

Re-orientation of Coconut production to meet the demand for value addition

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Post harvest processing of coconut is now being changed from the edible and inedible traditional products to several other value added products. Research conducted by the Board and other research institutions with technical and financial support of the Board has developed new technologies for several coconut products and byproducts. Presently several food products are developed from coconut kernel like desiccated coconut, coconut milk powder, coconut milk and virgin coconut oil which are having high demand and prospects for commercial production and marketing. Hence high kernel output per hectare has now emerged as an important factor in coconut. We have to analyse various characteristics that facilitate industrial processing taking into account the changing uses of coconut and the changing

technologies in handling and processing. Other important changes, namely, the small size of holdings due to fragmentation of coconut land and the necessity to breed varieties and forms suitable for smallholder management need to be explored. A fast growing consumer demand is recorded for coconut kernel based products especially in those areas where fresh coconut are not readily available and in cities where people do not have enough time in grating coconut for various culinary purposes. Kernel based ready to eat products like coconut milk powder and edible coconut gratings are now acceptable and are widely used by different categories of consumers for usage in households, bakery and confectionary units, hotels and other fast food eating centers. Tender coconut is a refreshing drink and a delicious food across

the globe. It's valuable sweet water and gelatinous kernel is a tasty and healthy food. Value added products made from tender coconut are also available in the country. Another important value added product is Neera, the unfermented sap from coconut inflorescence. Several value added products from Neera such as Neera sugar, honey, chocolate and jaggery are also available now which are having fast growing demand. Hence there is need for reorienting production or coconut farming based on the demand of processing industries i.e. with high kernel content, nuts suitable for tender nut purpose and which can yield more Neera.

Increase production of nuts with higher kernel output

It is a matter of concern that there exist great disparity in kernel to nut

weight ratio in variety to variety and also soil to soil. The kernel output is low in India compared to other major coconut growing countries. Kernel nut ratio is different even in various states of India. The number of nuts required for production of one tonne of coconut kernel in Srilanka, Philippines, Indonesia and Malaysia ranges from 3000 to 3500 nuts against 4000 to 4500 nuts in India. This is also reflected in the price of coconut and coconut products in India and other countries. This demands the need for re-orienting our efforts both in research and development towards achieving increase in production in terms of higher kernel output per tree or per unit area.

Potash is one of the three major fertilizer element commonly recommended for successful production of any crop. It is required for coconut in large amounts. For example an arecanut tree requires 250 gram of potash while coconut palm requires 1200 gram per year, that is five times of the requirement for arecanut. Potassium is known to be important in plant metabolism in regulation of stomata function (water economy of the plant) and in the formation of chlorophyll. It also participates in photosynthesis, helps in root development, enabling uptake of more nutrients and water from the soil and subsequently in increasing yield and improving quality of nuts. Coconut is a heavy



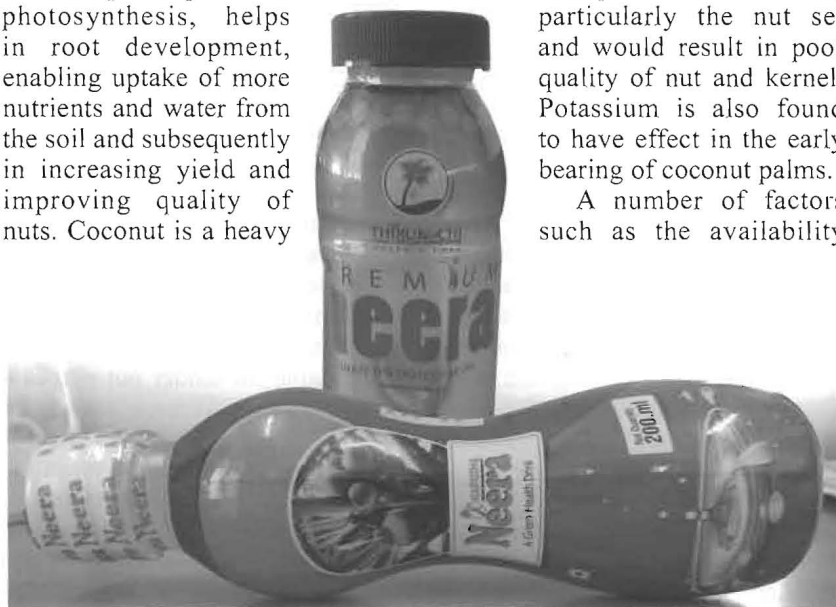
feeder of potassium. Potassium stimulates early shooting and early fruit maturity. Supplementing potassium in the soil substantially increases the yield. Experimental results revealed that palms receiving regular dose of fertilizers bear fruit at the fifth year of planting while palms with proper potash nutrition needed eight years to start yielding. Studies conducted indicate that nitrogen contribute only eight per cent increase in kernel yield whereas potassium contribute around 25 to 39% increase. Thus potassium plays an important role in coconut kernel quality and thickness. The deficiency of potassium affects all the production factors, particularly the nut set and would result in poor quality of nut and kernel. Potassium is also found to have effect in the early bearing of coconut palms.

A number of factors such as the availability

and the fixation of potassium in the soil affect potassium status of individual coconut soil. The absorption of potassium is interfered by an excess of nitrogen, calcium and magnesium in the soil, thus affecting potassium nutrition and kernel weight of coconut. The response of coconut to the available potassium is also influenced by other ionic inter-relationship in the soil and absorption of potassium by the palm.

For better and profitable farming and higher kernel yield, balanced fertilization with nitrogen, phosphorus and potassium is most essential. The general recommendation for fertilizing adult bearing palm is to apply 500g N, 320g P_2O_5 and 1200g K_2O in two split doses, namely $\frac{1}{3}$ of the above dosage during May- June and two - third during Aug - September. To supply this quantity of nutrient it is required to apply 1.1Kg urea, 1.5kg mussoriephos and 2 kg Muriate of Potash. This enables the farmer to get higher crop yield with higher kernel output.

High crude fibre content in kernel is perhaps related to firmness or rigidity of kernel. The high fibre kernel gives good quality kernel which is not rubbery and possesses more milk content. The same applies to expelling cream from grated kernel. Firmness or rigidity is favorable to efficient cutting of kernel into small particles for production of desiccated coconut or expelling cream. The mature kernel of dwarf varieties and immature kernel of tall varieties are known to contain lower levels of crude fibre than mature kernels. Hybrid varieties, especially Chandrasankara, Kalpasamardhi and Tall varieties Lakhadweep ordinary, Malayan Dwarf varieties are giving comparatively more kernel output than other varieties. Hence for future replanting and new planting programmes, planting of these varieties can be given more



preference. However, more varietal studies on kernel and coconut milk outputs are also to be taken up by research agencies.

Plant varieties suitable for tender nut

Studies conducted by various research institutions identified suitable varieties for tender nuts. Dwarf cultivars like Chowghat Orange Dwarf (COD) was recommended and released as best tender nut variety by CPCRI for this purpose. Besides these varieties such as Chowghat Green Dwarf (CGD) Gangabondam and Malayan Orange Dwarf (MOD) are also recommended for tender nut purpose. However, exotic varieties with more water content and sugar and other nutrient contents are also available in other countries suitable for cultivation in India for this purpose. Malayan Dwarf varieties, King Coconut seen in Sri Lanka and Cameroon Red Dwarf in African countries are suitable for cultivation in India for this purpose. These varieties can also be planted in our country while taking up new planting and replanting coconut to meet the tender nut demand in the market.

Suitable varieties for Neera production

Neera tapping and coconut palm sugar industry is another source of higher income to small coconut holders and making coconut farming profitable in future. Growing coconut palms with higher Neera production is another re-orientation in coconut farming which is required to meet the increasing demand of Neera and Neera based value added products. Neera yield differ with the variety, vigor of the palm and the seasons. Trees which yield large number of nuts and are in their prime age of around 40 years are known to produce plenty of Neera. The annual yield of neera in such palms had been found to vary



Letter to Editor

I write to convey our appreciation for the April 2015 ICJ issue and its excellent content beginning with the Chairman's page and the individual articles promoting coconut planting with carefully selected material to ensure viability of coconut farmers in the long term. The adage of 'beginning with the end in mind' is so true in coconut cultivation going forward today especially with the fast emerging non-traditional products of coconut of much higher and increasing value driven by the market demand. Selecting what to plant is to be determined by what final products one would pursue in the expanding market – this could become the trend in coconut cultivation. India's exemplary ways become the endorsed way forward also for many other coconut nations around the world.

Keep up the great work.



Uron Salum
Executive Director
Asian and Pacific Coconut Community
Jakarta, Indonesia

I found the April 2015 issue of Indian Coconut Journal very interesting.

Merv Aranha,
Concession Drive
Glencoe, Ontario, Canada



between 300 and 400 litres. In India an average yield of 300 litres has been recorded for a tapping period of six months. Studies on tapping in Sri Lanka revealed that the hybrids yield more neera than the Ordinary Talls (OT). In India varieties like DxT hybrids and Lakshadweep ordinary (Tall) have reported to higher neera yield/tree. The vigor of palms used for neera tapping should be maintained by adopting integrated nutrient management practices with irrigation to get maximum economic yield of Neera on a sustainable basis.

In household uses as well as for the local markets, the quality and yield of kernel, quality and quantity of water in tender coconut and neera yield per spathe or palm are important considerations. There are dwarf cultivars which are known to yield nuts containing large

volume of water with good flavour and higher contents of total and reducing sugars. Likewise, some hybrid and tall cultivars produce nuts with higher proportions of both kernel and neera. Such cultivars could be popularized and also used in breeding programmes. The neera yield of these cultivars and their hybrids is also likely to be high as high yielding palms are known to produce plenty of neera. Such cultivars or hybrids have to be identified and promoted.

Thus timely adoption of integrated management practices, planting hybrids and other varieties suitable for kernel, neera and tender coconut production are essential to re-orient production based on demand for processing industry for making value added products suiting the changing need and taste of the customers. ■