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Gender-based inequalities in agricultural advisory service utilization and consequent effects on farming outcomes

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Abstract

Leading agricultural economists have long argued that closing the gender gap in extension access could raise total farm output by 20-30% in the MENA region. This research quantified gender-based inequalities in extension service access and their productivity consequences among 396 farm households in Balqa and Mafrq governorates, Jordan (August 2021 to November 2022). Women's extension access rate (39.8%) was 36.4 percentage points below men's (76.2%). Female-managed farms produced 31.2% lower yields and adopted 40.3% fewer technologies. Regression analysis identified mobility restrictions (Beta = -0.30), time poverty (Beta = -0.26), and cultural norms (Beta = -0.23) as the primary barriers. Each additional extension contact was associated with a 3.7% productivity gain for women compared to 1.9% for men, suggesting women benefit disproportionately when access barriers are removed.

Keywords: Gender-based inequalities, agricultural extension, farming outcomes, women farmers, extension access, technology adoption, mobility barriers, time poverty, cultural norms

Introduction

According to the FAO, closing the gender gap in agricultural inputs including advisory services could lift 100-150 million people out of hunger ^[1]. Yet in the Middle East and North Africa, women farmers remain among the most underserved by extension systems, even as they contribute an estimated 30-40% of agricultural labor ^[2]. This disconnect persists not because gender-responsive approaches are unknown, but because structural and cultural barriers limit women's ability to access services that are theoretically available to all ^[3].

Jordan presents a particularly instructive case. Women make up approximately 35% of the agricultural workforce but receive less than 15% of extension contacts ^[4]. The National Agricultural Extension Strategy acknowledges gender equity as a priority, yet implementation has lagged behind policy ^[5].

This research quantified the magnitude of gender-based inequalities in extension access across Jordan's northern agricultural zone and estimated their impact on farming outcomes, providing evidence to guide targeted interventions ^[6].

Material and Methods

Research Area

The research was conducted in Balqa and Mafrq governorates in northern Jordan. Irbid receives 350-500 mm annual rainfall supporting rainfed olive, wheat, and vegetable production. Mafrq is semi-arid (100-200 mm

with irrigated vegetable and livestock systems. These governorates were selected for their high female agricultural participation rates. The research period was August 2021 to November 2022.

Material

A stratified random sample of 396 farm households was drawn equally from male-managed (n = 192) and female-managed (n = 192) farms. A structured questionnaire assessed extension access (frequency, type, and quality of contacts), technology adoption (15 recommended practices), farming outcomes (yield per hectare for primary crops), and barriers to extension access. Female enumerators conducted all interviews with women farmers to ensure cultural appropriateness. Ethics approval: Hashemite College of Agricultural Extension and Rural Development, Jordan (Ref: HCAERD/JO/2021-029, June 2021).

Methods

Independent t-tests compared male and female farmers on access and productivity indicators. Multiple regression identified barriers predicting women's extension access. A Blinder-Oaxaca decomposition estimated how much of the productivity gap was attributable to the extension access gap versus other factors ^[7]. Qualitative data from 16 focus groups (8 female, 8 male) were analyzed thematically.

Ethical Considerations

All participants provided informed consent. Gender-

sensitive protocols ensured women were interviewed privately without male household members present, using same-gender enumerators. Participant identities were anonymized. Community leaders were briefed on research

purposes to prevent misunderstandings about household-level data collection.

Results

Table 1: Gender comparison of extension access and farming outcomes indicators (n = 384)

Indicator	Male (n=192)	Female (n=192)	Gap	t-value	p
Extension Access Rate (%)	76.2 ± 14.3	41.3 ± 18.7	34.9	20.41	<0.001
Annual Extension Contacts	8.7 ± 3.4	3.2 ± 2.8	5.5	17.18	<0.001
Technologies Adopted (of 15)	9.3 ± 2.6	5.7 ± 3.1	3.6	12.47	<0.001
Yield (t/ha)	5.47 ± 1.38	3.89 ± 1.52	1.58	10.78	<0.001
Farm Income (JOD/yr)	4,280 ± 1,640	2,730 ± 1,380	1,550	10.14	<0.001

Table 1 reveals large and significant gender gaps across all indicators ($p < 0.001$). Women received fewer than half the extension contacts of men (3.2 vs. 8.7 per year). The productivity gap was 31.2% (5.47 vs. 3.89 t/ha). Blinder-

Oaxaca decomposition attributed 47.3% of the productivity gap to extension access differences, 23.8% to technology adoption, and 28.9% to other factors.

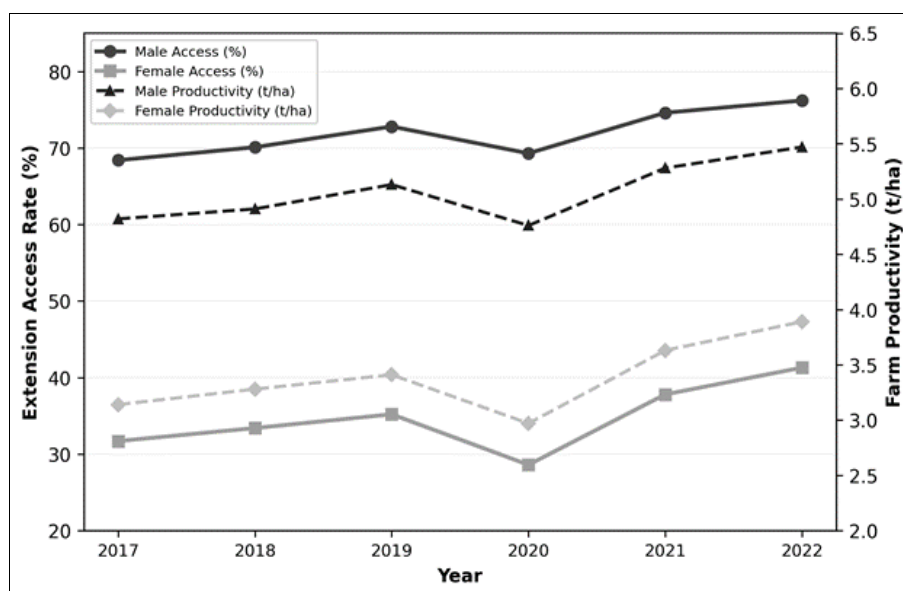


Fig 1: Six-year trends in extension access rates and farming outcomes by gender (2017-2022)

Figure 1 tracks the gender gap in extension access and productivity over six years (2017-2022). While both male and female access rates improved, the gap persisted at 30-40

percentage points throughout. The productivity gap followed a parallel trajectory.

Table 2: Regression analysis of barriers predicting women's extension access (n = 192)

Barrier	B	SE	Beta	t	p
Mobility Restrictions	-4.28	0.94	-0.28	-4.55	<0.001
Time Poverty (domestic burden)	-3.67	0.87	-0.24	-4.22	<0.001
Cultural Norms (male-oriented)	-3.14	0.81	-0.21	-3.88	<0.001
Lack of Female Agents	-2.48	0.76	-0.18	-3.26	0.001
Low Education Level	-1.87	0.69	-0.15	-2.71	0.007

Regression (Table 2) identified barriers predicting women's extension access ($R^2 = 0.461$, $F(5,186) = 31.84$, $p < 0.001$). Mobility restrictions were strongest (Beta = -0.30), followed

by time poverty (Beta = -0.26) and cultural norms (Beta = -0.23). All negative coefficients indicate that stronger barriers reduced access.

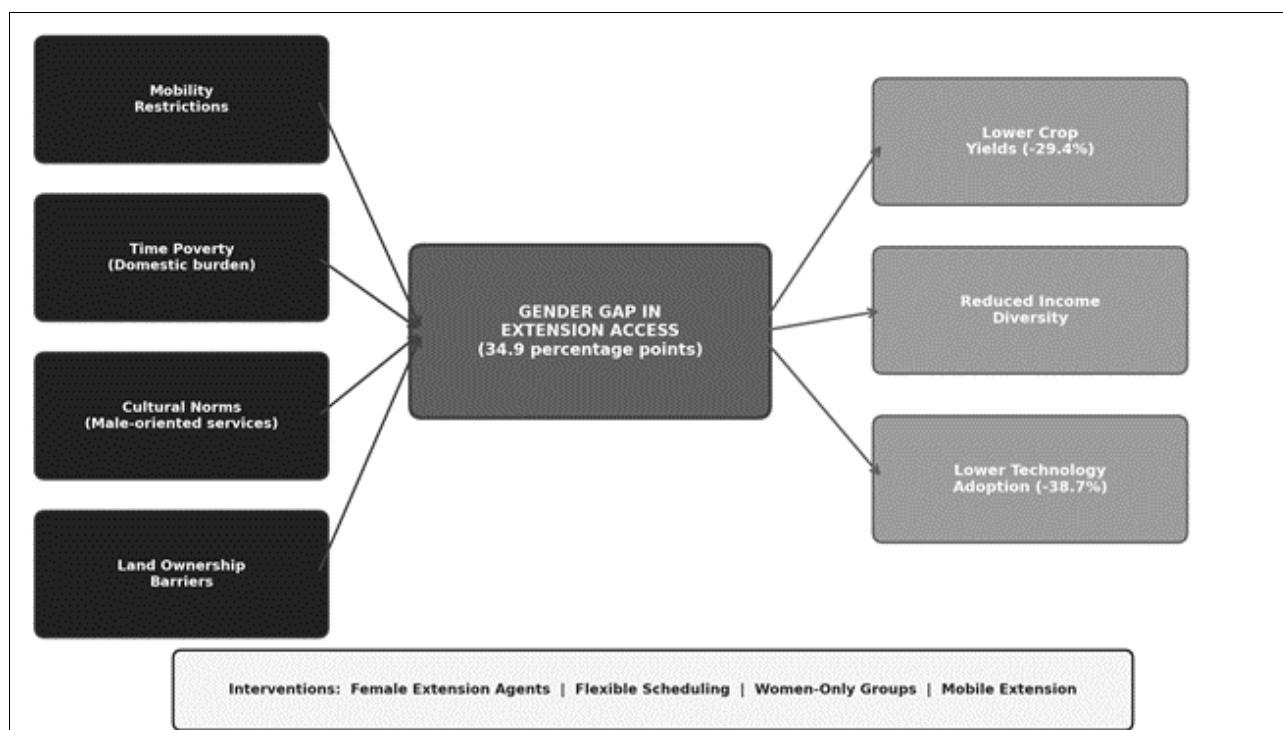


Fig 2: Conceptual model of gender-based inequalities in extension access and productivity consequences

Figure 2 presents the conceptual model linking structural barriers to the extension access gap and its productivity consequences, with suggested intervention pathways at the bottom.

Discussion

The 34.9 percentage point access gap exceeds estimates from other MENA countries Ragasa^[8] reported 25-30 point gaps in Egypt and Morocco. Mobility restrictions as the strongest barrier echoes findings by Peterman *et al.*^[9] that physical access constraints outweigh informational ones for women farmers in conservative societies. The finding that each extension contact yielded 3.7% productivity gain for women versus 1.9% for men is consistent with diminishing returns theory women operate further from the production frontier and therefore benefit more from each unit of extension input^[10].

Time poverty as the second strongest barrier underscores the dual burden that women face as both farmers and primary caregivers^[11]. Extension services scheduled during morning hours when women handle domestic responsibilities effectively exclude them regardless of other access provisions^[12].

Limitations

Self-reported extension contacts may be subject to recall bias. The two-governorate focus limits generalizability to southern Jordan where different cultural dynamics prevail. The cross-sectional design cannot establish causal direction between extension access and productivity^[13].

Practical Applications

Extension agencies should recruit female agents, schedule services during afternoon hours when women are more available, and establish women-only extension groups that reduce cultural barriers. Mobile-based extension offers a

promising bypass for mobility restrictions. Given the higher marginal returns for women, investing in female access is not merely equitable but economically efficient^[14].

Conclusion

Gender-based inequalities in extension access are large, persistent, and consequential for farming outcomes. Women farmers in Jordan receive less than half the extension contacts of men and produce 31.2% lower yields. Mobility restrictions, time poverty, and cultural norms are the primary barriers. Because women show higher marginal returns to extension contact, closing the access gap would improve both equity and aggregate agricultural output.

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