Impact Analysis of Insect-Repellent Biochar Production Costs on the Economic Viability of Rural Cattle Farming

Siwat Tajamai[1], Haris Homdoung[1], Supakit Chaimuanglen[2], Rungrudee Chanoodhom[2]
Nigran Homdoung[3] and Rameshprabu Ramaraj[3*]

[1]Wattanothai Payap School, Science-Mathematics Program, Chiang Mai, Thailand, 50100
[2]Creative Industrial Material Research and Development Centre, Lampang, Thailand, 52130
[3]School of Renewable Energy, Maejo University, Chiang Mai, 50290, Thailand

Corresponding Author Email: rrameshprabu@gmail.com

Abstract

This study aims to evaluate the costs, cost-effectiveness and feasibility of Bio-Cassia Biochar (BCB), which has insect-repelling properties. The study explores how this biochar can be used to fatten beef cattle in households and how products can be created to help households earn income. An evaluation of the financial aspects has been carried out, considering the raw material, labour, electric power, machines and production capacity costs at current market prices. Additionally, the study investigates the impact of biomass prices, BCB production, cassava starch, electricity, machinery, and labor costs on the overall production cost, farmer income, and payback period. These factors are compared against the productivity gains achieved by preventing blood-sucking insect disturbances throughout the fattening period. The findings indicate that the highest production costs are attributed to labor, longan wood waste, cassava starch, and electricity, accounting for 36.66%, 31.16%, 12.17%, and 11.47%, respectively. The production cost of BCB ranges from 7.36 to 14.36 THB/kg. Field implementation by farmers demonstrates a payback period between 1.15 and 2.15 years. In conclusion, investing in an insect-repellent BCB production system for beef cattle fattening is highly cost-effective and generates appropriate income for farmers.

Keywords: Bio-Cassia Biochar, Insect-repellent biochar, Cost-effectiveness, Payback period, Cattle fattening