Toward Gender Inclusivity in Tomato Variety Selection and Production Chain in Uganda

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Introduction

Both men and women participate in tomato production, a potential engine for food production and income generation (Sekabojja et al., 2023; Taku-Forchu, 2019; Tusiime et al., 2019). However, tomato growth is hampered by an array of challenges ranging from abiotic (drought), and biotic (pests and diseases) to technical (post-harvest losses). The most economically important pests include bollworms and white flies while diseases include tomato blight, bacterial wilt disease (BWD), and bottom-end rot (Tumwine, 2010; Tusiime et al., 2019). BWD has become rampant in Uganda, reported to cause plant damage at every stage of growth. However, mainstreaming of gender opportunities and constraints that female and male tomato farmers might face like during the adoption of BWD control strategies would be crucial for the successful development of tomato production. Studies (e.g., Diiro et al., 2015; Theriault et al., 2017) indicate gender disparity in the adoption of new technologies where women stand at a disadvantage. Such studies find that a systemic shortage in access to resources by women, aggravated by mainstream gender roles, makes the adoption of technologies difficult (Peterman et al., 2011). This study sought to understand gender differences in tomato production among farmers, focusing on varieties grown and their attributes; tomato production enhancements used; access to extension education and production constraints and opportunities. This study aligns with the AAAE research value of "examining social dynamics in human and life sciences" (AAAE, 2023, p. 11) to develop strategies for inclusive extension education programs (Ikendi et al., 2024).

Gender and Development (GAD) Framework

We adopted the GAD framework which recognizes that gender roles and relations significantly influence agricultural productivity (Cullen et al., 2025). The framework emphasizes that gender relations between men, women, boys, and girls are socially constructed and affect economic and social outcomes within agricultural systems. By framing the analysis within this context, the study dissects the gendered dynamics of tomato production, focusing on three core dimensions. First is access to resources which examines how access to critical inputs, like capital, technology, associations, quality seeds, fertilizers, and irrigation, varies by gender. The study unearths specific barriers women face in obtaining these resources and how these barriers contribute to disparities in tomato production. Second, is decision-making power, investigating whose voices are amplified in the production process and how this affects resource allocation and profitability. Studies illustrate that despite significant contributions to agricultural labor, women often experience diminished authority in critical decisions as agricultural income increases (Kakungulu et al., 2025). Third, is cultural context and norms, focusing on how societal norms and expectations influence the roles and responsibilities assigned to men and women within the tomato value chain. Understanding these dynamics is crucial as they underpin both the constraints and opportunities present in agricultural practices.

Methods

This abstract is part of a larger study conducted in Wakiso, Mukono, Mpigi, Luwero, and Kabale districts where the project "Improved Resilience through Sustainable Production of Grafted Tomatoes in Uganda" (IRESO) implements tomato value-chain activities (Solidaridad, 2018). A representative sample of 355 was determined from 4,500 farmers. However, 297 (n=70 female; n=227, male) farmers were accessed across 58 villages in the five districts. This abstract focused on the tomato varieties, perception of preferences for the varieties, methods farmers use to enhance yields, access to extension services, and credit to improve tomato production. After a pilot study, the project coordinators led the research team to target farmers. Verbal consent was sought after explaining the goal of the study. Participation was voluntary and farmers were assured that their failure to participate would not affect the benefits they receive from IRESO. Questions were asked in the local dialect after which data was entered in Excel, cleaned, and transferred to SPSS 24 for analysis. Descriptive analysis was conducted, and data are presented as percentages by gender, and where possible chi-square analysis was performed to assess associations at 0.05 significance.

Results and Discussions

The top five tomato varieties planted were Assila-F1 (19%), Money-maker (13%), Rio-grande (12%), Tengeru-97 (9%) and Lambu (8%). Most females grew Assila (26.5%) and Rio-grande (14.7%),

while males grew Assila (23.7%), Money-maker (19.2%) and Rio-grande (14.7%). Chi-square tests reveal no significant differences between men and women (p=0.961). Production by district showed that Assila was common in Wakiso, Mpigi, and Luwero; Rambo in Mukono, and Money-maker in Kabale district. Farmers selected Assila for good marketable traits including attractive red color**,** oval shape, heavy sweet fruits, good keeping quality, and transportability. Rambo was reported to be tolerant to bacterial wilt and black spots, with good shelf life, and transportability. Farmers in Kabale and Mpigi grew Money-makers for high yields. However, 31% of farmers in Kabale did not know the name of the tomato variety they planted. This could partly be explained by the practice of some farmers using recycled seed provided by fellow farmers in their villages as stated during the pilot study, implying a need for tomato seed actors to help farmers with quality seeds and extension education on proper multiplication (Tusiime et al., 2020).

Farmers used yield-enhancing agronomic practices, and we found that more female-managed plots (70%) were irrigated compared to 58% of male-managed plots, and 44% of female used inorganic fertilizers than 39% of male farmers. However, males applied more fertilizers (46.00±56.17kg/acre) than females (20.88±15.96kg/acre). In Uganda, Diiro et al. (2015) found that the shortage of non-farm income by female farmers constrained their adoption of fertilizer use. An average farming household lived 4.99km away from the nearest credit institution with no gender statistical difference found, although females lived closer than males. Women participate in savings and credit organizations as their main source of credit (Ninsiima et al., 2023). However, farmers who had received credit for tomato production differed significantly at a 1% error between females and males. Female farmers face shortages of credit collateral and risk-averseness (Hill & Vigneri, 2014). In access to extension services, an average farmer lived 6.38km from the agricultural extension office. Peer farmers and NGO programs were very important sources of information about tomato diseases, a similar finding related to agronomy extension in Eastern region (Ikendi et al., 2024). Farmers (59%) had received training on bacterial wilt disease, but fewer females (37%) trained than males (66%).

Conclusions/Implications/Recommendations

Results provide insights into gender-specific constraints and opportunities for tomato production relevant to the design and implementation of policies to increase productivity. This study finds it important for tomato seed companies and value chain actors (Tusiime et al., 2020) to engage in gender-sensitive marketing strategies that reduce adoption constraints faced by both female and male farmers. These may include providing non-gender-aligned credit schemes to improve input access for both women and men especially those who do not possess the traditional collateral security (Ninsiima et al., 2023). This approach can reduce the barriers to resource access as required by the Gender and Development (GAD) framework to influence production (Cullen et al., 2025). Farmers are encouraged to engage in tomato farmer groups to provide platforms to build capacity in schemes like contract farming and collective action in marketing to reduce market inefficiencies. Engaging in groups is another platform where the voices of both males and females can be valued and could close the gap in decision-making as it pertains to practices of collective action in production and marketing (Cullen et al., 2025). These strategies could also lessen the burden of traditional norms associated with gendered agricultural production and marketing norms where male farmers are aligned with sales and female farmers with food production, creating imbalances in the same households over resources and allocation powers (Ikendi et al., 2024; Kakungulu et al., 2025).

The study found clear spatial differences among districts relating to tomato varieties which holds implications for which variety seed companies should promote targeting farmers (Tusiime et al., 2020). This study recommends the feasibility of tomato grafting using resistant rootstocks to control bacterial wilt disease (BWD), which was raised as among the major constraints, moreover, female farmers have had less extension training about its control and prevention. This technique has been used to provide resistance to soil and seed-borne pathogens in vegetable crops (Ashok & Sanket, 2017). The incidence of BWD on susceptible Ana F1 grafted onto resistant rootstocks has been shown to decrease by 95% and 92% respectively and a 65% increase in yield when susceptible scions are grafted onto resistant rootstocks (Onduso, 2014). Overall, engage farmers in extension education programs relating to the various aspects of the tomato production chain from seed selection through postharvest management (Ikendi et al., 2024).

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