

**Sub: Promoting new initiative products from coconut trees - Neera, palm sugar, palm syrup and honey reg.**

***Hearty Greetings from Coconut Development Board !***

We wish to place on record our sincere thanks for the timely efforts taken by the Government of Karnataka by declaring support of Rs.700/- per quintal in addition to the Government of India declared MSP of Rs. 5350/- per quintal for ball copra. This measure is bound to provide a great relief to the coconut growers of the state. Still the price crisis seems to be prolonging even beyond the normal period. Various measures have been initiated by Government of India and Government of Karnataka to tide over the crisis since January 2012. One of the major factors that contributes to this price crisis is the fact that processing of coconut is confined to conversion into copra and coconut oil, in spite of coconut being a crop of multifarious uses. Hence the pricing of coconut and copra has always been influenced by the prevailing prices of coconut oil in the domestic and international markets. India, being a country deficient in edible oils, coconut oil prices, in turn, are impacted by the fluctuations in the prices of other edible oils. Thus the price of coconut is highly dependent on prices of other edible oils. In the globalised market, with regional trade agreements like SAARC, SAFTA, ASEAN etc working towards a free market, low to zero import duties on palm oil, lack of trade restrictions etc are facilitating large scale import of edible oils, especially palm oil, and thereby the price fall in coconut is likely to be repetitive phenomenon. It is high time to get the price of coconut out from heavy negative impact of oil prices. It is in this context that the Board would like to put forth to your kind attention, the prospects of Neera.

As you know, Neera, the non-alcoholic, mineral rich and nutritious health drink is the vascular sap of the immature inflorescence of coconut which can be promoted due to its potential for value addition, employment generation and better returns to the coconut farmers. Potential of the products that can be produced from the inflorescence sap and the revenue generation is detailed in the note attached herewith. All major coconut growing countries like Srilanka, Indonesia, Phillipines, Malaysia, Thailand and Vietnam have gone much ahead in Neera production and value addition. A wide variety of value added products like “coconut syrup”, crystal sugar and jaggery can be produced from Neera. These products have huge prospects in the domestic and international markets owing to the health and nutritive attributes of the products. All the major coconut-growing countries of the world like Phillipines, Thailand, Indonesia and our neighbouring country Srilanka have exploited the potential of this product in the domestic and export market. Last year the production of coconut palm sugar from Neera had crossed 6 lakh tones in Indonesia alone; of which 25% was exported to USA.

The major hurdle in the production of Neera and other products like coconut palm sugar is that even though Neera contains zero alcohol, license is to be taken for the tapping of the inflorescence. Neera, coconut sugar, coconut palm jaggery, coconut flower syrup etc are exported by the producing countries world wide. The products are now being imported to India, with zero duty and made available in the retail stores in the country. Neera is already marketed in the shops in the country. When such conditions prevail owing to the opening up of the economy, there is no logic and rationale in restricting the production of Neera and other value added products. It is high time that the tapping of coconut inflorescence be permitted so that the production of value added products from Neera

can be undertaken. Measures have already been taken by the Department of Horticulture, Government of Karnataka for production of Neera on a pilot basis in the Horticulture farm at Thumbe with support from CDB.

Coconut Development Board has already established **Coconut Producer Societies (CPS)** in the major coconut growing regions. The CPS are registered charitable societies, with 40-100 member farmers, who associate together as a group for undertaking production, processing and marketing of coconut in a sustainable manner. As on date, 1609 CPS have been registered with the Board. Board intends to integrate 15-25 CPSs to form a **Coconut Producers Federation (CPF)** and integrate 10 federations to form a **Producer Company** with 51% share holding by coconut farmers. The formation of 30 Federations have already been completed and are registered with the Board. The first Producer Company will be launched during this year. Board intends to form at least 10 Producer Companies in the initial phase.

The Board is planning to initiate 1000 CPS in Karnataka during this financial year. The CPS will be integrated to form CPF. Under the auspices of well functioning Coconut Producer Societies and their Federations, production of Neera, coconut palm jaggery, syrup and sugar can be undertaken by issuing them license. The export market also offers huge potential for such value added products. CDB being the Export Promotion Council for the export of coconut and coconut products(other than coir), promotion of export will bring in more foreign exchange.

Board proposes that Neera be sold only in processed, preserved and packaged form and as other value added products so as to ensure the quality and consistency of the product. Coconut bioparks under the auspices of the State Government will also aid in enabling hygienic production, preservation and packaging of Neera and other products like coconut palm sugar. Karnataka being a state promoting industries for the fields of economic and social development, coconut needs to be put in the forefront. And the best potential option is products like Neera, coconut palm sugar, palm jaggery, coconut syrup etc which are highly nutritive, healthy, rich in minerals and have an established growing market, both domestic and international.

Under the above circumstances, once again it is requested for initiating a conducive policy to well functioning Coconut Growers Associations and federated Coconut Producers Societies(CPSs) which are registered with CDB for the production of Neera, coconut sugar, coconut honey, syrup etc. Such a policy will result in ensuring coconut farmers a better income, diversifying into various value added products with health attributes and generation of rural employment and rural income. Concerted efforts were initiated by the State Government for production of Neera and we wish to continue the efforts so as to open a new niche market for coconut with high potential for growth. **Policy decisions at the Government level may kindly be considered for issuing license to well functioning and federated Coconut Producers Societies for tapping of the coconut inflorescence for the production of Neera, coconut palm sugar etc.**

Yours sincerely,

(T. K. Jose)

To  
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### **Note on Prospects of value added products from Coconut Neera.**

India stands **first in productivity (8323 nuts/ha), second in production ( 15730 million nuts)and third in area under coconut.** The crop contributes more than Rs 8000 crores annually to the GDP and earns valuable foreign exchange to the extent of Rs 2000 crores by way of export of coconut products. The contribution of the crop to the vegetable oil pool in the country is about 5 per cent and the crop sustains 10 million people of the country through cultivation, processing, marketing and trade related activities. Under these circumstances, the crop holds much value in the Indian economy.

Karnataka has a total area of 4.3 lakh ha under coconut and stand second next to Kerala in total area under coconut. The annual production in the state is 30,563 lakh nuts in a year. Coconut is cultivated in 29 districts and occupies acreage more than 10,000 ha in 11 districts. The crop is one of the most important horticultural crops cultivated in the state.

Coconut cultivation in the state is undertaken in small and marginal holdings. But the mindset of the traditional coconut grower is attuned to processing for copra and coconut oil that their thoughts do not go out of this oil circle. But coconut is not just an oilseed crop. Exploiting the potentials of this crop to enable production of value added products will help in protecting the farmers from the annually recurring price fall during the peak production months.

It is in this context that products from the **coconut inflorescence sap like Neera, coconut palm syrup, jaggery, coconut sugar** etc gain importance. **Neera is the non-alcoholic and nutritious drink from the immature inflorescence of coconut** which can be promoted due to its potential for value addition, employment generation and better returns to the coconut farmers. Products like **coconut flower syrup, jaggery and coconut palm sugar are produced from Neera.**

The processing and nutritional attributes of the different Neera products are detailed below.

#### **I. Neera**

The vascular sap collected from immature unopened coconut inflorescence is popularly known as “**Neera**” in fresh form. It is a sugar containing juice and is a delicious health drink and a rich source of sugars, minerals and vitamins. It is sweet and oyster white in colour and translucent. It is tapped from the coconut inflorescence and is filtered, pasteurized, and bio preservatives added to preserve the product. Treated Neera can be preserved in cans upto 2 months at room temperature. It can also be packed in tetra packs or glass bottles. Tapping can be done for 6 months in an year. The cost of processing was found to be Rs. 3.80 in the case of bottled Neera(200 ml), Rs. 8.10 in case of canned Neera (200 ml) and Rs. 5.30 in flexible packages. (Source : CFTRI)

#### **Uses of Neera :**

Neera is popular as a **delicious health** drink. It is good for digestion, facilitates clear urination and prevents jaundice. The nutrient-rich "sap" is **has low Glycemic Index** (GI of only 35) and hence **diabetic-friendly** since very low amounts of the sugar is absorbed into the blood. It is an **abundant source of minerals, 17 amino acids, vitamin C, broad-spectrum B vitamins,** and has a nearly neutral pH. Coconut crystals can be made out of this pure, low glycemic natural sap. While most brown sugar is boiled at temperatures up to 221 degrees F with the end product containing 93% sucrose, sap crystals contain only 0.5% glucose, 1.5% fructose, 16% sucrose, and 82% inulin - a prebiotic that promotes

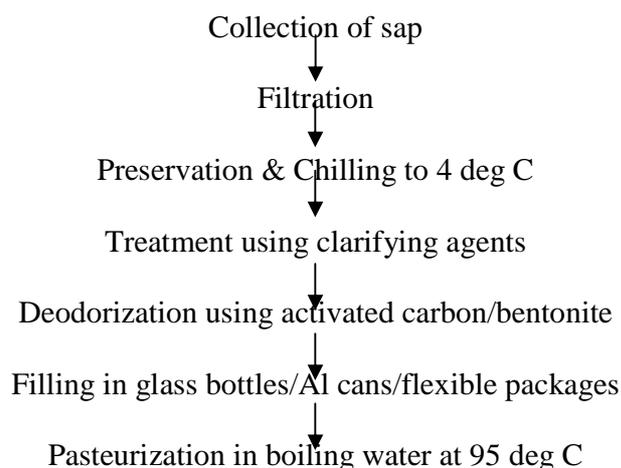
digestive health. It can be used as an ideal sweetener. Neera fetches much better returns compared to copra.

### Composition of Neera

Composition	
Total solids ( g/100 ml)	15.2-19.7
pH	3.9-4.7
Specific gravity	1.058-1.077
Total sugars( g/100 ml)	14.40
Original reducing sugars( g/100 ml)	5.58
Total reducing sugars ( g/100 ml)	9.85
Total ash( g/100 ml)	0.11-0.41
Citric acid ( g/100 ml)	0.50
Alcohol in %	nil
Iron ( g/100 ml)	0.15
Phosphorus ( g/100 ml)	7.59
Ascorbic acid (mg/100 ml)	16-30
Total protein ( g/100 ml)	0.23-0.32

Technologies have been developed for the preservation of “Neera” by Central Food Technological Research Institute(CFTRI) and Defence Food Research Laboratory(DFRL) under a project funded by the Government of Karnataka. The Regional Agricultural Research Station at Pilicode under the Kerala Agricultural University have also developed technology for the ‘preservation of Neera’ and the production of many non alcoholic value added products like soft drinks, concentrates, granules, toffee, jam, cake, wine etc from coconut inflorescence sap.

### Process flow chart for the production of Neera





*Coconut inflorescence*



*Tapping of unopened inflorescence*



*Neera*



*Branded Neera manufactured by the Karnataka Horticulture department available as a soft drink*

**Estimated Project cost for Neera production (1000 litres capacity per day )**

Land Required	40 cents
Building (3000 sq ft)	21.00 lakhs
Plant and Machinery	45.00 lakhs
Electrification	03.00 lakhs
Preoperative expenses	03.00 lakhs
W Capital Margin Money	03.00 lakhs

**Total Project Cost**                      **Rs 75 lakhs**  
(Excluding land)

**II. Coconut flower syrup :**

This is a product similar to jaggery with **high content of minerals**. It is a **rich source of potassium**. It has good content of sodium and is **free from total fats and cholesterol**. It is produced when fresh Neera is heated and concentrated into a syrup. The input output ratio is 6:1. The syrup has 50% sucrose content and possess **low glycemic index at the levels of 35GI** which indicates that low levels of sugar gets absorbed into the blood thus making it **safe for diabetic patients**.

**Production of coconut flower syrup in Thailand**



*Tapping of inflorescence*



*Preparation of syrup*



*Concentration*



*Retail pack in market*

*Packing of syrup*

**Uses of coconut syrup :**

The product can be used for healthy food preparations, as topping on wide variety of appetizer, dessert or beverage, for delicious serving and for a healthy lifestyle. It is also used as a health drink in connection with Ayurveda and other systems of medicine.



*Toppings on cakes, ice creams*



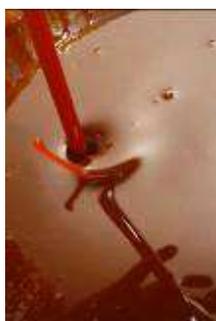
*Coconut fruit juice drink*

**III. Coconut palm jaggery :**

The strained unfermented coconut sap is boiled, and crystallized and transferred into suitable moulds to prepare jaggery. The semisolid jaggery solidifies gradually by the cooling effect of the atmosphere into a crystallized hard substance. The recovery of jaggery from syrup is 15% The nutritional composition of coconut palm jaggery in 100 g is detailed below.

Component	Quantity in mg
Thiamine	21.00
Riboflavin	432.00
Nicotonic Acid	5.24
Ascorbic Acid	11.00

It is used as a sweetening agent for the preparation of dishes and is superior to cane jaggery.



*Coconut palm jaggery*



*Coconut palm jaggery crystallized into blocks*



*Coconut palm sugar*

#### **IV. Coconut palm sugar :**

The coconut palm syrup or jaggery can be crystallized to produce fine granules of sugar. Transition of coconut jaggery into a ground granule sweetener is more accepted by global markets. The recovery of palm sugar from coconut palm jaggery is 15%. The application of this sugar is tremendous and offers huge potential owing to its most important health attributes, the **low Glycemic index and the high nutrient content**. It can be the **most suited alternative sweetener**, especially when agave sugar is being rejected owing to the high fructose content. This alternative sugar industry is estimated to be a \$1.3 billion industry and hence the market prospects are enormous.

It is understood that in producing countries like Indonesia, around 50,000 MT of coconut sugar is produced per month and 6 lakh MT produced per year. The product has good local market in Indonesia. Indofood, an important brand of instant noodle is found to buy 30,000 MT of coconut sugar in a year. Unilever purchases the same volume for their sweet soy sauce.

#### **Nutritional composition of coconut palm sugar (in 100 g)**

<b>Component</b>	<b>Quantity</b>
Moisture	0.06 %
Protein	432 mg
Minerals	5.24 mg
Carbohydrate	11.0 mg
Calcium	18.9 mg
Phosphorous	1.9 mg
Iron	5.2 mg



*Coconut palm sugar*



*Organic palm sugar*



*Different brands of Coconut palm sugar*



## **Neera tapping and coconut palm sugar production undertaken in Indonesia – a case study**

During the recently conducted technical seminar COCOTECH at Kochi, details of Neera tapping undertaken in Indonesia were presented which has proved beyond doubt that this can be undertaken on a community basis thereby generating rural income and rural employment. The highlights of the Indonesian experience in Neera production are

- Average tall (unimproved) coconut produces 3-4.5 liters of fresh nectar/day.
- Average collector can manage 30-50 trees/day and tapping done twice a day
- Final yield per day is an average of 15 kg/producer family or 450kg/month
- Indonesia currently has well over 100,000 farmers within population that rely on Neera and coconut palm sugar as their primary income.
- Those 100,000 coconut sugar producers bring over 50,000 MT of coconut sugar to market domestically every month.
- Over 6,00,000 MT of coconut sugar produced and mostly consumed domestically in Indonesia every year.
- Indofood ( an Indonesian powerhouse brand of instant noodles) purchases over 30,000 MT per year. Unilever buys almost the same volume for their sweet soy sauce product.
- The product has good local market in Indonesia.

**Conclusion :** The production of Neera and other value added products from Neera can be undertaken on a commercial scale under the auspices of Coconut Producer Societies and Federations of CPS due to the following factors

**From the producers point of view**, when 25% of the inflorescences in a palm, i e., 3 inflorescences are marked for production of Neera and other products, it not only earns the farmer **more returns and results in production of diversified products**, but also reduces arrivals of copra/coconut oil in the market thereby stabilising the demand and price of coconut and its products.

**From the consumer point of view**, Neera, coconut palm syrup, jaggery and sugar possess **low Glycemic Index**, are rich in minerals and free from fats and are hence ideal sweetening agents for a wide variety of dishes. India being a country where the proportion of health conscious and diabetic people are growing, products with low GI and high mineral content like palm syrup, jaggery and sugar offer a better substitute to cane sugar and sugar free sweeteners available now. Products like **coconut flower syrup, jaggery and coconut palm sugar produced from immature coconut inflorescence sap** were displayed during the recent Cocotech seminar conducted at Kochi and have consolidated niche markets in major consuming countries.

**From the marketing point of view**, arrival of coconut into the market as coconut, copra and coconut oil has diminished the market prospects for this potential crop resulting in recurring price fall. Diversification into more useful and healthy products will enable stabilization of demand for the varied products including copra and coconut oil that the farmers will not have to succumb to price crash. A community based planned production under the auspices of Coconut Producer Federations promoted by CDB can bring into the market different value added products from Neera and establish speciality markets for each product.

**From the social point of view**, production of Neera, coconut palm syrup, jaggery and sugar generates rural employment and rural income, which adds to the GDP of the state. Since the cash flow from tapping of inflorescence is daily and steady, the standards of living of the coconut farming community is also improved. Increased stabilized returns will bring in more investments into the sector resulting in sustainable overall development of the society.

Under these circumstances, considering the health attributes of Neera and other value added products from Neera, it is requested that a conducive policy may be considered at the Government level permitting well functioning Coconut Producer Federations (CPF) comprising of an integration of Coconut Producers Societies(CPSs) for the production of Neera, coconut palm syrup, jaggery and sugar. This will result in ensuring coconut farmers a better income, diversifying into various value added products with health attributes and generation of rural employment and rural income.

Marketing Division  
Coconut Development Board

## **Economics of production of Neera and various products from Neera**

### ***Assumptions :***

Number of palms per hectare is 160

Total number of palms tapped in a hectare is limited to 80.

Number of inflorescences tapped per tree per annum is 3

Average productivity per ha in Karnataka is 7110 nuts/year.

Cost of one litre of Neera is put as Rs. 50/-

Conversion ratio from Neera to jaggery is 6:1.

Cost of one kg of coconut palm jaggery is put as Rs. 250/-

### **Estimated returns from coconut sale**

Item	Price in Rs/nut				
	Rs. 4/-	Rs. 5/-	Rs. 6/-	Rs. 8/-	Rs. 10/-
Value of product in Rs.	28,160/-	35,200/-	42,240/-	56,320/-	70,400/-

### **Estimated returns from copra sale**

(at MSP of Rs. 51/- per kg)

Item	Copra
Yield	1016 kg
Value of product in Rs.	51,816/-

### Estimated returns from Neera

Item	Yield of Neera		
	@ 1 litre/tree/day	@ 2 litre/tree/day	@ 3 litre/tree/day
Yield of Neera in litres	7200 litres	14400 litres	21600 litres
Yield of Neera from 80 palm tapped for 3 months	7200 litres	14400 litres	21600 litres
Returns from Neera @ Rs. 50 per litre	3.6 lakhs	7.2 lakhs	10.8 lakhs
Returns per palm	Rs. 4,500/-	Rs. 9,000/-	Rs. 13,500/-
Returns to farmer in the proportion of 75 % of production	2.7 lakhs	5.4 lakhs	8.1 lakhs
Returns to tapper in the proportion of 25 % of production	0.9 lakhs	1.8 lakhs	2.7 lakhs

### Estimated returns from coconut palm jaggery

Item	Production of Neera at		
	@ 1 litre/tree/day	@ 2 litre/tree/day	@ 3 litre/tree/day
Yield of jaggery in kg	1200 kg	2400 kg	3600 kg
Returns from jaggery @ Rs. 250 per kg	3.0 lakh	6.0 lakh	9.0 lakh

Tapping of 25% of inflorescences (3 inflorescence) in a palm for production of Neera will yield additional income to the farmer and to the tapper, without much reduction in yield. The Coconut farmer communities in the Federations of CPS can work out a viable proportion of production of Neera and jaggery so that the products can cater to defined segments of the society. Neera being a sweet and nutritious health drink can be promoted among all sections of the society. Coconut palm jaggery owing to their low Glycemic Index can be positioned as a safe and healthy alternative sweetener. If we convert jaggery further to coconut palm sugar, value addition is still better.