

**Beyond Household Headship: A Systematic Review of Gender and Conservation
Agriculture in Sub-Saharan Africa**

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Introduction

Conservation agriculture (CA) has been widely promoted across the globe as a climate-resilient, productivity-enhancing practice for smallholder farmers, characterized by minimum tillage, permanent soil cover, and crop rotation (FAO, 2024). CA can improve crop yield, soil health, and water retention (Hobbs et al., 2007; Nyagumbo et al., 2017). However, CA's benefits and burdens are not experienced equally across genders, and gender in agricultural development has been severely neglected. Although CA is practiced across sub-Saharan Africa (SSA), little is known about how gender shapes its adoption and outcomes (Farnworth et al., 2016). Wekesah et al. (2019) conducted a foundational systematic review of gender and CA in SSA, but substantial new research has since emerged. An updated synthesis is needed to deepen the field's collective understanding of how gender and CA interact and to guide more equitable agricultural development efforts.

This study examined peer-reviewed empirical research published 2018-2024 on the intersection of gender and CA in SSA. Research questions: (1) How is gender operationalized in research on CA in SSA? (2) What are gendered impacts of CA in SSA? (3) How does farmers' gender influence CA outcomes? (4) What barriers hinder women's participation in CA? This work directly advances the AAAE Research Values of examining social dynamics in human and life sciences and ensuring diversity, equity, inclusion, and belonging by illuminating how gendered power relations, structural barriers, and household dynamics shape the adoption and outcomes of an AFNR innovation across SSA (AAAE, 2023).

Methodology

This systematic review followed Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA). Researchers searched Web of Science, Scopus, CAB Abstracts, and ProQuest (AGRICOLA) for peer-reviewed, English-language, empirical studies published 2018-2024 addressing gender and CA (or closely related practices) in SSA. The search strategy development involved guidance from a Virginia Tech expert librarian specializing in information synthesis and review. The initial search yielded 1,620 results; after removing duplicates and screening titles, abstracts, and full texts against inclusion/exclusion criteria, 42 studies were retained for analysis. Two researchers independently conducted full-text review and peer debriefed to resolve disagreements. Data were extracted and analyzed in Covidence to answer the research questions.

Results

Gender was most commonly operationalized through household headship (male- vs. female-headed) as a proxy in 26 of 42 studies, an approach that renders the experiences of women within male-headed households largely invisible. Fourteen studies used more relational framings centered on power, labor, and decision-making, and a smaller subset applied intersectional approaches considering age, marital status, and land tenure alongside gender. Adoption differences were examined in 35 studies; the dominant pattern was male-advantaged adoption. In Kenya, male-headed households showed statistically significant adoption advantages across all agro-ecological regions studied (Kalungu & Leal Filho, 2018). A notable subset of studies, however, found higher or equal adoption among women when structural

barriers were reduced: in Tanzania, female farmers were 3.78 times more likely to adopt CA than male farmers, with 56.7% of adopters being female, attributed to women's higher participation in training and farmer groups (Selya et al., 2023).

Gender-disaggregated productivity and income outcomes revealed that women systematically captured smaller shares of CA's benefits. Across 1,172 households in Malawi and Zimbabwe, men achieved significant productivity gains from partial CA adoption, while women required the full practice bundle to realize comparable gains, reflecting a thinner resource base (Makate et al., 2019a). In Kenya, male household heads received 68.8% of crop sale income compared to 25.9% for spouses (Kalungu & Leal Filho, 2018), and in Ethiopia, 85.3% of women reported their husbands as the sole decision-maker over farm output sales (Tsige, 2019). CA's promoted labor-saving benefits did not hold uniformly for women. A multi-country panel study found total household labor increased by roughly 55 person-days per hectare per year under full CA package adoption, with women absorbing a disproportionate share (Montt & Luu, 2020). Tasks were also divided along gender lines, with women concentrated in hand-weeding, sowing, and fertilizing, and men controlling mechanized operations and herbicide application (Tsige et al., 2020).

Across at least ten studies, CA adoption alone did not improve women's decision-making authority. In Ghana, women remained dependent on their husbands' consent to implement CA practices even as direct training beneficiaries (Nachibi et al., 2024). Women's pre-existing autonomy predicted CA adoption rather than only resulting from it: autonomous women in Malawi were 3.28 times more likely to adopt both short- and long-term sustainable practices (Kansanga et al., 2021). The strongest empowerment gains were associated with gender-transformative programming pairing CA training with deliberate household- and community-level norm change, such as a five-year Malawian intervention that significantly increased women's autonomy through joint food preparation, gender campaigns, and co-designed farmer research teams (Kansanga et al., 2024).

Conclusions

CA is not a gender-neutral practice in SSA. Its design, implementation, and outcomes are shaped by, and can reinforce, pre-existing gender inequities in land, resources, decision-making, and labor. The adoption gap between men and women primarily reflects structural barriers rather than differences in knowledge or motivation, and when those barriers are reduced, women adopt CA at comparable or higher rates. CA's labor-saving narrative is context-dependent, and meaningful empowerment gains require intentional, gender-transformative program design rather than CA adoption alone.

Implications/Recommendations/Impact on Profession

Researchers and Extension professionals should move beyond household-headship proxies toward intra-household, sex-disaggregated data collection that captures women's experiences in male-headed households. Extension programming should reach women directly, through female extension agents and gender-responsive training, rather than assuming benefits trickle down through male household heads. Labor-saving claims used in CA promotion should be scrutinized rather than assumed. Programs aiming to improve gendered outcomes should adopt gender-transformative programming, addressing household power dynamics alongside technical content, as the design standard for equitable CA outcomes in SSA.

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