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## Sustainable livelihoods in protected areas: The case of *Pimenta dioica* in the Maya biosphere reserve

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### Abstract

The Maya Biosphere Reserve (MBR) in Petén, Guatemala has been a successful model for community-managed forests in Central America since 1990, with *Pimenta dioica* gaining significance due to its increasing demand. This study examined the value chain of *P. dioica* in Guatemala, with a specific focus on the MBR, identifying the main actors, activities, trade flows, price points, margins, markets, trends, challenges, and opportunities for sustainable harvesting and marketing of this valuable resource. The study used a literature review, semi-structured interviews with key informants along the value chain, and focus group discussions with community representatives and harvesters. Our findings revealed that harvesting *P. dioica* is a high-priority activity for forest communities due to its relatively high price and income generation potential, and the participation of women and youth in various activities along the value chain. However, changes in climatic conditions have severely affected the harvesting seasons, threatening a consistent supply. Moreover, local cooperatives and intermediaries compete for local production, capturing different shares of added value depending on the product characteristics, certifications, and distance of the communities. The fruit is mainly exported dried, channeled by a limited number of actors mainly towards the USA and EU where it can reach retail prices between 7 to 26 times greater than the export price. The study identifies several opportunities for value chain strengthening, including forest enrichment, grafting, drying facilities, and product differentiation based on organic, fair, and sustainable production for forest conservation. However, increased bargaining power from producing countries and increased consumer information are necessary to achieve a more equitable value distribution. In conclusion, our study provides insights into the value chain of *P. dioica* in the MBR, highlighting the importance of community management and sustainable harvesting practices. It also identifies several opportunities for value chain strengthening, which can enhance the economic benefits for the local communities and promote forest conservation. Nonetheless, challenges such as climate change and unequal value distribution remain significant obstacles to overcome. Further research is necessary to develop effective strategies for the sustainable management of *P. dioica* and other forest products in the MBR and similar contexts.

**Keywords:** Community managed forests, forest conservation, non timber forest products, value chain analysis