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Transforming Livestock Farming into a Sustainable Source of Animal Protein through Agroforestry

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Abstract

This paper aims to discussing the potentialities of Agroforestry to make livestock farming an agroecological source of milk and beef, through those nature-friendly designs where trees provide wealth and services suitable to support the production systems with low input, under tropical conditions. Outcomes come from on-farm research carried out in several Cuban institutions and in different degraded agroecosystems which are devoted to milk and beef production. Silvopastoral systems in grass-legume associations, legume protein banks and forest/fruit plantations together with alley cropping for forage production have been the most studied. All these agroforestry alternatives have in common: (i) not use of irrigation and chemical fertilisers, (ii) grazing with different number of paddocks and stocking rate, and (iii) the use local genotypes. Individual milk yields, with stocking rate from 1 to 2 cow ha^{-1}, ranges between 7 and 8 kg as general trend. The lower production is reported for agroecosystems with: (i) low fertility soil, (ii) animals with low genetic potential and/or (iii) high trees density constraining the growth of the pasture. While yields over 8 kg are associated with the use of moderate amounts of feed supplements and animals with a better milk production capacity. In silvopastoral systems devoted to beef production, when animals are young cattle, the optimum stocking rate might range between 2 and 3 head per hectare. This, combined with a sound management of the soil-grass-animal-tree complex, has reached an average daily weight gain close to 700 g day^{-1} with final weight between 400 and 445 kg, and 800 kg of meat ha^{-1} yr^{-1}. When the end is to raise heifers for replacement, the daily weight gain ranges from 450 to 600 g $animal^{-1}$ day^{-1} with a live weight and an age at the reproduction incorporation of 290–300 kg and 24–27 months, respectively. It is concluded that Agroforestry constitutes an ecological alternative to foster a sustainable livestock production. However the nature of livestock-trees interactions is variable and the benefits of the more positive effects are not yet recognised by farmers and policy makers. Consequently, the potential of Agroforestry has not been effectively exploited.

Keywords: Agroforestry, livestock, silvopastoral systems, sustainable production

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