ABSTRACT

ELIDA NOVITA. Processing Design at Robusta Coffee Agroindustry Using Modified Wet Process Technology Based on Cleaner Production. Under direction of RIZAL SYARIEF, ERLIZA NOOR, and RUBIYO.

Coffee in Indonesia included 5 main crops commodities, and 10 main export commodities. Since 2008, Indonesia is the third exporter countries after Brazil, and Vietnam. Coffee has been shown to have definitely beneficial for Indonesian farmer as source of income, and contributes for regional development, so its sustainability should be maintained. One of constraints faced by farmers is low quality of coffee beans due to post-harvest handling. Most coffee producer in Indonesia is smallholder Robusta coffee which used to dry process for coffee berry. Application of wet process is more sophisticated than the dry process, but leads to better quality coffee bean, though need high input of water, and produce wastewater that can pollute the environment. It should be designed coffee processing based on clean production to minimize, and prevent the wastewater generated from processing. Development of processing technologies based on cleaner production is a part of sustainability development strategies on smallholder coffee agroindustry. Therefore, the main objective of this research is to design sustainability of smallholder coffee processing using wet technology that has quality oriented to improve farmer productivity, and incomes without dismissing social, and environmental interests. In particular, the general objective is achieved through several phases with their aims as follows; (1) to formulate coffee agroindustry sustainability framework based on economic, environmental, social, and institutional indicators, (2) to determine the sustainability status of smallholder coffee agroindustry, (3) to modify wet technology on Robusta coffee processing by water minimizing, (4) to design of waste treatment system on smallholder coffee agroindustry, (5) to formulate the structure of smallholder coffee agroindustry development which based on cleaner production. Research is conducted through several stages in the research field of coffee plantation area (Sidomulyo village, Jember Regency), laboratories (Jember University, and AWMC, The University of Queensland), and pilot plant unit (Indonesian Coffee and Cocoa Research Institute). Sustainability analysis showed the value of sustainability is 58.94% (sustainable enough) with 10 main leverage factors. Modified wet technology through water minimization can reach optimum levels at 2,987 – 3,345 m³/tonne of coffee berry. Within this volume, the quality of green coffee could be maintained, and wastewater minimized until 67% compared to conventional wet processing. Waste treatment designed of coffee processing have been done through reduce, reuse, and recycle (3R) to obtain the economic value of by-products. Economic analysis showed smallholder coffee agroindustry which applied modified wet technology based on cleaner production has higher feasibility, and flexibility compared with the dry processing mainly deal with fluctuation of world coffee prices. Development of smallholder Robusta coffee can be performed based on the structures of needs, constraints, required changes, goals, and indicators obtained through the ISM simulation.

Keywords: Robusta, coffee, wet process, cleaner production, sustainability, ISM