Developing a sustainable value chain of Brazil nuts for Swiss consumers

Final project fact sheet

Brazil nuts are one of the most economically important non-timber forest products. However, increasing deforestation and the lack of natural regeneration of Brazil nut trees (*Bertholletia. excelsa*) threaten the sustainability of the nut production. SUSTAIN has conducted an interdisciplinary evaluation of the long-term ecological and social sustainability of the Brazil nut supply chain in Madre de Dios (Peru). The project collected and analyzed key information about the reproductive ecology of the Brazil nut tree, and identified the best management practices and governance necessary for a more equitable value chain. In addition, a model able to connect Western consumers to sustainable operations and restoration of Brazil nut rich landscapes has been developed. This model can serve as a wider business model that could be potentially applied to other products and regions.

Motivation

The Brazil nut is a giant tropical rainforest tree found in Brazil, Bolivia and Peru. The nutritious nuts, harvested mainly from the wild, are one of the economically most important non-timber forest products in the world. Annual exports of Brazil nuts are valued at tens of millions of US dollars, but only a small fraction is sourced ethically through certification. Brazil nut harvesting is a crucial part of rural livelihoods across the Amazon region, and contributes to regional economies and reduces poverty. Because of increasing forest degradation due to timber harvesting and agricultural activities, it is of great importance to investigate how the population viability and productivity of Brazil nut trees are impacted in order to guide optimal harvesting and management practices. A restored and sustainable production of *B. excelsa* fruits would provide a source of income to many rural populations throughout the Amazon basin and, consequently, promote forest conservation.

Objective

The project aimed to examine possibilities to develop a resilient supply chain for certified and sustainable Brazil nuts from Peru by 1) providing a scientific knowledge base of Brazil nut reproductive ecology and forest enrichment to promote adaptive management strategies; and 2) working with stakeholders to build a forest-to-consumer value chain for long-term ethically and sustainably sourced Peruvian Brazil nuts for the Swiss-based market. This provides an opportunity to alleviate poverty, conserve tropical forest and mitigate climate change through reduced forest degradation.

Research Highlights

The project has made significant scientific advances in the field of reproductive ecology of the Brazil nut tree. For the first time, the most important pollinator communities and their activity in the natural forest across a degradation gradient context have

Image 1: Gabriela Wiederkehr Guerra observing pollinators in Madre de Dios, Peru. Credit: Juan Carlos Huayllapuma

been identified and quantified. Additionally, several artificial bee nests were designed to increase bee abundance, and observed to have up to a 100% occupation rate depending on the model. These are important steps to allow the development of pollination management practices. We also found significant levels of fine-scale genetic structure, signs of genetic erosion in progeny, and significant associations between genetic diversity and seedling survival, growth, and adult tree productivity. These results signal to the role of adequate management of this species' genetic resources and the significant negative effects of forest degradation on these patterns. In addition, the project identified the best practices to plant Brazil nut trees in different types of landscapes and quantified the costs and success rates of different planting activities over time.

Image 2: Brazil nut tree, seedlings and seeds. Credit: Rens Brouwer

Relevance to Stakeholders

This interdisciplinary research provides the scientific basis for the resilient forest management of Brazil nut populations. The project has contributed to understanding and reducing the barriers that harvesters face to adopt certifications for Brazil nuts production due to the unpredictable demand and the lack of local capacity. In addition, the project helped to increase consumer awareness in Switzerland of the nutritional, environmental and social benefits of certified Brazil nuts to sustain a larger and more resilient supply chain. The project is currently integrating the results from the different research components into scientific publications and online resources where all project output, including publications and MSc/BSc theses, will be made available. The project results have also been shared with the public through blogs, activities with local stakeholders and through presentations at several international conferences.

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https://worldfoodsystem.ethz.ch/research/research-programs/CRP/SUSTAIN.html

Selected Publications

Jansen, M., Guariguata, M.R., Raneri, J.E., Ickowitz, A., Chiriboga-Arroyo, F., Quaedvlieg, J., Kettle, C.J. (2020). Food for thought: the underutilized potential of tropical tree-sourced foods for 21st century sustainable food systems. ***People and Nature***.

Chiriboga-Arroyo, F., Jansen, M., Bardales Lozano, R., Ismail, S.A., Thomas, E., García, M., Corvera Gomringer, R., Kettle, C.J. (2020) Genetic threats to the Forest Giants of the Amazon: habitat degradation effects on the Brazil nut (***Bertholletia excelsa***), a socio-economically important tropical tree. ***Plants, People, Planet***.

Selected Blogs

Nachhaltige Paranuesse zum Schutz der Regenwaelder. COOP. **26.03.2019**

Chiriboga-Arroyo, F. Going nuts in the Amazon. ETH Zurich. https://blogs.ethz.ch/ETHambassadors/2020/05/14/going-nuts-in-the-amazon/. **14.05.2020**.

Online resources

SUSTAIN website: https://www.sustain-forest.org/
SUSTAIN Facebook page: https://www.facebook.com/sustain-peru/

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