouraged to get together and form into small cooperatives or crop based organizations to develop and utilize community facilities for farm operations, post harvest processing and marketing to economize on production as well as marketing costs. Further, research orientation will lead to an increase in the number of economically viable coconut farms of different sizes and increase in the number of processing enterprises. As the technologies are adopted only when profitable, policy interventions in market and regulation of trade tariffs to the benefit of the industry to compete with global players are the way forward. To encourage investments in coconut sector, the government, as policy a policy matters must consider coconut as a priority crop in its national agricultural development agenda. ■