

Article

Sustainable Development in the Colombian Post-Conflict—The Impact of Renewable Energies in Coffee-Growing Women

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Abstract: Coffee is one of the most representative agricultural products in Colombia; several factors related to how it is produced, processed and marketed make it particularly important in post-conflict situations. The cultivation of coffee has acquired a very important role in the post-conflict stage that Colombia is experiencing. The rural areas hit hardest by violence are now seeing how improving agricultural conditions can help promote sustainable development and build peace in their regions. In coffee processing, women play an important role, with between 20% and 30% of coffee farms around the world being female-operated and up to 70% of labor in coffee production being provided by women. Women not only contribute to coffee processing, but they are also responsible for family activities such as cooking, and those activities are often made in wood stoves, thereby increasing their health risk. Against this background, this study presents the design and implementation of a biodigester fed by waste produced at Coffee Production Units (CPUs) located in the rural area of Tolima department in Colombia (an important scene of the armed conflict) in order to produce biogas for domestic cooking activities. Results show that implemented biodigester can produce between 1362 and 1597 kg/day (1.1704 and 1.3604 Nm³/day), which is enough energy for domestic activities for a family of four. Furthermore, it demonstrates benefits in the economic, social and environmental context of CPUs. Additionally, due to the importance of women in coffee production, this paper also evaluates the impact of the implementation of biodigesters in farms, which has shown that biodigester implementation positively impacts the production activities and activities performed by women, thereby increasing their life quality.

Keywords: sustainable development; renewable energy; coffee-growing women; post-conflict



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1. Introduction

Coffee is one of the most representative agricultural products in Colombia, supporting nearly 540,000 coffee producers in the country and their families; 96% of producers are small-scale (up to 5 hectares), 3% are medium scale (between 5 and 10 hectares) and 1% are large-scale (10+ hectares) [1]. In 2021, Colombia was the largest producer of mild washed Arabica coffee of the world and it recorded a production of 12.6 million 60-kilo bags of green coffee/year (756,000 ton/year) [2]. Despite an increase in coffee production in recent years, there are new challenges that must be considered to ensure subsistence in an increasingly rigorous and competitive market. Factors such as reduction in costs and improvement in coffee quality during growing and processing constitute fundamental pillars of ensuring profitability of the sector, which can be hit by phenomena such as the reduction in quoted international coffee prices [3].