

From the Education Paradox to Climate Challenges:

An Institutional Analysis of Rural Women's Empowerment in the Jordanian Agricultural Sector

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Abstract: This study aims to provide a systematic institutional analysis of the persistent gap between the high educational attainment of Jordanian women and their low level of economic participation, a phenomenon commonly referred to as the “Jordanian Paradox.” The analysis focuses specifically on rural women in the agricultural sector, who face intersecting institutional and environmental constraints that are further intensified by the accelerating impacts of climate change. The study adopts a descriptive–analytical approach that integrates quantitative and qualitative data, drawing on an integrated theoretical framework combining the Social Relations Approach and the Capability Approach. Quantitative analysis is based on data from the **Labor Force Survey** and the **World Bank Enterprise Survey**, alongside the proposal of an innovative methodology—the **Geo-Institutional Principal–Agent Analysis**—to incorporate spatial environmental and institutional constraints into economic modeling. The findings indicate that women’s low economic participation is driven by multidimensional structural constraints that are particularly pronounced in rural contexts. **World Bank Enterprise Survey** data reveal that women-led enterprises are significantly less likely to obtain commercial credit due to collateral requirements, reflecting patterns of indirect discrimination. These challenges are further compounded by limited provision of public resources and increasing water scarcity. The study concludes that addressing the **Jordanian Paradox** requires transformative reforms that directly target institutional constraints through an integrated approach linking economic empowerment, food security, and climate adaptation, with a focus on rights, access to resources, and representation.

Keywords: Women's Empowerment, Rural Women, Agricultural Sector, Climate Change, Jordanian Paradox, Capability Approach, Institutional Constraints.

من مفارقة التعليم إلى تحديات المناخ:

تحليل مؤسسي لتمكين المرأة الريفية في القطاع الزراعي الأردني

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مديرية بحوث البيئة والتغير المناخي | المركز الوطني للبحوث الزراعية | الأردن

المستخلص: تهدف هذه الدراسة إلى تقديم تحليل مؤسسي منهجي للتباين المستمر بين الارتفاع الملحوظ في التحصيل العلمي للمرأة الأردنية وانخفاض مشاركتها الاقتصادية، وهي الظاهرة المعروفة بـ«المفارقة الأردنية»، مع تركيز خاص على المرأة الريفية في القطاع الزراعي التي تواجه قيوداً مؤسسية وبيئية متداخلة تتفاقم بفعل آثار التغير المناخي. اعتمدت الدراسة المنهج الوصفي التحليلي من خلال دمج البيانات الكمية والنوعية، مستندة إلى إطار نظري متكامل يجمع بين نهج العلاقات الاجتماعية ونهج القدرات، وتحليل بيانات مسح القوى العاملة ومسح منشآت البنك الدولي، إلى جانب اقتراح منهجية تحليل الوكيل الجغرافي-المؤسسي لدمج الأبعاد المكانية البيئية والمؤسسية في النمذجة الاقتصادية. أظهرت النتائج أن ضعف المشاركة الاقتصادية للمرأة يعود إلى معوقات هيكلية متعددة الأبعاد تتجلى بوضوح في المناطق الريفية؛ إذ تشير بيانات مسح منشآت البنك الدولي إلى أن المنشآت التي تقودها نساء أقل احتمالاً بشكل دال للحصول على القروض التجارية نتيجة متطلبات الضمانات، بما يعكس أنماطاً من التمييز غير المباشر، وتتفاقم هذه المعوقات بفعل محدودية توفير الموارد العامة وندرة المياه. وتخلص الدراسة إلى أن معالجة المفارقة الأردنية تتطلب إصلاحات تحويلية تستهدف القيود المؤسسية بصورة مباشرة، من خلال تبني نهج متكامل يربط بين التمكين الاقتصادي، والأمن الغذائي، والتكيف مع التغير المناخي، مع التركيز على الحقوق، وإتاحة الموارد، وتعزيز التمثيل.

الكلمات المفتاحية: تمكين المرأة، المرأة الريفية، القطاع الزراعي، التغير المناخي، المفارقة الأردنية، نهج القدرات، القيود المؤسسية

1. Introduction.

The discrepancy between the high educational achievement of women and their disproportionately low participation in the formal labor market in Jordan, often termed the "**Jordanian Paradox**," represents one of the most complex structural challenges to national development in the **Middle East and North Africa** (MENA) region (Assaad et al., 2020 ; IMF, 2022). Jordan has achieved historic milestones in human capital formation, with a female literacy rate of approximately **97.5%** and university graduating classes that are consistently more than **50%** female (World Bank, 2024 ; DOS, 2024). However, this substantial investment in education has faced persistent barriers in translating into formal economic agency. The **National Female Labor Force Participation** (FLFP) rate has remained between **14%** and **15%** for over two decades, which is significantly below the average for Arab countries (currently around **19.2%**) and lower-middle-income peers (Assaad et al., 2020 ; UN Women, 2019).

This "**Jordanian Paradox**" is not an isolated economic anomaly but is deeply rooted in institutional arrangements that require further alignment to better accommodate the needs of a highly educated female workforce (Kabeer, 1994). Historically, the public sector provided a stable entry point for educated women, offering social protections and working hours that were compatible with domestic roles (Assaad et al., 2020). However, as Jordan moves toward a private-sector-led growth model—central to the **Economic Modernization Vision 2033**—the private sector has encountered structural bottlenecks in offering similarly responsive environments, particularly in terms of childcare and safe transportation (Kasoolu et al., 2019 ; World Bank, 2020). Consequently, Jordanian women often face a "**Forced Non-Participation**" scenario, where female unemployment among citizens reached **32.9%** in 2024, with nearly **74%** of unemployed women holding a bachelor's degree or higher (DOS, 2024).

The complexity of these dynamics is most acute in the rural agricultural sector. Rural women in Jordan are indispensable to household food security and agricultural resilience, yet their labor is frequently concentrated in informal or unpaid family roles (UN Women, 2021). This "**Statistical Invisibility**" masks their significant contribution to the rural economy while simultaneously limiting their access to formal credit, social security, and legal protections (FAO, 2024). Furthermore, the agricultural sector is managed within absolute physical and climatic scarcities. Jordan is the world's second most water-poor nation, with renewable water resources standing at only **145 (m³)/person**—far below the international absolute scarcity threshold (AlQatarneh et al., 2018 ; UNICEF, 2025).

Climate change acts as a "**Threat Multiplier**" in this context, exacerbating the vulnerability of rural livelihoods (UNDP, 2025). Rising temperatures and irregular rainfall patterns are depleting groundwater reserves and reducing crop yields, directly impacting the productive capacity of rural households (AlQatarneh et al., 2018 ; Bashabsheh & Alzboon, 2024). For rural women, water scarcity translates into increased domestic management time, which further reduces the time available for formal economic participation (Tamkeen, 2025 ; UNICEF, 2025). Recent research indicates that **88.7%** of women in the agricultural sector have observed a decline in crop production due to these environmental shifts (Tamkeen, 2025).

The persistence of the Jordanian Paradox is driven by "**Institutional Friction**"—the set of formal and informal rules that shape access to resources (Kabeer, 1994). In the financial market, for example, women-led agricultural enterprises face significant structural hurdles. Since **92.7%** of women in Jordan do not individually own a house or land, they cannot meet the traditional real-estate collateral requirements of commercial banks (World Bank, 2024 ; IDLO, 2020). This lack of access to finance prevents women from adopting modern, climate-smart technologies that are essential for long-term sustainability (Sen, 1999 ; Rathore, 2017).

To address these challenges, the Government of Jordan has prioritized doubling female participation as part of its national reform agenda (JNCW, 2023). However, achieving these goals requires a paradigm shift that integrates gender empowerment with climate resilience and institutional modernization. This study introduces the **Geo-Institutional Principal-Agent Analysis** (GIPA) framework to analyze how localized environmental shocks interact with structural rigidities across different governorates. By analyzing data from the **Labor Force Survey** (LFS) and the **World Bank Enterprise Survey** (WBES), this study seeks to identify the institutional bottlenecks that limit the capabilities of rural women, providing a strategic roadmap for inclusive growth aligned with national modernization goals.

2. Methodology.

The methodology of this study utilizes a descriptive-analytical approach that integrates quantitative data with an innovative theoretical framework combining the **Social Relations Approach** (SRA) and the **Capability Approach** (CA).

2.1 The Social Relations Approach: Mapping Structural Constraints

The **SRA** (Kabeer, 1994) is used to systematically analyze the institutions that sustain gender disparities: the Household, Market, State, and Community. Each institution is governed by "**Rules**" (both formal and informal) and "**Resources**" that determine power dynamics. In rural Jordan, we analyze how the household's rules on the division of labor create "**Time Poverty**" for women, while market rules—such as collateral requirements—restrict access to financial resources (Kabeer, 1994; UN Women, 2020). This framework allows for a deep diagnosis of why educational gains have not yet translated into economic participation.

2.2 The Capability Approach: Evaluating Substantive Freedoms

Complementing the **SRA**, the **CA** (Sen, 1999) assesses the impact of these institutional rules on women's "**Real Freedoms**." The central concept is the conversion factor (Robeyns, 2005). These determine how effectively a woman can convert a resource (like a university degree) into a functioning (sustainable employment). In rural Jordan, personal factors (skills in **Climate-Smart Agriculture** (CSA)), social factors (public transport safety), and environmental factors (water reliability) act as critical conversion factors that can either enable or distort economic agency (Sen, 1999; Robeyns, 2005).

2.3 Innovative Methodology: GIPA

To bridge the gap between macro-outcomes and localized barriers, the study introduces the **GIPA** framework. This model incorporates spatial environmental data into a Principal-Agent framework:

- **Agent** (The Rural Woman): Seeks to maximize household well-being and economic autonomy.
- **Principal** (Institutional Entities): State agencies, banks, and community leaders.
- **Information Asymmetry**: Analyze how the lack of gender-specific data on climate impact (Principal side) and the lack of awareness regarding adaptation technologies (Agent side) leads to "**Agency Loss**," where women remain in informal roles (UNDP, 2025; UNICEF, 2025).
- **Spatial Metrics**: **GIPA** utilizes governorate-level indicators, such as the Index of Water Supply Intermittency Heterogeneity, to model how localized resource scarcity increases the "**Cost Of Effort**" for women, leading to formal labor market withdrawal (UNICEF, 2025).

2.4 Data Sources and Econometric Models

The quantitative component utilizes micro-data from the **2024 LFS** and the **WBES**. We employ a Probit model to identify the predictors of labor force participation based on household characteristics. To analyze financial exclusion, we use the **Poisson Pseudo-Maximum Likelihood** (PPML) estimator (Silva & Tenreiro, 2006). This robust model is superior for handling "**Zero**" values in credit data, allowing us to measure the intensive margin of credit access—not just the approval of a loan, but the discriminatory conditions (e.g., the requirement for extra guarantors) often applied to women entrepreneurs (Brock & De Haas, 2023).

3. Empirical Findings.

3.1 Household Institutions and the Time-Poverty Trap

An analysis of the **2024 LFS** data confirms that household characteristics are the strongest determinants of participation patterns. Even when highly educated, marriage and the presence of children under five show a strong and statistically significant negative correlation with labor force participation (Assaad et al., 2020; Kasoolu et al., 2019). The social expectation of the "**Double Burden**" forces women to spend an average of **5 to 7** hours daily on unpaid domestic duties, creating a "**time-poverty trap**" that restricts their ability to manage formal agricultural operations (UN Women, 2020).

3.2 Market Institutions and Indirect Friction in Lending

WBES analysis reveals a stark disparity in credit conditions for women-led agricultural firms. While application rates are relatively similar across genders, loan officers are **26%** more likely to require a third-party guarantor or real-estate collateral when the applicant is female, even with an identical financial profile to a male counterpart (Brock & De Haas, 2023). Since **92.7%** of women do

not individually own a house or land, this institutional rule serves as a "**Second Glass Ceiling**," preventing women from adopting climate-smart agribusiness models (World Bank, 2024; IDLO, 2020).

Table 1. Integrated SRA-CA Framework: Institutional Constraints and Capability Deprivation

Sphere	Mechanism	Affected Factor	Capability Deprivation
Household	Unequal care burden	Social/Personal (Time)	Restricted formal employment
Market	Collateral requirements	Personal/Sociopolitical	Limited entrepreneurial expansion
State	Resource disparities	Social/Environmental	Impaired work-family balance
Environment	Water scarcity/Drought	Environmental	Reduced sustainable livelihood

3.3 The Climate Awareness and Resilience Gap

The GIPA model highlights a spatial correlation: governorates with higher water supply intermittency (e.g., Mafrqa and Ma'an) show lower rates of formal female participation (UNDP, 2025; UNICEF, 2025). Furthermore, field research in 2025 indicates a critical **Knowledge Gap**: 65.1% of female agricultural workers had never heard of the scientific concept of "**Climate Change**," despite suffering from its physical impacts (Tamkeen, 2025). This lack of conceptual awareness, combined with a 97.7% lack of financial assistance for adaptation, severely constrains women's adaptive agency.

Table 2. Proposed Proxy Indicators (GIPA) for Institutional and Environmental Constraints

Constraining Source	Proposed Proxy Indicator	Analytical Justification
Water Resources	Index of Water Supply Intermittency	The Burden of domestic water management (UNICEF, 2025).
Climate	Rainfall/Temperature Deviation Index	Links climate shocks to formal farm work (Tamkeen, 2025).
Market	Real Estate Collateral Requirement	Proxy for indirect institutional friction (IDLO, 2020).

Table 3. Summary of Key Empirical Findings and Institutional Interpretation

Data Source	Empirical Finding	Institutional Mechanism (Bottleneck)
LFS Probit	Children negatively correlated with FLFP	Social norms on unpaid care (Social Factor)
WBES PPML	Women face 26% higher guarantor requirement	Collateral bias/Asset poverty (Personal Factor)
GIPA Model	Water intermittency correlates with low FLFP	Disparities in public resource provision (Env Factor)

4. Discussion.

4.1 Interpreting Results in Light of the Theoretical Framework

Applying Kabeer's SRA to the findings reveals that the "**rules**" of the household institution—placing the care burden on women—are often in tension with the "**rules**" of the market institution, which demand tangible assets for growth. This tension operates as a distorted conversion factor in the Capability Approach (Sen, 1999). When a rural woman possesses the resource of a degree but lives in a governorate with high water intermittency and limited childcare, she faces a reduced capability to participate formally. Her decision to remain in the informal sector is often a rational response to these structural bottlenecks.

4.2 Macroeconomic Context and Administrative Modernization

The Jordanian Paradox has been influenced by a macroeconomic shift toward private-sector-led growth. Historically, public sector jobs provided the security and shorter hours preferred by educated women (Assaad et al., 2020; Kasoolu et al., 2019). Administrative modernization and fiscal consolidation have necessarily shifted the employment focus. However, the private agricultural

sector still requires further policy support to provide safe transport and nurseries, which **40%** of women cite as essential for entering the workforce. This highlights a need for better alignment between national empowerment strategies and the delivery of support services.

4.3 The Gendered Impact of Climate Friction

Jordan's water stress is not gender-neutral. In rural areas, water scarcity imposes a disproportionate time burden on women, who manage domestic water needs. The **GIPA** results showing a correlation between water intermittency and lower formal employment prove that physical climate constraints are actively de-formalizing women's work (**UNDP, 2025; UNICEF, 2025**). To address this, national water management strategies must increasingly integrate gender-sensitive delivery models that ensure women-led farms are not underserved during periods of scarcity.

4.4 Aligning with the Economic Modernization Vision 2033

The **Economic Modernization Vision 2033** recognizes agriculture as a high-value sector capable of driving export growth and food security (**JNCW, 2023**). To be inclusive, the vision moves beyond technical solutions to prioritize institutional supports, such as the **Agricultural Risk Mitigation Fund Law** of 2025. This law is a pivotal reform, offering up to **25%** compensation for climate losses to smallholders (**UNDP, 2025**). Ensuring women can access these funds, regardless of land ownership status, remains a key institutional opportunity for the Ministry of Agriculture (**FAO, 2024; UNDP, 2025**).

4.5 Reforming Financial Access for Women-led Agribusiness

To break the "**Second Glass Ceiling**," Jordan's financial sector can adopt "**Trust-Based**" or "**Joint-Liability**" models, similar to those used in global microfinance (**Rathore, 2017**). The **Agricultural Credit Corporation (ACC)** has passed a **JD 70 million** lending budget for **2025** specifically targeting women and youth (**ACC, 2025**). For this to be effective, moving toward "**Alternative Data**" (like utility payment histories) to assess creditworthiness is essential for the **92.7%** of women who lack real estate guarantees (**World Bank, 2024**).

4.6 Knowledge as a Prerequisite for Adaptive Agency

The **65.1%** climate **Knowledge Gap** identified by **Tamkeen's (2025)** underscores that empowerment is linked to information. For rural women to act as agents of change, they require intensive, locally-tailored training in **CSA**. Techniques like hydroponics and greywater recycling can mitigate mobility constraints by allowing for high-value production closer to home (**ACTED, 2023**).

5. Conclusion.

Addressing the Jordanian Paradox in the agricultural sector is a strategic necessity for national food security and social equity. This study has shown that the gap between education and participation is maintained by intersecting institutional rules that require further modernization to accommodate women's roles and asset ownership patterns. These constraints are amplified by extreme water scarcity, which acts as a "**Threat Multiplier**." To achieve the **Economic Modernization Vision 2033**, the study recommends:

1. **Rights:** Enforce the **2025 Agricultural Risk Mitigation Fund** to protect smallholder women from climate shocks.
2. **Resources:** Mandate gender-responsive budgeting to fund rural infrastructure and reform **ACC** lending models to waive real-estate collateral requirements.
3. **Representation:** Close the climate awareness gap through national **CSA** training programs and support women-led cooperatives to enhance collective market power.

By targeting these institutional bottlenecks, Jordan can finally leverage its massive investment in female education to build a resilient and inclusive future.

Abbreviations

Agricultural Credit Corporation	ACC
Capability Approach	CA
The National Female Labor Force Participation	FLFP
Geo-Institutional Principal-Agent Analysis	GIPA

Labor Force Survey	LFS
Middle East and North Africa	MENA
Poisson Pseudo-Maximum Likelihood	PPML
Social Relations Approach	SRA
World Bank Enterprise Survey	WBES

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