RESEARCH BRIEF

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Combinations of CSA methods and better access for women improve food security and reduce multidimensional poverty

The research brief is based on the EfD Discussion Paper *Gendered Impacts of Multiple Climate-Smart Agricultural Practices on Nutrition and Multidimensional Poverty among Cassava Farmers in Nigeria* by the authors

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Key Messages

- Bundled CSA practices outperform single practices: Farmers adopting multiple CSA practices experience substantially larger gains in food security and poverty reduction than those adopting only one practice.
- Gender matters beyond household headship: Women's access to credit, resource control, and information significantly influences CSA adoption and outcomes, while female headship alone is insufficient.
- Mixed cropping and organic manure are particularly powerful: These practices, especially when combined, deliver strong food security and nutrition benefits and are widely adopted.
- Integrated CSA strategies reduce multidimensional poverty: The most comprehensive CSA bundles reduce multidimensional poverty by over four percentage points compared to non-adopters.
- Extension and finance systems are not gender-neutral: Existing extension services and financial mechanisms may unintentionally limit women's effective participation in CSA adoption.

Background and Methodology

Cassava serves as a vital food security and livelihood source for millions of

Nigerian households. However, its production faces growing challenges from climate variability, soil degradation, and poverty. Climate-Smart Agriculture (CSA) provides a way to enhance productivity, resilience, and sustainability simultaneously, yet adoption rates vary, especially between genders.

This study uses four waves of nationally representative panel data from the Nigeria General Household Survey (2011–2019) and focuses on cassava-producing households. It examines four CSA practices: improved cassava stems, mixed cropping/intercropping, organic manure, and combined organic–inorganic manure use.

Methodologically, the study applies:

- Fixed-effects multivariate logit models to capture interdependent adoption decisions across CSA practices.
- Panel endogenous switching regression (ESR) to estimate causal impacts of CSA adoption while correcting for selection bias.
- Gender-sensitive variables capturing intra-household dynamics, access to resources, and decision-making authority.

Outcomes analyzed include food security (inverse FIES), household dietary diversity (HDDS), and multidimensional poverty (MDPI).

Results

- Adoption of CSA practices is highly complementary, with strong positive correlations across practices.
- Integrated CSA bundles, especially those combining organic manure and mixed cropping, lead to the greatest improvements in food security and poverty reduction.
- The complete CSA bundle enhances food security by almost 2.5 percentage points and decreases multidimensional poverty by more than 4 points compared to non-adopters.
- Adopting CSA enhances dietary diversity, though the improvements happen non-linearly, showing significant trade-offs and decreasing returns in certain practices combinations.
- Gender-disaggregated analysis indicates that women particularly benefit from practices related to food availability and nutrition, although they encounter more obstacles in accessing resource-intensive CSA options.

Policy Implications

- Promote CSA packages, not single technologies: Agricultural programs should incentivize complementary CSA bundles rather than isolated practices.
- Design gender-responsive financial instruments: Expanding women's access to credit and digital finance is essential for scaling CSA adoption.
- Reform extension services to better align with women's production constraints, information needs, and time burdens.
- Target intra-household dynamics: Policies should move beyond female headship and address bargaining

power, joint decision-making, and control over resources.

- Scale CSA through evidence-based programming: National CSA strategies should integrate rigorous monitoring of nutrition and poverty outcomes, not just yields.

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