



Poster no 684: Ex-post impact of the digital and personalized recommendations in rice production: a case study of RiceAdvice application in the Senegal river valley



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Introduction

- ❖ Blanket advice on fertilizer application rates has failed to achieve potential yield gains for crop production in much of sub-Saharan Africa.
- ❖ The development of the rice value chain requires technological advances in rice production to increase yield while reducing environmental footprint.
- ❖ The RiceAdvice app is an Android-based decision support tools that extension agents can use to provide farming households with pre-season, field specific management guidelines for rice production (Fig. 1).
- ❖ Ex-post impact of personalized recommendations for rice nutrient management among farmers in the dry and wet seasons was assessed in Senegal.

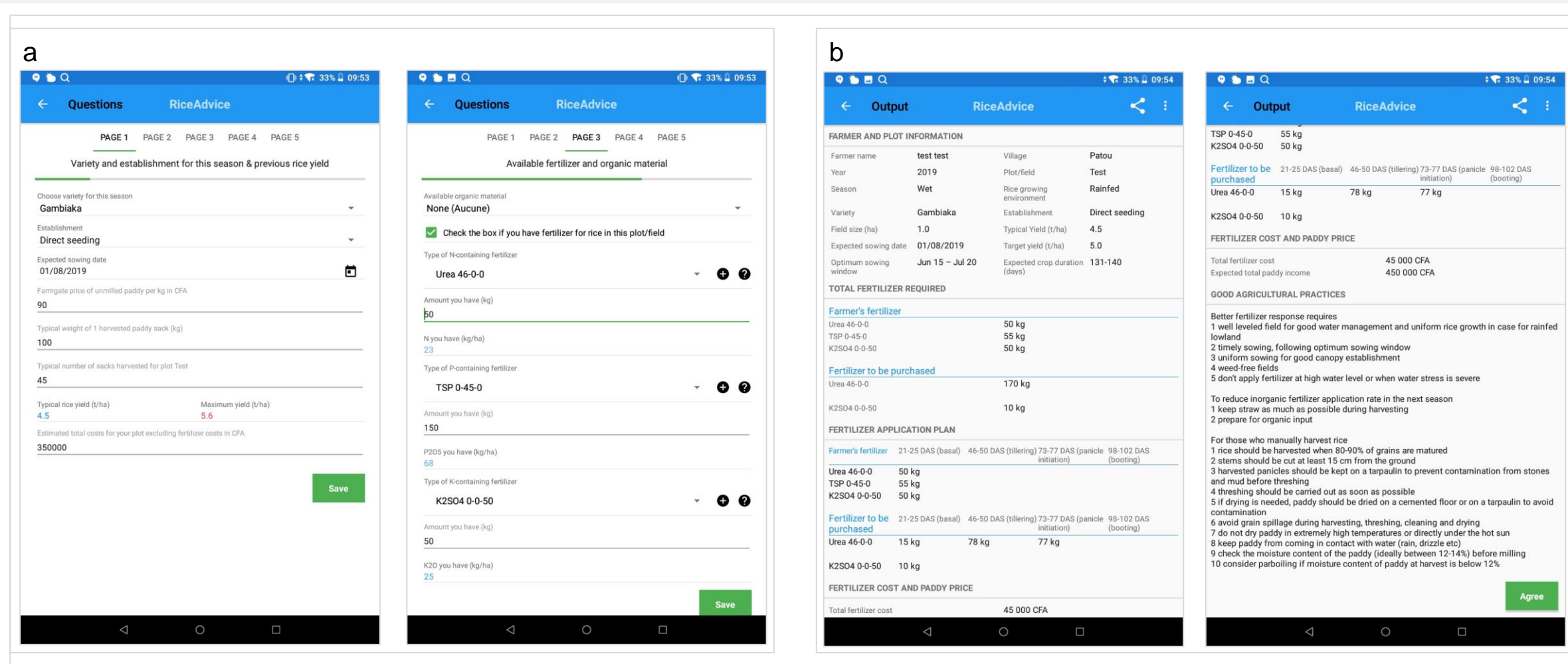


Fig. 1: RiceAdvice application. (a) provides examples of the data input screens for the app, (b) provides examples of the personalized output from the app.

Materials and Methods

Study area

- ❖ The survey was conducted in the Senegal River Valley (SRV) in the northern part of the country (Fig. 2).
- ❖ SRV is the main rice producing region the country
- ❖ Rice is produced in irrigated system in the SRV

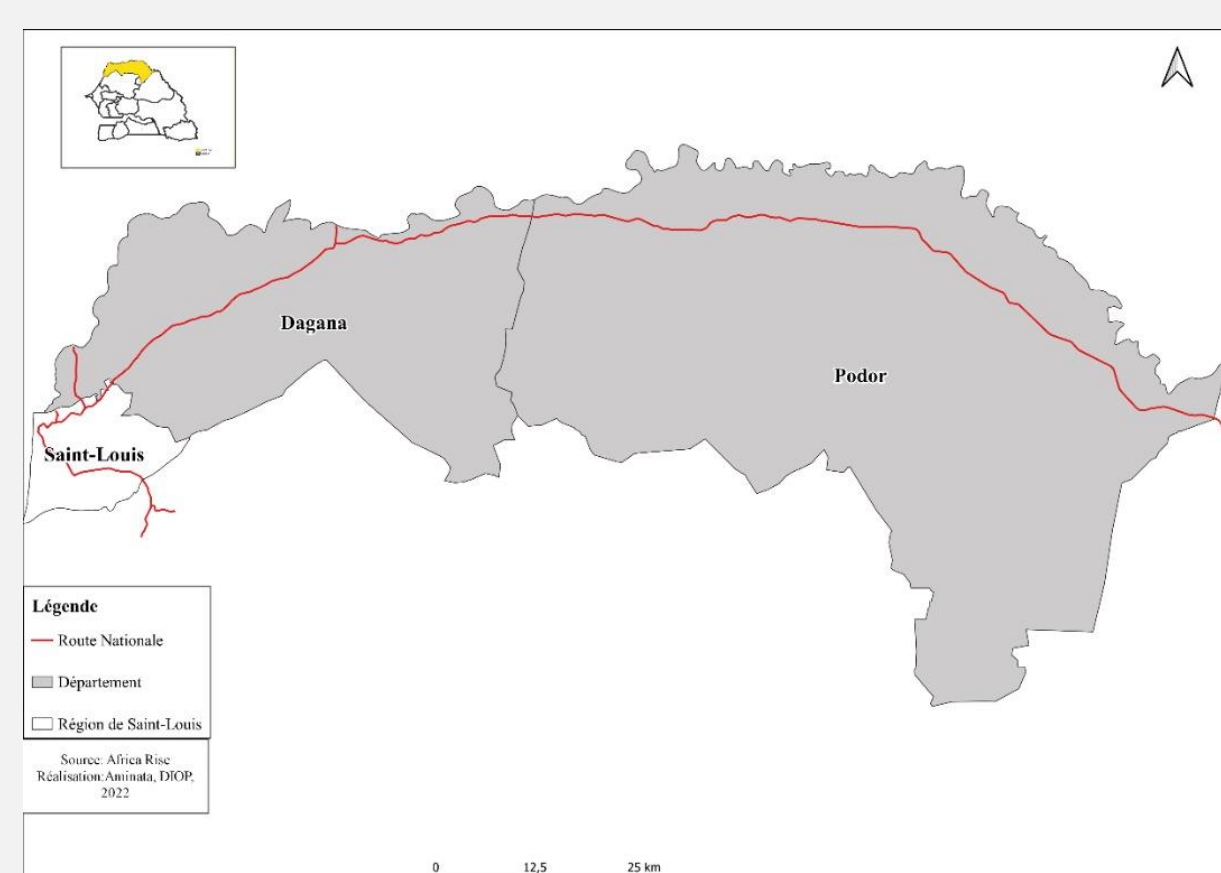


Fig. 2: Map of survey regions in Senegal

Experimental design and sampling

- ❖ Two-degree stratified random sampling technique was used (Fig. 3).
- ❖ In total 1200 households were selected from the sampling technique in 41 villages

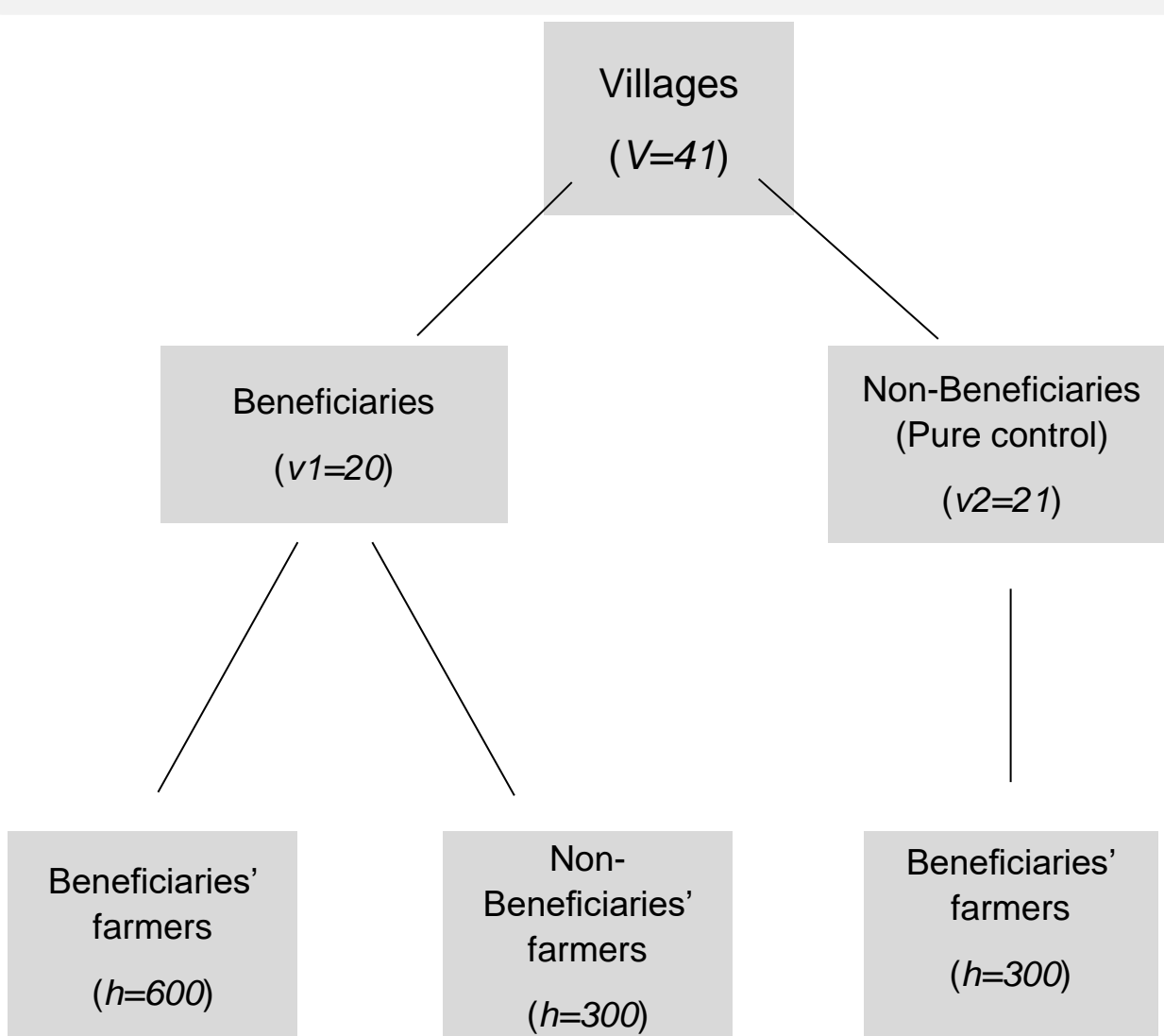


Fig. 3: Experimental design

Data analysis

- ❖ Endogenous switching regression (ESR) model was adopted to control for selection bias due to unobserved factors.

Acknowledgement

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Results

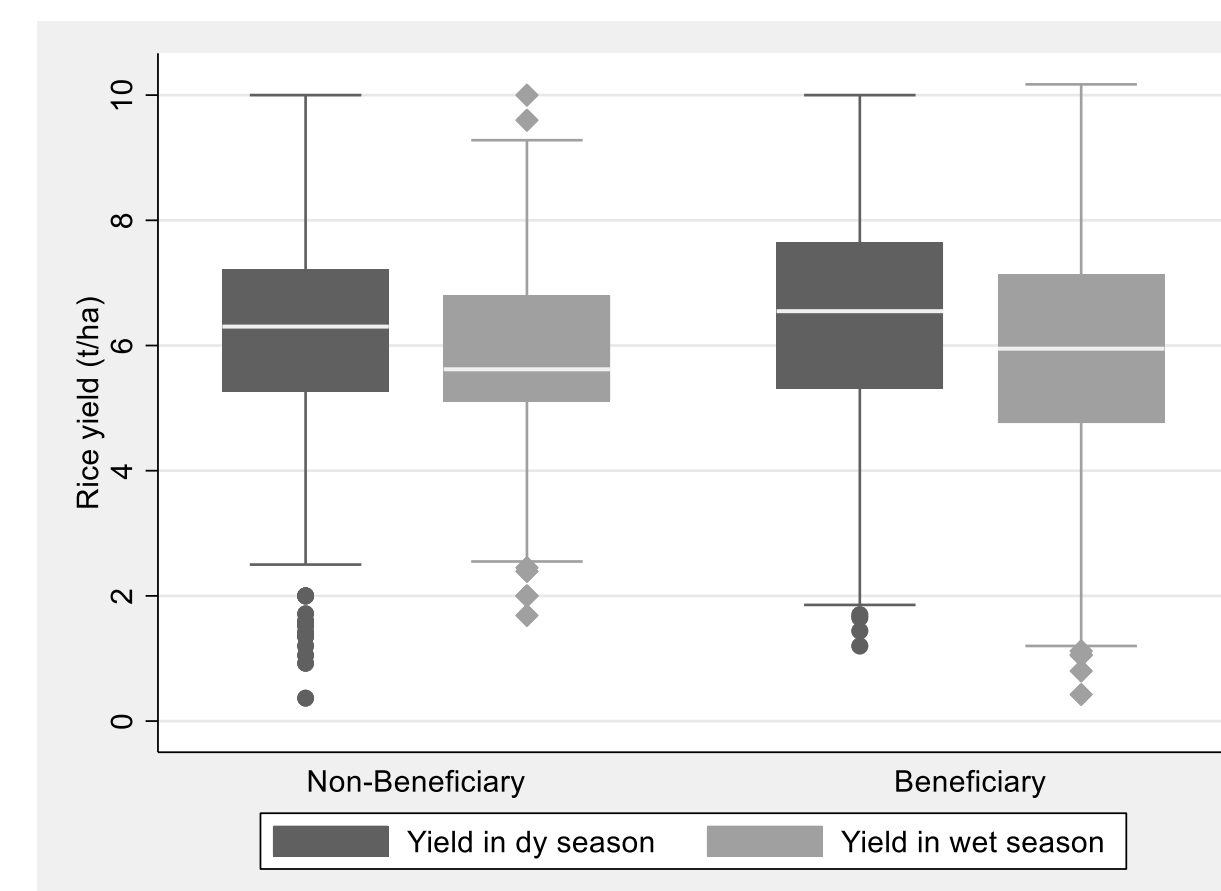


Fig. 4: Rice yield per growing season and per beneficiary.

- ❖ Most rice farmers grew rice during the dry season because the yield were higher (Fig. 4).
- ❖ Formal education and contact with extension service affect the adoption of the RiceAdvice by rice farmers (Table 1).
- ❖ Results showed positive impact of RiceAdvice of 220kg/ha and 580 XOF/ha on yield and profit, respectively (Table 2).

Table 1. Determinants of participation.

| | Coef. | Std. Err. |
|--|-----------|-----------|
| Sex of the household head (=1 if male) | 0.640*** | 0.212 |
| Formal education (=1 if Yes) | 0.166* | 0.090 |
| Quantity of DAP used (Kg/ha) | -0.002* | 0.001 |
| Quantity of urea used (Kg/ha) | -0.000 | 0.000 |
| Access to credit (=1 if Yes) | 0.002 | 0.090 |
| Distance to inputs market (km) | -0.036*** | 0.006 |
| Agricultural training (=1 if Yes) | 0.478*** | 0.090 |
| Contact with extension service (=1 if Yes) | 0.709*** | 0.089 |
| Constant | -0.868* | 0.491 |
| N | 1120 | |
| p | 0.000 | |
| chi2 | 112.747 | |
| Likelihood | -2764.622 | |

Note: * p<0.10, ** p<0.05, *** p<0.01

Table 2. Endogenous switching regression treatment effects.

| | Decision stage | | ATE |
|-------------------------|----------------|-----------------|-----------|
| | Beneficiary | Non-beneficiary | |
| Yield (T/ha) | | | |
| Beneficiary (ATT) | 6.44 | 6.22 | 0.22*** |
| Non-beneficiary (ATU) | 6.21 | 8.24 | 2.03*** |
| Heterogeneous effects | 0.23 | -2.02 | 2.25 |
| Profit (US\$/ha) | | | |
| Beneficiary (ATT) | 795.45 | 216.19 | 579.26*** |
| Non-beneficiary (ATU) | 748.41 | 860.5 | 112.09*** |
| Heterogeneous effects | 47.04 | -644.31 | 691.35 |

Note: ATE-average treatment effect; ATT-average treatment effect for treated. ATU-average treatment effect for untreated; *** p < 0.01.

Conclusion

- Personalized advice (RiceAdvice) increases yields and profit of smallholder farmers.
- Socio-economic, institutional and perception characteristics affect the adoption of the RiceAdvice app by rice farmers.
- More targeted information to farmers can improve livelihood and prevent negative environmental effects.