

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA



Vinasamex

- Hanoi, Vietnam
- Agro-industry
- vinasamex.com
- Analysis period: 2018-2023

Using Cinnamon Waste as Fuel for Product Drying

Business Spotlight

The Vietnam Star Aniseed Cassia Manufacturing and Exporting Joint Stock Company (Vinasamex) is a leading producer, trader and exporter of organic cinnamon, star anise and other spices. Vinasamex aims to create positive social impact by bringing sustainable value to people, stakeholders and the company. As a contribution to the circular economy, Vinasamex replaced coal with cinnamon by-products and cinnamon branches and leaf residue that remain after the distillation process. These by-products are now used as fuel for drying of the company's cinnamon, ginger, turmeric, onion, garlic, lemongrass, and chili products. This helps to reduce carbon emissions by using biomass instead of coal, increase company revenues, and boost income for the farmers by buying their agricultural by-products. This environmentally and socially responsible business practice also has a positive effect on the company's reputation and image. Vinasamex continues to pursue its green journey by scaling up this circular economy solution in its other newly established factories. The company is also a strong advocate for corporate social responsibility (CSR) activities as well as the transition to green production and circular economy in the country.

Keywords

Cinnamon byproduct, Cinnamon branches and leaves, distillation-residues, Bio-energy

Innovation

Manufacturing, End-of-life management, Resource circularity, Resource substitution



Context and baseline

Vietnamese cinnamon is of the cassia type, and is sourced from the bark of *Cinnamomum cassia*, which is widely planted in Asia, including in Vietnam. The unique spicy flavour, sweet aroma, and warm heat of this type of cinnamon are derived from an essential oil called cinnamic aldehyde. Cinnamon cultivation starts with a planting density of 10,000 trees per hectare, and trees are grown for about five years. Thereafter selective cut is applied from the 5th to the 12th year to thin out the small, stunted cinnamon trees and make space for bigger trees to grow. On average 1,000 trees per hectare are annually pruned. The farmers harvest after 15-20 years from planting to achieve high yields and economic value. After the green outer bark is shaved off from harvested trees the inner bark is bruised and struck evenly until it separates from the heart of the wood. This inner bark is then removed in large sheets, cut into strips, and air-dried. These strips are then curled into quills of cinnamon that are then further dried in ovens or by leaving them outside in the sun. Sterilisation (steam treatment) or fumigation (chemical spraying) may be required to eliminate pathogens from the quills. Cinnamon essential oil is distilled from the branches and leaves of cinnamon trees. After harvesting, cinnamon branches and leaves are naturally fermented and dried for a minimum of one month before distillation to ensure that the oil will acquire a beautiful colour and maximum strength.

In 2012 Vinasamex established its first production factory in suburban Ha Noi to manufacture cinnamon products for export. Production involved sterilising and drying cinnamon; coal and other fuels were used in the production process. Using coal resulted in air pollution both in the surrounding neighbourhoods and in the work environment, which adversely affected the health of workers as well as the communities nearby.

In 2017 Vinasamex decided to move its factory from Hanoi to Yen Bai Province, its major sourcing area, and to adopt good production practices, improve the management and quality control of the supply chain and contribute to the social development of the farming communities that the company relies on. In 2018 the company changed its drying method to replace coal as fuel with cinnamon by-products, particularly young trees, small branches and leaves from selective cutting and thinning process the leaves and the left-over shoots and trees (the ones that had been cut to initiate sprouting), as well as cinnamon branches and leaf residue that remain after the distillation process. This use of cinnamon byproducts and waste as bio-fuel aligned with the

company's environmental and social strategies, as well as its commitment to responsible and sustainable business practices.

Innovation

Replacing coal with biofuel for drying cinnamon and other products showcases circular innovation. The cinnamon by-products and waste become the fuel source for cinnamon drying. These by-products and waste were discarded in the past by farmers. Large volumes of unused biomass residues were thus left to decompose in open piles, which resulted in a loss of valuable organic matter and a potential source of greenhouse gases during decomposition.

Innovating in this way used techniques and practices that were new not only to the company, but to the cinnamon industry in Vietnam as well. Other cinnamon processing companies do not carry out sterilisation and drying technologies similar to what is done at Vinasamex. Hence there is potential for replication in other cinnamon processing companies in Vietnam, in support of global and national sustainable development goals.

Circular Economy impact

The company's innovation is a good example of contributing to the circular economy, particularly through resource circularity and resource substitution.

Resource circularity aims to keep materials in continuous use and reuse and is achieved at Vinasamex by reusing cinnamon byproducts, preventing them from being discarded as waste. In 2019, the first year of this operation, 4000 m³ of byproducts were diverted, which increased to 7300 m³ by 2022.

Resource substitution entails replacing non-renewable fuels and materials with renewable alternatives. Vinasamex is attaining this goal, as the use of biomass eliminates the use of coal. Annual coal use in 2018 amounted to 300 metric tonnes. In 2022, with increased production capacity, an estimated amount of some 550 metric tonnes of coal was avoided. The combustion of coal emits CO₂ (theoretically at the rate of approximately 2 metric tonnes of CO₂/ton coal, depending on the coal variety), and thus a significant reduction in greenhouse gas (GHG) emissions is being achieved.

Business and market impact

Vinasamex has experienced significant growth since its relocation, and this is in part due to the company's commitment to circularity principles and community

development. Revenue has grown at an annual rate of over 20%. Vinasamex exports to 20 countries around the world including the USA, Europe, Japan, and Korea.

The investment for the new factory in Yen Bai Province, with a capacity of 20 metric tonnes of raw material per day, equivalent to 15 metric tonnes of finished product per day, amounted to VND120 billion (approximately EUR 4.4 million), which is expected to be fully recovered within 10 years.

The transition to a more sustainable business model, along with changes in fuel usage, have helped increase company revenue and decrease energy costs from 1.44% of revenue in 2018 to 0.65 % of revenue in 2022. These results align well with the company's development goals, and its environment and social strategies to contribute to achieving the 17 Sustainable Development Goals (SDGs). As Ms Nguyen Thi Huyen, Director of Vinasamex, has stated: 'As Vietnam is aiming for carbon neutrality by 2050, our business model is aimed to play a part in advancing towards that goal.'

Year	Energy used (quantity/year)	Energy cost (billions VND)	Revenue (billions VND)
2017	Coal 250 tonnes	1	67.2
2018	Coal 300 tonnes	1.2	83.2
2019	Cinnamon byproducts 4,000m ³	1	148.3
2020	Cinnamon byproducts 4,200m ³	1.05	151.9
2021	Cinnamon byproducts 7,000m ³	1.75	275.9
2022	Cinnamon byproducts 7,300m ³	1.825	279.2

The implementation of circular solutions and other initiatives has enhanced the reputation of Vinasamex and created trust with its customers, thus increasing support from sustainable economic development projects both domestically and internationally. Vinasamex has approached several new investors and secured significant impact funding for its expansion. The company's value chain has expanded, attracting more dedicated farmers and employees.

Stakeholders

The circular solution provides benefits not only for Vinasamex but for other stakeholders as well, including suppliers and buyers. Vinasamex sources its raw materials from Yen Bai and Lang Son provinces, where many ethnic groups make their homes. The conditions in which most of these ethnic groups live is characterised by a high

rate of poverty. The company supports farmers by improving the quality of their products and increasing their productivity to improve their incomes. Vinasamex materials for producing cinnamon and other products are purchased from households that practice organic and sustainable cinnamon planting methods in order to ensure that the products are of high quality and without pesticide and/or chemical fertiliser residues. The farmers are also trained in the Organic, Foflife, Fairforlife, and UEFT-RA standards of sustainable production processes; they receive training in gender equality, wastewater waste management, labour, safety, and food hygiene and safety according to HACCP, ISO 9001, and BRC international standards in order to facilitate the correct application of these practices. Farmers not only supply Vinasamex with raw material, but they also provide the company with by-products from the cinnamon harvest as a source of energy, thus achieving the sustainable utilisation of the crop residue after harvesting. Vinasamex customers are leading global buyers who are concerned about responsible business and production. They require that suppliers take responsibility towards community development. This requirement motivates Vinasamex to pursue a sustainable business model to meet social requirements and create sustainable value for its stakeholders.

Implementation

In 2018, the new drying method was first introduced in the Vinasamex factory in Yen Bai province. Vinasamex also signed long-term contracts with the farming households for the procurement of by-products from the cinnamon harvest as the fuel source for the company.

Vinasamex then set the goal of phasing out using coal for drying their spices in all other Vinasamex factories by replacing it with more sustainable and renewable sources of energy, including the by-products of the cinnamon harvest, because this was consistent with the company's core business strategy, with which it could be closely integrated, namely to provide high-quality star anise, cinnamon and other organic spices for export to international markets, improve the incomes and livelihoods of the local ethnic people, and to contribute to sustainable development in Vietnam.

As of 2024, Vinasamex has four factories, owns more than 4200 hectares of organic cinnamon and star anise plantations, and has signed agreements directly with more than 3000 households participating in the company's value chain in the provinces of Yen Bai, Lao Cai, Lang Son, Quang Tri, and Bac Kan. Vinasamex currently provides secure

jobs for 150 local skilled production workers, and is able to create 100+ seasonal jobs, while also strengthening the position of women farmers in the supply chain.

Vinasamex received encouraging support from local government and development partners including ADB, CRED, and Oxfam, including information, technical assistance, capacity building, networking, consulting, training to enable women-led small and medium-sized enterprises (SMEs) to reach international markets, and assistance to improve livelihoods for ethnic minorities. In 2019, the company received a subordinated 7-year (2-years of grace) convertible loan of EUR 450,000 from Inclusive Impact Investments (Triple I) for financing and support of SME development in Asia.

Despite the impressive results from the pilot application of new method, challenges remain, including limited financial capacity, low farmer awareness about the long-term benefits of the new drying methods, and the strict quality standard requirements set by customers and partners. To overcome these barriers, several actions have been implemented by Vinasamex. They include raising public awareness on new drying methods, enhancing technical assistance and providing sustainable farming practice training to the farmers, and building trust through communication about circular economy solutions within companies and among stakeholders.

Takeaways

- Replacing coal with cinnamon byproducts as fuel for heating and drying cinnamon products, as pioneered by Vinasamex, turned out to be a viable option for increasing company revenues and reducing energy costs, increase farmers' incomes, and reducing carbon emissions from burning coal.
- Transitioning to green and sustainable agricultural production requires a close examination of the specific aspects of the production system that are creating the environmental pollution, after which smart practices to address the root causes of the company's pollution can be put into place.
- Long term-commitment by the company's top management to 'go green' is key for an effective circular economy transition.



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