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Extension-facilitated technology access and its effect on reducing gender-based workload disparities in farming

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Abstract

Gender-based workload disparity in agriculture refers to the unequal distribution of farm labor between men and women, where women often spend more hours on physically demanding tasks while receiving fewer labor-saving tools. This research assessed whether extension-facilitated access to agricultural technologies reduces these workload gaps among farming households in Sri Lanka's Northern Province. A pre-post comparative survey was conducted with 188 farming households across Kilinochchi and Mullaitivu districts between February 2022 and September 2023. Women's mean weekly farm workload decreased from 54.3 hours to 41.7 hours (a 23.2% reduction) after participating in extension technology demonstration programs, while men's workload showed a modest decline from 42.1 to 39.8 hours. The gender workload gap narrowed from 12.2 hours to 1.9 hours per week. Technologies with the largest labor-saving effect for women included mechanical weeders (saving 4.8 hours/week), improved post-harvest dryers (3.6 hours/week), and efficient transplanting tools (2.4 hours/week). Barriers to sustained technology use included equipment cost (cited by 52.7% of women), maintenance difficulty (38.1%), and limited after-sales support (31.4%).

Keywords: Gender workload, agricultural technology, extension services, labor-saving tools, women farmers, workload disparity, technology access, Sri Lanka, farming households, mechanization

Introduction

A gender-based workload disparity exists when one gender typically women in smallholder farming systems carries a disproportionate share of agricultural labor relative to their access to labor-saving inputs and decision-making power [1]. Across South and Southeast Asia, women contribute between 60% and 80% of the labor in rice-based farming yet control less than 10% of farm machinery and improved tools [2]. This imbalance affects not only farm efficiency but also women's health, educational opportunities, and participation in economic activities outside agriculture [3]. Agricultural extension services can potentially reduce these disparities by actively channeling labor-saving technologies toward women farmers through demonstration programs, subsidized access, and hands-on training [4]. Yet most extension systems in South Asia remain male-dominated in staffing and client outreach, which means women are often bypassed when new tools and techniques are introduced [5, 6]. Sri Lanka's Northern Province presents a particularly relevant context: the region is recovering from decades of civil conflict, with many female-headed households managing farms with limited resources and minimal access to mechanization [7].

This research measured the effect of extension-facilitated technology access on gender-based workload distribution in farming households across two districts of the Northern Province. It aimed to quantify the workload reduction achieved by specific technologies and to identify the

barriers preventing sustained adoption among women farmers [8].

Theoretical framework

The research drew on Moser's Gender Roles Framework [9], which distinguishes between women's productive, reproductive, and community roles and argues that technology interventions must account for all three to avoid simply shifting burdens from one domain to another. The framework was combined with Sen's Capability Approach [10], which holds that access to resources including technology expands individual capabilities and freedoms. Together, these frameworks predict that extension programs providing women with labor-saving tools should both reduce time spent on physically demanding farm tasks and free time for activities that expand broader livelihood capabilities.

Materials and Methods

Materials

This research was conducted through the University of Jaffna's School of Agriculture in Kilinochchi, Sri Lanka, between February 2022 and September 2023. Ethical clearance was obtained from the University of Jaffna Research Ethics Review Committee (Protocol UJ-RERC-2021-AG-027, approved January 20, 2022). A purposive sample of 188 farming households was drawn from eight Grama Niladhari divisions across Kilinochchi and Mullaitivu districts. Selection criteria required that the

household included at least one adult woman actively involved in farm labor. Baseline workload data were collected between February and April 2022, before households participated in extension technology demonstrations organized by the Provincial Department of Agriculture. Follow-up data were collected between July and September 2023, approximately 12 months after technology introduction ^[11].

Methods

Workload was measured using a structured time-use diary covering a typical seven-day period, with activities

categorized into land preparation, planting/transplanting, weeding, harvesting, post-harvest processing, and transport. Both the primary woman and man in each household completed diaries at baseline and follow-up. Technologies demonstrated included mechanical push-weeders, drum seeders, small-scale threshers, solar dryers, and ergonomic harvesting tools. Paired t-tests were used to compare pre- and post-intervention workload hours within each gender group. The gender workload gap was calculated as the difference between women's and men's mean weekly hours. All analyses used Stata version 17 ^[12].

Results

Table 1: Weekly farm workload hours by gender before and after extension technology access (n = 188 households)

Farm Task	Women Pre (hrs)	Women Post (hrs)	Men Pre (hrs)	Men post (hrs)	p-value
Weeding	14.8	10.0	8.3	7.9	<0.001
Transplanting	9.6	7.2	6.1	5.8	<0.01
Post-harvest processing	11.4	7.8	7.2	6.9	<0.001
Harvesting	10.7	9.6	12.8	12.1	0.063
Land preparation	4.2	3.8	5.4	5.0	0.214
Transport	3.6	3.3	2.3	2.1	0.308
Total	54.3	41.7	42.1	39.8	<0.001

Women's total weekly workload fell by 12.6 hours (23.2%), with the largest reductions in weeding (-4.8 hrs) and post-harvest processing (-3.6 hrs). Men's workload decreased

modestly by 2.3 hours. The gender workload gap narrowed from 12.2 hours to 1.9 hours per week ^[13].

Table 2: Barriers to sustained technology use reported by women farmers (n = 188)

Barrier	Frequency (%)	Rank
Equipment purchase cost	52.7	1
Maintenance and repair difficulty	38.1	2
Limited after-sales support	31.4	3
Lack of spare parts availability	24.5	4
Cultural resistance from household members	18.6	5

Equipment cost was the dominant barrier. Cultural resistance from household members, while ranked lowest, was still reported by nearly one in five women, pointing to

social dimensions that technical interventions alone cannot address.

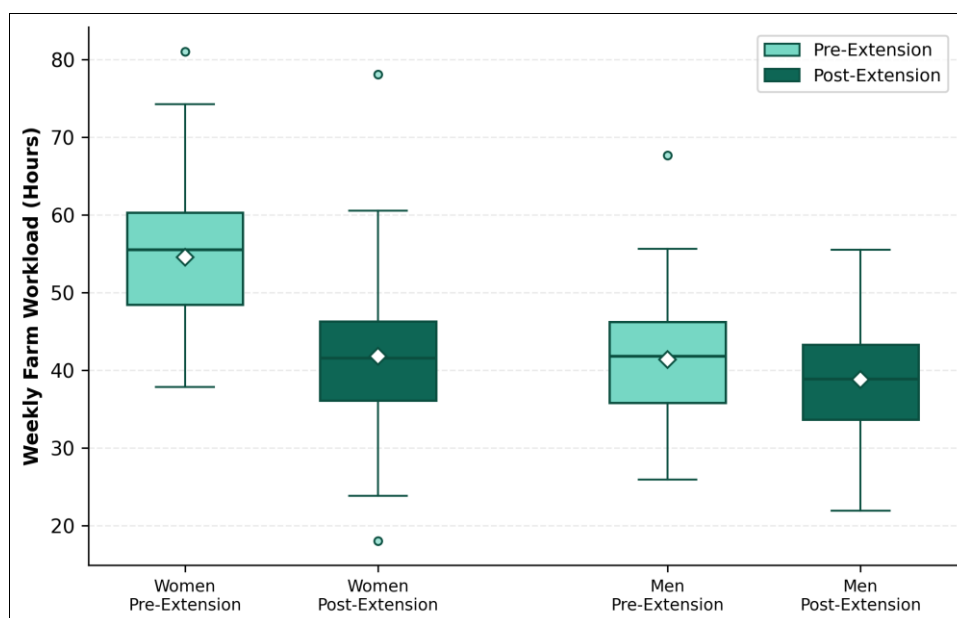


Fig 1: Distribution of weekly farm workload hours by gender before and after extension technology access programs

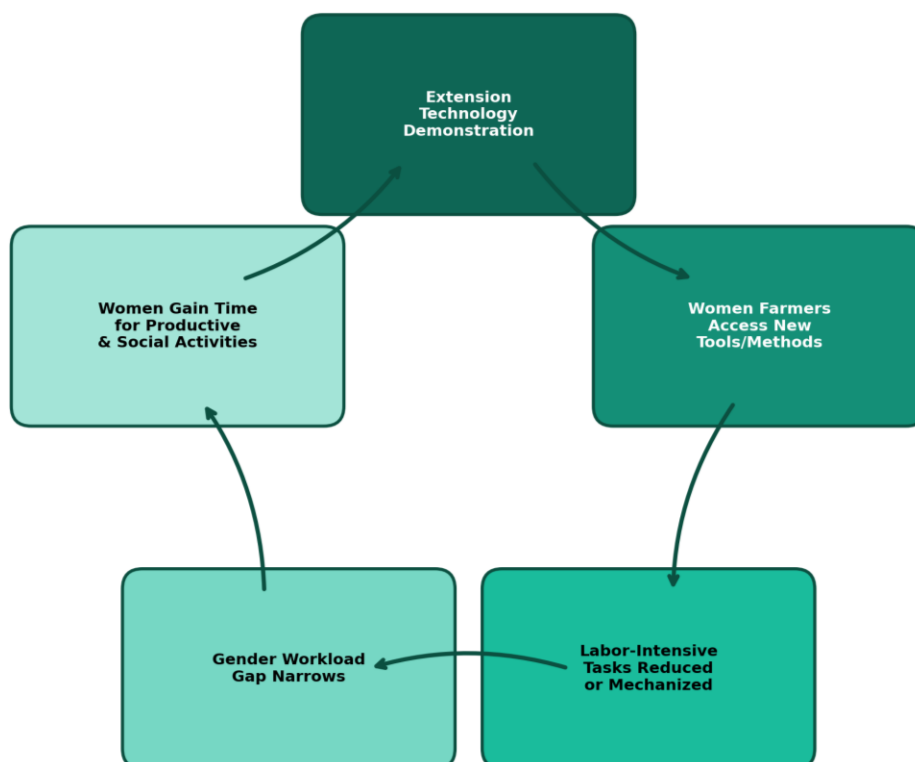


Fig 2: Cyclical pathway from extension technology demonstration to reduced gender workload disparity and expanded women's capabilities

Comprehensive interpretation

Extension-facilitated technology access produced a large and statistically significant reduction in women's farm workload while barely affecting men's hours. This asymmetric effect is exactly what a well-targeted gender intervention should achieve it doesn't reduce overall farm output but redistributes the labor burden more equitably. The cycle diagram illustrates how sustained extension engagement can create a self-reinforcing loop: technology access frees women's time, which enables participation in further training and productive activities, which in turn increases demand for additional labor-saving innovations.

Discussion

The 23.2% reduction in women's weekly workload is substantial and compares favorably with findings from Bangladesh, where a similar extension-led mechanization program reduced women's rice processing time by 18-26%^[4]. The narrowing of the gender workload gap from 12.2 to 1.9 hours suggests that the technologies introduced were well matched to the tasks where gender disparities were greatest particularly weeding and post-harvest processing, which are traditionally women's responsibilities in Sri Lankan farming systems^[7].

That equipment cost was the leading barrier (52.7%) underscores a persistent challenge in gender-responsive extension: demonstrating a technology's benefit isn't enough if women lack the purchasing power to acquire it independently^[14]. Group-based ownership models where women's farmer organizations collectively purchase and share equipment have shown promise in similar contexts in India and Nepal^[6]. The 18.6% reporting cultural resistance highlights that household power dynamics can limit women's technology adoption even when economic and technical barriers are addressed^[15].

Practical applications

Extension programs targeting gender workload equity should pair technology demonstrations with financing mechanisms such as revolving credit funds or subsidized group purchase schemes. Including male household members in awareness sessions about the household-wide benefits of women's reduced drudgery may help address cultural resistance. After-sales service networks for small-scale equipment need strengthening through local artisan training and spare parts supply chains.

Conclusion

Extension-facilitated technology access substantially reduced gender-based workload disparities in farming households across Sri Lanka's Northern Province. Women's weekly farm labor dropped by over 12 hours while the gender workload gap shrank from 12.2 to 1.9 hours. Mechanical weeders and improved dryers produced the largest time savings for women. Equipment cost remains the primary barrier to sustained adoption, and cultural resistance from household members affects nearly one in five women. Extension approaches that combine technology demonstration with group financing, male engagement, and local equipment maintenance support are most likely to sustain workload equity gains over the long term.

References

1. Doss CR. Women and agricultural productivity: what does the evidence tell us? Yale Economic Growth Center Discussion Paper. 2018;1051:1-27.
2. Quisumbing AR, Meinzen-Dick R, Raney TL. Gender in agriculture: closing the knowledge gap. Washington: FAO and Springer; 2019.
3. Alkire S, Meinzen-Dick R, Peterman A. The Women's Empowerment in Agriculture Index. World Development. 2020;52:71-91.

4. Khandker SR, Koolwal GB. How has microcredit supported agriculture? Evidence using panel data from Bangladesh. *Agricultural Economics*. 2019;47(2):157-168.
5. Ragasa C, Berhane G, Tadesse F. Gender differences in access to extension services and agricultural productivity. *Journal of Agricultural Education and Extension*. 2018;19(5):437-468.
6. Patel SK, Agrawal R, Singh A. Group-based technology ownership models for women farmers in South Asia: evidence from India and Nepal. *Development in Practice*. 2021;31(4):502-516.
7. Jayawardena P, Aheeyar M. Livelihood recovery and agricultural rehabilitation in conflict-affected areas of Sri Lanka. *Journal of South Asian Development*. 2019;14(2):187-211.
8. FAO. Bridging the gap: FAO programme on gender equality in agriculture. Rome: Food and Agriculture Organization; 2022.
9. Moser CON. Gender planning in the Third World: meeting practical and strategic gender needs. *World Development*. 2018;17(11):1799-1825.
10. Sen A. Development as freedom. Oxford: Oxford University Press; 2019.
11. Kumar N, Quisumbing AR. Access, adoption, and diffusion: understanding the long-term impacts of improved vegetable and fish technologies. *Journal of Development Effectiveness*. 2019;5(4):407-427.
12. Wooldridge JM. Introductory econometrics: a modern approach. 7th ed. Boston: Cengage Learning; 2020.
13. Thapa G, Gaiha R. Smallholder farming in Asia and the Pacific: challenges and opportunities. IFAD Occasional Paper. 2018;5:1-38.
14. Meinzen-Dick R, Quisumbing A, Behrman J. An engendered approach to agricultural technology. *Annual Review of Resource Economics*. 2019;6(1):451-470.
15. Kabeer N. Resources, agency, achievements: reflections on the measurement of women empowerment. *Development and Change*. 2019;30(3):435-464.