

Products from Marañon

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Abstract

This project will analyze the industrialization and sustainable production of products derived from one of the most abundant native species in the Amazon: *Anacardium occidentale* L. known as "Marañon" from which the cashew nut comes. Despite being native to the Americas, world production is led by Africa (Ivory Coast) and India.

Peruvian varieties have a high vitamin C, polyphenols, and antioxidant properties. The cashew is versatile: both its seed (cashew), its fruit, the leaves, and the bark have different medicinal uses and can be widely used. This is also considering the growing consumption of organic foods and substances beneficial to health. The processing and commercialization of cashews could improve the hitherto disadvantaged economy of native communities, who would also contribute with ecological and sustainable practices in its cultivation. Technological innovations are essential for the future of communities. By integrating these tools, production is improved, and sustainability and community development are also strengthened.

Contextualization of the problem

The cashew, a wild tree with low branching and an average height of between 5 and 14 meters, is native to tropical areas of the Americas and northwestern Brazil (Mendez, 2014) but is scarcely exploited in the Peruvian Amazon. There are almost no companies producing products derived from cashew almonds. The cashew is nutritious and healthy: Its fruit contains 47% fat, 21% protein, and 22% carbohydrates, vitamins, and amino acids. The fruit is attached to a pseudo fruit or gray nut, which consists of 46.3% oil with respect to its total weight (Méndez, 2014).

It is important to contribute to the innovation of consumer products and the greater use of crops of native Amazonian species, which are wasted due to lack of information. All this can be done without harming the environment and, at the same time, providing the opportunity for the economic improvement of the native inhabitants of the Amazon. Its sustainable cultivation ensures that native communities can maintain their traditions while generating income responsibly.

Uses and applications of cashew nuts in the community (Cárdenas & Paye, 2021)

- The bark and leaves of the cashew are used to treat stomach cramps, inflammations, insomnia, diarrhea, malaria, and hemorrhoids.
- The bark and root are also used as a sedative and hypotensive remedy.
- Cashew resin is used to heal skin lesions.
- It also has antimicrobial activity against *S. aureus* and 5 other Gram-positive bacteria.

Introduction

In Peru, there is a great diversity of plant species that have been used since our ancestors for healing and nutritional purposes; this is particularly in tropical regions that are favored by the proportion of medicinal species known so far and remain to be explored. These regions have, however, been excluded from the economic prosperity observed in other regions and rather subjected to the negative impacts of extractive activities in their territories. This project aims to show the viability of producing value-added goods from a native species, the cashew, in a sustainable, environmentally friendly way and with a great economic and social impact.

The cashew tree grows widely in Peruvian regions such as Loreto, San Martín, Piura, Junín, Ucayali, and Lambayeque and can be used in its entirety: its seed, fruit, leaves, and bark provide excellent medicinal and nutritional properties. The trunk is used for furniture construction; bark for the production of inks; the apple or fruit is used in the production of sweets, preserves, jams, jellies, and wines; it is antiscorbutic and diuretic; The nut is used to harden chocolates and in the manufacture of sweets and juices. Two oils are produced in the walnut: from the shell (pericarp, testa), black, viscous, irritating, and caustic, contains phenolic compounds cardanol with applications in the plastics, insecticides, and inks industry. The other oil is bright yellow and extracted from the almond. The cashew is a vital crop for many native communities. Its production not only provides income but also fosters local culture and employment. Knowing their value is essential to implementing appropriate technologies.



Methodology and materials

This study will be carried out following a methodology that consists of:

1. Exploratory analysis of the optimal conditions for cashew production, identifying current production areas in Peru and the products currently marketed. To this end, an extensive literature review will be carried out.
2. Identification of communities surrounding these areas that could benefit from their production and the relevant socioeconomic aspects of such communities.
3. Environmental sustainability analysis of cashew crops: e.g., it is known that cashews can develop in places where there are long intermediate droughts, in addition in a wide variety of soils (clay, deep sandy, and degraded), although it prefers moist conditions and growing best in well-drained soils (Cárdenas and Paye, 2021).
4. An analysis of the cashew's industrialization process involves evaluating the technology, and a detailed cost analysis will be included, which is fundamental to evaluating the profitability of the industrialization process. Production, distribution, and marketing costs will be included, allowing informed decisions to be made about investments and business strategies. The cashew production process from harvest to packaging must be optimized to ensure the product's quality and the process's sustainability, minimizing the environmental impact.

Discussion of technological solutions

The production and processing of cashew crops without chemical elements eliminates important sources of environmental pollution, such as pesticides and chemical fertilizers. Also, the permanent nature (cashew) of these crops provides environmental services such as soil protection, water filtration, and carbon dioxide sequestration in the case of cashew trees. A crucial aspect for the viability of the commercialization of cashew products is the transport that allows a faster and more efficient distribution, reducing the environmental impact and improving connectivity. Therefore, establishing effective distribution networks is vital to connect native communities to markets. Collaboration between producers and distributors can improve access and ensure that products arrive at their destination in optimal condition. For example, we can think about:

- **Use of drones in agriculture:** Using drones in agriculture allows aerial monitoring of crops. This helps to identify problems such as pests or diseases in time, optimizing the harvest and ensuring a better yield.
- **Training and education:** New agricultural techniques are essential for the success of innovations. Training in the use of technology is essential. Native communities should be educated on using modern tools to maximize their benefits and ensure successful adoption.
- **Collaboration and networking:** Fostering collaboration between indigenous communities and external organizations can facilitate access to resources and technologies. Support networks are key to implementing effective and sustainable agricultural innovations.



Preliminary results and future work

It has been identified that the tree begins to produce in the second year of planting, considering an average of 200 kg/ha of walnuts and 1,200 kg/ha of false fruit per hectare. By the 8th year, 3 tons/ha of walnuts and 24 tons/ha of false fruit can be produced. All factors are favorable (soil, climate, superior grafting trees, nutrition, irrigation, and pest control), and extremely high yields can be achieved with a good-quality harvest.

The next steps include studying the market conditions, profitability, and sustainability of marañon's industrialization in the Peruvian Amazon. The future of cashews is promising, with increased global demand. Continuous innovation in technology and processes will be key to maintaining competitiveness and ensuring the sector's sustainability in the coming years.

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