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Behavioural determinants of farmers’ willingness to end residue burning in ghana: evidence from a hybrid choice model

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Abstract

Persistent reliance on traditional open-field burning of agricultural residues emits greenhouse gases (GHGs), resulting in adverse environmental, health, social, and economic impacts. Despite alternatives that exist to valorise and monetise crop residues, thereby boosting farmers’ incomes, the willingness to adopt them remains inadequate. This indicates that mere availability is not enough to change behaviour. Our study employed a hybrid choice model (HCM) to assess the psychometric factors influencing farmers’ decision-making, using indicators of their willingness to adopt innovations. The research involved 200 tropical fruit farmers from six administrative regions of Ghana who participated in a choice experiment. Our findings show that farmers require substantial monetary compensation for participating in technology training (100.8 Ghana Cedis), village training (82.7 Ghana Cedis), and collective governance structures (65 Ghana Cedis). Additionally, the amount of monetary compensation needed to encourage farmers to stop residue burning in favour of sustainable practices decreases by 77 Ghana Cedis when they receive public recognition, indicating that social capital can substitute for financial incentives. Moreover, the disutility associated with government support, along with farmers’ demand for a high-risk premium to accept such interventions, suggests that state-led governance overlooks farmers’ opportunity costs and institutional distrust. Ultimately, including psychometric factors such as innovation risk yields better predictive performance than standard choice models and provides a more realistic view of farmers’ decision-making processes. By adopting an HCM, our study first contributes to the literature by advancing methodological insights into the analysis of discrete choice models with loss-framing effects in smallholder farmers’ decision-making. Our study provides policy-relevant insights into incentive structures, reflecting behavioural insights, that inform the design of more effective environmental policies.

Keywords: Agricultural residue, Ghana, HCM, residue burning, WTA