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Research Article

Gender, Micro-Insurance, and Climate Shock Resilience Among Female Smallholder Farmers

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ABSTRACT

Weather-index crop insurance has been widely promoted as an innovative financial instrument to shield smallholder farmers from devastating droughts and floods. However, gender-disaggregated uptake data reveals that female farmers enroll in agricultural micro-insurance at substantially lower rates than men due to lack of formal land titles, liquidity constraints during planting seasons, and insurance contracts designed around male-controlled cash crops rather than women's food crops. When climate disasters strike, uninsured female farmers are forced to sell productive assets or reduce household nutrition. This paper evaluates gender-tailored weather-index insurance pilots in rural Kenya and Rajasthan, India. Utilizing feminist economics and risk-governance frameworks, the study analyzes enrollment records alongside focus groups with 90 female farmers (48 in Kenya, 42 in Rajasthan). We demonstrate that bundling index insurance with women's savings groups and flexible mobile-money premium schedules enhances climate resilience — but only when product design, payout timing, and trust are also redesigned around women's crops, cash flows, and collective institutions.

Keywords: *Micro-insurance; climate resilience; female smallholder farmers; feminist economics; weather-index insurance; agricultural risk; Kenya; India*

1. Introduction

For a smallholder farmer, a single failed rain can mean a lost season, a sold goat, a daughter withdrawn from school, or a smaller plate at dinner. Climate change is making such shocks more frequent and less predictable, especially in rain-fed systems in sub-Saharan Africa and South Asia (IPCC, 2022). Weather-index insurance (WII) was designed as an answer: instead of verifying each farmer's loss — costly and prone to moral hazard — the insurer pays when an objective index, such as rainfall at a nearby station or a satellite vegetation measure, crosses a threshold. Payouts are fast, transparent, and scalable in theory (Jensen et al., 2015).

In practice, uptake has been low, and lower still for women. This is not a puzzle about 'financial illiteracy' or 'risk aversion' in the abstract. It is a puzzle about design: who holds land title, whose crops are indexed, when premiums fall due, who receives the payout, and who is trusted to explain the product. Feminist economics insists that markets are embedded in gendered institutions — land tenure, intra-household bargaining, unpaid care, and social norms — and that a product that ignores those institutions will reproduce them (Folbre, 1994; Elson, 1999). This article evaluates gender-tailored WII pilots in rural Kenya (Nakuru / Njoro and neighbouring counties) and Rajasthan, India, asking: what makes index insurance work for female farmers, and what does 'work' mean beyond enrolment?

2. Theoretical Framework: Feminist Economics and Risk Governance

Feminist economics starts from the observation that women's economic lives are shaped by unpaid care, constrained asset ownership, and unequal bargaining power within households (Folbre, 1994; Elson, 1999). A woman may farm a plot she does not own, grow food crops her husband does not value in cash terms, and lack the liquidity to pay a premium at planting time, when cash is scarcest. If insurance requires a land title, a bank account in her name, or a premium paid in a single lump sum, it will exclude her even if she wants it. Dasgupta (2024) shows that climate shocks are gendered in their impacts and that social protection — including insurance — must be designed to address those gendered vulnerabilities, not merely to reach women as an add-on group.

Risk governance adds a second lens. Insurance is not only a financial contract; it is a governance arrangement that distributes risk among farmers, insurers, reinsurers, governments, and donors (Linnerooth-Bayer & Mechler, 2015). Two governance failures matter here. Basis risk — the gap between index-triggered payouts and actual farm losses — undermines trust, especially among women, who have less buffer to absorb a 'false negative' (Belissa et al., 2020). And product design — which crops, which index, which payout timing — reflects whose risk counts. Akter et al. (2016) show that gender and product design jointly shape farmers' preferences for weather-index insurance: women value different payout timings and structures than men, in part because their cash-flow needs and food-security responsibilities differ.

We evaluate pilots on four criteria: (i) uptake — do women enrol and renew?; (ii) fit — does the product cover women's crops and losses?; (iii) payout usefulness — does money arrive in time and in a form women control?; and (iv) resilience — does insurance protect assets, nutrition, and investment, rather than merely compensating loss?

3. Methodology

We use comparative qualitative and administrative research. We analysed enrolment records from two gender-tailored WII pilots (2023–2025): a bundled savings-group pilot in Kenya and a parametric drought / excess-moisture pilot reaching women farmers in Rajasthan (with related pilots in Uttar Pradesh). We conducted focus groups with 90 female farmers (48 in Kenya, 42 in Rajasthan), in Kiswahili, Kikuyu, Hindi, and Marwari (with interpreters), exploring planting calendars, cash flows, land access, trust in insurers, and experiences of payouts. We also interviewed savings-group leaders, insurance agents, and programme staff. Pseudonyms are used. Limitations: enrolment records are programme-specific and not nationally representative; focus groups privilege organised women in savings groups, and therefore under-represent the most isolated women.

4. Why Women Enrol Less: Land, Liquidity, Crops, and Trust

Four barriers recur in both countries. First, land. Index insurance often requires proof of cultivation or land title, yet women in Kenya and Rajasthan frequently farm family or marital land without title in their own name (Doss et al., 2015). When the contract is in the husband's name, the payout goes to the husband. Second, liquidity. Premiums typically fall due at planting, precisely when cash is scarcest and women are buying seed, paying school fees, and feeding households. A lump-sum premium competes with food. Third, crop mismatch. Standard indexes are built for staple cash crops — maize in Kenya, wheat or mustard in Rajasthan — while women disproportionately grow food crops, vegetables, and pulses on smaller plots that are not indexed (Akter et al., 2016). Fourth, trust and basis risk. When a farmer loses her crop but the index does not trigger, she experiences basis risk as betrayal, not as statistics. Women, with less savings to absorb such a failure, are more likely to exit after one bad experience (Belissa et al., 2020).

Table 1 summarises these barriers and the gender-tailored design responses tested in the pilots. As Table 1 shows, each barrier requires a design response, not merely an awareness campaign.

Table 1. Barriers to women's enrolment in weather-index insurance and gender-tailored design responses

Barrier	Why it hits women harder	Gender-tailored design response
No land title	Farming family/marital land; contract in husband's name	Enrolment via cultivation proof / savings-group membership, not title; payout to woman's mobile-money account
Liquidity at planting	Cash scarcest at planting; premium competes with food/school fees	Flexible / instalment premiums via mobile money; bundling with savings groups; premium timed to harvest / remittances
Crop mismatch	Women's food crops / vegetables / pulses not indexed	Index for women's crops; picture-based / satellite checks; multi-crop or food-security triggers
Basis risk / distrust	Less buffer to absorb false negative; one failure = exit	Lower basis risk (denser stations, picture-based insurance), transparent triggers, early / partial payouts
Information / agency	Extension reaches men; women lack time / mobility	Women agents, savings-group meetings, voice-note / local-language explanations

Source: Authors' synthesis from Akter et al. (2016), Belissa et al. (2020), Doss et al. (2015), and focus groups (n=90).

5. Kenya: Bundling Insurance with Savings Groups and Mobile Money

In Kenya, the most promising model was bundling. ACRE Africa has bundled index insurance with credit and inputs to reach close to 200,000 farmers across Kenya, Rwanda, and Tanzania, and IFPRI–ACRE picture-based insurance — which uses smartphone photos to assess crop damage when the index fails — increased uptake by nearly 20 percentage points, with the largest effects among women and farmers in semi-arid areas (IFPRI, 2024). In our pilot, savings groups (chamas) became the distribution and trust channel: the group explained the product, collected premiums in instalments, and verified who had planted what. Flexible payment schedules mattered: allowing women to pay in small amounts via M-Pesa, timed to market days or remittances, reduced the planting-season liquidity crunch (BIGD, 2024).

Customised payout timing also mattered. Evidence from a Kenyan pilot shows that allowing farmers to customise the timing and size of payouts increases perceived value, especially for women with low economic empowerment, even if it does not immediately raise uptake (Casaburi & Willis, 2018; BIGD, 2024). In focus groups, Kenyan women preferred earlier, smaller payouts that could buy food or replant, over a single post-harvest payout that arrived too late. One farmer in Njoro said: 'If the rain fails in May, I need money in May, not in October. In October, my children have already gone hungry.' Picture-based insurance helped with basis risk: a photo of a damaged plot could trigger a review even if the rainfall index did not, restoring trust after a false negative. Family framing also mattered in northern Kenya: gender-inclusive livestock insurance framed around family protection was associated with a 50% increase in uptake among women who had previously experimented with subsidised cover (BASIS, 2024).

Challenges remained. Mobile-money accounts were often in husbands' names. Savings groups, while powerful, could exclude the poorest women who could not save regularly. And basis risk persisted where weather stations were sparse. The pilot's lesson is not that bundling solves everything, but that bundling changes the question: from 'why don't women buy insurance?' to 'why doesn't insurance fit women's lives?'

6. Rajasthan: Parametric Insurance for Women Farmers and Informal Workers

In Rajasthan, gender-tailored parametric insurance has taken two forms. First, crop insurance: Global Parametrics, with Frontier Markets, developed a parametric drought product using a water-balance index for women smallholder farmers in Rajasthan and Uttar Pradesh, initially covering 5,000 farmers and benefiting an estimated 24,000 individuals, with policies sold and payouts delivered through Frontier Markets' women-entrepreneur network (Global Parametrics, 2025). A later gender-smart product, piloted for the Rabi season November 2025–April 2026 in four districts across Rajasthan and Uttar Pradesh, covered both excess moisture and drought, with Go Digit as local insurer (CelsiusPro, 2026). Women agents — local entrepreneurs who already sold farm inputs and household goods — were central: they explained the index in local language, collected premiums in small instalments, and followed up on payouts.

Second, parametric cover for informal women workers: in April 2024, Climate Resilience for All piloted a $600,000 parametric programme for 50,000 women of the Self-Employed Women's Association (SEWA) across Rajasthan, Maharashtra, and Gujarat, paying out when heat crossed thresholds; 92% of women in 16 districts of Rajasthan and Gujarat received payouts, with the highest $19.80 per member in Dungarpur (Down To Earth, 2024). This matters because many women farmers are also informal workers, and heat, not only drought, destroys livelihoods and health. In focus groups, Rajasthani women valued the heat product's simplicity — 'if it is too hot, we get money' — over the crop product's complexity, and they valued that the payout went directly to their Jan Dhan / mobile account.

Challenges in Rajasthan mirrored Kenya but with Indian inflections: land titles are overwhelmingly in men's names, the Pradhan Mantri Fasal Bima Yojana (PMFBY) crop insurance scheme has historically reached larger farmers, and women's time poverty — unpaid care, water collection, and farm labour — limited attendance at meetings. The pilots that worked used existing women's collectives (self-help groups, SEWA) rather than creating new structures, and they paid women directly.

Figure 1 below summarises the pathway from gender-tailored design to resilience in both cases. As Figure 1 shows, bundling, flexible premiums, and direct payouts are not add-ons; they are the mechanism through which insurance becomes usable for women.

Figure 1. From gender-tailored design to climate resilience: pathway in Kenya and Rajasthan (analytical model)

Gender-tailored design	Immediate outcome	Resilience outcome
Savings-group bundling + women agents	Trust, enrolment, group accountability	Women enrol and renew; group verifies losses
Flexible mobile-money premiums	Liquidity crunch eased	Premium paid without selling food / assets
Index for women's crops + picture / satellite checks	Lower basis risk, perceived fairness	Payout when loss occurs; trust retained
Early / customised payout to woman's account	Money in time, controlled by woman	Food, replanting, school fees; assets protected
GENDER-TAILORED DESIGN → IMMEDIATE OUTCOME → CLIMATE RESILIENCE		

Source: Authors' synthesis from focus groups (n=90) and literature cited in Sections 4–6. Figure 1 is analytical, not a statistical estimate.

7. Comparative Synthesis: What Works, and What Does Not

Three findings cut across Kenya and Rajasthan. First, bundling works because it embeds insurance in institutions women already trust — savings groups, self-help groups, SEWA — rather than asking women to trust a distant insurer. Second, flexibility works because it matches women's cash flows: instalments, mobile money, and customised payout timing matter more than premium subsidies alone (Akter et al., 2016; Casaburi & Willis, 2018). Third, direct payment to women matters: when payouts go to the woman's mobile-money account, they are more likely to be spent on food, replanting, and children's needs, and less likely to be captured by male relatives — a finding consistent with feminist economics on intra-household bargaining (Doss et al., 2015).

What does not work is also clear. Awareness campaigns without design change do not raise sustained uptake. A single lump-sum premium at planting, an index for a crop women do not grow, and a payout to a husband's account will fail, however well explained. And insurance alone is not resilience: without access to drought-tolerant seed, irrigation, extension, and social protection, insurance compensates loss but does not prevent it. The pilots that showed resilience combined insurance with savings, inputs, and agronomic advice — a bundled resilience package, not a standalone product.

8. Policy Recommendations

We recommend four reforms. (1) Design for women by default: enrolment via cultivation, not title; indexes for women's food crops; premiums in instalments via mobile money; payouts directly to women's accounts, with early / partial payouts. (2) Reduce basis risk: invest in denser weather stations, satellite and picture-based verification, and transparent, local-language trigger explanations. (3) Bundle insurance with savings, credit, and extension: governments and donors should fund bundled packages through women's collectives, not standalone insurance sales. (4) Embed insurance in social protection: link WII to PMFBY in India and to Kenya's agricultural insurance programmes, with subsidies targeted to women and to climate-vulnerable counties / districts, and with gender-disaggregated monitoring of enrolment, payouts, and outcomes (Dasgupta, 2024).

9. Conclusion

Weather-index insurance was promised as a shield for smallholders against climate shocks. For female farmers, that shield has often been the wrong shape: built for titled land, cash crops, lump-sum premiums, and male-headed households. In Kenya and Rajasthan, gender-tailored pilots show that a different shield is possible — one bundled with women's savings groups, paid in flexible mobile-money instalments, indexed to women's crops, and paid directly to women in time to matter. That shield does not by itself end climate vulnerability, but it stops a drought from becoming a sale of assets, a smaller plate, or a daughter out of school. Resilience, in this sense, is not only about surviving a shock; it is about who gets to decide, in the moment of shock, what survival looks like.

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