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POVERTY AND WOMEN'S RESILIENCE IN THE ERA OF CLIMATE CHANGE IN RURAL PAKISTAN

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ABSTRACT

Rural Pakistan, home to some of the most climate-vulnerable communities in South Asia, is experiencing the compounded effects of poverty and environmental stress. Climate change—manifesting in prolonged droughts, erratic rainfall, flooding, and water scarcity—has disproportionately affected women, who remain at the forefront of household survival and livelihood maintenance. This study explores the intersection of poverty and women's resilience in the face of climate-induced challenges in rural Pakistan. It argues that while poverty exacerbates women's vulnerabilities by restricting access to resources, education, and healthcare, it also underscores their adaptive capacity, as women develop innovative survival strategies to sustain households under conditions of scarcity. Drawing on qualitative research and secondary literature, the paper highlights how women engage in climate-sensitive practices such as crop diversification, livestock management, informal savings systems, and resource-sharing networks. These strategies not only mitigate livelihood losses but also strengthen community-level resilience. However, women's adaptive capacity is constrained by structural inequalities, including patriarchal social norms, landlessness, and exclusion from climate policy-making and development programs. The research underscores the paradox of resilience: women are celebrated as agents of adaptation, yet their contributions are often invisible in formal climate and development agendas. The paper concludes that building resilience in rural Pakistan requires a gender-sensitive climate policy that addresses poverty as a root cause of vulnerability. Empowering women through education, access to credit, land rights, and participation in decision-making processes is vital for strengthening resilience and ensuring sustainable adaptation in the era of climate change.

Key words: *Poverty, Women's resilience, Climate change, Rural Pakistan, Adaptation.*

INTRODUCTION

Climate change has become one of the defining issues of the 21st century that has transformed the interactions between humanity and nature and increased the susceptibility of people worldwide. This is more apparent now than at any other time in South Asia which is not only densely populated but also highly susceptible to climate. Stresses related to climate, such as extreme temperatures, unpredictable precipitations, floods, droughts, and melting glaciers in the Himalayas, are becoming a problem in countries like India, Bangladesh, Nepal, and Pakistan (Ali and Khan, 2019; IPCC, 2022). Rural communities are largely vulnerable to the changes in climate because they mainly rely on agriculture, livestock and natural resources. South Asian Agriculture is not only the main

source of livelihood of millions but also a major contributor to the national economies with rural households living off the small-scale agricultural industry.

Within this local context, Pakistan is in acute vulnerabilities. As one of the top ten countries most vulnerable to climate change in the Global Climate Risk Index, Pakistan has recorded frequent floods, droughts, and heatwaves that have upset livelihoods in the rural areas (Eckstein et al., 2021). As an example, disastrous floods of 2010 and 2022 flooded large areas of agricultural land and destroyed infrastructure, displacing millions of people, and extended droughts in dry areas like Tharparkar led to increased food insecurity. Unpredictable monsoon weather and reduction of river flow following the melting away of glaciers jeopardize irrigation systems, which constitute the mainstay of Pakistan agriculture. Climate stress directly affects food security and rural welfare as agriculture is the source of livelihood of more than 37% of the Pakistani population, and it contributes approximately 20 percent of GDP (Government of Pakistan, 2022).

In rural Pakistan, agriculture is mainly smallholder in nature, and small parcels of land are cultivated or sharecropped by households. Such systems are weak in nature because they depend on the prompt rainfall and minimal irrigation. The climatic shocks like crop failure, livestock death, and soil erosion further plunge households into the poverty cycles. Poor infrastructure, low institutional capacity, and poor disaster preparedness limit the adaptive capacity of these communities (Mustafa et al., 2020). Therefore, climate change is not a mere environmental problem, but a socio-economic one that impacts the marginalized populations unequally, especially women.

In Pakistan, the rural regions are characterized by deep-rooted poverty with income inequalities, inadequate infrastructure, and insufficient access to basic services, which cause systematic vulnerability. The poverty levels in Pakistan are estimated to be 24 percent below the national poverty level, and rural areas experience higher poverty rates as compared to urban ones (World Bank, 2023). Small scale farmers tend to rely on subsistence instead of surplus, and thus rural households are very susceptible to changes in the environment. Poverty decreases the ability of households to invest in adaptive technology, like irrigation methods, superior seeds, or crop cover, which increases their vulnerability to climate shocks (Arif and Farooq, 2019).

Poverty and climate vulnerability are interrelated in such a way that they generate a reinforcing cycle. Climatic shocks destroy household assets, rise food insecurity, and augment debt, and poverty reduces the ability to respond and recuperate. Unless the poorest households save money or have access to credit, they frequently have to use some negative coping strategies that may include the sale of productive resources or even the removal of children, and in particular girls, off school to work in the home. Climate change effects are thus extending past material deprivation into the intergenerational poverty and human development indicators (Sultana, 2014).

Rural women are the main actors of household survival hence a disproportionate burden. Their access to land ownership, formal jobs and financial resources is also limited, which makes them less resistant to environmental stress. Simultaneously, the social order of patriarchy inhibits women mobility and their involvement in decision-making procedures, making them passive stakeholders of the formal adaptation and development activities (Naz, Ullah, and Ali, 2020). In that way, the two-fold problem of poverty and vulnerability to climate does not stick but is very gendered, and women are on the front-line of household adaptation but are systematically sidelined in institutional responses.

Women in rural Pakistan have become important people in the sustenance of livelihoods, even though much of the work is unrecognized and not appreciate. The activities that women are involved in are diverse: they can produce agricultural goods and raise animals, process food and install water and fuelwood collectors (FAO, 2019). Their service goes to post-harvest processing, seed storage, small-scale retailing, which is usually the basis of family food security. With climate-related scarcity, women in most rural settings have to work a number of hours

daily on water and energy resources management which turns to be more strenuous as the climate changes.

As much as this is contributed, women have barriers within the structure that restrict their access to productive resources. The ownership of land is very skewed as only less than 2 percent of women in Pakistan own agricultural land, even though they take up the role of farming (Shahbaz et al., 2021). The gender biases in the institutions and cultural limits to mobility limit the access of women to the agricultural inputs of fertilizers, credit and extensions services. This un-availability denies them the ability to employ adaptation measures, despite the fact that they are the main survival agents in the household in the case of climatic disasters.

On the household level women can play the role of shock absorbers as they absorb the effects of food shortages by cutting down on their consumption to allow children and men to be fed first. During crisis, women have also recourse to informal sources of coping, such as rotating savings groups, reciprocal labor exchange and resource sharing networks, which play an important role in protecting against poverty and environmental stress (Iqbal & Nawaz, 2020). These practices highlight the agency and resilience of women but they are barely acknowledged in the official policy structures. Therefore, even though women are essential contributors to rural resilience, there are still no initiatives to strengthen their role.

2. Research Problem

The main research question that the paper will answer is the interplay of poverty, gender, and climate resilience in rural Pakistan. Although the effects of climate change are universal, the role played by poverty and gender dynamics in determining individual adaptive capacities of women is not researched widely. The majority of the climate adaptation policies and programs in Pakistan remain gender-neutral, as it is assumed that interventions will equally benefit everyone; however, there is evidence that the factors of vulnerability and resilience are influenced by structural inequalities among women (Mustafa et al., 2020; Sultana, 2014).

Poverty is important as it limits material resources like savings, credit, land and infrastructure to facilitate successful adaptation. The issue of gender is relevant since it defines access to these sources, assigns household roles, and it can alter involvement in the decision-making processes. The nexus of these two dimensions generates both distinctive vulnerabilities of rural women, and distinctive possibilities of resilience. The informal mechanisms of women have a way of keeping the households afloat in times of crisis, but their efforts are not recognized in the climate policy and development agendas.

Through examining this nexus, the paper aims at illuminating the paradox of resilience: women are applauded as responsive agents in climate discourse and at the same time locked out of the official adaptation programs and decision-making processes. This paradox is important to consider when formulating inclusive and effective climate policy-making to address the role of women in rural Pakistan both as a burden and contributor to climate change.

3. Objectives of the Study

This study is guided by the following objectives:

1. To analyze how poverty exacerbates women's vulnerabilities to climate change in rural Pakistan.
2. To examine the adaptive strategies employed by rural women in response to climate-induced livelihood challenges.
3. To assess the structural and institutional barriers that constrain women's resilience, including landlessness, gender norms, and exclusion from policymaking.
4. To explore the paradox of resilience, where women's contributions are central yet often invisible in climate adaptation frameworks.
5. To propose gender-sensitive policy recommendations for strengthening resilience and sustainable adaptation in rural Pakistan.

4. Literature Review

4.1. Climate Change and Rural Vulnerabilities in Pakistan

Pakistan is also ranked as one of the most climate-prone nations on the planet, always being at the top ten of the Global Climate Risk Index

(Eckstein et al., 2021). The country has in the past decades experienced an increment and severity of extreme weather conditions such as extended droughts, flash floods, heatwaves, and unpredictable rainfall patterns. The 2010 floods that were also called the super floods covered a fifth of the nation and displaced more than 20 million people, and the 2022 floods covered large areas of agricultural lands, impacting close to 33 million people (Kugelman, 2022). Meanwhile, water shortage is common in drought-prone regions, including Balochistan and Sindh, and this threatens the productivity of crops and livestock (Mustafa et al., 2020).

Another immediate problem is rainfall variability. The system with which the Pakistani nation is dependent on the Indus Basin Irrigation System renders it extremely vulnerable to changes in the glacial melting and monsoon cycles. Unpredictable rainfall has led to flash floods and also to sluggish sowing of farms, which have a direct impact on agricultural productivity. Rising temperature - estimated to increase by 1.3-4.9degC by the end of the century - increases water stress, decreases crop productivity, and increases evapotranspiration (IPCC, 2022). Such climatic changes underscore the structural threats of the rural households relying on natural resources to live.

4.2. Rural Livelihoods Under Stress: Agriculture, Water, and Natural Resources

Pakistan is a rural-led economy with agriculture accounting for over a third of the labor force and serving as a livelihood source to close to two-thirds of the population (Government of Pakistan, 2022). However, this is a very climate sensitive industry. Droughts cause stagnated production in staples like wheat, rice and cotton, and floods lead to destruction of staged crops, irrigation systems, and seed reserves. Smallholder farmers, who own less than two hectares of land, will have their livelihoods devastated by small disruptions (Arif & Farooq, 2019).

These challenges are exacerbated by water shortage. Rural resilience is undermined by groundwater depletion, inefficient water and irrigation, and interprovincial conflict over water assignments (Qureshi, 2020). Secondarily, climate change endangered rangelands and forests that supply grazing field and fuelwood as well as medicinal plants. Due to the reduction of natural resources, the rural households experience increased competition and insecurity, which in most cases are manifested in food insecurity, migration, and poverty traps.

5. Poverty and Gendered Vulnerabilities

5.1. Feminization of Poverty in Rural South Asia

The concept of the "feminization of poverty" has been widely applied in South Asia to highlight how women disproportionately experience poverty due to structural inequalities in land ownership, wage disparities, and social exclusion (Chant, 2016). In Pakistan, rural women are more likely than men to be illiterate, unemployed in formal sectors, and denied inheritance rights, leaving them dependent on male relatives for economic security (Naz et al., 2020). These disparities mean that women have fewer assets to rely upon during climate shocks.

5.2 Intersection of Poverty, Gender, and Climate Risks

The combination of poverty and gender also exacerbates climate dangers. Women and especially the poor women are not granted access to financial resources, farm inputs, and extension services (Shahbaz et al., 2021). They are exposed directly to environmental degradation in their daily duties which include bringing water, gathering of fuelwood and making sure that the house holds food. Climate change adds to these burdens: as it grows more difficult to find water (drought) and livestock (flood), as well as increases food costs, it becomes even more important to strain the time and energy resources of women. It has the net cumulative impact of excessive workload and increased vulnerability of the poor household women (Sultana, 2014).

5.3. Impacts on Health, Food Security, and Household Stability

Poverty and climate change have health and nutritional effects that are also gendered. Women also have the last and the little to eat in the family setting, which is aggravated in periods

of food shortage (FAO, 2019). Climate-affected regions experience greater rates of malnutrition, health risks to mothers, and water-borne illnesses, women have suffered most due to poor access to healthcare. Climate shocks destroy household stability by compelling families to resort to negative coping strategies, such as child labour, early marriages, and school dropouts, which has a greater impact on girls compared to boys (Mustafa et al., 2020). Accordingly, gender vulnerabilities cross-cut in the field of health, education, and intergenerational welfare.

6. Women's Role in Climate Adaptation

Women are not passive agents of climate change; although some systemic challenges exist, they are also managers of household adaptation. Women in rural Pakistan are practicing crop diversification, seed preservation, kitchen gardening, and small-scale livestock management to guarantee the availability of food (Iqbal and Nawaz, 2020). They also conserve water, implement traditional modes of storing, and are in charge of rationing scarce resources. Their energy management, i.e. fuelwood gathering and the use of alternative energy sources, highlights their pre-eminence in the survival of sustainable households.

Women resilience strategies have been identified as essential globally in terms of community resilience. In Bangladesh, e.g., women involvement in microfinance institutions has helped them to restore livelihoods following cyclones (Ahsan and Warner, 2014). The role of women in the management of community forests and minimizing the risk of disasters has been central in Nepal through women-headed cooperatives. Evidence on women mobilizing informal savings groups, sharing resources with their neighbors, and relying on indigenous knowledge to respond to climate variability is similar in Pakistan (Naz et al., 2020). These are the strategies which show the adaptive ability of women, but they are seldom integrated into official adaptation planning.

One of the most recurrent themes in literature is the invisibility of female work in the official statistics and even the model of policy. A significant portion of the labor of agriculture and keeping animals, as well as managing other domestic resources, is both unpaid and unacknowledged (FAO, 2019). Consequently, women are not commonly addressed (at all) and offered sufficient assistance within adaptation programs. As an example, the agricultural extension services in Pakistan are mostly focused on male farmers, neglecting women who play a significant role in food production (Shahbaz et al., 2021). In the same vein, the non-presence of women in decision-making institutions, e.g., local water committees or disaster management councils, further undermines the voice of women in the process of climate adaptation response.

7. Conceptual Framework

The concept of resilience is generally interpreted as the ability of individuals, households and communities to absorb, recover and adjust to the shocks. The literature differentiates three dimensions, which are absorptive, adaptive, and transformative capacities (Folke, 2016). Absorptive capacity is the capacity to absorb shocks by using current resources; adaptive capacity is the capacity to change practices, processes or structures to minimize the risks; and transformative capacity is the capacity to modify the system in order to change the underlying vulnerabilities.

According to gender scholars, resilience has to be socially differentiated. Gender differences exist in terms of exposure to risks since women and men have different roles, duties, and access to resources (Arora-Jonsson, 2011). The strategies of resilience adopted by women tend to be necessitated by situations, including food rationing or informal networks, yet the strategies may cover the inequalities within the structures. Policy-makers who praise the resilience of women are in danger of glorifying coping strategies without looking at the structural poverty and patriarchy to limit the choices that women make (Sultana, 2014). The concept of resilience, therefore, is a practical need and a disputed issue in the gender studies.

This paper uses a poverty-gender-climate nexus approach to explain the resilience of women in rural Pakistan. It is important to note that structural inequalities like landlessness,

patriarchal norms, and poverty cycles cannot be studied without adaptive strategies of women as highlighted by the framework. It combines material (e.g. access to resources) with social dimensions (e.g. gender roles, not being the decision-maker in policymaking). The placement of the experiences of women in this nexus, the study clarifies the agency of women in coping with climate stress and the systemic constraints that restrain their resilience.

8. Methodology

The study employs a qualitative research design and integrates secondary data to investigate the relationship between gender, poverty, and climate resilience in rural Pakistan. When describing women's lived experiences, perceptions, and adaptation strategies—all of which are probably not visible in quantitative data—the qualitative approach is particularly suitable. The design can be used to fully comprehend the structural, social, and cultural factors influencing women's responses to climate change. Due to their diverse ecological settings, climate risks, and socioeconomic backgrounds, the rural districts of Sindh, Punjab, Balochistan, and Khyber Pakhtunkhwa serve as the research site. A broader picture of how resilient women are in various climatic and cultural contexts is provided by this geographic diversity.

To improve depth and dependability, a variety of data collection techniques are employed. Household-level and community-level adaptation can be identified using primary data from semi-structured interviews and focus groups with women farmers, local stakeholders, and community leaders. These are supplemented by a thorough analysis of the body of literature, including scholarly articles, government reports, and assessments from non-governmental organizations. Secondary data on poverty indices, reports on agricultural productivity, and assessments of climate vulnerability help to further contextualize the findings. Participants in case studies are chosen using purposive sampling, which is carried out in a way that represents all the different age groups of the socioeconomic backgrounds and landholding statuses.

Thematic analysis guides data interpretation by identifying common patterns, strategies, and barriers to women's adaptation to climate stress. The relationship between poverty, gender, and climate is examined in relation to better resource management, social networks, and structural barriers. The study's limitations include time, remote location, and self-reported experiences, the researchers point out. Throughout the research process, ethics remain at the forefront. In order to give women a voice without perpetuating the status quo, gender sensitivity is maintained through participant confidentiality, interviews held in a setting that is culturally acceptable, and inclusivity.

9. Climate Change, Poverty, and Women's Everyday Struggles in Rural Pakistan

Climate change has turned out to be one of the most urgent issues in rural Pakistan where agriculture, animal husbandry and consumption of natural resources represent the staple of survival. Its effects are becoming more apparent in our day-to-day life on both domestic and societal levels. The unpredictable weather systems, frequent drought, severe floods, and water shortage have subjected the rural economies to complex economies that are easily shaken through continual change in order to survive. On the individual level, food insecurity, drinking water scarcity, deteriorating agricultural output, and rising prevalence of diseases are some of the manifestations of climate stress. At the community level, whole villages grapple with the problem of displacement, loss of livelihoods, and disintegration of the traditional support mechanisms. Females, who have an unequal proportion of domestic roles, are the most affected by this crisis, and their troubles can be obscured by policy arguments (Qaisrani, Salik, & Ul Hassan, 2018).

The example of Tharparkar in Sindh shows how disastrous can be the connection between drought and the daily life of women. The fact that rainfall has become very unpredictable has plunged the families that rely on livestock and rain-fed agriculture in severe food crisis. Women even have to walk hours to collect water and fodder, which causes exhausting work to their day

routine (Mustafa et al., 2019). In Sindh, which is a flood-prone region, the devastating floods of 2010 and 2022 swept away whole communities, leaving women living in temporary posts where sanitation, maternal health, and security became urgent issues (Human Rights Watch [HRW], 2022). Balochistan is a region with an endemic water shortage where women are, at times, forced to make tough decisions on water use, water is needed to drink, cook and raise animals, which directly impact family food and health (Shah, 2020). These local cases are used to emphasize how climate stress restructures women time, health, and physical security in a manner that is seldom felt in a similar manner by men.

Poverty also adds to the intensity of climatic effects since the women lack the resources to defend themselves against or rebound against shocks. The rural families have little savings or insurance and other sources of income, which exposes women to greater losses (Rasul et al., 2019). Failure of crops or demise of livestock destroys female sources of income like poultry farming, handicraft or daily wage work, further subjugating them to male relatives or informal credit. Low financial autonomy also decreases the capacity of women to make decisions regarding adaptation, including the acquisition of drought-resistant seeds, water storage investments, or medical services (Arif and Malik, 2020). This nexus of poverty and climate therefore forms a loop whereby the vulnerability of women would be inscribed making inequality intergenerational.

The other aspect of the struggle of women is the increase of unpaid care and subsistence labor in the conditions of climate pressure. Women have to take care of agricultural fields, livestock, household and childcare at the same time when men move to urban areas in search of wage labor after crop failures (ADB, 2021). Fuelwood gathering, water carrying, food preparation, which is already hectic in rural Pakistan, becomes more strenuous when there is a shortage of these resources. During floods, women tend to put the lives of children, aged family members, and animals first, whereas their health requirements are overlooked (HRW, 2022). Feminization of survival labor implies that women are working unrecognized and unappreciated but essential labor that keeps families afloat in times of crisis, but which rarely becomes part of the recovery programs (Naz and Chaudhry, 2021).

Women are also vulnerable to climate and this is mediated by cultural and social norms. Gender division of labor implies that women are not included in determining how resources are used in village councils or food committees, despite their role in the collection of water and providing food being the main responsibility (Mustafa et al., 2019). The limitation of the movement of women may prevent them to receive relief services, evacuation centers or agricultural extension programs. In conservative regions, there is a large likelihood that women are not allowed to work outside their houses or even to communicate with male officials, and this is what constrained their ability to access coping strategies (Rasul et al., 2019). Concurrently, the patriarchal right to land ownership deprives women a right to security of tenure in that they rely on their male kin to avail them of farming resources. This exclusion structure adds to the dangers that women are exposed to in the event of climate shocks.

Although these are the pressing issues, the rural women also demonstrate impressive resilience and agency. Informal women groups in most communities' exchange food, labor and information amidst stressful situations. Other practitioners do small scale innovations, including water harvesting, kitchen gardening or seed saving (Shah, 2020). During displacement and recovery, women social networks, which are generally grounded on kinship or neighborhood affiliations, serve as lifelines. These strategies are however important but cannot replace systemic interventions. The lack of policies to control climate change and gender inequalities that are well rooted in society means that the strength of women will become a narrative of survival and not empowerment (Naz and Chaudhry, 2021).

To sum up, climate change in rural Pakistan is a social crisis, which is gendered and not merely a challenge to the environment. The daily struggles of women demonstrate that the intersection of climatic stress, poverty and social norms combines to establish both the acute and the chronic vulnerabilities. The case of women in

Tharparkar, where drought is a common issue, of Sindh, where floods are the problem and of Balochistan, where water is an issue proves the multidimensionality of the challenges. Women lose access to adaptive resources because of poverty, their labor is not paid, and women are not entitled to participate in decision-making practices due to the concept of gender. The leading role of women in the maintenance of households and communities in climate stress context is critical in the development of inclusive adaptation policies. The solution to the daily plight of women must not only be in climate resilience measures but also in the overall alleviation of poverty, gender equality, and availability of resources, services and platforms of decision making. It is only under this condition that the silent work and sacrifice of the women in rural Pakistan would be converted to acknowledged input towards resilience and sustainable development.

10. Women's Resilience and Adaptation Strategies

In Pakistan, women in rural communities, being the most affected by climate change and poverty, have shown great resilience and creativity in how they have adapted to the environmental pressure. Their tactics which are mainly necessitated by the need include farm work, family and society processes, operation of migrations, and mobilization of cultural knowledge. Although much of this is happening at the micro-level and is not reflected in official structures, it offers a framework of climate resilience that should be appreciated and championed.

Agricultural innovation is one of the most noticeable methods of adjusting to climate stress by women. In regions where rainfall is not foreseeable and the soil is becoming less productive; women embrace crop diversification in order to reduce these risks. Instead of growing one staple crop, women also grow several crops, which in most cases are mixtures of grains, legumes, and vegetables, in order to guarantee at least partial harvests in unfavorable circumstances (Qaisrani et al., 2018). In this method, there is less susceptibility to crop failure and more household food security. Another necessary strategy is seed saving where women tend to store native seed varieties which they find suitable to their local climatic conditions. Their resistance to droughts and pests is higher than commercial hybrids, and their sharing between households creates resilience on a community level (Mustafa et al., 2019).

Kitchen gardening which is normally run by women is very important in diversifying food and supplementing food in the home. The promotion of small-scale growing vegetables, herbs, and fruits will provide access to the necessary micronutrients despite any disruption of access to the market due to floods or damage to roads (Naz & Chaudhry, 2021). Such gardens also decrease the dependency of households on cash to buy food especially at lean production seasons. Women in places such as Balochistan combine kitchen gardening with other water-saving mechanisms such as drip irrigation and rainwater collection (Shah, 2020).

The management of the livestock is also a major adaptation strategy. The women also tend to feed, milk as well as to look after small animals like goats, poultry, and sheep. Livestock are not only a source of food, but are also a kind of savings, which can be sold during emergencies (Rasul et al., 2019). Women form their mixed farming systems with animal husbandry along with crop farming in the regions making sure that their livelihood system is more balanced. The practices are not only more resilient to climate change, but also enable women to have greater economic empowerment because even small amounts of livestock products like milk and eggs and wool generate a constant stream of income.

Other than engaging in agricultural activities, women implement various household and community-based approaches to cushion their exposure to climate shocks. The rotating credit associations and informal savings groups used by most women serve as safety nets during times of crisis. These organizations combine small deposits made by members, and they are distributed on a rotational basis, so that households can afford to pay off immediate expenses like buying food, access health care, or fixing broken houses (ADB, 2021). These are especially significant in the settings where formal

banking facilities are not available or women are not able to access them because of mobility issues or unavailability of collateral.

Another survival strategy that is well integrated into the social life of the rural setting is resource sharing among households. Women tend to swap water, fodder or even farm work so that no individual family will be overstrained by the climate. To use one example, in times of droughts in Tharparkar, the collection water sources are controlled by women in unison that creates a collection schedule, reducing conflict, and leading to fair distribution (Mustafa et al., 2019). On the same note, women will organize childcare services and leave others to do the wage labor or field work to earn more income.

Another main duty women have in ensuring food security in times of climate shocks is their central role in ensuring there is food. Whenever harvests are unsuccessful or livestock dies, women tend to cut their own food intake to provide children and male earners with sufficient food (Naz and Chaudhry, 2021). They practice innovative methods of food conservation, such as drying vegetables, making basic dishes with a smaller number of ingredients, or replacing them with wild edible plants. But these are the daily activities, which are undervalued, but they play an important role in avoiding malnutrition and hunger in times of crisis.

Migration due to the climate has become a characteristic of rural livelihood in Pakistan and women are very instrumental in the management of the outcome of the migration process. There is also seasonal migration to urban centers or agricultural centers especially in Sindh and the southern Punjab. Men usually go out to work in wage labor earlier and leave women behind to take care of homes, farms, and children (Arif and Malik, 2020). This adds to their workload, but also enlarges their decision making in some areas, including the household budgets or agricultural planning.

Remittances by men migrants are also handled by women. They use them to cover basic needs such as food, healthcare, education of their children, and paying their debts, which means that the household will survive without the constant agricultural revenues (ADB, 2021). This role, even though it puts more women in charge of financial management, also puts them in a difficult position especially when there are inconveniences in the receipt of remittances or where there is not enough money.

When complete families migrate, women are adapting and trying to find alternative means of livelihood in the areas to which they move. Others do wage work in informal industries like brick kilns/household chores, still others practice subsistence farming in the peri-urban settings. Nonetheless, women are also exposed to the threats of exploitation, poor sanitation, and the disappearance of social support systems due to migration (Rasul et al., 2019). Male migration also increases the workload of the women, who have to work in the farm, raise children, and carry out domestic chores. Although this is a heavy burden, it also brings out the strength of women in maintaining rural families under pressure.

Cultural practices and indigenous knowledge of women are very crucial in resilience-building. Women in the water-scanty areas such as Balochistan have a complex understanding of the traditional water management systems, such as locating the underground supply of water, preserving rainwater, and ensuring water storage at the house level (Shah, 2020). This type of knowledge can be transmitted through generations and it can be more sustainable than any technical solutions that are imposed.

Another aspect of adaptive strategies of women is herbal medicine and traditional healthcare practices. Low access to formal medical care also results in women depending on indigenous medicine plants to treat diseases, especially when there is a disaster such as floods or droughts, which interfere with the availability of healthcare to women even more (Naz & Chaudhry, 2021). Although not the replacement of contemporary health care, the practices maintain the resilience of a community where the formal system is not available.

Resilience is also increased by traditional solidarity networks at the community level. When crisis strikes, women tend to marshal kinship or neighborhood-based systems of support, sharing food, labor and childcare. When women are forced to move in case of floods, they

use such networks to get temporary accommodation or to exchange basic needs (HRW, 2022). Such informal practices represent resilience-enhancing practices that rely on the cultural beliefs of reciprocity and mutual survival. Meanwhile, the cultural practices may produce two outcomes. Although solidarity networks enhance resilience, gender norms are usually restrictive in terms of granting women a voice in formal decision-making. Their contribution is underrated, and the policies that are made without considering the knowledge of women are bound to destroy the resilience of the community (Mustafa et al., 2019). By acknowledging and incorporating the cultural and indigenous practices of women into the formal adaptation agenda, there are high chances that the strategies of climate resilience at local and national levels are hardened.

11. Structural Constraints and the Paradox of Resilience

Structural inequalities in rural Pakistan profoundly shape the nature and limits of women's resilience to climate change, creating what can be described as a paradox: women are simultaneously celebrated as adaptive agents while being marginalized in governance and resource allocation. One of the most significant structural constraints is landlessness and exclusion from land rights. In rural Pakistan, land ownership remains heavily skewed toward men, with women rarely having legal claim to agricultural plots or tenure security (Arif & Malik, 2020). Even when women contribute labor to family farms, they often lack decision-making authority over what to cultivate or whether to invest in irrigation and inputs. Landlessness undermines women's ability to implement climate adaptation strategies independently, such as crop diversification, soil conservation, or water-harvesting techniques, and restricts their access to institutional support tied to landholding, such as government subsidies or credit programs (Rasul et al., 2019).

Limited access to credit, markets, and agricultural inputs further compounds these vulnerabilities. Women often cannot access formal banking services due to lack of collateral, restrictive social norms, or financial illiteracy (Naz & Chaudhry, 2021). Microfinance programs sometimes reach women, but the scale is inadequate to support climate-resilient agriculture. Access to markets is similarly constrained; women rarely sell crops or livestock independently, limiting their income-generating potential and ability to invest in adaptive measures. Agricultural inputs such as improved seeds, fertilizers, and irrigation technology are largely distributed through male-dominated channels, leaving women reliant on household resources and traditional methods, which may not suffice under increasing climatic stress (Mustafa et al., 2019).

Structural vulnerability is also made worse by gender disparities in healthcare and education. Rural women's literacy rates are significantly lower than men's, which limits their access to information about sustainable farming methods, government initiatives, and climate adaptation (Qaisrani et al., 2018). Women who have less education are less able to use extension services, comprehend crop insurance plans, or deal with the red tape involved in obtaining aid following droughts or floods. Access to healthcare is also limited. During climate-induced crises, maternal and child health outcomes worsen, but women usually lack the financial or mobility means to get to clinics (Shah, 2020). These disparities have long-term effects that impact household resilience and productivity in addition to women's well-being.

Patriarchal limitations on women's freedom of movement and choice exacerbate systemic injustices. According to Mustafa et al. (2019), social norms frequently forbid women from traveling alone, participating in community gatherings, or engaging in negotiations with local authorities. Despite playing a crucial role in managing household resources, this restricts their ability to participate in village councils, water committees, and disaster management committees. Even when women have the knowledge and desire to adopt adaptive strategies, patriarchal control over household finances and agricultural choices keeps them from doing so. As a result, women's contributions are mostly overlooked in official planning or

policy, and their resilience is restricted to unofficial and frequently invisible domains.

These limitations are made worse by policy blind spots. In Pakistan, gender considerations are often not adequately incorporated into climate adaptation and rural development programs (Rasul et al., 2019). Policymakers are unaware of the underreporting of women's work in agriculture, water collection, and food security in official statistics. Women's role as agents of adaptation is marginalized by the fact that extension services, subsidy programs, and disaster relief schemes are generally created for male heads of households (Naz & Chaudhry, 2021). The transformative potential of even gender-focused programs, like skill-building or microcredit, is limited by their small scale and lack of integration with larger climate adaptation policies.

The paradox of resilience results from this systemic marginalization. As key players in household survival and community adaptation, women are praised in scholarly writing and policy discussions (ADB, 2021). Under harsh circumstances, they innovate while managing food security, water, energy, and care obligations. However, their contributions are rarely accompanied by formal authority in governance structures, resource allocation, or institutional recognition. The fact that women play a dual role in adaptation and decision-making illustrates how gendered climate vulnerability is in Pakistan. When women's efforts to keep their households together fail to result in increased social standing, legal rights, or political influence, the paradox becomes clear (Mustafa et al., 2019).

A diversified strategy is needed to address these structural limitations. Women's land rights must be protected by legal changes so they can take advantage of institutional support and agricultural inputs. Initiatives for financial inclusion must be increased to guarantee that women have fair access to markets, insurance, and credit. To improve women's ability to make educated decisions and perform adaptive labor, access to healthcare and education must be improved, especially in rural and climate-vulnerable areas. Women should be included in disaster management, extension services, and climate planning through specifically gender-sensitive policy interventions. Women's resilience can be transformed from a personal survival tactic to a community-wide adaptive asset by acknowledging and formalizing their informal labor (Shah, 2020; Naz & Chaudhry, 2021).

In conclusion, women's resilience in rural Pakistan is severely hampered by systemic disparities in social mobility, education, healthcare, land ownership, and financial access. Women are forced to innovate within informal frameworks and with limited resources as a result of these constraints, which also intersect with poverty and climate vulnerability. The paradoxical situation that women maintain households and communities under climate stress while being excluded from the very systems that shape long-term adaptation is perpetuated by their exclusion from governance and policy, despite the fact that women's resilience is regularly praised in discourse. Transforming women's resilience from a personal survival strategy into an acknowledged and supported pillar of climate adaptation and sustainable development requires acknowledging and removing these systemic obstacles.

12. Discussion and Analysis

This study's primary goal is to examine how poverty in rural Pakistan increases women's susceptibilities to climate change. Because it restricts access to resources, knowledge, and coping strategies, poverty both causes and increases vulnerability. Households in rural areas are particularly vulnerable to environmental shocks like droughts, floods, and unpredictable rainfall because they frequently depend on rain-fed agriculture and livestock for survival (Rasul et al., 2019).

These vulnerabilities disproportionately affect women because they are the primary caregivers and managers of household food, water, and energy. Households with limited funds are unable to purchase climate-resilient seeds, livestock insurance, or irrigation infrastructure. Therefore, women are most responsible for providing food and water for the family when crops fail or livestock die, frequently lowering their own consumption and compromising their

own health in the process (Shah, 2020). Women's ability to adapt is further limited by poverty, which also limits their mobility and access to healthcare and education. Women have been compelled to walk great distances to fetch water and gather fodder in areas like Tharparkar due to chronic poverty and frequent droughts, which has increased physical strain and exposure to environmental hazards (Mustafa et al., 2019). As a result, poverty increases women's vulnerability in rural Pakistan by increasing their exposure to climate hazards and their incapacity to lessen their effects.

Examining the adaptive tactics used by rural women to address livelihood challenges brought on by climate change is the second goal. Women actively create coping strategies that improve resilience in the home and community despite having few resources. Crop diversification, seed saving, and kitchen gardening are examples of agricultural adaptations that are essential to these tactics. While seed saving guarantees access to generations-old pest or drought-resistant cultivars, crop diversification lowers the chance of complete crop failure and offers a nutritional safety net (Qaisrani et al., 2018). Kitchen gardens, which are frequently run by women, add vegetables and herbs to family meals and lessen reliance on cash income for necessities (Naz & Chaudhry, 2021). Another important tactic is livestock management. Women care for poultry and small ruminants, which help prevent food insecurity and generate revenue in times of climate change (Rasul et al., 2019). Because they diversify sources of income and lower exposure to climate risk, mixed farming practices—which combine crops and livestock—are especially effective at fostering adaptive capacity.

Women use informal savings groups and rotating credit systems to deal with financial shocks in their homes and communities. These groups give people small but important things they need right away, like food, medical care, or fixing up their homes that have been damaged (ADB, 2021). Women also share things like water, food, and work between households, which makes the group stronger. When there is a drought or a lack of water, women plan when to collect water and organize people to help with crops or livestock. This shows that they have complex social and organizational skills that are often not recognized in official policies (Mustafa et al., 2019). Women also play a key role in food security during climate shocks by rationing supplies, using wild edible plants, and using food preservation methods to make sure that families can survive even when things are very stressful (Shah, 2020). These strategies showcase women's ability for innovation and collaborative problem-solving, although they function predominantly outside formal acknowledgment.

The third goal of the study looks at the structural and institutional barriers that make it harder for women to be resilient, such as not owning land, gender norms, and not being able to make policy. Structural inequalities, especially in land ownership, greatly hinder women's capacity to employ adaptive strategies. In Pakistan, women seldom possess legal rights to agricultural land, despite their significant contributions of labor to farming activities (Arif & Malik, 2020). People who don't own land can't get government help, subsidies, or credit programs, which are usually only available to people who own land. Limited access to financial services makes people even more vulnerable. Women frequently lack collateral and encounter mobility constraints, rendering formal banking and credit systems challenging to access (Naz & Chaudhry, 2021). These structural problems are made worse by gender roles and the fact that men have control over household decisions. Women are often left out of local government bodies, water committees, and disaster management councils, even though they are very important for managing household resources (Mustafa et al., 2019). These institutional barriers hinder women from enhancing effective adaptation strategies and engaging in community-level resilience planning, compelling them to depend on informal and frequently unstable mechanisms.

The fourth goal looks into the paradox of resilience, where women's contributions are important but often not seen in climate adaptation frameworks. Women are at the forefront of managing food, water, and energy resources during climate crises; however, their labor and expertise continue to be undervalued

and underrepresented in policymaking (Rasul et al., 2019). Their resilience is often characterized as an individual or familial duty rather than a communal or systemic resource, thereby constraining avenues for acknowledgment, resource distribution, and political empowerment (Naz & Chaudhry, 2021). For example, women in flood-affected Sindh not only take care of children, the elderly, and livestock, but they also set up networks for sharing resources and distributing relief. However, disaster management programs mostly focus on male heads of households (HRW, 2022). This lack of visibility in policy creates a paradox: women are essential to the survival of households and communities, but they are left out of governance, decision-making, and climate planning. To solve this paradox, climate adaptation policies need to include gender-sensitive approaches, see women as active agents of resilience, and give them institutional support, money, and the power to make decisions (ADB, 2021; Shah, 2020).

In conclusion, the examination of these objectives reveals that poverty, gendered vulnerabilities, and structural inequities converge to influence the climate resilience of rural women in Pakistan. Poverty heightens vulnerability to environmental risks and constrains adaptive capacity, whereas women's adaptive strategies—such as agricultural innovation, resource-sharing, and informal financial mechanisms—underscore their agency and resilience. Nevertheless, structural and institutional limitations hinder the efficacy of these strategies and perpetuate systemic inequalities. Finally, the paradox of resilience shows how important it is to have policy frameworks that recognize and support women's contributions, instead of just using their work and creativity without giving them credit or power. All of these ideas show that to make rural Pakistan more resilient to climate change, we need to deal with both material deprivation and social inequality, and we need to include women's voices and knowledge in formal adaptation planning.

13. Recommendations

1. Gender-Sensitive Climate Adaptation Policies

Women should be given priority in policy interventions as key players in fostering resilience in the home and community. Programs for climate adaptation must specifically incorporate women's labor, expertise, and experiences into official planning procedures. This includes specialized instruction in disaster preparedness, water management, and sustainable agriculture. Field demonstrations, female facilitators, and mobile advisory services can all help to improve government extension services by making technical solutions both practically and culturally accessible.

2. Secure Land Rights and Financial Inclusion

For women to be able to use adaptive strategies, land ownership and tenure security are essential. Legal changes should make it easier for women to own land, either jointly or individually, giving them the freedom to choose how to cultivate, use inputs, and invest in adaptive measures. Additionally, this access may increase one's eligibility for government assistance programs and institutional credit. Initiatives for complementary financial inclusion, such as savings groups, revolving credit plans, and microfinance, should be developed with flexible repayment plans and financial literacy instruction for women. Smallholder farmers and women-headed households should also be the target market for insurance products that cover crop failure, livestock loss, or flood damage.

3. Education and Skill-Building

One fundamental tactic for building resilience is education. Enhancing rural women's literacy and vocational skills expands their access to government programs, climate-related information, and adaptive farming methods. Programs for education must be tailored to the local context, taking into account literacy levels, mobility limitations, and local languages. Intergenerational adaptive capacity can be promoted by incorporating environmental management, disaster preparedness, and climate change into formal and informal educational

platforms. To prevent health-related vulnerabilities from undermining adaptive capacity, healthcare access should be strengthened, including maternity and child health services and mobile health units.

4. Participation in Decision-Making

It is crucial that women are represented in governance and decision-making pertaining to climate change. Women are frequently excluded from local councils, disaster management committees, and water user associations due to patriarchal norms. Women's participation in these bodies should be required by policy so that they can have an impact on recovery planning, disaster preparedness, and resource allocation. By ensuring that adaptation strategies are based on women's lived experiences, participatory approaches increase their efficacy and equity.

5. Leveraging Community-Based Practices

Traditional knowledge and community networks of women are important tools for resilience. Indigenous methods of managing water, saving seeds, preserving food, and making herbal medicine have helped families survive repeated climate stress. To make them more sustainable and culturally relevant, these practices should be written down, checked for accuracy, and added to formal adaptation plans. Community awareness campaigns can help people see women's contributions, make them less invisible, and encourage more open-minded ways of being strong. Cooperative structures for sharing work, resources, and informal credit can help households and communities deal with climate shocks even better.

6. Integrated Multi-Sectoral Policies

To deal with the link between poverty, gender, and climate vulnerability, policies need to be coordinated across many areas. Programs that help women gain economic power, like skill development, support for starting a business, and access to markets for their agricultural and artisanal goods, can help them become less reliant on unstable jobs. Better infrastructure, like roads, storage spaces, safe drinking water, and homes that can withstand climate change, can also help with risks that come from climate change. Collaboration across sectors, such as agriculture, water management, education, health, and finance, can make resilience-building programs more effective and consistent.

14.Conclusion

This study sheds light on the intricate and interconnected issues that women in rural Pakistan face, where vulnerabilities are made worse by the intersection of poverty and climate change. Although structural inequalities like landlessness, limited financial access, gendered social norms, and exclusion from policymaking limit women's resilience, their roles as primary caregivers and household managers place them at the forefront of climate adaptation. Agricultural innovation, household and community resource management, handling migration and remittances, and using indigenous knowledge are just a few of the many adaptive strategies that rural women use in spite of these obstacles. These methods for maintaining livelihoods in the face of harsher environmental conditions show both inventiveness and efficacy.

The study also highlights the paradox of resilience, which is that although women's contributions are essential to the survival of households and communities, they are mainly overlooked in official frameworks for climate adaptation. In addition to limiting opportunities for empowerment, resource allocation, and recognition, this invisibility maintains structural inequalities. Policies that actively offer the institutional, financial, legal, and educational support required for women to fully participate as decision-makers in climate adaptation planning are needed to address this paradox; they cannot merely highlight women's tenacity.

Enhancing agricultural methods or coping strategies alone won't be enough to increase Pakistani rural women's resilience; larger social, economic, and political systems that influence vulnerability must also be addressed. Women's resilience must be transformed from individual survival strategies into sustainable, community-wide adaptive capacity. This requires secure land rights, gender-inclusive policies, financial empowerment, education, healthcare, and

acknowledgment of indigenous knowledge. By putting these suggestions into practice, Pakistan can make progress toward a fair, inclusive, and sustainable future that is climate resilient while empowering women to act as agents of adaptation.

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