



1000FARMS



Market intelligence to understand groundnut preferences among Tanzanian farmers

A data-driven approach shows that gender is not the only factor behind farmer choice of crop variety

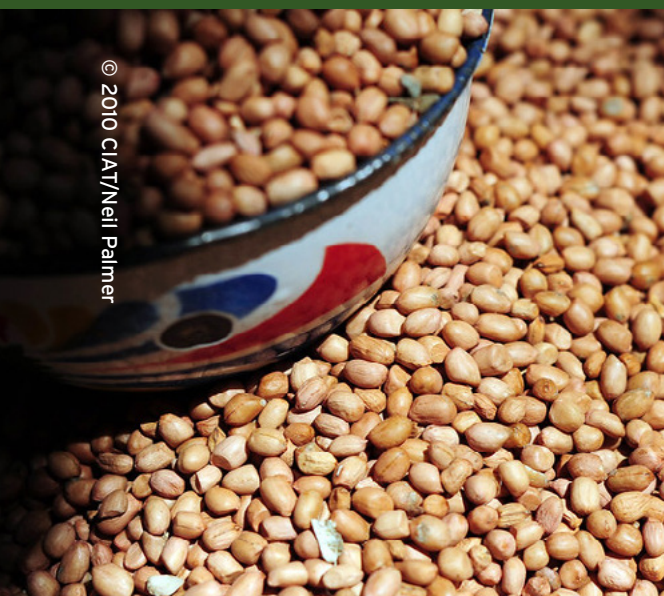
Groundnut is a critical crop for smallholder farmers in Tanzania, providing both food security and income. Adoption of new groundnut varieties has been low, however. To overcome barriers to adoption, better insights into farmer preferences and on-farm performance are needed. On-farm participatory testing, or tricot, can address this need, ensuring that breeding efforts align more closely with the differing realities of diverse farming households.

In the past, breeding programs often relied on gender-disaggregated data, separately analysing data for women and men. While this acknowledges that men and women farmers have distinct preferences and constraints, it cannot account for nuanced socio-economic roles that shape decision-making, access to inputs, and market participation. To fill in these gaps, the 1000FARMS platform applied an innovative “market intelligence” approach to groundnut variety selection.

Innovative methodology for farmer-centric variety selection

The tricot approach collects data from individual farmers, including detailed socio-economic data. This makes it possible to refine the analysis of how gender intersects with other factors in shaping farmers' preferences. The study, led by Happy Daudi (Tanzania Agricultural Research Institute/International Maize and Wheat Improvement Center, CIMMYT) and the 1000FARMS team, engaged 1,805 farmers across four growing seasons (2021-2024). It tested 57 groundnut varieties (including 46 breeding lines) using the tricot on-farm testing framework. Instead of a simple male vs. female preference analysis, researchers used data-driven segmentation to identify distinct farmer clusters based on socio-economic roles, production control, and market access.

First, *cluster identification* was carried out, using R-based statistical analysis to group farmers by shared socio-economic characteristics such as farming experience, production control, seed exchange practices, and agro-ecological zones. This allowed for the identification of distinct farmer profiles that cut across gender lines. Second, *persona development* was achieved through large language models that translated this data into detailed, relatable farmer personas, rendering the insights actionable for breeding programs. Finally, the tricot dataset was analysed to determine whether these farmer clusters had distinct preferences and criteria when selecting varieties.



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Three distinct farmer segments with unique preferences

Segment 1: Mixed-gender farms

- Composition: 56% women, 44% men (average age: 59 years)
- Experience: 23+ years of groundnut farming
- Household dynamics: Men and women jointly control production, seed exchange, and sales
- Top preferred varieties: *ICGV-SM 16592 (=Tarika 1, released in 2024), ICGV-SM 16558, ICGV-SM 0371*
- Groundnut traits: This group values pod yield and haulm yield more than the other groups.

Key insight: Experience and socio-economic status have a greater influence on variety selection than gender alone.

Segment 2: Women-led farms

- Composition: Predominantly female (average age: 40 years)
- Experience: Relatively new to groundnut farming (average 6.5 years)
- Household dynamics: Women control production but have limited influence over seed exchange and sales
- Top preferred varieties: *ICGV-SM 16593 (=Tarika 2, released in 2024), ICGV-SM 16612, ICGV-SM 0371*
- Groundnut traits: This group values oil content, grain colour, early maturity, and easy shelling more than the other groups.

Key insight: Women's choices are shaped by structural constraints - limited market access reduces their ability to adopt highly commercial varieties.

Segment 3: Men-led farms

- Composition: Entirely male (average age: 40 years)
- Experience: Relatively new to groundnut farming (average 6.7 years)
- Household dynamics: Greater control over seed exchange, sales, and production
- Top preferred varieties: *Naliendele 09, ICGV-SM 15621, ICGV-SM 16528*
- Groundnut traits: This group values marketability more than the other groups.

Key insight: Market-oriented farming is predominantly male-driven, with men favouring varieties linked to commercial viability and trade networks.

Why this matters: Rethinking gender in breeding

This study challenges the assumption that gender alone drives variety selection. The findings reveal that experience, market access, and decision-making control are equally - if not more - important determinants. The findings are already shaping breeding and dissemination strategies.

Two new groundnut varieties, Tarika 1 and Tarika 2, have been released in direct response to preferences identified within specific farmer segments. The study has also informed gender-inclusive market access strategies by identifying constraints faced by women farmers and targeting interventions to improve their participation in seed exchange networks and sales opportunities. In addition, future participatory breeding efforts are being refined to integrate socio-economic clustering rather than relying solely on gender-based targeting.

Gender still matters in farming choices, but experience and economic roles, including access to the market, tend to shape decisions. This work sets a new standard for gender-responsive breeding, ensuring that future agricultural innovations are rooted in real-world farming dynamics rather than simplified gender stereotypes. The 1000FARMS project continues to drive transformation in participatory breeding, proving that better data leads to better crops - and better outcomes for all farmers.

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