
The Role of Women's Land Rights and Economic Participation in Post-Disaster Recovery and Sustainable Development in Pakistan

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Abstract

The growing vulnerability of Pakistan to climate change-driven disasters has exacerbated existing levels of inequality among its citizens, especially in terms of women's rights to land and economic participation. Having comprised a significant proportion of the rural demographic, women's restricted rights to ownership of land have been largely responsible for restricting disaster recovery efforts. The paper aims to investigate the role of women's rights to land in terms of economic participation and recovery in flood-hit areas of Pakistan. Employing a mixed methodology, this study will test the hypothesis using propensity score matching as well as employing multi-level regression analysis on survey responses from Sindh and Punjab provinces among 500 households in addition to conducting in-depth interviews among women entrepreneurs. The paper will show that women who own land are capable of restoring their economic output more quickly than their Non-Land-Ownning counterparts. The study will conclude by asserting that supporting women's rights to land is an important policy agenda within Disaster Recovery and sustainable development in Pakistan.

Keywords: Women's Land Rights; Economic Participation; Post-Disaster Recovery; Gender and Development; Climate Resilience; Sustainable Development; Pakistan

Introduction

Natural disasters are a huge worry messing up societies, economies and making things harder for those already struggling. Pakistan's been hit hard lately ranking as one of the top countries facing climate related disasters. We are talking about big stuff like the 2005 earthquake that killed over 73,000 people and the 2010 and 2022 floods that swamped huge areas and displaced millions (NDMA, 2022; ADB, 2023).

When disaster hits recovery efforts often forget about women and their important roles especially related to land rights and money making. This screws up not just quick fixes but also the long-term goals everyone shares like those in the United Nations Sustainable Development Goals like equal rights for everyone and taking action on climate change.

Women owning land is super important for being fair and bouncing back. When women have secure land,

they can get loans, put money into farming that can handle tough weather, and have a say in decisions (FAO, 2021). But in Pakistan old fashioned views sometimes twist Islamic inheritance laws keeping women from owning land fairly. Sure, the Constitution says everyone should have property rights, but it doesn't always happen. Even though women make up almost half the rural population they own less than 2% of the farmland (Pakistan Bureau of Statistics ,2021; BISP ,2022). This gap gets bigger when disasters strike and women who are usually taking care of everyone are at risk of losing stuff not having enough food and facing violence. Studies from the 2010 floods showed that women without land titles had a tough time getting help trapping them in poverty (UN Women,2013).Also, women being able to make their own money helps a lot when things are getting back to normal. When women get involved in things like small businesses, raising animals, and making farm products better, it helps their families and communities get back on their feet (World Bank, 2020). But in Pakistan, not many women (only about 22%) are working compared to men (81%), because they can't move around as easily, don't have as much education (only 46% of women can read), and face unfair rules (Pakistan Economic Survey, 2023-24). Disasters make these issues worse; the 2022 floods messed up the jobs of 9 million women, but recovery programs don't often think about women's needs when creating job opportunities (Oxfam, 2023). But in places like Bangladesh, women run groups with secure land did better after cyclones, making about 30% more money (IFPRI, 2022).

Pakistan's plans for the future need to keep this in mind. The country of climate change plan and Vision 2025 talk about helping everyone but they do not always pay enough attention to gender issues. Plans after disasters often focus on things like rebuilding roads instead of making sure everyone's treated fairly which can make things worse (MoCC, 2021). For example, after the 2010 floods help went mostly to families headed by men ignoring women and slowing down progress on things like reducing poverty and hunger.

Making sure women can own land could really help Pakistan move forward like allowing women to plant trees and crops that can handle tough weather which would help the environment and boost the country's economy because women do so much of the farming work (PSR, 2023).

Even though people are writing more about gender and disasters we still don't know enough about what's happening in Pakistan. Most studies are about other countries in South Asia and don't get into the details of what's happening locally, like the tribal customs in some areas or the way land is owned in others (Ayeb-Karlsson et al., 2020). We need more research on how women's land rights affect their ability to make money and recover after disasters, including things like their ethnic background and social class (Khalid & Shah Nawaz, 2022). And while some stories show how women are dealing with things, we still need a better look at whether programs like the Benazir Income Support Programme's land titling are really working.

This study will look at how making women's land rights stronger helps them make money, bounce back after disasters, and move towards a sustainable future. This research uses the idea that when things aren't fair for women, disasters hit them harder, but when they are empowered, they can handle things better (Enarson, 2012). It also uses Amartya Sen's idea that land rights are important for allowing people to have economic freedom (Sen, 1999). The study combines surveys from flood hit areas (Sindh and Punjab, n=500) looks at how land ownership affects income and talks to 50 women business owners. It also uses information from other surveys to give context (Pakistan Social and Living Standards Measurement (PSLM) surveys (2019 to 2023).

Here are some questions :

1. How much do women's land rights affect their ability to make money after a disaster?
2. How do these things help families and communities recover like getting their income back and rebuilding their stuff?
3. What changes can be made to include gender equality in Pakistan's plans for the future?

Early signs are that women with land titles make 25% more income after floods and get their stuff back 40% faster. By getting a better look at these things, this paper pushes for changes like fixing the Land Revenue Act to allow joint ownership and creating programs like disaster microfinance for women. Helping women

through land rights and money-making is not just fair but important for Pakistan to be strong and sustainable.

Methodology

This research uses a sequential explanatory design that involves a mix of both qualitative and quantitative research. The research aims to examine the significance of women's land rights and economic empowerment for post-disaster relief and sustainable development in the context of Pakistan. It uses surveys for the qualitative collection of data, which helps to explain the findings, and hence, it uses the triangular method for valid research. The research starts with gathering data to identify any pattern.

Study Area and Sampling

The study conducted fieldwork in the affected districts of Sindh (Jacobabad, and Dadu) and Punjab (Rahim Yar Khan, and Muzaffargarh), chosen for their vulnerability to disasters, agricultural orientation, and established gender gaps in land ownership. The 2022 floods heavily affected these districts, with more than 5 million women being left vulnerable. The study employed multi-stage stratified random sampling, with 500 households (250 in each province), stratified for women's land ownership (owners and non-owners), and employment status (formally employed, micro/more businesses, and none). Additionally, 50 households in each district for the study's strata were randomly chosen from the village government revenue lists. The purposive method was employed in the study's qualitative aspects, targeting 50 women (25 in each province), with varied trends in land right status and post-disaster status.

Data Collection Instruments

Quantitative data collected through a structured household survey conducted through Computer-Assisted Personal Interviewing (CAPI) with Open Data Kit (ODK). The tool was developed through PSLM surveys and pilot-tested for validity with 50 households, Cronbach's alpha value 0.87, with items including land certificates, pre-post disaster income sources, recovery rates for recovered assets, and sustainable practices such as resilient farming. Economic engagement through hours worked, income, and business viability rates. Conducted between March to June 2025, six to 18 months after the floods. The qualitative tools comprised semi-structured in depth interviews (45-60 minutes) with women entrepreneurs and focus group discussions (FGDs; 8 groups comprising 6-8 participants). The in depth interview guides covered challenges to access to land, economic strategies, and perceptions of policies in the context of the GDRR frameworks. These interviews and FGDs in Urdu/Sindhi, carried out by female enumerators, audio recorded and field noted to capture non verbal communication.

Data Analysis Procedures

Quantitative analysis was conducted with Stata 17 software to perform descriptive statistics, testing, and econometric analysis. Propensity score matching analysis was employed to estimate the treatment effect of land rights on the outcome of recoveries while adjusting with covariates such as age, education, household size, and intensity of floods (caliper width = 0.05; balancing property $p > 0.10$). Multilevel regressions were employed to examine economic participation (dependent variable was log income) while including district-level fixed effects and interaction of disaster occurrence. The sustainable development factors were estimated based on PCA to obtain a composite variable of resilience (Eigenvalue > 1 ; Variance Explained = 68%). Qualitative data was analyzed for themes using NVivo software version 14, which employed the six-step process recommended by Braun & Clarke, including familiarization, coding, generation of themes, review, definition, and reporting. These deductive codes, which were refined from the capabilities approach of Sen, were derived inductively from the transcripts. Triangulation of the data included the comparison of the quantitative findings, such as the earning of 25% more for landowners, against the narratives of the

Analytical Technique	Purpose	Key Variables	Software
PSM	Causal inference on land rights	Treatment: Land title; Outcome: Income recovery	Stata 17
Multilevel Regression	Economic participation effects	DV: Log income; IVs: Land rights, disaster exposure	Stata 17
PCA	Resilience index construction	Assets, food security, adaptive practices	R 4.3
Thematic Analysis	Barriers and enablers	Land access, policy gaps	NVivo 14

Source of author:

Ethical Considerations and Limitations

Approval from [University IRB, Pakistan], conducted with informed consent, treatment of confidentiality (through use of pseudonyms), and referral for gender-based violence. Enumerators trained on cultural sensitivity, despite patriarchal societies. Possible pitfalls are recall bias (temporal measures) or selection (through PSM). Generalization is restricted to flood-prone agricultural belts. Future research could be extended to earthquake cases or the urban situation.

Results

The quantitative results indicate important correlations between female rights to land, economic engagement, and recovery indicators. For every 500 households surveyed, only 28% claimed households where females had legal titles to land, which were largely joint owners (18%). There were 32% higher rates of recovering assets ($p<0.01$) and 27% more diversification of income for land-owning females than non-owners 18 months after the floods in 2022.

Demographic Profile

Participants averaged 38 years old, with 52% having primary education or less. Pre-flood, 61% of women engaged in agriculture, dropping to 44% post-disaster due to asset loss. Flood severity (measured by inundation depth) affected 82% of households, destroying livelihoods for 67% of women-led enterprises.

Characteristic	Land Owners (n=140)	Non-Owners (n=360)	p-value
Household Income (PKR/month, post-flood)	45,200	32,800	<0.001
Enterprise Survival Rate (%)	76	51	<0.01
Resilience Score (PCA, 0-100)	68.4	52.1	<0.001

Source of author:

Quantitative Impacts of Land Rights

Propensity Score Matching (PSM) confirmed causal effects: land titles increased post-disaster income by 25% (ATT=0.223, SE=0.048, $p<0.001$), controlling for covariates. Multilevel regression ($R^2=0.41$) showed land rights positively predicted economic participation ($\beta=0.31$, $p<0.01$), moderated by disaster exposure (interaction $\beta=0.18$, $p<0.05$). Sustainable practices, like drought-resistant crops, were 40% more prevalent among titled women (OR=2.8, 95% CI: 1.9-4.1).

Economic Participation Outcomes

Women with land access reported 19 hours/week in income activities vs. 12 hours for others ($p < 0.001$). Microenterprises (e.g., livestock, handicrafts) survived at 65% rate for land owners, yielding 1.4x higher returns. Sustainable development indicators improved: food security scores rose 22% in titled households, linking to SDG 2 compliance.

Qualitative Themes

Thematic analysis of 50 interviews and 8 FGDs identified three themes: (1) *Empowerment through Tenure* "Land papers gave me bank loan confidence" (42% of land owners); (2) *Barriers to Participation* Mobility norms and credit denial cited by 68%; (3) *Recovery Pathways* Savings groups and cooperatives enabled 35% faster rebuilding. Narratives highlighted intersectional gains for educated ethnic minorities.

Integrated Findings

1. Triangulation affirmed quantitative trends: land rights facilitated economic diversification, reducing vulnerability by 29% (composite resilience index). Policy gaps emerged in FGDs, with 72% unaware of inheritance reforms, underscoring intervention needs.

Discussion

The empirical findings from this study provide strong evidence that women's land rights act as a crucial catalyst for economic participation, post-disaster recovery, and sustainable development in flood-prone areas of Pakistan. The quantitative results reveal that households with documented land titles led by women attained 25% higher post-flood incomes ($ATT=0.223$, $p < 0.001$) and 32% superior asset recovery rates compared to non-owners, thus establishing a causal linkage through propensity score matching. These results are in line with the Gender and Disaster Risk Reduction framework, which recognizes that equal access to resources reduces sex-differentiated vulnerabilities, but extends it through quantification of economic multipliers in the key South Asian patriarchal context. The qualitative narratives shed further light on the mechanisms: women often expressed that land documentation enabled credit access ("Land papers gave me bank loan confidence"), changing the nature of tenure from symbolic towards instrumental empowerment, consistent with Sen's capabilities approach, where property rights widen the scope of freedoms for income earning and household decision-making. These results challenge the dominant assumptions in disaster literature, which place the prime cause of women's marginalization in cultural norms. Although mobility restrictions and inheritance biases based on conservative interpretations of Islamic law remain common, land titling emerged as a pragmatic bypass in enabling microenterprises with 76 percent survival rates, compared with 51 percent for non-owners. This parallels IFPRI's findings in Bangladesh, where women-led cooperatives achieved 30 percent greater income stability after cyclones, but localizes to Pakistan's agrarian feudalism: joint titles bypassed male kin control in Sindh and Punjab districts. The economic participation of titled women surged to 19 hours/week, diversified from flood-vulnerable crops to resilient livestock and handicrafts, and yielded returns 1.4 times higher. The intersectional effects were pronounced: educated ethnic minorities-e.g., among Punjabi women-amplified gains, underscoring the importance of analyses disaggregated beyond binary gender metrics, a cause endorsed by Khalid and Shahnawaz (2022). The composite resilience score (68.4 vs. 52.1) links land reforms to several SDGs in sustainable development terms: improved food security (22% improvement) contributes to SDG 2 (Zero Hunger), while adaptive practices such as drought-resistant cropping ($OR=2.8$) further SDG 13 (Climate Action). Pakistan's 2022 floods exemplified the worst of maladaptive recovery, favoring male-headed households, where focusing on women might unlock their potential contribution to 60% of rural agricultural output (PSR, 2023) and create potential GDP gains of up to 2-3% through inclusive growth. This finding aligns with the National Climate Change Policy (2021), which demands gender mainstreaming but lacks enforcement metrics. Land-secured women with diversified

livelihoods reduced household vulnerability by 29%, situating tenure security as one low-cost lever for national resilience in the context of rising climate threats-Pakistan ranks fifth globally in disaster vulnerability (World Bank, 2023).

Compared to other literature, this study fills Pakistan-specific gaps in a body of work riddled with South Asian generalizations. Ayeb-Karlsson et al. (2020) identified environmental stress-livelihood links but failed to consider district-fixed effects, to which multilevel models here attribute 18% of the variation in participation to disaster-land interactions. BISP's pilots of land titling, previously undervalued, demonstrated the validity of cash-plus-asset models: titled beneficiaries rebuilt 40% faster, compared with pure transfers presented in UN Women analyses of the 2013 floods. The parallel with World Bank tenure-income nexuses is an affirmation of universality. However, given the unique feudal structures in Sindh and tribal customs in analogs such as Khyber Pakhtunkhwa, this paper outlines the case for tailored interventions. Oxfam reported 9 million women losing their livelihoods in the 2022 floods; our data shows that land titling may halve such impacts through enterprise viability. The actionable policy implications are urgent. Legally, the mandatory joint titling in disaster zones through amendment to the Land Revenue Act, combined with digital registries under Article 23 of the Constitution, would operationalize equity. Economically, upscale BISP-linked microfinance-targeting disaster-vulnerable women with resilient enterprise training-which can replicate the 27% income diversification observed. At the institutional level, gender quotas in recovery funds allocation-30%-are urgently required at NDMA's National Disaster Management Plan, monitored via PSLM indicators for tenure-resilience tracking. Savings cooperatives, mentioned in 35% of FGDs at the community level, call for a national rollout and integration with the inclusive growth agenda of Vision 2025. These reforms not only address immediate recovery needs but embed sustainability by reducing future disaster costs by 20-25% through proactive empowerment.

Limitations warrant caution. Recall bias over 18 months may understate acute losses, though timelines and triangulation mitigated this; longitudinal panels across multi-hazard cycles-e.g., KPK earthquakes-would strengthen causality. The sample's focus on agrarian flood districts limits urban or seismic generalizability, where mobility norms differ. Self-selection into titling-potentially confounding motivation - was addressed via PSM balancing ($p>0.10$), but endogeneity persists in observational data. Future research should employ quasi-experimental designs around BISP expansions, incorporate climate projections via agent-based models, and test scalability amid population pressures. Qualitative depth on ethnic intersections invites ethnographic extensions in Balochistan's arid zones. These findings finally reframe women's land rights and economic participation as less of an equity issue per se than as a strategic imperative in the face of a disaster-resilient Pakistan. Repeated catastrophes have made it crucial that tenure security for 48% of the rural population unlocks pathways of transformation, making recovery an agreed achievement in line with SDGs and national priorities. Immediate policy adoption could prevent further worsening vulnerabilities and permit equitable sustainable development within one of the most stressed climates of the world. This study contributes rigorous, sub-national evidence to global discourses in urging stakeholders-from government to donors-to take up the call toward gender-inclusive resilience building.

Conclusion

This comprehensive study on "The Role of Women's Land Rights and Economic Participation in Post Disaster Recovery and Sustainable Development in Pakistan" yields transformative insights affirming that gender equitable resource access is not merely a social justice imperative but a cornerstone of national resilience. Through rigorous mixed methods analysis encompassing propensity score matching on 500 flood affected households multilevel regressions, principal component analysis for resilience indices and thematic triangulation from 50 interviews and focus groups key findings emerge with resounding clarity. Women with documented land titles realized 25% higher post disaster incomes (ATT=0.223, $p<0.001$), 32% superior asset recovery rates and 29% reduced household vulnerability compared to non-owners. These quantifiable gains

stemmed from enhanced credit access, microenterprise survival (76% vs. 51%), and adoption of sustainable practices like drought-resistant cropping (OR=2.8), fundamentally reshaping recovery trajectories in Sindh and Punjab's agrarian heartlands.[1]

Theoretically, results validate and extend the Gender and Disaster Risk Reduction (GDRR) framework by Enarson (2012), demonstrating how land tenure converts gendered vulnerabilities into empowerment multipliers within Pakistan's patriarchal structures. Qualitative narratives—"Land papers gave me bank loan confidence"—echo Sen's (1999) capabilities approach, where property rights expand economic freedoms, enabling 19 hours/week of participation versus 12 for others. This challenges reductive cultural attributions in prior literature (UN Women, 2013), revealing joint titling as a culturally attuned bypass to feudal and inheritance barriers under conservative Islamic interpretations. Intersectional nuances further enrich the discourse: educated ethnic minorities amplified effects, urging disaggregated models beyond binary lenses (Khalid & Shahnawaz, 2022). By linking land rights to diversified livelihoods from flood prone rice to resilient livestock findings localize global precedents like IFPRI's(2022) Bangladesh cooperatives which achieved 30% income stability while quantifying Pakistan specific district fixed effects (18% variance explained). In sustainable development paradigms the evidence forges direct pathways to multiple UN Sustainable Development Goals. Compared to lower socioeconomic group members in Pakistan (52.1), elevated resilience scores (68.4) support SDG 1 (No Poverty) through income premiums, SDG 2 (Zero Hunger) by improving food security by 22%, SDG 5 (Gender Equality) through elimination of tenure disparities (despite 48% of the rural population being women, women own <2% of land), and SDG 13 (Climate Action) through adaptive methodologies in agriculture. PDN's historical natural disasters on the Pakistani population include: the 2005 earthquake which resulted in 73,000 lives lost; the 2010 floods which impacted over 20 million people, resulting in 20/26 million displacements; and more recently, the 2022 floods which displaced 33 million people while costing the economy over USD 30 billion, illustrating maladaptive reconstruction efforts which have recreated cycles of vulnerability (UN, 2019). By empowering women, who currently contribute 60% to rural GDP (PSR, 2023), to participate more fully within the economy, the national economy has the capacity to grow by 2-3% over time and to save 20-25% on future disaster-related expenditures based on the resilience indices. These findings fit perfectly with the national policy blueprints, namely the National Climate Change Policy (2021) and Vision 2025, which encourage inclusive growth but lack a specific focus on gender mainstreaming as is reflected in the current NDMA infrastructure filters. The legal and policy implications are such that a multi-scaled approach must be implemented to ensure that the evidence becomes practice. In relation to the law, it is essential to amend the Land Revenue Act to require joint land titling in areas at high risk for disasters, thereby utilising the property protection clause outlined in Article 23 of the Constitution and the integration of digital land registries for both verification and enforcement purposes. Economically speaking, there are opportunities to expand the pilot phases of the Benazir Income Support Programme (BISP) to improve recovery from disaster by 40% through disaster-linked microfinance institutions. In particular the combination of cash transfers and training for women led cooperatives and savings groups has been identified in 35% of focus group discussions(FGDs). Institutionally embed gender quotas in NDMA frameworks: allocate 30% of recovery funds to female initiatives monitored annually via Pakistan Social and Living Standards Measurement (PSLM) indicators on tenure-resilience linkages. Community enablers, such as mobility supporting transport subsidies and literacy drives (addressing 46% female rates) will sustain participation amid mobility norms constraining 68% of women. Donor partnerships World Bank, ADB, Oxfam should prioritize these integrating with SDG financing to avert deepening climate inequities in a nation ranking fifth globally in disaster vulnerability (World Bank, 2023). This research fills critical voids in Pakistan-centric empirics, bridging qualitative coping accounts with causal econometrics absent in Ayebe-Karlsson et al. (2020)'s regional generalizations or Oxfam's (2023) descriptive flood reports. By validating cash-plus-land models over standalone aid, it offers a scalable blueprint amid escalating hydro-meteorological risks, where 2022 floods previewed climate futures. Limitations recall bias

over 18 months, agrarian sample scope underscore avenues for extension: longitudinal multi-hazard panels (e.g., KPK earthquakes), urban scalability tests, agent-based climate simulations, and ethnographic dives into Balochistan's arid intersections. Quasi experimental evaluations of BISP expansions could refine cost-benefit ratios ensuring policy adaptability.

Women's economic participation and land rights, while frequently considered 'supporting issues' arise as key tools to strengthen Pakistan to a more resilient trajectory. If 48% of a country's rural population were transformed into proactive rebuilders versus disaster dependent actors, that country would realize the optimal level of untapped potential and synergies created by the alignment of recovery and growth in one of the world's most vulnerable and climate impacted countries. All stakeholders from federal ministries through to grassroots non-governmental organisations must act immediately to ensure that the evidence is indisputable and that the consequences are literally a matter of survival. If Pakistan establishes gender inclusive reforms today it will create an environment where disaster response drives progress rather than continuing the cycles of poverty.

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