Implementation of Certified Climate-Smart Robusta Coffee Cultivation and Its Impact on Farmers' Welfare in Forest Areas of Jember Regency

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ABSTRACT

Global climate change has emerged as a major challenge for the agricultural sector, including for Robusta coffee farmers who are increasingly confronted with uncertainty in rainfall patterns and heightened risks of drought. These conditions have significantly contributed to declining Robusta coffee productivity, which in turn threatens income stability and diminishes farmers' quality of life. In response to these conditions, private institutions have implemented the Climate-Smart Robusta Coffee Cultivation Program (PBKCI) through the 4C (Common Code for the Coffee Community) and Rainforest Alliance (RA) certification schemes by providing sustainability-oriented education, promoting climate-smart adaptive farming practices, and strengthening resilience to climate change. Nevertheless, the effectiveness and success of these programs remain subject to debate. This study examines the extent to which farmer characteristics and institutional roles influence the adoption of certified climate-smart Robusta coffee cultivation practices, as well as their impact on farmers' welfare in forest areas of Jember Regency. A quantitative research design was employed using Structural Equation Modeling with Partial Least Squares (SEM-PLS). Data were collected from 317 Robusta coffee farmers participating in the 4C and Rainforest Alliance certification programs. The empirical results indicate that farmer characteristics exert a weak influence, whereas institutional roles have a strong direct effect on the level of PBKCI-standard Robusta coffee cultivation adoption. Both factors contribute to improvements in farmers' welfare; however, farmer characteristics were found to have no direct effect on welfare. More specifically, this study identifies PBKCI adoption as an effective mediating variable that channels the indirect effects of farmer characteristics and institutional roles toward enhanced farmers' welfare. These findings underscore that the success of PBKCI in improving farmers' welfare can be achieved through strong institutional support, which plays a vital role in encouraging farmers to adopt sustainable and climate-smart Robusta coffee farming technologies as a viable and profitable livelihood source.

Keywords: Coffee Cultivation; Robusta; Certification; Climate-Smart; Welfare