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# Coconut flower - market potential and future forecast in the Coconut Land (Bến Tre), Vietnam

Dai-Long Ngo-Hoang<sup>1</sup>

<sup>1</sup> Vietnam National University Ho Chi Minh City

**Funding:** No specific funding was received for this work.

**Potential competing interests:** No potential competing interests to declare.

## Abstract

Coconut inflorescence sap (Coconut nectar), commonly known as neera of Coconut flower, is a sweet and nutritious liquid collected from the immature coconut spadix. It is not only a popular health drink but also a rich source of various essential nutrients such as sugars, proteins, minerals, antioxidants, and vitamins. Due to its numerous health benefits, neera has gained immense popularity as a natural drink and a raw material for value-added products like natural coconut sugar, palm syrup, jaggery, and honey. The use of geolocation marketing strategies that leverage local knowledge and practices can greatly benefit the livelihoods of coconut farmers in Bến Tre, Vietnam.

**Dai-Long Ngo-Hoang<sup>1</sup>**

<sup>1</sup> *Economic Geography & Regional Development Section, Faculty of Geography (Room A222); Vietnam National University – Ho Chi Minh City (VNU-HCM); University of Social Sciences and Humanities (USSH); 10-12 Dinh Tien Hoang, Ben Nghe Ward, Dist. 1, Ho Chi Minh City, Vietnam; Tel: +84 (0) 98 498 16 04; Email: [dsilong0606@yahoo.com](mailto:dsilong0606@yahoo.com)*

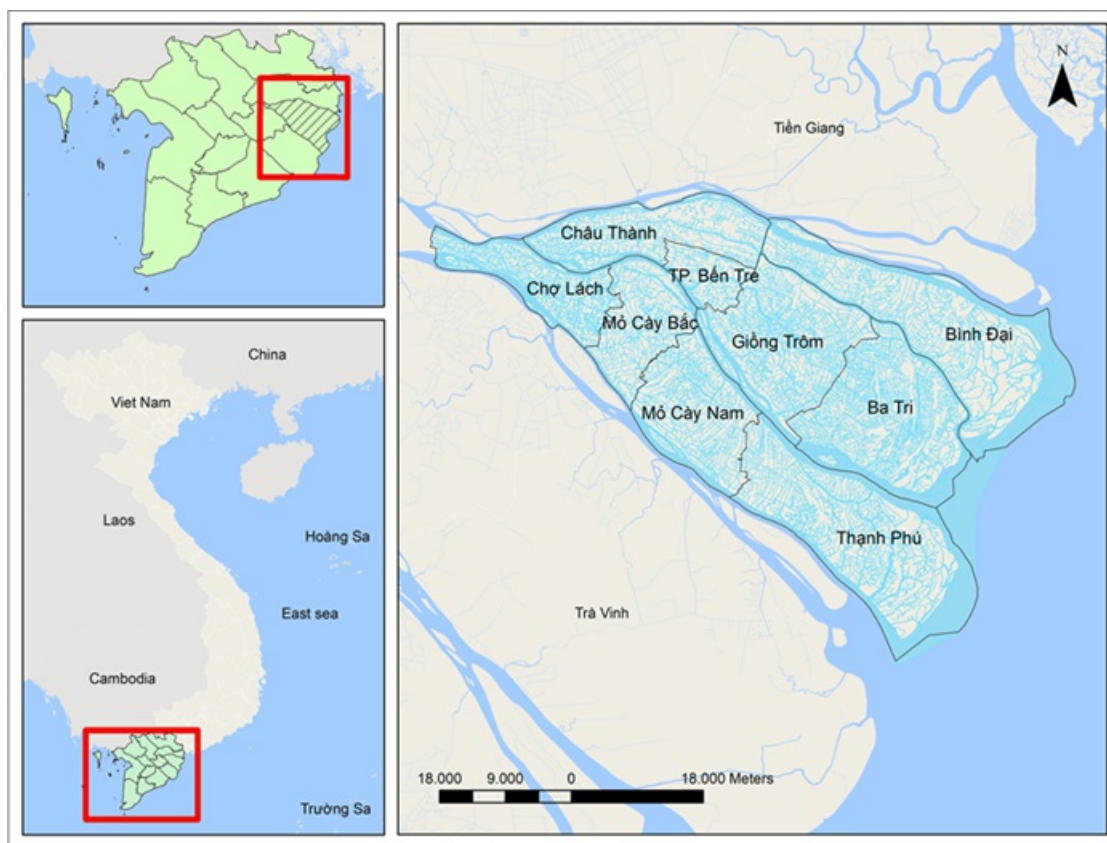
**Keywords:** Coconut nectar, diversification, neera, tapping, coconut farmers.

## Overview in the Coconut Land (Xứ Dừa)

Bến Tre is home to the largest coconut-growing area in Vietnam, with 60,000 hectares of land dedicated to coconut cultivation, accounting for 50% of the country's total area. The region produces over 600 million coconut fruits annually, with each tree producing an average of 12 flowers. The flowers are composed of a green outer shell called a coconut mo, with male and female flowers inside. Once the male flowers open, they pollinate the female flowers which develop into coconuts. Each flower can produce more than 0.6 liters of honey every 12 hours, with a total of approximately 30 liters of fresh honey obtainable over a 30-day cycle. The flowers are collected in succession, with honey being harvested for 9 months each year while the trees are nourished for the remaining 3 months. Additionally, the fresh nectar from coconut

flowers can be used to produce over 60 value-added products.

Coconut farming has been an essential source of livelihood for many people in tropical regions for centuries. However, due to frequent price fluctuations of major coconut products such as nut, copra, and oil, coconut farmers face numerous challenges to sustain their livelihoods. As a result, there is a growing need for product diversification in coconut farming. Neera tapping provides an excellent opportunity for farmers to diversify their products and earn a higher income.



**Figure 1.** Case study in the Coconut Land area, Bến Tre province

## Coconut nectar has numerous health benefits that can contribute to overall well-being

One of its benefits is its ability to balance blood sugar and regulate blood pressure. Bến Tre's coconut (Vietnam) nectar has a low glycemic index of less than 45, making it suitable for people on a diet and those with diabetes. A low glycemic index is classified as  $GI \leq 55$ , moderate as  $GI: 56 < 69$ , and high as  $GI \geq 70$ .

Moreover, coconut nectar can boost immunity and promote a healthy immune system. It contains polyphenols, which are antioxidants that provide a range of health benefits, including anti-aging, moisturizing, and improving skin health.



**Figure 2.** Coconut tapping

Coconut nectar also helps balance electrolytes in the body by providing essential minerals and replenishing fluids. This can contribute to better nerve function and improve overall physical performance.

Lastly, coconut nectar can promote digestive health by stabilizing bowel movements and strengthening the digestive system. This can help maintain a healthy gut and improve nutrient absorption. Overall, incorporating coconut nectar into one's diet can provide numerous health benefits and contribute to a healthier lifestyle.

## The indigenous knowledge method

The neera tapping process involves collecting the sap from the immature coconut spadix. However, to obtain economic benefits from neera tapping, various factors must be considered. These factors affect the quantity and quality of neera collected, and improving them can lead to increased production and profitability. This review covers some of the critical factors that influence neera quantity and quality, providing valuable information for researchers and farmers to improve neera characteristics for commercial utilization.

The traditional method of harvesting coconut nectar is similar to that of palm nectar collection and has been practiced in many countries including Malaysia, the Philippines, and South India since ancient times. During honey collection, the coconut tree does not produce fruit. However, when the tree is tall and climbing to collect honey is risky, farmers may release the tree to produce fruit. During this period, the tree is well cared for and produces an abundant yield. According to a 2010 report by FAO, coconut sugar is considered the most sustainable sweetener in the world due to its positive impact on improving livelihoods, adapting to climate change, and promoting sustainable consumption trends. In fact, coconut trees in the same area can produce 50-70% more sugar than sugar cane. Adopting the practice of collecting coconut flower nectar helps increase the economic value for farmers by 3-5 times.

## Techniques for exploiting coconut nectar

The widespread utilization of coconut nectar in producing various healthy food items, such as coconut sugar, vinegar, syrup, soft drinks, bottled nectar, and wine, can be observed in numerous countries like the Philippines, Malaysia, Sri Lanka, Thailand, and India.

The fact that the people of Bến Tre have been cultivating coconuts for over 200 years exemplifies their inherent curiosity and admiration for indigenous knowledge. Their extensive experience with coconut farming is a true testament to their commitment to learning and valuing local expertise.

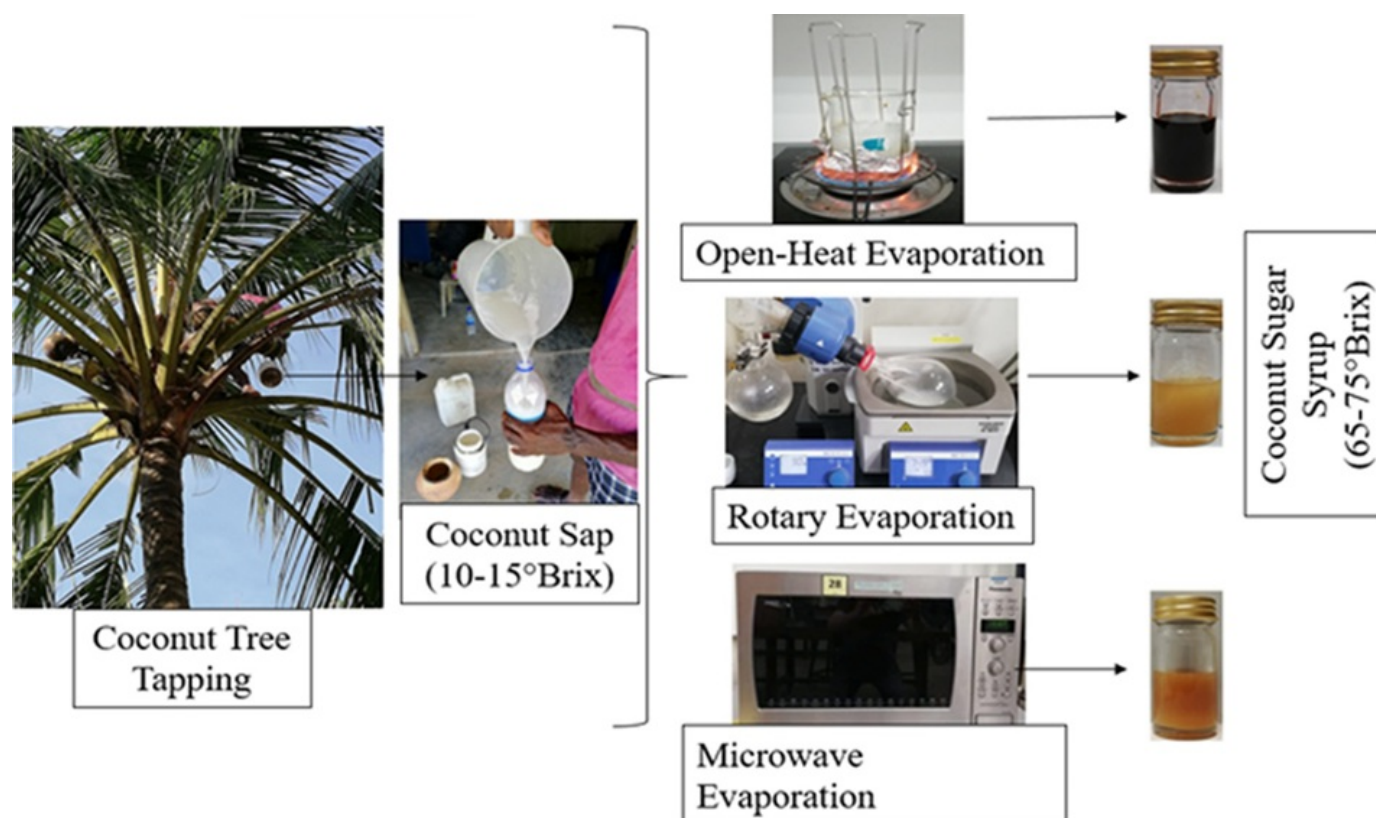
To collect coconut nectar, follow these steps:



1. Choose coconut trees that have given stable fruit for at least 6 years.
2. Select the 4th inflorescence that has just begun to open and process to collect nectar in the 3rd inflorescence. Continue sequentially in the next inflorescence after about 20 days.
3. Stimulate the plastic vessels to secrete nectar out by using a wooden pestle to beat around the inflorescence about 5cm towards the top. Tap and cut off about 3-5 mm/inflorescence twice a day in the morning and afternoon. Gently pull the inflorescence until the nectar flows out.
4. Collect coconut nectar twice a day in the morning or late afternoon using porcelain vases, bamboo tubes, or plastic vases placed directly in the flower. Collect nectar for 1 month from each coconut inflorescence with an average yield of 30 liters/inflorescence. Stop collecting nectar after about 6 months to allow the coconut tree to recover. Coconut nectar can be used to make various products with high economic value.

**Box 1.** In-depth notes from an experienced Bến Tre farmer, 2009

One of the critical factors affecting neera tapping is the age of the coconut tree. Neera tapping can begin when the coconut tree reaches its reproductive stage, which is around 6-7 years old. Trees that are too young or too old may not produce sufficient sap for tapping, leading to reduced profitability. Therefore, farmers need to ensure that their coconut trees are of optimal age for neera tapping.



**Figure 3.** Processing of coconut sap into sugar syrup

Another important factor that affects neera tapping is the season. Neera tapping is most productive during the rainy season when there is high humidity and moderate temperatures. The sap flow in the spadix is also higher during this period, leading to increased sap collection. However, during the dry season, the sap flow decreases, and tapping may not be as profitable. Therefore, farmers should plan their neera tapping activities during the rainy season for maximum profitability.

The method of tapping also significantly affects neera quantity and quality. Traditional neera tapping involves making a cut on the spadix and collecting the sap in a pot. However, this method can damage the spadix and reduce sap flow, leading to reduced yield. Therefore, modern methods that involve using a tapping machine to collect the sap have been developed. These machines make a small cut on the spadix, which minimizes damage to the spadix and increases sap flow, leading to increased yield and profitability.

The time of day when tapping is carried out also plays a crucial role in neera quantity and quality. The sap flow is highest early in the morning and decreases as the day progresses. Therefore, tapping should be carried out early in the morning to collect the maximum amount of sap. Additionally, the sap collected should be stored properly to prevent fermentation, which can affect its quality and reduce its shelf life.

The location of the coconut tree and its surroundings also affect neera quality. Trees that are located in areas with high pollution or chemical contamination may produce sap that is not suitable for human consumption. Therefore, farmers should ensure that their coconut trees are planted in a clean and pollution-free environment to produce high-quality sap.

## Use coconut nectar to produce some nutritious food

Coconut nectar is not only a highly nutritious product obtained from the young coco flower corn, but it also serves as a versatile ingredient that can be transformed into around 60 derivative products. Rich in carbohydrates, with sucrose accounting for 14.8-16.6% of its content, coconut nectar also contains a diverse array of other essential nutrients. These include 14 amino acids, 12 different vitamins, and minerals ranging from 0.3-0.4%. Notably, the nectar is abundant in glutamic acid, an essential amino acid for the nervous system and male gonad reproduction, with a content of 34.20 mg/100g. It also contains Inositol, a vital vitamin that has numerous health benefits.

To process sugar from coconut nectar, one must first collect the nectar from coconut trees using tools such as bamboo tubes or plastic pipes. The collected nectar is then combed and cooked on low heat. The nectar is boiled for 1 hour and 30 minutes until it thickens, and is constantly stirred to prevent burning. The mixture is then poured into molds to form sugar lumps, and can be further broken down into granulated sugar by heating and stirring until small particles are formed. The final product is cooled, weighed, and packaged. This process involves several steps, including collection, preparation, cooking, granulation, and packaging.

**Box 2.** In-depth notes from an experienced Bến Tre farmer, 2009

## Conclusions and recommendations for the Bến Tre province in the future of a socialist-oriented market economy

In conclusion, neera tapping provides an excellent opportunity for coconut farmers to diversify their products and increase their income. In the context of climate change, sustainable livelihoods, and circular economy in Bến Tre, the coconut palm holds great importance as a versatile crop that can contribute to the resilience of farming communities. However, with the volatile prices of copra, small farmers are facing difficulties relying solely on copra production for their income. Therefore, diversification of coconut farming is necessary for the sustainability of coconut growers. The coconut inflorescence sap, as a natural health drink, has enormous potential in the Indian market as well as in other countries such as Sri Lanka, Indonesia, Thailand, Myanmar, Africa, the Philippines, and Pacific Ocean Islands.

If properly promoted, it can become a valuable commodity not only as a health drink but also as a raw material for various value-added coconut products like syrup, sugar, and honey, which have significant export potential in developed markets such as the USA and Europe. This would ensure the profitability of coconut cultivation, contributing to the livelihoods and well-being of coconut communities and supporting the transition towards a more sustainable and circular economy.

Although there is limited research on the parameters of coconut nectar exploitation and production in Bến Tre, it is important to conduct comparative studies with other countries in the Asia Pacific region that have a well-established coconut industry. The qualitative evaluations presented in this article suggest potential issues but are not comprehensive. Conducting research on the yield and quality of coconut nectar in Bến Tre, and comparing it with other countries, would provide better information to support decision-making and improve the livelihoods of local communities in the face of climate change. Such research would also contribute to increasing the value of indigenous coconut trees.

Despite being a vital source of income for many communities in Southeast Asia, the extraction of coconut nectar is a role that often goes unnoticed. This long-standing tradition is particularly important in the western Pacific coasts where nipa coconuts are a primary source of income for a sizable portion of the population. In the Philippines, for instance, coconuts were the primary source of sugar and alcohol production in the 1910s, with an output of 100,000 liters at that time. Coconut nectar serves as an excellent raw material for the food and pharmaceutical industries, and is a vital source of income for farmers in Thailand and the Philippines. The high-quality, deliciously flavored coconut sugar from Malaysia is also exported and has gained popularity among consumers worldwide. Despite its importance, the role of coconut nectar in supporting these communities and industries is often overlooked.

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