

Internal Displacement and the Promotion of Agriculture Intensification: Experimental Evidence from a Fragile Setting

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Context

- **Conflict & Displacement:**
 - Conflict and insurgency have internally displaced 3.7M in Nigeria.
 - Reduced displaced households' access to land, assets, and markets.
- **Climate Stress:**
 - Erratic rainy seasons, droughts, floods.
 - Soil degradation – erosion and micronutrient depletion – vicious cycle of unsustainable agriculture.
- **Nutrition:**
 - Severe micronutrient deficiencies especially iron and zinc.
 - High food prices drive now prevent 92% of Nigerians from affording a healthy diet (FAO, 2021).
- **Policy and Humanitarian Response:**
 - State specific - Focus on integration, access to land and eligibility for state level input support.
 - Seed–fertilizer bundles are the core support for IDPs - 100% subsidized by humanitarian agencies. (FAO/WFP)

Motivation

- **Low Productivity:** Limited use of complementary technologies drives low yields.
- **Binding Constraints:** No single constraint binds productivity—bundles matter (Suri & Udry, 2022).
- **Risk & Liquidity:** Climate and conflict shocks intensify risk, decrease liquidity and investment.
- **Support Gap:** < 2% receive social or cash transfers.
- **Adoption:** Discounts and insurance matter; small and phased subsidies (Duflo et al., 2011).
- **Policy/Humanitarian:** Agriculture support critical, how best to design for fragile contexts.
- **Biofortification:** Biofortified crops offer affordable nutrition, but bundles remain under-studied.
- **Evidence Gap: Very limited rigorous evidence on integrated bundles for IDP vs host populations.**

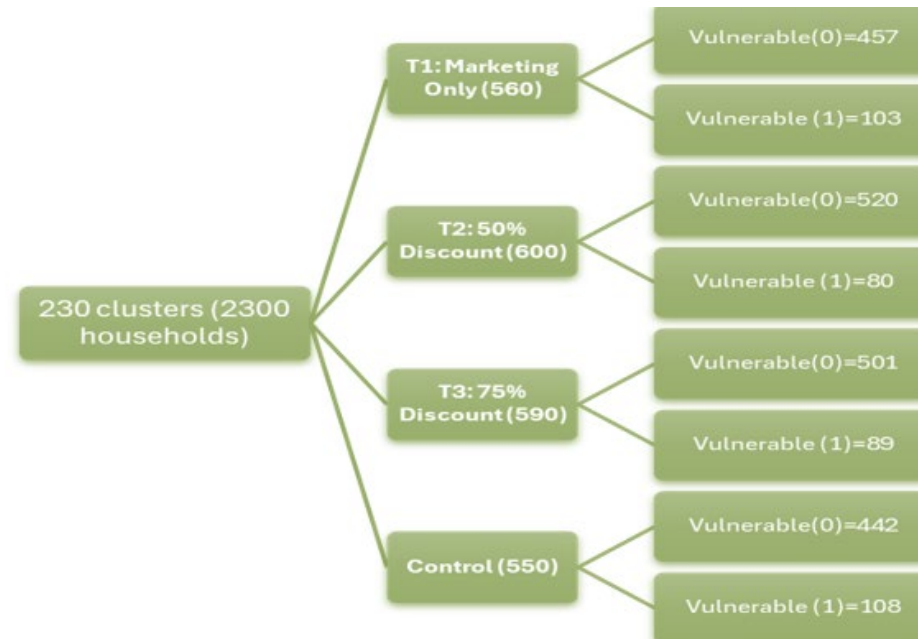
Intervention Design

Study Area	Five local government areas (LGAs) in Gombe state with higher levels of IDPs.
Bundle Size	The bundle is designed for a quarter-hectare plot, with pictorial and verbal guidance on crop management.
Provider	Inputs are supplied by Premier Seed Nigeria Ltd.
Seeds	The seed package includes 2 kg high iron pearl millet, 5 kg vitamin A maize and 6 kg iron cowpea (non-BF), all climate-smart and with elevated micronutrients.
Fertilizer	The fertilizer component includes 50 kg NPK (microdose), 50 kg urea (two splits), and one liter organic fertilizer.
Crop Protection	1 liter each cypermethrin and pendamethalin.
Insurance	Weather-index rainfall insurance, activated via SMS using an m-voucher and underwritten by Pula Insurance.
Pricing	Total bundle cost is ~USD 81 (vs. ~USD 107-110 for discrete inputs)

Method and Sample

- Cluster randomized trial at level of traditional village.
- Communities randomly assigned to three treatment arms and pure control.
- Control (no info), T1 info-only, T2 50% discount + info, T3 75% discount + info.
- SMS and paper vouchers serve as an encouragement design to increase bundle uptake.

- Sample
 - 230 clusters at baseline
 - 10 households per cluster
 - Control: 550
 - T1: 560
 - T2: 600
 - T3: 590
 - 17% are IDP households



Outcome Variables

Research Questions

- 1) What is farmer demand for a bundle of nutrition- and climate-adapted agricultural technologies?
- 2) Does adoption of bundled technologies increase productivity and nutrition outcomes?
- 3) Are these effects equitable across internally displaced and host populations?

Adoption

- Purchase of bundle, planting of included and similar seed varieties, inputs applied (fertilizer, pesticide, herbicide).
- Recommended application practices followed

Yield (kg/ha)

- Farmer reported.
- Assessed at household and plot level: Total harvest ÷ total cultivated area.

Consumption (binary, proxy for nutrition intake)

- Household consumption of biofortified crops

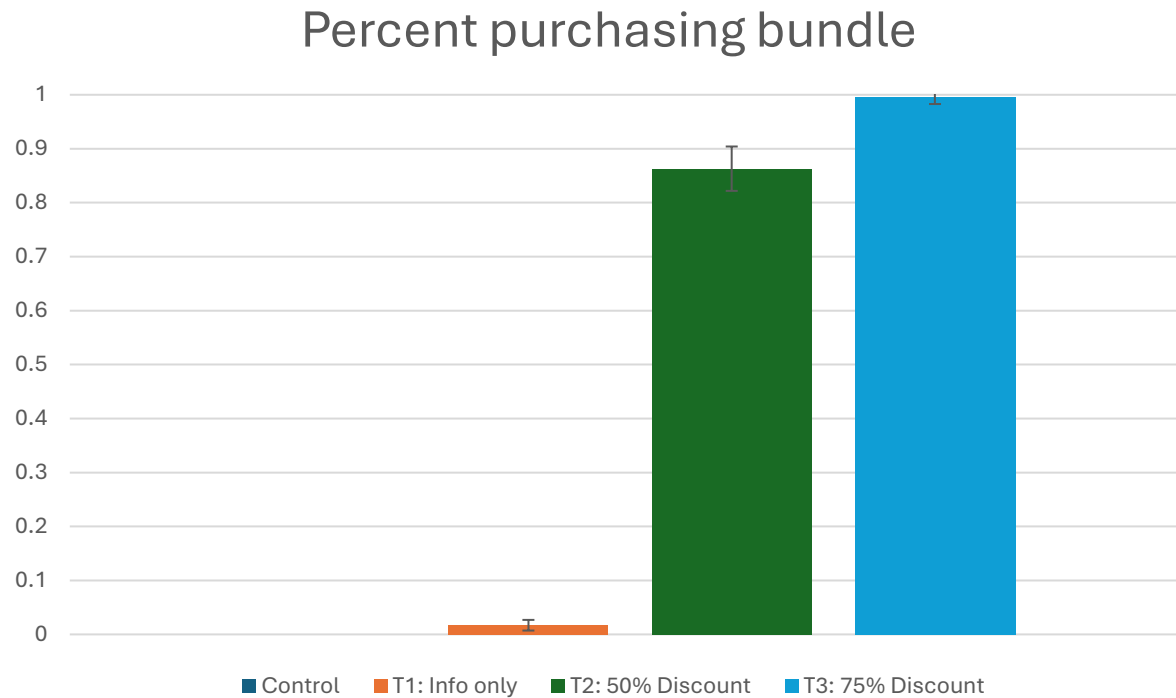
Data Collection

- Conducted listing, baseline and post harvest rounds.
- Random assignment via lottery after listing survey.
- Post harvest survey – single round for wet season.

	Q4 2023	Q1 2024	Q2 2024	Q3 2024	Q4 2024
Listing survey					
Lottery					
Baseline Pretesting					
Baseline survey					
Baseline analysis					
Endline pretesting					
Voucher distribution and reminders					
Agrodealer and extension training					
Bundle purchases					
Enumerator training					
Endline survey					

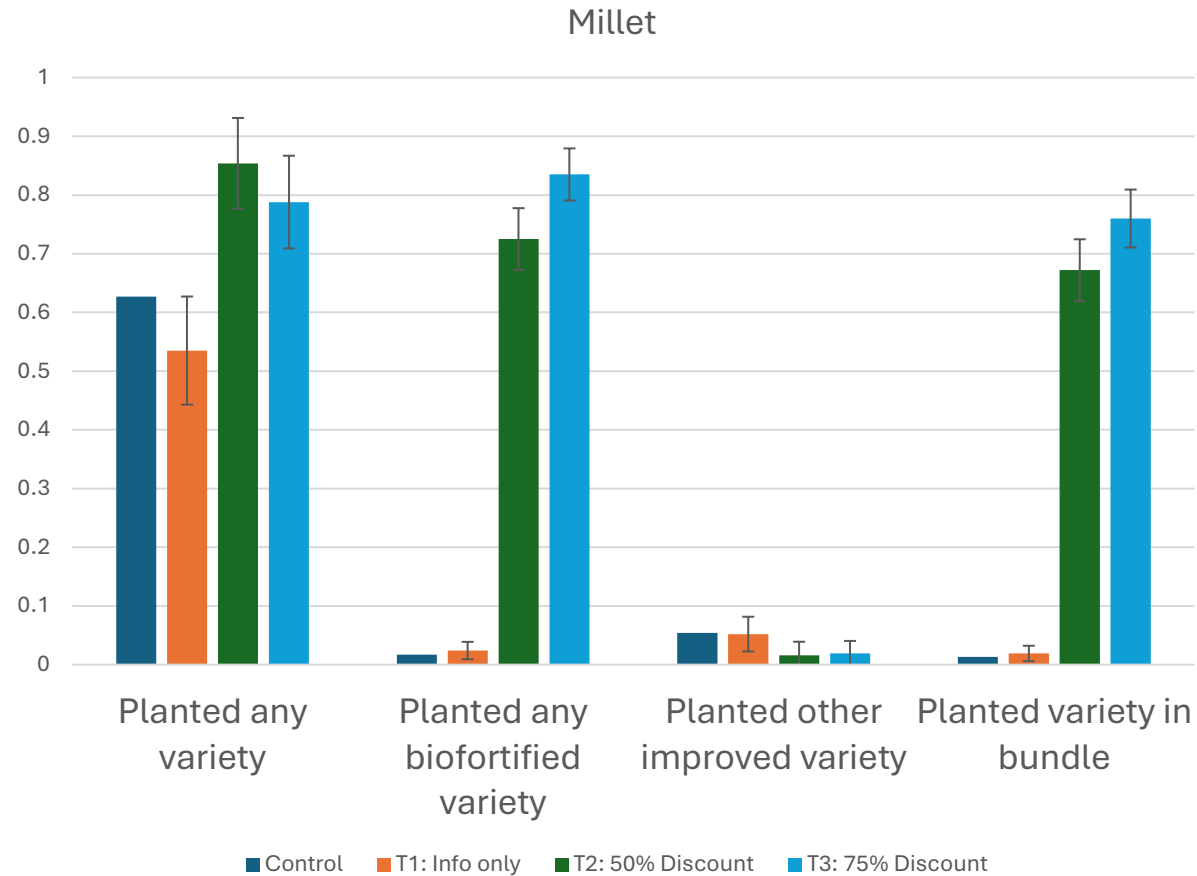
RESULTS

Bundle Adoption



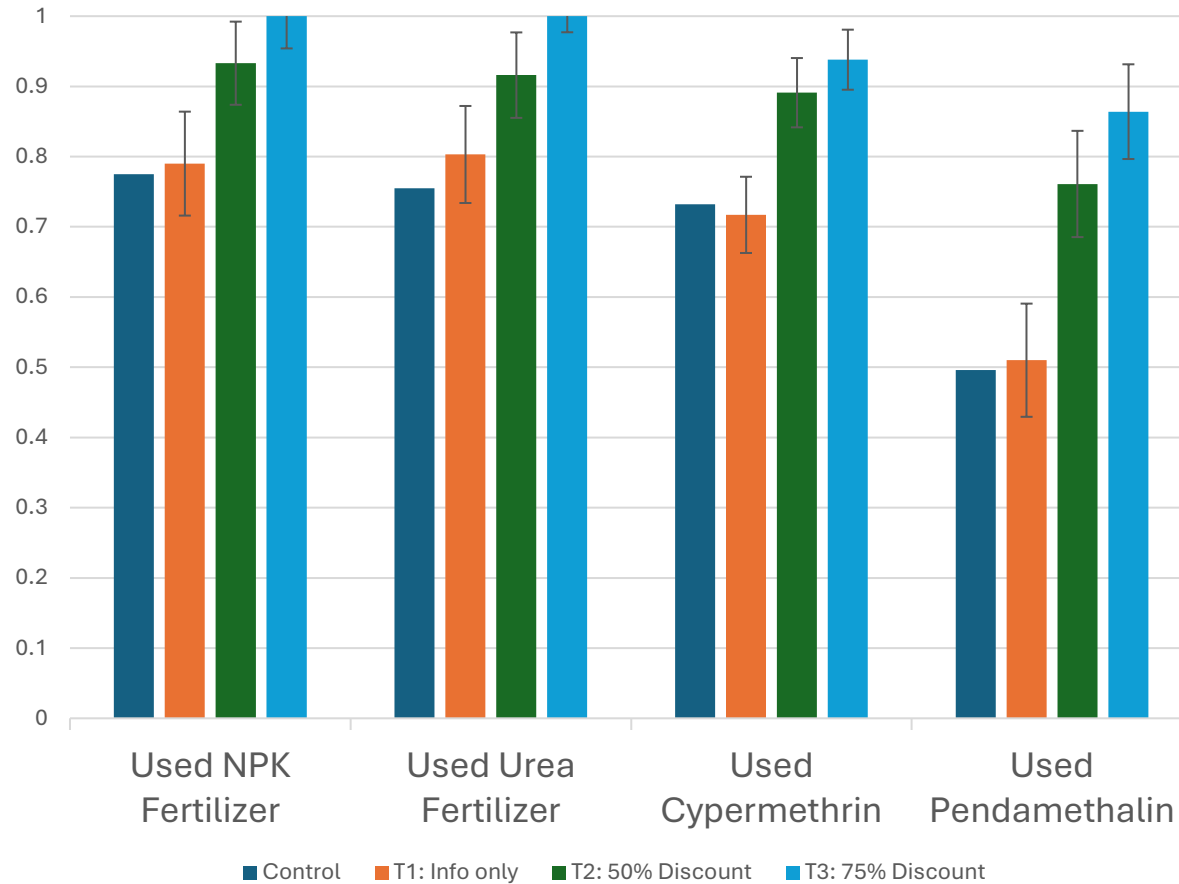
- Purchase rates of bundle high in both subsidy groups
- Purchase rates similar across household type

Use of Seeds



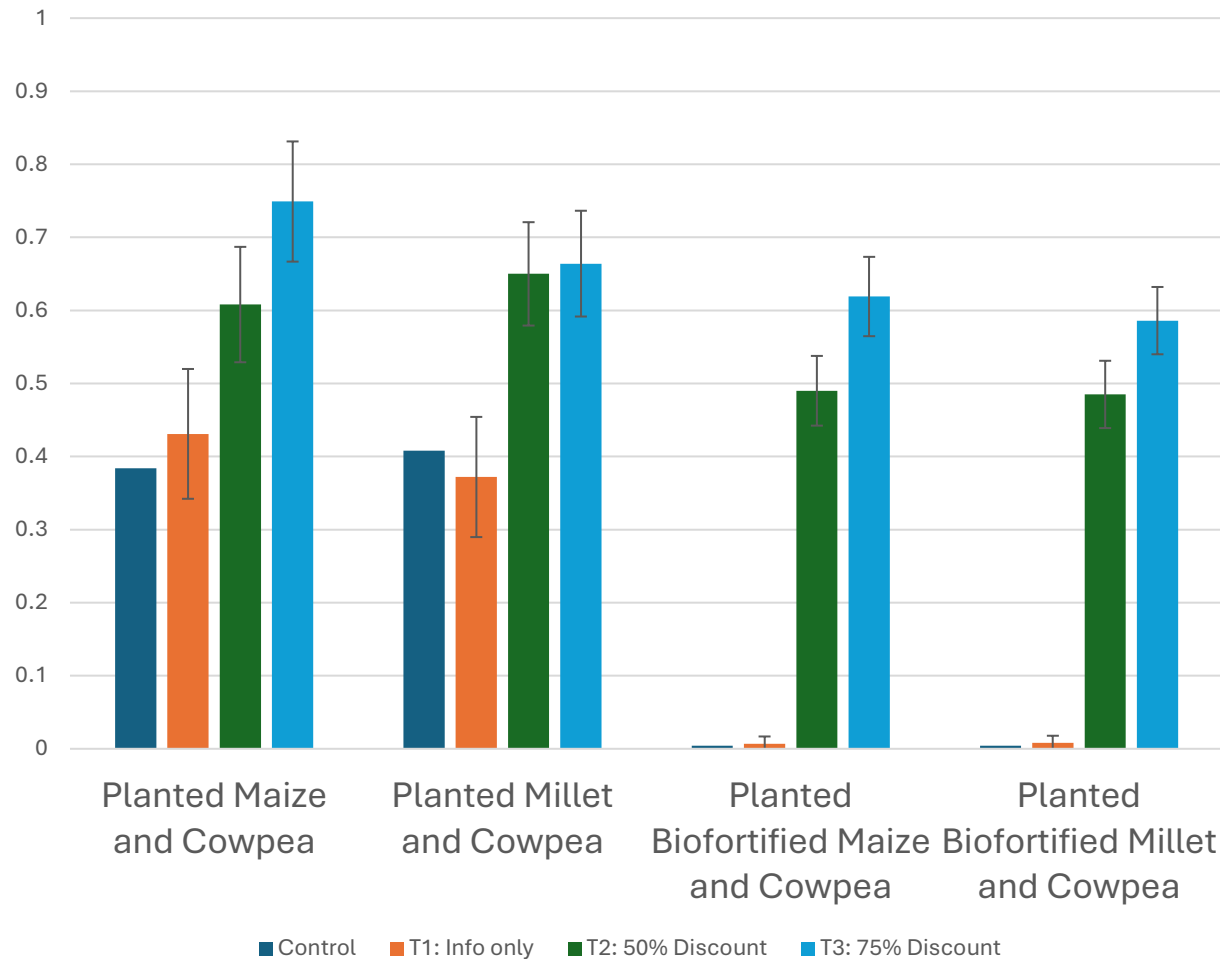
- Strong adoption results for all target crops: maize, millets and cowpea.
- Nutritious varieties substituting both local and improved varieties.

Fertilizer Use



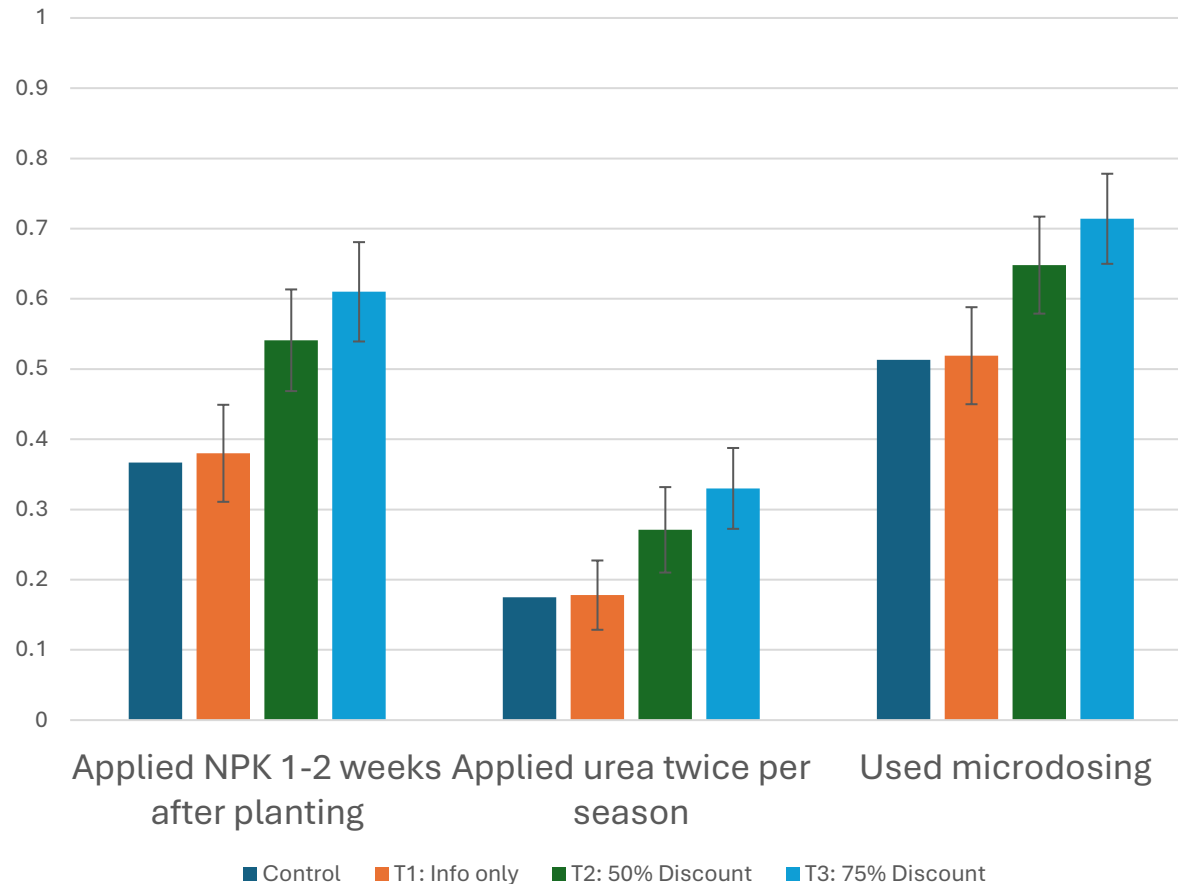
- Fertilizer uptake improves even beyond baseline and reflects improved intensification.
- No significant differences across household types.

Technology Use Practices: Intercropping



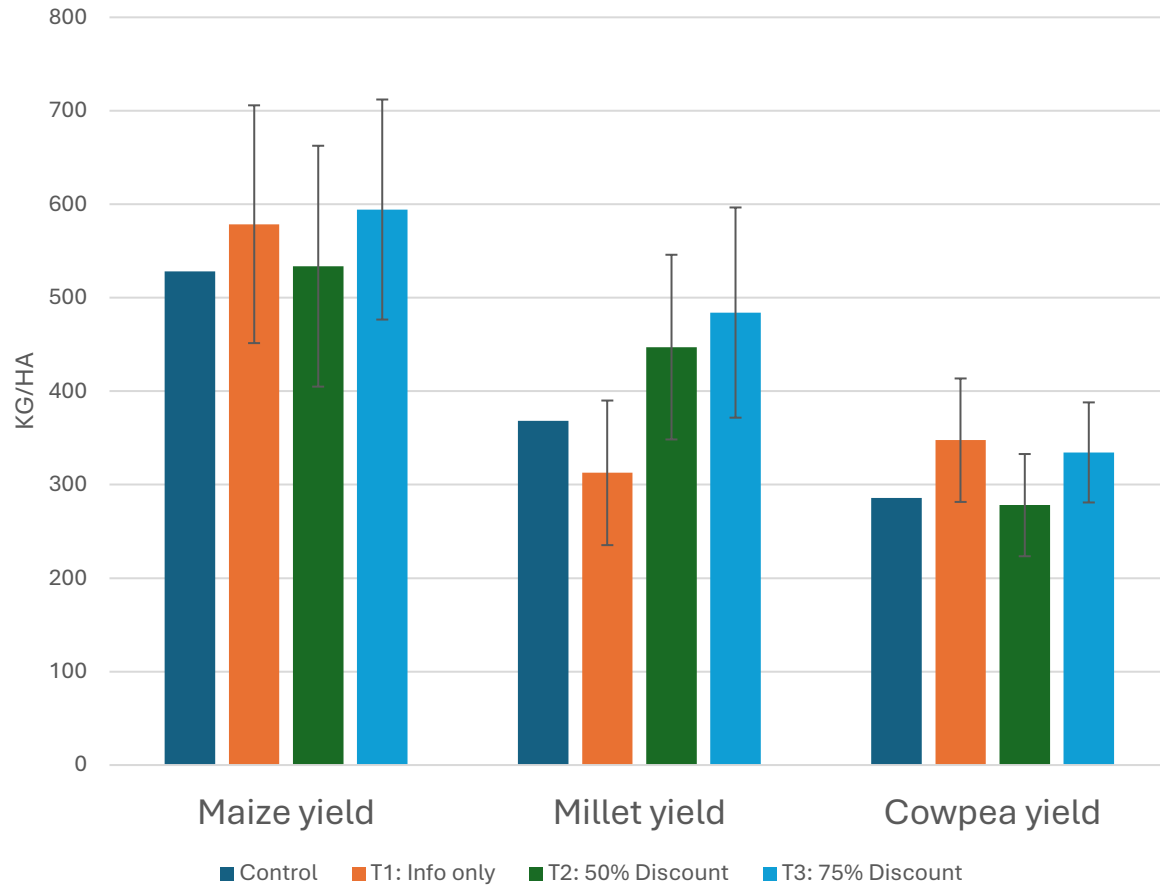
- Strong improvements in intercropping.
- No significant differences across household types.

Technology Use Practices: Fertilizer



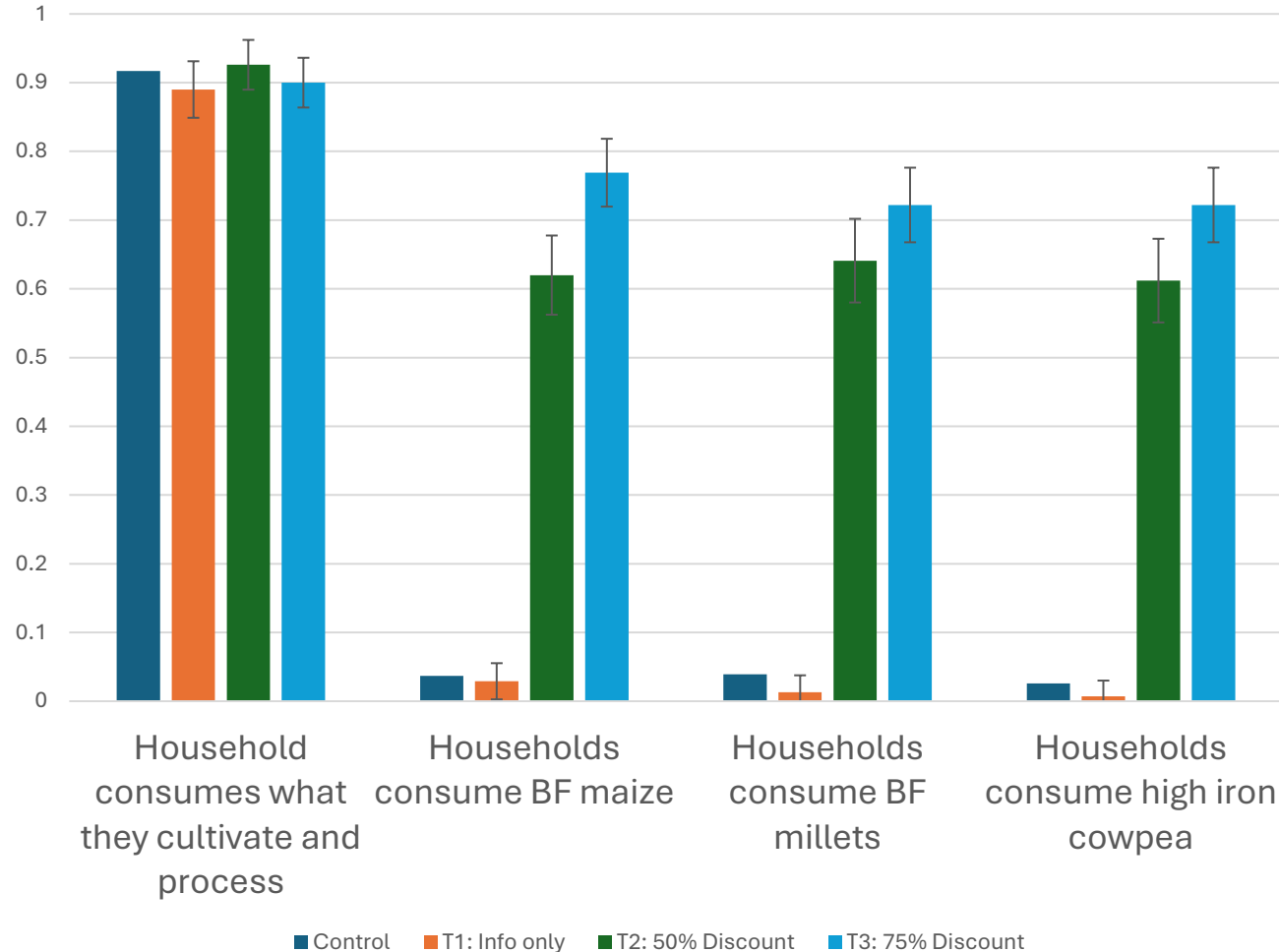
- Improvements in fertilizer use practices, especially microdosing.
- No significant differences across household types.

Yields



- Small amounts of seed given the overall average land sizes of ~5Ha. Relatively higher standard errors.
- Results promising for high iron millets.
- No significant differences across household types.

Consumption



- 91% of households consume what they grow.
- Significant improvements in consumption of nutritious crops – our main variable for nutrition intake.
- No differences across household types.

Conclusion

- ❑ **Subsidies lead to high levels of adoption:** Information alone (T1) shows no effect.
- ❑ **Consumption of biofortified crops increased:** However, consumption of own crop low overall for IDPs.
- ❑ **Yield effects are limited and inconsistent:** Only high iron millets show a robust yield gain (+171 kg millet per household, +46% of the control mean).
- ❑ **Vulnerable households do not differ much in adoption:** Despite theory predicting lower adoption under risk, IDPs adopt at similar rates—subsidies likely relaxed liquidity and credit constraints.
- ❑ **Welfare gains remain constrained:** Even when yields rise, IDPs may divert output to pressing needs, limiting dietary improvements
- ❑ **Agriculture subsidies alone may be insufficient:** Complementary support (nutrition education, complementary cash transfers, insurance) could boost impacts.