



Aligning Local Interventions with Global and Constitutional Frameworks: A Comprehensive Policy Review for Strengthening Climate Resilience and Economic Security in Balochistan through Targeted Water Management and Climate-Smart Agriculture

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Abstract: Balochistan, Pakistan's driest province, faces severe water shortages, long droughts, and heatwaves, threatening its farming economy. Current water policies, shaped by the Indus Waters Treaty, do not address the groundwater crisis or adaptation needs, worsening poverty and food insecurity. This review aims to assess community-driven changes in water management and climate-smart agriculture to build resilience and economic security. It focuses on improving climate resilience while aligning with Pakistan's constitutional commitments and international agreements, such as the Paris Agreement and the UN SDGs. The analysis shows that decentralized solutions like drip irrigation, rainwater harvesting, drought-resistant crops, and community-led governance can significantly reduce water use by up to 90%, boost crop yields by 15-40%, and lower financial losses. To break the cycle of vulnerability, policymakers must shift from large, centralized projects to community-focused approaches, integrating climate-resilient microfinance into provincial planning.

Keywords: Climate Resilience, Economic Security, Water Governance, Climate-Smart Agriculture, Balochistan, Sustainable Development Goals, Groundwater Management

Introduction

The story of climate change often shows an unequal impact. Regions that contribute the least to global greenhouse gas emissions face severe consequences. This is especially evident in Balochistan, the largest province in Pakistan by land area. Despite emitting very few greenhouse gases, Balochistan finds itself on the front lines of the climate crisis. It faces many environmental challenges that threaten its social and economic stability. The province mainly has an arid to semi-arid climate, characterized by low and unpredictable annual rainfall. Rainfall rarely exceeds 250 millimeters and can be as low as 50 mm in the driest areas. This water scarcity is made worse by very high evaporation rates and an alarming pattern of prolonged droughts that have become more frequent and severe over the past

few decades. These extended dry periods are interrupted by sudden, often devastating weather events, including strong flash floods and extreme heatwaves. Such conditions push both human and ecological limits. For example, Turbat recorded a temperature of 53.7°C, one of the highest ever documented on Earth. This highlights the severe heat stress becoming common in the area.

The increasing climate instability directly impacts Balochistan's economy, which relies heavily on agriculture. The agriculture and livestock sectors are the main source of livelihood for about 70-75% of the provincial population and are a vital part of its economy. Unfortunately, this crucial economic sector now faces an existential threat. Since the early 2000s, ongoing droughts have gradually weakened the province's agricultural foundation. Studies and provincial disaster assessments show that in the hardest-hit districts, crop yields have dropped by up to 40%. The harm goes beyond staple crops; around 80% of the province's valuable fruit orchards have been destroyed, and livestock losses are in the millions, leading to significant asset depletion for farming and pastoral communities. The total financial losses from drought-related issues have been estimated at around Pakistani Rupees 33 billion, inflicting serious damage on an already weak economy. The human impact includes worsening food insecurity, lower incomes, and forced migration as communities lose their means of survival.

These increasing climate challenges do not occur in isolation; they build on a backdrop of deep socio-economic hardship and weak institutions. Balochistan is repeatedly cited as the poorest province in Pakistan, with poverty estimates reaching as high as 71% of the population. Its Human Development Index (HDI) score of 0.421 is significantly lower than the national average of 0.562, indicating persistent issues in health, education, and income. The province faces serious issues with its infrastructure, limited access to basic services, literacy rates around 41%, and a healthcare system that is always overburdened. As a result, both individuals and institutions struggle to cope. Climate shocks don't just cause immediate harm; they weaken the foundations of resilience. This sets off a harmful cycle where each disaster lowers the ability to handle the next one, leading to greater vulnerability and poverty.

A significant part of this challenge comes from the historical structure of Pakistan's national water policy. For over sixty years, the country has managed water resources mainly based on the hydrological view of the Indus Basin, influenced largely by the 1960 Indus Waters Treaty (IWT) with India. While the treaty succeeded in its main goal of distributing cross-border surface waters, its narrow focus on river flows pushed important issues of groundwater management, water efficiency, and climate adaptation to the background. In Balochistan, which is mostly outside the Indus Basin Irrigation System (IBIS), this national framework has provided little benefit. As a result, the province has had to depend on its limited and quickly depleting internal water resources, mainly groundwater. This reliance has caused the unfortunate decline of advanced local water systems, especially the karez (or qanat), which are networks of gently sloping underground tunnels that accessed aquifers to provide a sustainable, gravity-fed water supply for irrigation with minimal evaporation losses. Historically, over 1,200 of these systems operated in Balochistan, each capable of

delivering up to 200 liters per second to support hundreds of families. Today, most of these remarkable structures are no longer in use and have fallen into disrepair, as they have run dry due to dropping water tables. In their place, a chaotic rise of unregulated, diesel-powered tube wells has taken over, drilling deeper into the aquifers in an unsustainable race for water. In the provincial capital of Quetta, for example, the water table is dropping alarmingly at about three meters per year, warning of an impending water crisis.

This research review is set against a backdrop of urgent climate issues, economic uncertainty, and institutional shortcomings. The study focuses on one main question: How can targeted policy actions in water management and climate-smart agriculture be developed and put into practice to boost climate resilience and economic security in Balochistan while meeting Pakistan's constitutional duties and global climate agreements? To answer this question, we need to bring together knowledge from different fields, such as climate science, water engineering, agricultural economics, development policy, and constitutional law. The review will closely look at: (a) strategies for managing severe water shortages and reducing drought risk; (b) practical farming techniques that work well in dry areas; (c) the necessary institutional, legal, and policy frameworks for success; and (d) the ways to turn high-level policies into real actions that communities can own and implement. In this analysis, we define "climate resilience" as the ability of social, economic, and environmental systems in Balochistan to anticipate, absorb, accommodate, and recover from the impacts of climate shocks, such as drought and heatwaves, quickly and effectively. "Economic security" means that individuals, households, and communities can consistently meet their basic needs and sustain a stable livelihood, even when faced with climatic and economic challenges. In the rural context of Balochistan, these two ideas are closely and deeply connected.

Furthermore, the province's situation has important legal and ethical aspects. On the international level, Pakistan is a signatory to the Paris Agreement (2015) and has promised to reach the UN Sustainable Development Goals (SDGs). These goals include specific targets for clean water and sanitation (SDG 6), climate action (SDG 13), and the protection of terrestrial ecosystems. At the national level, even though the Constitution of Pakistan does not directly mention a fundamental "right to water," the higher courts have progressively interpreted the right to life, outlined in Article 9, to include the right to a healthy environment and access to clean water. This legal expansion, notably determined in the landmark case of *Shehla Zia vs. WAPDA (1994)*, places a duty on the state to provide these essentials. This responsibility is further supported by Article 14, which protects dignity; Article 25, which ensures equality among citizens; and Article 38(d), which clearly requires the state to provide basic needs like food, clothing, and housing. Additionally, Articles 153 and 155 establish the Council of Common Interests (CCI) as the top federal forum for settling inter-provincial disputes, including those about water distribution. This forum is crucial for addressing Balochistan's long-standing issues concerning the fair distribution of national resources.

This review suggests that Balochistan can start to overcome its cycle of vulnerability by building resilience from the community level and grounding these efforts in legal and

policy commitments. If done well, this combined approach could serve as a model for other dry, climate-sensitive areas in the Global South. The following sections will provide a thorough look at the evidence, learning from both global experiences and local practices to create a clear and practical policy framework.

Research Method

This research uses a thorough and organized literature review method to combine a wide range of knowledge and tackle a complex research question. The inquiry covers areas like hydro-climatology, agricultural science, water governance, economics, and law. This approach was considered the best way to bring together varied evidence and build a complete policy framework. The methodology followed a multi-step process to ensure quality, relevance, and trustworthiness.

In the first stage, Source Selection and Identification, we conducted a careful and broad search for relevant literature. The main sources we consulted included: Peer-reviewed academic journals: We accessed these through major databases such as Google Scholar, Scopus, and Web of Science. Our search terms included combinations of "Balochistan," "water scarcity," "drought," "climate-smart agriculture," "groundwater governance," "decentralization," "Indus Waters Treaty," "constitutional right to water," "community-based adaptation," and names of specific technologies like "drip irrigation" and "karez." Government and policy documents: These provided crucial policy context and official data. Key documents we analyzed included Pakistan's National Water Policy (2018), National Climate Change Policy (2012 and its updates), Balochistan's Provincial Integrated Water Resource Management (IWRM) Policy, and various national and provincial disaster and damage assessment reports.

Reports from international organizations and NGOs provided valuable insights into global best practices, case studies, and funding methods. Sources included publications from the World Bank, the United Nations Development Programme (UNDP), the Food and Agriculture Organization (FAO), the International Union for Conservation of Nature (IUCN), the World Resources Institute (WRI), and various international water management institutes.

Legal and constitutional analysis involved examining scholarly articles and commentaries on Pakistani constitutional law. Special attention was given to environmental law and the interpretation of fundamental rights. Landmark court judgments, particularly "Shehla Zia vs. WAPDA (1994)," were analyzed in detail. Case studies from similar regions were gathered for comparative analysis. This included studies on Israel's national water system, Australia's Murray-Darling Basin Plan, community-led watershed management in Rajasthan and Maharashtra (India), and Jordan's water reuse strategies.

The second stage involved thematic classification and organization. The large amount of gathered literature was coded and sorted into pre-defined thematic categories that directly related to the research question. These themes were:

1. Hydro-climatic Profile and Vulnerabilities of Balochistan: Establishing the basic context of climate risks, water availability, and socio-economic exposure.

2. **Water Management Interventions:** This included technological solutions (such as drip irrigation, solar pumps, and rainwater harvesting), governance models (like regulation, community management, and water markets), and demand-side strategies.
3. **Climate-Smart Agricultural Practices:** This covered drought-resistant crops, agroforestry, soil and water conservation techniques, and climate-resilient livestock management.
4. **Institutional and Governance Frameworks:** This examined the roles of local institutions, decentralization policies, traditional knowledge systems (e.g., water governance), and the integration of longer-term perspectives.

The third stage focused on the analysis: Comparative and Critical Analysis. In each thematic category, we conducted a comparative analysis. For example, we looked at the effectiveness of drip irrigation technology by comparing its adoption and impact in Israel, India, and pilot projects in Pakistan. We also compared models of decentralized water governance in India's Panchayati Raj institutions with the potential for similar structures in Balochistan. This process was not just descriptive; it included a critical assessment of how transferable each intervention was, taking into account Balochistan's unique social, economic, cultural, and institutional contexts. We implicitly used a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to evaluate Balochistan's policy environment and the feasibility of applying the lessons learned.

To ensure quality and credibility, we prioritized recent sources published within the last 10 to 15 years to reflect current knowledge. Exceptions were made for significant historical works or key legal texts. We rigorously cross-referenced data points, especially regarding climate indicators and economic losses, across multiple sources—like comparing figures from government reports with those from academic studies—to check accuracy. We used grey literature, such as news articles and working papers, cautiously. This was mainly to capture recent developments, and we always supplemented it with more reliable sources whenever possible.

Finally, the Synthesis stage involved bringing together evidence from these diverse sources into a clear narrative. Instead of offering a step-by-step summary of each source, the findings were combined to build evidence-based arguments for each sub-topic. The common views in the literature were identified and highlighted, while any important disagreements or critical perspectives were noted to present a balanced view. Citations were included throughout to provide credit and allow for tracing and verification.

Limitations: It is important to recognize the limitations of this methodology. As a literature review, the findings depend on the availability and quality of published information. There may be useful insights from the field, unpublished local initiatives, or recent developments in Balochistan that are not yet captured in academic or grey literature. Additionally, the review does not produce new primary quantitative data. To address these limitations, the study used a wide range of source types and employed triangulation to strengthen the validity of its conclusions. The main goal was to create a solid foundation for policy-making, which can later be validated and improved through empirical field research.

Result and Discussion

The hydro-climatic crisis in Balochistan is a clear example of the broader global challenge of managing very limited water resources in a changing climate. The review identifies groundwater governance as the most important and overlooked area. Groundwater is essential for the province, providing over 90% of its agricultural, drinking, and industrial water needs. However, this crucial resource is being over-extracted, with withdrawal rates far exceeding natural recharge. The literature consistently points to an urgent need for a strong regulatory framework that includes, at the very least, a system of extraction permits based on aquifer capacity, targeted artificial recharge programs, and systematic community-led monitoring of well depths and water quality. A key study on Pakistan's water governance highlights the existing framework as burdened by "excessive legislation," where many overlapping laws and competing mandates across different agencies lead to a confusing division of responsibility (Qayyum et al., 2023). The study strongly supports consolidating these laws and empowering a single, skilled authority with clear enforcement capabilities. In Balochistan, there have been sporadic attempts to regulate tube wells, such as requiring licenses for drilling and encouraging a shift from diesel to solar pumps. However, these efforts have been consistently weakened by a lack of enforcement capacity and political will. A recurring policy recommendation from the analysis is to significantly strengthen the Balochistan Environmental Protection Agency (BEPA) by giving it a clear mandate, necessary funding, and technical resources to oversee and enforce groundwater regulations, while formally including local community representatives in its monitoring and oversight systems. Literature from global drylands clearly states that without community involvement and ownership, compliance with top-down regulations in rural areas is almost impossible (Ostrom, 1990).

Beyond governance, the review shows a strong agreement on the transformative potential of water conservation technologies. Drip irrigation systems are notable because they deliver water directly to plant roots with minimal losses. Evidence from dry regions worldwide indicates that drip irrigation can improve water-use efficiency by 60-90% compared to traditional flood irrigation. It also increases crop yields by 20-50% due to better application of water and nutrients (Shamah, 2015). Israel's experience is often cited as a prime example. The country developed a national strategy that combined the pioneering drip technology from Simcha Blass, commercialized by Netafim, with large-scale wastewater recycling for agriculture, now exceeding 85% reuse. Israel has successfully separated agricultural productivity from natural water availability. Similarly, Australia's response to the Millennium Drought, through the Murray-Darling Basin Plan, teaches valuable lessons in demand management using economic tools. The Plan defined sustainable diversion limits for the basin, separated water rights from land ownership, and created a cap-and-trade system for water allocations (Alliance for Water Adaptation, 2021). This market-based approach allowed water to flow to its highest-value uses, such as permanent orchards over field crops, while keeping total extraction within ecological limits. Although the socio-economic and hydrological context of the Murray-Darling differs from Balochistan, the main idea—using clear, tradable property rights and market incentives to

reduce waste and promote conservation—is adaptable. For Balochistan, this could inform policies like introducing tradable water quotas for over-exploited aquifers such as the Quetta Basin or implementing progressive water pricing that reflects the true economic and environmental cost of extraction.

The review also emphasizes the importance of small-scale, decentralized water harvesting and storage solutions. In areas with short, intense rainfall, capturing seasonal runoff through structures like check dams, percolation tanks, retention basins, and rooftop collection systems can significantly improve local water security. These methods recharge aquifers and provide direct water supplies for domestic and agricultural use during long dry spells. Research from Rajasthan, India, highlights the success of grassroots movements, often backed by NGOs, in reviving traditional rainwater harvesting structures like johads (earthen check dams). These community-led initiatives have reversed groundwater depletion, revived rivers, and transformed the agricultural economy in several districts, offering a strong model for Balochistan. Given the province's similar climate, characterized by erratic but intense rainfall, widespread adoption of harvesting systems could reduce flash flood damage and create valuable water reserves. Studies suggest that a distributed network of thousands of small ponds, tanks, and recharge structures might be more effective and affordable for a poor province than a few large, centralized, and evaporation-prone dams. These solutions fit well with the study's focus on "affordable, local policy projects like rainwater harvesting" as a key part of building resilience. A relevant domestic example comes from Punjab province, where the government launched a program providing an 80% subsidy to farmers for converting their diesel tube wells to solar power. This intervention provided three key benefits. It cut farmers' energy costs, which are a significant expense. It also reduced carbon emissions and helped control the excessive pumping linked to heavily subsidized or free electricity. The Punjab case shows that well-planned, targeted subsidies can quickly boost the use of eco-friendly technologies. By using this model, Balochistan could encourage solar pumps and rainwater harvesting systems through direct community subsidies or microfinance programs. This would ensure that smallholder farmers, not just large landowners, enjoy the benefits.

A key conclusion from the literature is the need to shift policy focus from expanding supply to managing demand. Traditional approaches to water scarcity in Pakistan have largely favored large-scale engineering projects, such as major dams and long canals. However, analysis shows that these projects provide diminishing returns in Balochistan's particular context. They are extremely costly, face significant evaporation losses in dry areas, accumulate sediment, and usually benefit only a small area, often overlooking the most vulnerable and dispersed populations. The literature consistently indicates that in arid regions, improving water-use efficiency and managing demand is usually more cost-effective and sustainable than trying to boost supply. Measures like changing from flood irrigation to drip or sprinkler systems effectively "create" new water by extending existing supplies. Additionally, lining irrigation canals and fixing leaking urban water distribution networks can save large amounts of water. In cities like Quetta, where distribution losses are estimated at 40-50%, municipal water conservation is crucial for overall water security.

In the end, managing water demand is closely tied to agricultural decisions, including the types of crops grown. This leads directly to the next set of actions related to climate-smart agriculture.

Climate Smart Agriculture for Resilience:

Climate-smart agriculture (CSA) offers a broad framework for changing agricultural systems to support food security amid climate change. The Food and Agriculture Organization (FAO) describes CSA as a way to guide actions needed to modify agricultural systems so they better support development and food security in a changing climate (Food and Agriculture Organization, 2023). It has three main goals: sustainably increasing agricultural productivity and incomes, adapting to climate change and building resilience, and reducing or removing greenhouse gas emissions, where possible. In Balochistan, where agricultural emissions are low, the focus is largely on the first two areas: increasing productivity and building resilience. The research on CSA in dryland areas suggests several connected strategies that apply to Balochistan. The first and most immediate step is adopting drought-resistant and heat-tolerant crop varieties. This involves using seeds bred through traditional methods or modern biotechnology to have traits like deeper root systems, shorter growing cycles, and better tolerance to dry conditions and extreme heat. These varieties can maintain reasonable yields in conditions that would cause traditional varieties to fail completely. For instance, new types of wheat, sorghum, and millet can draw moisture from deeper soil layers and finish their life cycle before the hottest and driest periods hit. The introduction of better seeds for staple crops and high-value, low-water-use crops, such as certain pulses, quinoa, and drought-tolerant fodder, is seen in the literature as a “low-regret” policy that could have a huge impact (Khan & Gill, 2020).

By stabilizing yields from season to season, these seeds help improve household food security and farm income, which are crucial for economic stability. Studies show that having reliable seed varieties encourages farmers to invest in other necessary inputs like fertilizer and soil amendments, creating positive effects throughout the agricultural system. However, there are significant barriers to adoption. It depends on ensuring these seeds are accessible and affordable, and that farmers understand their benefits and how to grow them correctly. Therefore, effective policies should promote local agricultural research and development in crop breeding, including modern methods like marker-assisted selection and CRISPR for precise breeding, and create systems for producing, certifying, and distributing climate-resilient seeds at lower costs. Strengthening government extension services and setting up farmer field schools are vital for sharing knowledge and building trust in these new technologies. For Balochistan, promising options include drought-tolerant varieties of wheat, barley, and sorghum, along with introducing alternative crops like guar gum or safflower.

A second crucial strategy involves diversifying through agroforestry and regenerative farming practices. The current monoculture systems in Balochistan, especially water-intensive orchards and traditional wheat farming with intensive tillage, have raised the agricultural system’s vulnerability. Agroforestry combines trees and shrubs with crops

or livestock, offering a versatile solution. Trees can change the microclimate, reduce wind speed and soil erosion, improve soil fertility through nitrogen fixation and leaf litter, and provide extra income through fruit, nuts, fodder, fuelwood, and timber. Once established, these trees are relatively deep-rooted and resilient to drought.

The literature often mentions Pakistan's "Billion Tree Tsunami" project in Khyber Pakhtunkhwa, showing that large-scale greening is possible even in tough environments. This project has led to recorded benefits like reduced erosion and improved groundwater recharge. However, the review points out a key issue: traditional top-down afforestation projects often struggle in Balochistan due to very high costs, often over \$2000 per hectare, and low tree survival rates. In contrast, techniques like Farmer Managed Natural Regeneration (FMNR) and community-driven planting are much more cost-effective and successful. In some cases, these methods cost less than \$20 per hectare by simply protecting and managing natural seedlings sprouting from existing root systems. This shows that empowering local communities to restore vegetation through approaches like creating grazing enclosures and managing communal forests is a far better strategy for fighting desertification. Regenerative practices, such as low-till or no-till farming, maintaining soil cover with mulching or cover crops, and integrated soil fertility management, work together to greatly improve soil organic matter. This improvement enhances the soil's ability to retain water, which is crucial in a drought-prone area. Organizations like the International Union for Conservation of Nature (IUCN) have successfully piloted programs in bio-saline agriculture in neighboring Sindh. They use salt-tolerant grasses, shrubs, and trees to reclaim salt-affected lands, a method that could also apply to Balochistan's saline areas. The additional benefits of this approach are significant: healthier soils, less runoff, carbon sequestration, and the development of new, resilient value chains for farmers.

The literature consistently encourages a shift in policy away from large, centrally planned planting campaigns. Instead, it advocates for empowering local communities with technical support and small financial incentives to manage and restore their own ecosystems through agroforestry, sand dune stabilization, and rehabilitating rangelands. This represents a natural solution for adaptation, reducing climate impacts while also strengthening community unity and resilience. Given that livestock is a key part of Balochistan's economy, with an estimated population of over 44 million, implementing climate-smart livestock management and rangeland care is essential. Overgrazing is a major cause of land degradation and fodder shortages, creating a cycle that increases vulnerability. The literature suggests a two-part strategy. First, improve the genetic quality and health of the herds. Second, support community management of the rangelands. Introducing better breeds of cattle, sheep, and goats that can tolerate heat, drought, and disease can significantly increase survival rates and productivity during stressful climate periods. Breeds that produce more milk or meat per unit of water and fodder can help stabilize incomes for pastoralists during droughts. At the same time, improving the availability and quality of fodder by growing drought-resistant forages like sorghum-sudangrass hybrids, pearl millet, and spineless cactus (*Opuntia*), along with creating communal fodder reserves, is vital for sustaining herds during tough times.

The second part focuses on revitalizing the rangelands through natural management practices such as planned rotational grazing, controlling herd sizes to match the land's capacity, and reseeded degraded areas with native grasses. This approach allows vegetation to recover, improves ground cover, and boosts soil moisture retention. Case studies from areas near Balochistan show that involving pastoralist communities in the process—using traditional institutions like "jirgas" or new grazing associations—to set and enforce grazing rules and seasonal rotations leads to much better compliance and ecological results. A powerful idea from the literature is shifting from maintaining large numbers of low-quality animals to smaller, higher-quality herds, emphasizing quality over quantity. This strategy has been successfully used in parts of Rajasthan, India, where pastoralists were encouraged to reduce herd sizes while investing in healthier, better-bred, and more productive animals, easing pressure on the land and potentially increasing household income. For Balochistan, supportive policies could provide access to improved breeds through government breeding programs or subsidies, offer mobile veterinary services for disease management, and create legally recognized community rangeland management councils that work with local authorities to manage grazing lands. These actions directly improve economic security by preventing large herd losses that have historically harmed household wealth during droughts, while also increasing productivity per animal. They address environmental issues and help slow down desertification, which threatens both farming and pastoral livelihoods.

In summary, the literature on climate-smart agriculture advocates for a combined, integrated approach at both the farm and landscape levels. It is not just about adopting a single technology alone but rather about bringing together improved genetics, effective water management, soil conservation, crop diversification, and livestock methods to create a resilient production system. These actions support one another: drought-resistant crops save water for other uses, agroforestry trees provide shade that lessens heat stress on crops and livestock, and healthy rangelands reduce dust storms and erosion that can harm crops. An important message in this literature is the need to engage farmers and pastoralists as active partners in innovation through cooperative research and outreach, ensuring that solutions are tailored to local contexts and socially acceptable. Many climate-smart agriculture practices require more knowledge than capital, highlighting the need for investment in outreach, education, and capacity building. This leads to the third crucial element of success: the institutional and governance systems that allow these technical measures to be adopted and maintained on a larger scale.

Conclusion

Balochistan's climate resilience and economic security can be significantly enhanced through targeted, community-driven interventions in water management and climate-smart agriculture, supported by strong governance and aligned with constitutional and international commitments. Future research should focus on assessing the financial feasibility and long-term impacts of these interventions, especially through comprehensive data collection and monitoring. Practical recommendations include the establishment of

decentralized water user associations, integration of climate-smart practices into local farming systems, and strengthening institutional frameworks to ensure sustainable implementation. Policymakers should prioritize participatory governance, leverage international climate finance, and explore innovative solutions for scaling up successful local models, fostering resilience, and reducing vulnerabilities in the region.

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