Tropentag, September 17-19, 2018, Ghent

"Global food security and food safety:
The role of universities"

Profitability of Agroforestry-Based Biofuel Value Chains in India

Floris Dalemans, Bart Muys, Miet Maertens

KU Leuven, Earth and Environmental Sciences, Belgium

Abstract

Energy security is an essential condition for food security and rural poverty reduction in developing countries. To achieve increased independence from expensive fossil fuels for transport and electrification in poor landlocked areas, a search for affordable, more sustainable and alternative energy sources was recently initiated. Liquid biofuel production in small-scale agroforestry systems for local use is considered a promising option. In this novel approach multipurpose oilseed trees are integrated within existing farming systems. Although oilseed yields might be limited in these low input – high diversity – high resilience systems, the trees bring along multiple other products, uses and co-benefits, which add to the viability of the approach.

Such a biofuel model is being implemented in Hassan district, South India, but empirical studies have shown that current farmer participation is low, and that willingness to participate heavily depends on the economic profitability of oilseed collection. To assess the model's economic potential, this study uses primary survey and yield data to quantify its long-term profitability for various value chain actors and designs. It aims to determine whether, under which configurations, for whom, and to which extent biofuel value chains are profitable, and how this depends on a range of (uncertain) key factors, such as prices and policies, technology and yields, and opportunity costs of land, labour and capital.

The results show that labour is a crucial factor for profitability. In most scenarios, it is not viable for farmers to hire labour for cultivation and processing. If family labour is used to this end, the economic potential is higher, although returns to labour would only improve from current values for part of the households, indicating programme targeting should be accordingly differentiated. Also land opportunity costs are vital to consider, as profits only start to surpass these after 10 years. From the viewpoint of processors, conversion of seed oil to biodiesel is currently irrational, as the former is a more valuable product under the prevailing economic conditions. Biodiesel production is only viable in a minority of scenarios, questioning the feasibility of the programme as a biofuel program.

Keywords: Agroforestry, biofuels, profitability modelling, rural development, value chain design

Contact Address: Floris Dalemans, KU Leuven, Earth and Environmental Sciences, Celestijnenlaan 200e - Bus 2411, 3001 Leuven, Belgium, e-mail: floris.dalemans@kuleuven.be