Incentives to reduce crop residue burning: farmer preferences from Ghana

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1. Introduction

- Despite policies banning it, open-field burning is widespread in Ghana (Seglah et al., 2020).
- Second-largest contributor to air pollution across sub-Saharan Africa, with significant implications for soil health, emissions, and ecosystem health
- Farmers perceive it as low cost, good for the soil and a social norm (Lopes et al, 2020; Lopes et al, 2023; Jack et al. 2025)

Research Questions

- How do farmers value (non-) monetary incentives to stop residue burning?
- How do latent innovation attitudes affect farmers' preferences?

We examined the compensation farmers require to adopt sustainable residue management and whether training, recognition, and support reduce this requirement.

2. Methods

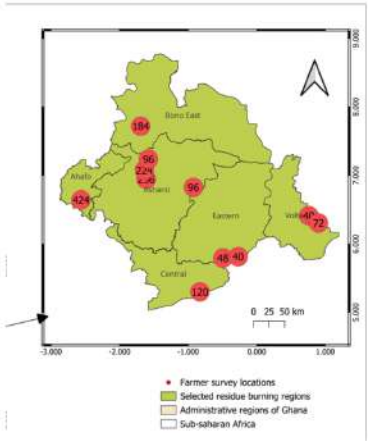
- Pre-study with interviews: farmers and extension officers to select and validate attributes and levels.
- Discrete choice experiment with survey (n= 200), including Likert-scale questions on attitudes toward innovation adoption.
- Model: Hybrid choice model (HCM) to account for latent innovation attitudes

$$U_{ijt} = \beta_1 (\text{Sustainable Practices})_{ijt} + \beta_2 (\text{Training})_{ijt} + \beta_3 (\text{Acknowledgement})_{ijt} + \beta_4 (\text{Governance})_{ijt} + \beta_5 (\text{Monetary})_{ijt} + \gamma (\text{Latent Variable})_i + \varepsilon_{ijt}$$

Table 1. Attributes and Levels used in the discrete choice experiment

Attributes	Levels
Sustainable practice	Controlled burning Ploughing Pruning and Mulching Plastic Mulching
Training	Field training Village training Technology training
Positive public recognition	Public award No public award
Governance	Individual support Group/Association support Government support
Monetary incentive	100 Ghana Cedis/ha (US$6/ha) 200 Ghana Cedis/ha (US$12/ha) 300 Ghana Cedis/ha (US$18/ha) 400 Ghana Cedis/ha (US$24/ha) 500 Ghana Cedis/ha (US$30/ha)

Figure 1. Spatial distribution of sampled districts and relative sample shares



3. Results

Table 2. HCM estimated results within the WTA space

Variables	Mean Coeff.
Village training	82.683***
	(19.752)
Technology training	100.775***
	(19.809)
Award	-77.470***
	(17.234)
Governance: Group	49.037**
	(21.209)
Governance: Government	65.355***
	(20.565)
Prune-and-mulch	-35.58
	(27.504)
Plastic mulching	57.023
	(41.416)
Ploughing	23.428
	(33.515)
Monetary	-4.390***
	(0.181)

- **Public recognition is a strong incentive:** Public acknowledgement reduces the compensation farmers require by about 77 GHS.
- **Training increases compensation needs:** Farmers require about 101 GHS extra for technology training and 83 GHS for village training, indicating that training is perceived as an additional burden.
- **Individual support is preferred**: Farmers require 49 GHS more for group support and 65 GHS more for government support compared to individual support

Note: A vector of other control variables were included, but not shown here for brevity.

4. Conclusion

- **Public recognition can help shift social norms.** Burning is an established social arrangement (with hunters), and public recognition may help legitimize the new practice.
- **Policy packages can combine monetary and nonmonetary incentives:** pairing financial support with public recognition and individually tailored support
- **Training should be designed carefully:** because training increases compensation needs, programmes should minimize farmers' time and participation costs rather than assuming training is an incentive in itself.

References

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