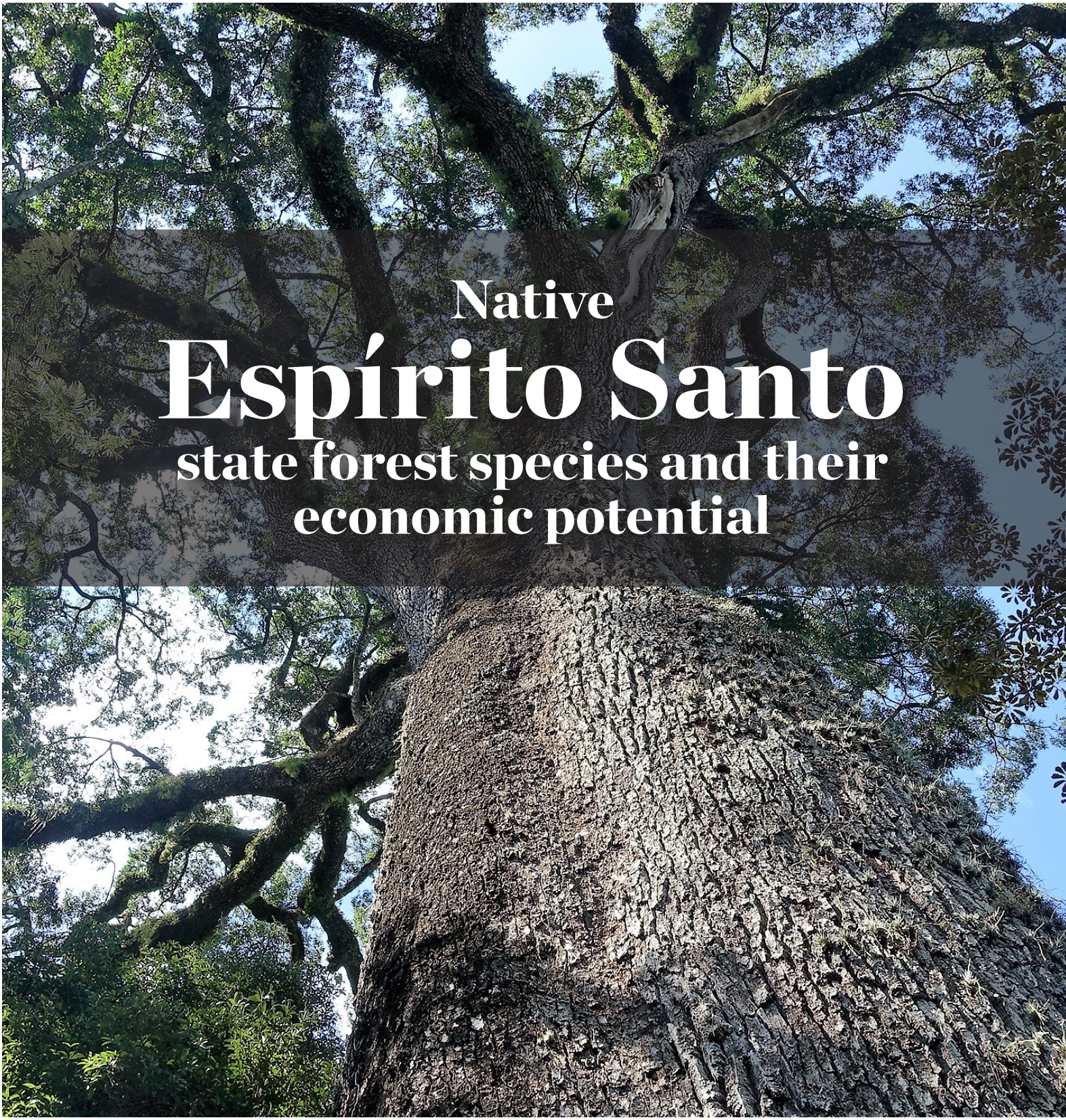

Native Espírito Santo

state forest species and their economic potential

Vitória, Espírito Santo state / 2022

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Partner: Brazilian Coalition on Climate, Forests and Agriculture
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Citation suggestion

TNC The Nature Conservancy; Agribusiness Development Center - CEDAGRO. 2022. Native Espírito Santo state forest species and their economic potential.

November 2022.

Execution

Introduction

THE ECONOMY OF THE ESPÍRITO SANTO STATE FORESTS

Renato Casagrande
Governor of Espírito Santo state

Gruto do Limoeiro (ES) _ (c) Vitor Jubini/MTur

Today's world presents us with great challenges, many unprecedented in humanity's civilizing journey. Whether globally or locally, we live in a time of rapid and deep transformation. The search for finite natural resources to fill consumers' demands has reached a scale never before seen and has become a problem for the entire planet. And the solution can be found largely in ensuring opportunities for those that seek sustainability in their production relationship with the natural world. Even though conventional businesses still participate greatly in the world economy, the strengthening of alternative markets is increasingly evident, with high value-added. The demand comes from consumers that seek quality excellence, a smaller environmental footprint, and give preference for local options produced more sustainably.

The Atlantic Forest was the first Brazilian biome to shelter the urban centers resulting from European colonization. That period of our history witnessed the expressive increase in the exploration of forest resources and the strong competition to occupy native spaces.

The result of that process was the destruction of the forests that covered the region and, consequently, a significant decrease in the ecosystem services they provided. Espírito Santo state is part of that history and context. However, the last decades were essential to a better understanding of what the Atlantic Forest offers. Espírito Santo has been a pioneer in creating programs that recognize and value the services and products that natural forests provide to society.

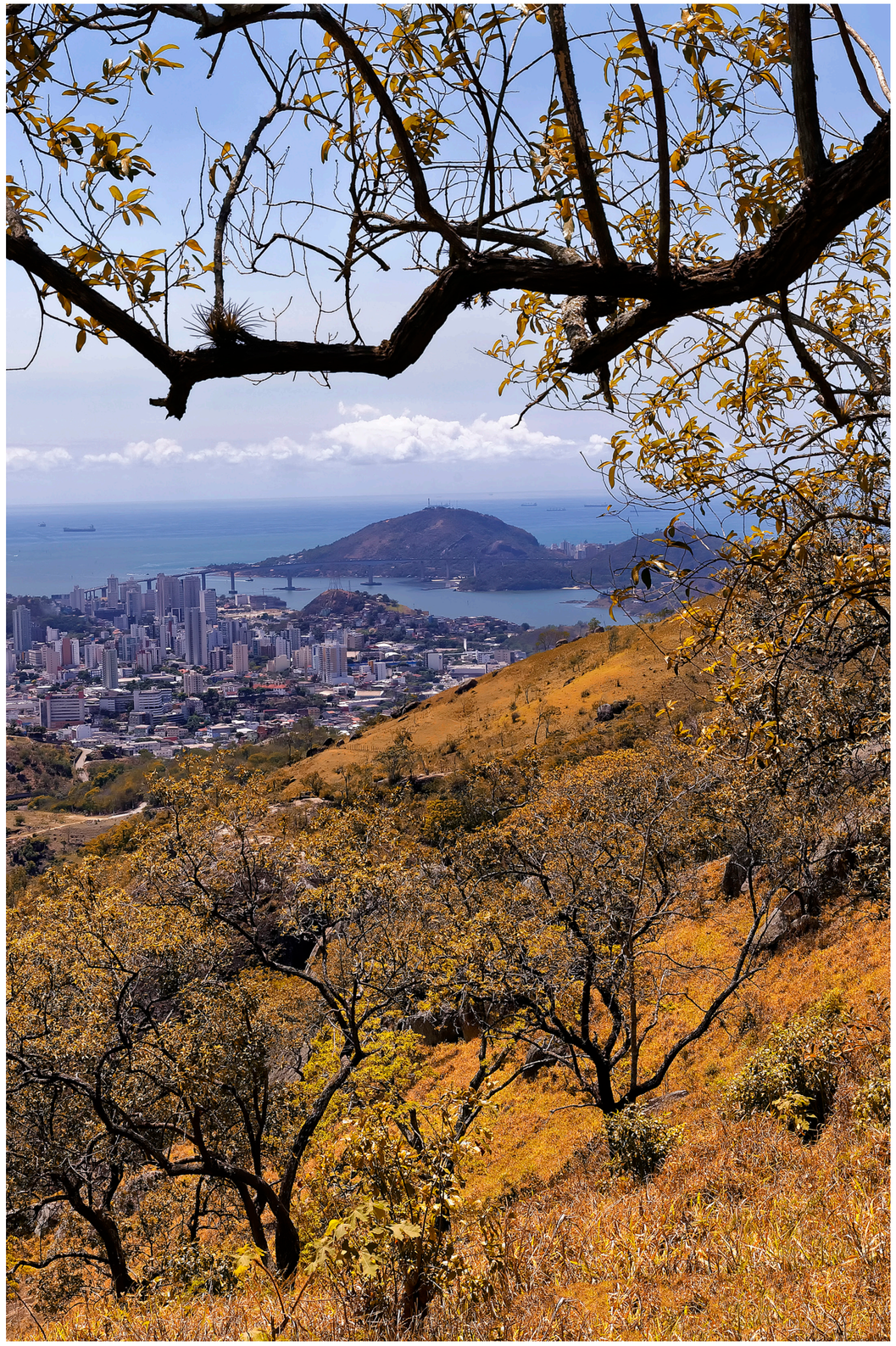
Today, we see the different aspects of forest restoration more clearly. And working in partnership with several public and private actors, we are building alternatives that translate into significant results. We have already identified market opportunities that combine high-technological quality products with local precedence, establishing the characteristics of a *Capixaba*[1] product as possessing individual qualities to be explored. Timber production with Atlantic Forest species presents advantages throughout the production chain, such as better tracing and quality control at the source, the guarantee of legal origin, and lower transportation costs and carbon footprint. That is the case, especially if compared to Amazon and illegal products still dominating a large market corner.

In addition to the existing demand, there is great potential for the increased competitiveness of forest, native species timber, and non-timber products in the state and the country's southeastern region's main consumer centers. Marketing issues are interesting, as are other aspects. A good example is a possibility of rural properties' environmental compliance through Legal Reserve[2] (LR) restoration for production purposes. That will lead to opportunities in the forest-product market and improvement in ecosystem services, such as water supply, erosion control, increased pollination, and biodiversity maintenance, among others. Thus, blending the uses of the territories with conservation and the recovery of forest cover, we will promote a virtual circle that involves the diversification and rural production quality and the strengthening of the state's production chain.

With all of that in mind, we received this publication on Espírito Santo's Forest Products Market, organized by The Nature Conservancy based on the studies conducted by CEDAGRO from 2017 to 2019. This document was developed as part of the work of the Native Species Forestry and Restoration Task Forces from the Brazilian Coalition on Climate, Forests and Agriculture. We are confident it will promote the opportunities reserved for the Atlantic Forest timber and non-timber products in Espírito Santo and other regions. In addition to supporting the decision-making of the many native forest use initiatives, it will also expand the debate on the issue. We do not doubt that working together on those alternatives is worth it. That way, by consolidating the national standard role Espírito Santo has today, we will be able to compete for space in the robust market that looms ahead.

[1] Borrowed from old Tupi, capixaba meant "corn hair." It may refer to the impression that native Peoples had of blonde Europeans or to the corn plantations near the city of Vitória. The term originally referred to natives of Vitória only, but it later expanded to mean natives of the whole state. https://en.wiktionary.org/wiki/capixaba

[2] Legal Reserve (RL) is an area located inside a rural property or land possession with the function of ensuring the sustainable economic use of the natural resources in a rural property, assisting the conservation and rehabilitation of ecological processes, and promoting the conservation of biodiversity, as well as the shelter and protection of wild fauna and native flora. Brazilian Agricultural Research Corporation (Embrapa).



Parque da Fonte Grande - Vitória (ES) _ (c) Marcelo Moryan/MTur

(c) Carmen Paixão

Executive Summary

This publication summarizes the main elements of an extensive study of the market for timber and non-timber forest products in the Espírito Santo Atlantic Forest. The Nature Conservancy (TNC) Brazil in partnership with CEDAGRO conducted the study, which is geared toward rural producers, investors in the forest market, and the productive forest chain. It comprised primary and secondary data from the main stakeholders in the production chains, such as producers, processing units, and commercial establishments, and an extensive study conducted with INCAPER[3]. The species presented best fit the criteria for selection based on evaluating the business sustainability, existing demand, and the product's potential. The study also considered the market's viability, the products and uses to be explored, the market profile, and the necessary production to serve the expanded demand.

In addition to the specific study of the 16 *Capixaba* Atlantic Forest native species, the publication presents the more general aspects of the global tropical timber market and the evolution of Brazil's participation in it, in addition to considering the Brazilian internal market.

Aroeira (c) Mauro Halpern

[3] Capixaba Institute of Research, Technical Assistance and Rural Extension.

1. Tendencies of the Market for Forest Products

Forest products can be timber and non-timber. Global timber production for industrial use[4] totaled more than 2 billion m^3 in 2018, and Brazil is in 4th position among the biggest producers. Such production volume caters to the most diverse industrial segments.

But sawlog production and exporting numbers alone indicate a different situation. Brazil was already ranked 9th on the list of sawlog-producing countries in 2020 but ranked only 12th among large exporters of the product. That shows enormous potential in that sector, which today is under-utilized.

Based on a group scenario created by various organizations, Project Verena estimated that global timber consumption in 2050 could practically double the current threshold (Batista et al., 2021). And national and international demand can drive sustainable business development by planting native tree species. Brazil can jump from providing the current 8% of that global demand to 13% in the same period if there are political incentives to increase carbon sequestration in the country.

Global tropical timber production grew between 1990 and 2000 but has been relatively stagnant since 2014.

In Brazil, tropical timber currently comes almost exclusively from the natural Amazon forests. Production occurs mainly via extractivist activities in private forests, the illegal exploration of public land, and concession contracts for managing federal or state public forests by private sector operators.

It's important to remember that the Atlantic Forest was once a great timber provider to the market. But the exhaustion of natural forests in the Atlantic Forest and the opening of roads in Brazil's northern region led the market to turn to the Brazilian Amazon for its supply of native timber since the 1970s.

Native Amazon timber is appreciated in Brazil and globally[5]. Brazilian products, such as sawlog, planed wood, veneers, plywood, floors, moldings, decking, and furniture, are well-known abroad. The study covers species from the Atlantic Forest in Espírito Santo that also occur in the Amazon or are very similar to that biome's species regarding their botanical classification and the appreciated characteristics of their timber.

In Brazil, there has been a decline in tropical timber production in the last two decades. The global volume of timber for industrial use and consumed by the planted forest sector has been growing consistently.

The use of tropical timber in Brazil is still significant and generates income for the country and municipalities. However, it has lost market space to exotic[6] timber species and other materials, such as concrete, metal, ceramic, plastic, plaster, and others. The declining use of tropical timber, especially in Brazil, is partly explained by the supposed connection to deforestation in the Amazon and the legality of the products, which hurt their reputation and, consequently, their use by consumers.

In the lumber productive chain, the opportunities for the native species are great. The consumer market demands quality timber that meets its needs in general, and whether the species is native or exotic is not a concern. The final destination of the timber products depends on the technological characteristics of the timber in question. That is essential regarding the competition analysis and the potential for a product substitution. From that perspective, the market possibilities for tropical timber that come to be produced in Espírito Santo are not limited to the substitution of Amazon native species but also represent something larger than the competition of exotic timber and other materials.

In the lumber productive chain, the biggest potential for tropical timber is in durable-use products such as roof structures, flooring, decking, the framework of horizontal constructions, pergolas, frames, brises, internal and external cladding, ceilings, furniture, joinery, and household items.

Timber can be one of the essential materials for a sustainable future, substituting those with high greenhouse gas (GHG) emissions such as steel, aluminum, and concrete. Compared to other products, timber has unique qualities such as capturing and storing carbon in the atmosphere, being renewable, having high resistance relative to weight, and having great thermal and acoustic insulation.

The native timber originating from Espírito Santo faces the challenge of needing to have its quality match that of the timber from the Amazon and demonstrating that it is the result of a rational and sustainable exploration, with minimizing extraction impacts in the processing and utilization and destination of residuals.

On the other hand, it has many advantages because it is traceable and extracted close to the domestic markets, with reduced transportation costs and less GHG emissions. It must be highly sustainable since the plantations can be well-managed with positive social and environmental impacts, transforming the landscape and feeding a production chain with job generation and income as it contributes to the environmental compliance of rural properties.

(c) Carmen Paixão

[4] It includes FAO-defined classes: *Pulpwood, sawlogs, veneer logs,* and *other industrial pulpwood*. It does not include *fuelwood*.
[5] With an emphasis on consumer markets in the European Union, North America, India, and Japan.
[6] Especially of the *Eucalyptus* e *Pinus genres*.

2. The Capixaba consumer market for Atlantic Forest native species and its potentialities[7]

The market of native forest products is a complex and diversified economic activity, and there are great opportunities for the economic use of products originating from Atlantic Forest native species.

One of the components seeks to serve consumers searching for healthy and tasty foods and quality of life at affordable prices, a habit already incorporated by part of the state's population. Thus, the native species fruit market represents an interesting opportunity for the non-timber forest product producer.

The main characteristic of the timber product market that translates into opportunity is Espírito Santo's significant demand for native timber for many uses, such as roof racking, furniture manufacturing, and window frames, among others.

The formation of new forests and maintaining those that still exist contribute to providing various ecosystem services, such as conserving biodiversity, water, and soil resources and storing CO_2. The latter is an aspect increasingly noted and valued by consumers.

In addition to the production issues and the market opportunities, another important point is the possibility of forest restoration activities in permanent preservation areas[8] (APPs) and Legal Reserves simultaneously with land's sustainable economic use. That makes possible the environmental compliance of rural properties and adherence to current environmental laws. In 2015 in Espírito Santo, there was a need to recover approximately 207,000 hectares of areas deemed for permanent preservation and around 79,000 hectares of Legal Reserve areas. (CEDAGRO, 2015a).

A modest estimate of the annual market demand[9] in Espírito Santo for non-timber products is 5,500 tons of fresh fruits. (CEDAGRO, 2018).

There is a potential for expanding the market of non-timber products in the Atlantic Forest. For that market to consolidate, an intensive product positioning is needed, which makes it possible to expand consumption by existing customers and reach a new consumer group.

And specific actions to balance the irregular supply of some products with the informality in the market can immediately expand consumption and the market itself.

Generally, 56% of the establishments surveyed that acquire the products of interest say that they have a demand greater than the volume they process and that they do not expand their production/commercialization due in large part to the lack and irregularity of product supplies.

Data show that part of the products sold in Espírito Santo supermarkets that have as ingredients some of the products of the species selected here do not originate from the state's production. That emphasizes the potential to expand the consumption of local products.

There's also room for developing new technologies and other improvements in the production chains of those non-timber products, strengthening their links and bringing about an increase in production, productivity, and quality.

Creating a balance between product supplies and the informality of the production units is an important objective to expand and consolidate the non-timber product market. Technological advancements can make it possible to produce fruits, the majority of which are seasonal, in different periods via the development of varieties that contemplate different production periods (early, medium, and late). And those techniques can also ensure that products preserve their characteristics for freezing, pastes, and essences.

As for timber species, there is a clear opportunity regarding the potential for the Espírito Santo market to absorb the Atlantic Forest timber species that come to be produced in the state. Establishments that acquire native timber and are concerned with ensuring the availability of timber from the Amazon biome say there is a chance they would change suppliers (from those in the Amazon to those in the Atlantic Forest) if the local product's supply becomes regular.

In addition, the study demonstrates that the Espírito Santo native species that come to be produced have a potentially viable market of 44.7 thousand m3 of sawed timber per year, which amounts to 50% of the current consumer demand for native species timber in the state (CEDAGRO, 2018).

No state timber suppliers exist in the Espírito Santo forest timber chain, and all products come from other states.

In the past, there was a traditional market for Atlantic Forest timber species in Espírito Santo, and it can be reestablished should the sector tend that way.

As in the case of non-timber products, it is important to position the timber from the Espírito Santo Atlantic Forest species as being produced via silvicultural systems through a consistent marketing program. That can support the final consumer's decision and favor demand and a change in the current consumption pattern based on species of Amazonian origin.

On the other hand, some aspects of the timber production chain need to improve their feasibility. Among them is the very existence of plantations for commercial, native timber species to reach the scale needed to attract the attention of those products' consumer market. Another need is advancing the infrastructure and formalization of the processing units (sawmills) and updating the state's regulatory framework. It needs to adapt to federal legislation so that procedures are simplified, and producers can be sure they will face no legal issues when they decide to explore their planted areas.

The minimum production area with native forest species needed to meet the current yearly purchase demand in Espírito Santo was estimated at 1,400 hectares for non-timber species products and 21,300 hectares (after 30 years) for the cultivation of the five timber species presented in this study.

When evaluating the amount paid for the timber and non-timber products presented here and considering the amount[10] demanded by the market, we conclude that all species are sustainable economically because their unit production cost is less than the amount paid by the markets.

[7] The analyses of this chapter are based on data collected in 2018, including the price and cost of products. We recommend they be considered with the appropriate period reference, anticipating potential changes, including the period's inflation.

[8] A Permanent Preservation Area (APP) is a protected area covered or not by native vegetation, with the environmental function of preserving water resources, the landscape, geological stability, and biodiversity, facilitating the gene flow of fauna and flora, protecting the soil, and ensuring the well-being of human populations. Brazilian Agricultural Research Corporation (Embrapa).

[9] Estimated by the effective demand and the estimated demand by the processing and/or commercialization units

[10] Product volume in kg/year for non-timber products and the volume of timber in m3 of lumber /year for the timber products.

3. Species with economic potential[11]

This study's list of selected species includes 16 forest species with market potential. They are:

Timber products	*Cordia trichotoma; Apuleia leiocarpa; Plathymenia reticulata; Bowdichia virgilioides;* and *Cariniana legalis.*
Non-timber products	*Anacardium occidentale; Schinus terebinthifolia; Spondias venulosa; Euterpe edulis; Eugenia uniflora; Myrciaria coronata; Spondias mombin; Psidium myrtoides; Genipa americana; Allagoptera caudescens; Pouteria caimito.*

The species selected for this study are not all forest species naturally occurring in Espírito Santo that present potential for economic use.

This study presents data and information illustrating each selected species regarding commercial aspects, ecological attributes, and silvicultural performance. Together, the information seeks to provide a general view for those interested in producing native forest species in Espírito Santo, allowing them to choose the best options depending on their interest and the production conditions of each location.

(c) Jean via Adobe Stock

[11] The analyses of this chapter are based on data collected in 2018, including the price and cost of products. We recommend they be considered with the appropriate period reference, anticipating potential changes, including the period's inflation.

4. Recommendations

Developing a sustainable market for native species of tropical timber in Brazil will require actions strengthening the tropical timber sector. That can occur with products provided via the management of natural forests, notably forest concessions in the Amazon, and scale and consolidate the planted forests with native species in degraded areas.

Native species planted forests have the potential to complement the provision of timber from managed natural forests. There are millions of hectares of severely-degraded pastureland, and the planting of native forest species can extend over those areas, expanding their productivity, providing environmental services, and positively impacting the environment.

Recommendations for the market considering the timber from native species planted forests:

Research and development	Structured programs that advance research and development for native species silviculture will have an important role in reducing risks and in the expanded return of investments, as was the case with pine and eucalyptus.
Improvement in the regulatory framework, facilitating the implementation of forest projects	Issues regarding federal and state regulations need to improve so that native-species commercial planting can gain scale. Fees and the lack of specific administrative processes for that type of planting generate unnecessary costs and legal uncertainty. Here are some recommendations regarding a regulations framework based on Valle et al. (2020): a. A registry of native species planting. Espírito Santo state could create a registry of native species planting, regulating federal legislation. The regulation and registry will promote legal certainty and strengthen the native species of forest and timber products. b. Fees for the harvesting. The exemption of fees generated by the Sinaflor registration and the state fees, such as those for registering, inspections, exploring, working, and licensing. The exemption would eliminate the restricting factors observed in the development of the market for forest products.
Sectoral organizations/ associations that foment the production chain	To structure and foment the production chain for the native species planted forests to overcome challenges more easily since those are in every aspect of the chain and not in one section only, such as planting or industrialization.
Attracting investments	The return expectations for these projects must be competitive with their risk, and investors will demand credible information to help them make such an assessment. Companies already active in the forest-based sector can bring crucial experience in growing planted forests at scale.
Carbon market	Espírito Santo state needs to advance in establishing and promoting a state carbon business policy and be ready for such a market, actively taking advantage of the opportunities it will bring. The sale of carbon in established markets can be a financial revenue for the project, increasing its returns and the incentives for its implementation.
Production planning	A "microplanning" approach that analyzes each project is needed to determine the best silviculture technical recommendations. In the case of plantations for timber production, producers must consider the intermediate thinning that will provide good management of the forest toward quality production at the end of the cycle and help pay for a high-quality production cycle.

5. Conclusions

The present study concluded that native species forest production in Espírito Santo is an economically viable and interesting alternative for non-timber and timber products.

The demand for environmental compliance in Espírito Santo properties can be partially met by native-species forest production in forest restoration areas with productive Legal Reserve restoration. That will bring economic benefits to producers and other members of the production chain and other benefits generated by ecosystem services provided by the restored areas.

The correct marketing positioning for Espírito Santo forest products can help expand and consolidate the market, generating a movement that values the local socio-environmentally favorable production compared to competing products, leading to a change in consumers' standards.

Espírito Santo can be an example of the new 21st-century green economy and take that learning and experience to other states and countries.

(c) Carmen Paixão

Cover: Jequitibá-rosa | *Cariniana legalis* (Mart.) Kuntze
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