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## Introduction

Food security in Sub-Saharan Africa (SSA) can be achieved through intensification programmes, such as production support, amid the growing population. But the intensive “monocultural” cropping, characterised by the use of synthetic fertilisers, may affect negatively the agroecosystem<sup>1</sup>. Increasing productivity through intensification under sustainable agricultural practices (SAPs) has been a challenge in SSA. Very few studies have investigated the effect of government interventions, such as production support, on farmers’ SAP adoption behaviour.

Ghana’s government, in 2017, introduced the Planting for Food and Jobs (PFJ) programme to increase food production through increased use of subsidised improved seeds and fertilisers, free extension services and pesticides<sup>2</sup>. The PFJ support is not a direct payment for SAP adoption. It is used to attract farmers onto the programme to be trained on SAPs through free extension services.

**Study objective:** Evaluate the effect of Ghana’s PFJ programme, integrated with technical advisory services and training, and other factors on farmers’ SAP adoption intensity, i.e., number of SAPs

## Methodology

- Quantitative questionnaire survey conducted among cereal farmers in Northern Ghana from December 2018 to April 2019.
- Multi-stage sampling – random selection of 285 PFJ beneficiary ≤ 2 years; 255 non-beneficiary selected with purposive sampling (i.e., sample size = 540).
- 502 used for the analyses after data cleaning and removal of outliers (252 PFJ beneficiaries and 250 non-beneficiaries).

### Analytical framework

$$Y = \alpha + \beta_1 D_i + \beta_2 M_i + \beta_3 R_i + \beta_4 G_i + \varepsilon_i, i = 1, 2, 3, \dots, N$$

Y = number of SAP adopted per farmer (i.e., crop rotation, intercropping, cover cropping, zero/minimal tillage, row planting, mulching, composting, and manure application)<sup>2</sup>.

D<sub>i</sub> = PFJ support (1 = if the farmer receives subsidised seeds, fertilisers and free pesticides)



Fig. 1: Sampled pictures of the field survey & farmers undergoing SAP training

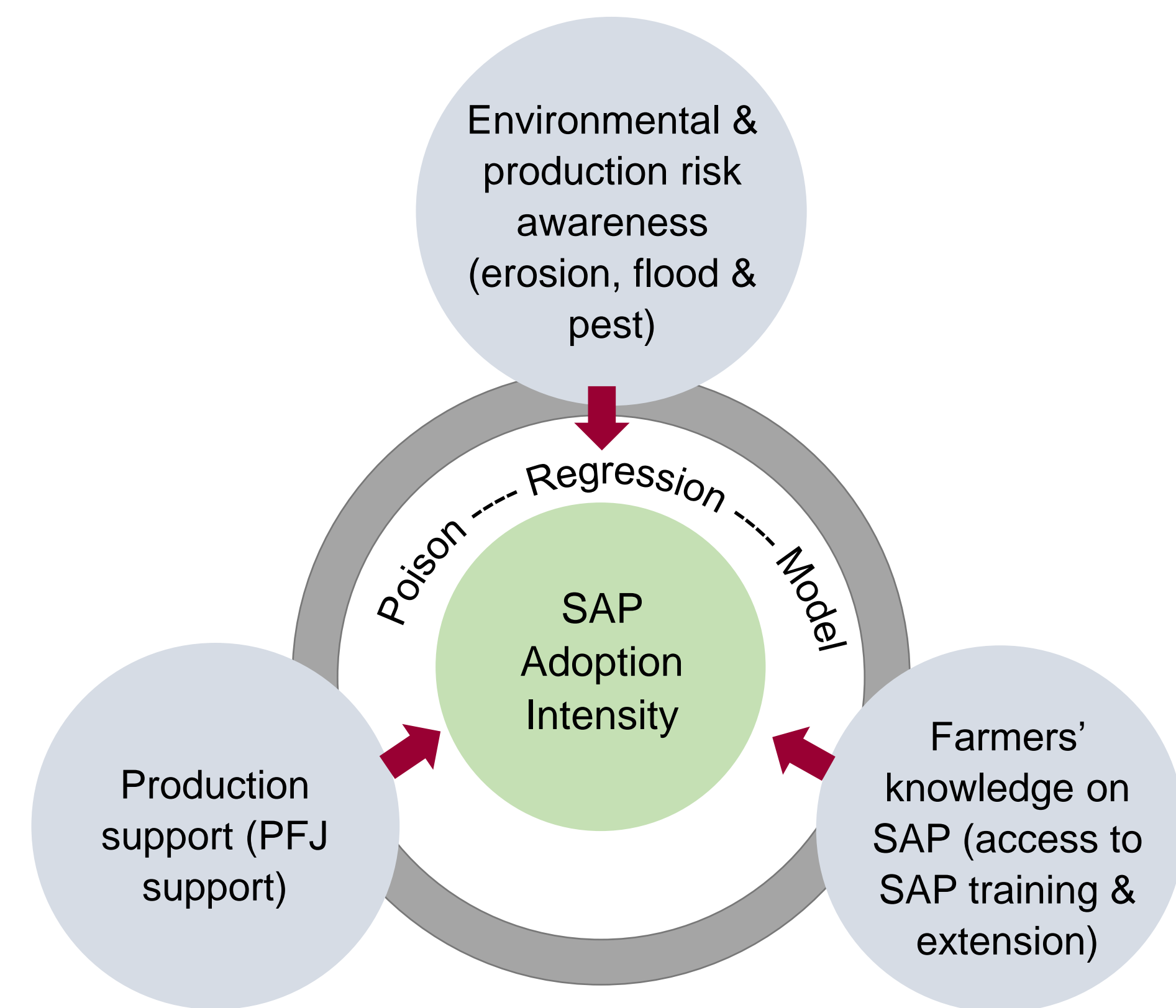


Fig. 2: Conceptual framework explaining the relationship between PFJ support and SAP adoption

## Result

Table 1: Poisson regression estimates of farmers’ SAP adoption intensity

Variables	Coef.	Std. Err.	P>z†	Mean Marg. Eff. ‡	Std. Err.
<b>Farmer and farm characteristics</b>					
Experience	0.01	0.00	*	0.01	0.01
Education	0.01	0.01	**	0.03	0.02
Gender	-0.13	0.07	**	-0.36	0.18
Farm size	0.01	0.01	**	0.03	0.02
Use of hired labour	0.13	0.07	*	0.34	0.19
Livestock production	0.29	0.08	***	0.77	0.23
<b>Geographic variables</b>					
Northern region	0.18	0.15		0.49	0.40
Savannah region	0.31	0.15	**	0.81	0.40
Upper East	0.34	0.18	**	1.74	0.38
Upper West	0.65	0.14	***	0.91	0.48
<b>Risk awareness variables</b>					
Pests invasion	-0.17	0.07	***	-0.45	0.18
Flood	0.12	0.08	*	0.32	0.20
Soil erosion	0.19	0.07	***	0.51	0.19
<b>Institutional variables</b>					
Extension services	0.14	0.08	*	0.37	0.22
SAP training	0.35	0.14	***	0.92	0.36
PFJ support	0.19	0.09	***	0.50	0.24
Access to credit	0.23	0.07	***	0.62	0.19
Farmer association	0.03	0.07		0.09	0.19
_cons	-0.57	0.19	***	—	—
Number of Obs.	423				
Wald Chi <sup>2</sup> (17)	353.49				
Prob > Chi <sup>2</sup>	0.00				
Pseudo R <sup>2</sup>	0.22				
Log-likelihood	-632.96				
Deviance goodness-of-fit = 168.62; Prob > Chi <sup>2</sup> (404) = 1.00					
Pearson goodness-of-fit = 147.81; Prob > Chi <sup>2</sup> (404) = 1.00					

† \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

‡ Mean marginal effect

## Discussion

**Access to PFJ support (+):** This is in line with literature that less motivated and resource-poor farmers can be encouraged with external support such as PFJ to change their behaviour towards SAP<sup>3</sup>.

**Access to extension and SAP training (+):** Training and extension services on SAP increases farmer knowledge on the adverse effects of erosion and soil degradation and its impact on their productivity<sup>3, 5</sup>.

The provision of information and technical assistance on sustainable agriculture increases the adoption and retention rate of SAP than the provision of external support such as PFJ<sup>3, 4</sup>.

## Conclusion

Access to production support increase the number of sustainable practices adopted by a farmer when combined with SAP training and extension participation.

The programme should focus on increasing adoption of soil fertility improvement SAPs through training and extension services due to the negative effect synthetic fertilisers (PFJ support) on the environment.

## References

1. Lovo, S. 2016. Tenure insecurity and investment in soil conservation. Evidence from Malawi. *World Development*, 78: 219–229.
2. MoFA. 2017. Planting for food and jobs strategic plan for implementation (2017–2020). Accra Ghana: Ministry of Food and Agriculture, Statistics, Research, and Information Directorate.
3. Bopp, et al., 2019. The role of farmers’ intrinsic motivation in the effectiveness of policy incentives to promote sustainable agricultural practices. *Journal of Environmental Management*, 244: 320–327.
4. Green, et al., 2013. Driving adoption of payments for ecosystem services through social marketing, Veracruz, Mexico. *Conservation Evidence*, 10: 48–52.
5. Bamire, et al., 2002. Adoption pattern of fertiliser technology among farmers in the ecological zones of south-western Nigeria: A Tobit analysis. *Australian Journal of Agricultural Research*, 53: 901–910.

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