Agroecological innovation as a source of bioenergy for family farming, in Northeast of Pará, Amazon region.

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INTRODUCTION

In Amazon region, the forest felling and burning are still the main activities to prepare an area for cultivation. However, this system has its sustainability compromised, due to low soil fertility, associated with nutrient losses during burning in the land preparation process .[1] The TIPITAMBA project is an alternative in the preparation of the area with forest cutting and triturating without burning, through Tritucap equipament and the implantation of agroforestry systems - AFSs, in properties of family farming.2 This chopped material lies on the ground to disintegrate and release nutrients over time, as well as protect the soil from the rain and the intense sun of the Amazon region.3 Although the TIPITAMBA project system has several proven advantages, it is worth mentioning that there are other issues to be addressed to overcome bottlenecks that have arisen with the

application of this method, such as the lack of firewood.4 Therefore, the aim of this research is to evaluate the use of part of secondary forest triturated for energetic purposes.

MATERIALS AND METHODS

A semi-structured interview was conducted to obtain information about quantification and used of biomass for energy among family farmers. It was analysed the biomass of a five-year-old secondary forest, in town of Igarapé-Açu, northeastern of Pará, Brazil, Amazon. The equipment of the Tipitamba project, Horizontal Tritucap, was used to triturate 1 hectare of secondary forest. The process was performed with two passes. The biomass retained in sieved of mesh of 75 mm of aperture was destined for energetic purposes and the rest returned to the ground. A composite sample of the retained biomass was submitted for immediate chemical analysis (ABNT8112/865), humidity, basic density (ABNT 11941/036) and high heating value (ABNT 8633/847), as well as energy yield (dry weight x high value of heating). Four plots of 32 m2 of the 1 ha were sampled.

Fig. 1: Five-year secondary forest, Igarapé-Açu, Amazonia
Fonte: autora, 2017

Fig. 2: Secondary forest shredder, AHWI Horizontal Tritucap, FM 600.
Fonte: autora, 2017

Fig. 3: Use of firewood for food preparation.
Fonte: autora, 2018

Fig. 4: Use of firewood for cassava flour preparation.
Fonte: autora, 2017

CONCLUSIONS

The removal of 50% of the cutted biomass from secondary forest of five years, presents suitable characteristics for use as an energy product and is sufficient to generate raw material for thermal energy in this region with biomass combustion in the ovens of cassava flour production.

RESULTS AND DISCUSSION

According to reports from family farmers, 99% of them need firewood, either for food cooking (56%), cassava flour production (66%) and / or charcoal (37%). Thus, it is necessary to obtain sources of raw materials, alternative and / or complementary to the use of firewood, which presents technical, economic and environmental feasibility, in order to minimize the pressure on native forest areas. Regarding the analyzes performed in this research with biomass of crushed secondary forest, at 5 years of age, the average approximate volume of 46.25 ton.ha-1 of dry biomass was quantified. Considering the volume retained in the 75mm sieve, we have the value of 14.10 ton.ha-1 corresponding to only 50% of the biomass of the secondary comminuted forest, leaving for the cycling of nutrients in the soil a volume of 14.61 tons -1. The secondary forest of cut biomass has considerable and suitable characteristics for use as an energy product, compared to the biomass currently used for energy.8 Therefore, it is possible to use part of the biomass for energy purposes, either as a primary alternative source

or complementary to the biomass. the use of firewood, providing socioeconomic improvements to family farmers, due to the avoided cost of buying firewood and generating income for those who manage to market part of the “surplus” volume of family use.

Variables	Val.
Poids net (ton.ha^{-1})	14,10
Densité (g.cm^{-3})	0,58
Humidité (%)	33,71
Matière volatile (%)	80,51
Cendres (%)	0,12
Carbone fixe (%)	19,37
Pouvoir calorifique supérieur(kcal.kg^{-1})	4374
Productivité énergétique (GCal.ha ^{1})	61,66

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