

Analysis of utilization of coffee pulp and husk for agricultural and energy services in Kiambu County, Kenya

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Abstract:

Coffee is one of the most important beverages in the world and its yearly production is about 1 million tons (green bean) in more than 50 countries. Kenya is among the leading coffee producers in Africa, exporting 850,000 bags (51,000 metric tons) in the year 2010 alone. Coffee harvesting and processing can however lead to different types of environmental loads such as a High demand for clean water, a significant amount of solid organic wastes, waste waters and off gases from coffee drying. It is estimated that 2 tons of spent coffee pulp and husks is wasted at the production facilities per Ton of consumable coffee beans. This means that the main bi-products, pulp and husk amount to one million tons worldwide, which is a serious problem due to presence of toxic materials such as caffeine and tannins. To contribute to safe disposal of solid biomass waste in coffee processing this research was conducted to assess the opportunities and challenges of expanded use of solid waste from coffee processing in energy and agricultural services in Kiambu County. Sustainability concerns in coffee processing were evaluated using the life cycle assessment approach. This research was based on a survey design targeting coffee farmers, factory employees, and selected key respondents in the County. The specific tools used were questionnaires, interview schedules, environmental and observation checklists. Data were analyzed using both descriptive and inferential statistics using both SPSS and Excel spreadsheets. Results showed that about 2 tons of fresh coffee was received cumulatively in all six factories surveyed per year. Coffee processing generates 51% solid biomass waste of the total input. This represents a significant load on-the environment, which calls for more innovations towards waste reduction in the entire coffee processing life cycle. There was no significant difference in the proportion of quantities of coffee processed and the amount of husk produced among the six factories, which suggests that production inefficiency levels in all the six factories are comparable. Low awareness on the diversified uses of coffee husk and pulp, limited finances and appropriate technologies were the key constraints to maximizing their use in Kiambu County. About 40% of respondents identified inadequate demand for husk as a serious problem while 75% stated that there is poor response to the re-use of husk and pulp. About 47% of farmers used coffee husks for composting. In line with the growing importance of sustainability thinking, there is need to integrate waste management practices into decision-making at the policy level in coffee factories in Kiambu County. This should take an entrepreneurial approach in order to open opportunities for more income generation to stakeholders besides enhancing environmental health. It is hoped that the findings of the study will assist farming communities, factory authorities, researchers, development agents as well as policy makers on maximizing the potential of coffee husk and pulp generated from coffee processing through offering remedial actions in creating jobs and promoting technology transfer beneficial to the area as well as foster environmental management practices.