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Policy Brief on

Multi-Dimensional Recovery Framework for the Case of Pakistan's Industrial Triangle

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Executive Summary

The 2025 floods in Pakistan caused unprecedented devastation, particularly across the industrial triangle of Gujranwala, Gujrat, and Sialkot in Punjab. These regions, vital to both the provincial and national economies, faced extensive disruptions in agriculture, manufacturing, infrastructure, and social systems. Over 1.05 million acres of farmland were submerged, resulting in significant losses in key crops, including rice, cotton, and sugarcane. The manufacturing sector in Sialkot, known for its export-driven industries, was severely impacted by infrastructure damage, halting production and disrupting supply chains. Additionally, the collapse of essential infrastructure, including roads, bridges, and irrigation systems, isolated communities and obstructed access to healthcare, education, and other vital services. Vulnerable groups, particularly women, children, and informal workers, bore the brunt of the social hardships, with compounded risks in displacement camps.

This policy brief argues that Pakistan's recovery from the floods must extend beyond emergency relief and incorporate long-term strategies for building resilience. A comprehensive recovery framework is proposed, consisting of four key pillars: (1) **climate-resilient infrastructure** to safeguard lives and assets; (2) **climate-smart agriculture** to ensure sustainable food systems and rural livelihoods; (3) **disaster risk governance** to improve preparedness, early warning, and response coordination; and (4) **inclusive social protection** mechanisms to support the most vulnerable populations. These interconnected pillars aim to promote both immediate recovery and long-term sustainability, addressing not only the physical damages but also systemic vulnerabilities in governance, infrastructure, and social security.

The floods exposed significant gaps in disaster preparedness, infrastructure resilience, and governance, revealing how weaknesses in these systems amplified the crisis. The proposed framework calls for integrated investments in infrastructure, agriculture, governance, and social protection, emphasizing the need for coordinated, multi-level action from government bodies, civil society, and international partners. By embracing these strategies, Pakistan can build a resilient, equitable recovery, transforming disaster response from reactive to proactive and ensuring sustainable development in the face of future climate challenges.

Introduction: Assessing the Damage

Floods in 2025 struck Pakistan with unprecedented severity, affecting millions nationwide, particularly in Khyber Pakhtunkhwa (KP), Punjab, and Sindh. Triggered by heavy monsoon rains and upstream water releases, the floods submerged vast areas, causing massive displacement and destruction. According to the UN Office for the Coordination of Humanitarian Affairs (OCHA), over 5.1 million people were affected nationwide by late August, with approximately 1.9 million evacuated and more than 1.05 million acres of farmland inundated in Punjab alone (OCHA, 2025). The floods caused widespread damage to homes, infrastructure, and agricultural lands, leading to increased health risks and disruption of essential services. The scale and intensity of the flooding reflect historic variability exacerbated by climate change and water management challenges. Within Punjab, the industrial triangle of Gujranwala, Gujrat, and Sialkot, historically regarded as the growth belt of Pakistan, experienced the most severe impact. The floods destroyed crops, halted manufacturing activities, and damaged vital infrastructure, causing both agricultural and industrial productivity to decline sharply (Urban Unit, 2025). Additionally, the area is a key agricultural hub cultivating major Kharif crops like rice, cotton, sugarcane, and maize, which underpin rural livelihoods and provincial food security (NDMA, 2025). What began as an environmental crisis soon evolved into a multidimensional economic emergency, where sectoral losses compounded and spread across the wider economy.

Agricultural lands were submerged, disrupting food supply chains and creating acute market shortages that drove inflationary pressures nationwide (Government of Pakistan, Ministry of Finance, 2025). Meanwhile, industrial units, particularly export-oriented manufacturing in Sialkot, were paralyzed by power disruptions, submerged facilities, and broken logistics networks (Shahid & Shahzad, 2025). The result was a dual contraction: supply-side shocks tightening the availability of essential goods and demand-side constraints as incomes and purchasing power fell simultaneously. Beyond the physical damage, the floods deepened existing social inequalities. Vulnerable groups, particularly women, children, and informal workers, faced the heaviest burden, from disrupted education and healthcare to heightened protection risks in displacement camps (United Nations Office for the Coordination of Humanitarian Affairs, 2025). The collapse of basic infrastructure also amplified human insecurity, pushing already marginalized communities further into the vicious cycle of poverty.

The floods also laid bare critical governance and institutional weaknesses. Early warning systems did not reach several at-risk communities, while local authorities lacked the resources and technical capacity for timely evacuation and response. The absence of integrated planning among federal, provincial, and district bodies delayed relief efforts and amplified losses, highlighting the urgent need for systemic reform in disaster management. The crisis also underscored the fragility of Pakistan's food systems and supply chains. Damage to rural roads, bridges, and storage infrastructure disrupted the flow of agricultural goods and inputs, constraining both market access and affordability. These disruptions, in a context already marked by fiscal strain and high import dependency, risked prolonging food insecurity and sustaining macroeconomic instability.

This policy brief, based on field research conducted by SDPI from 3 to 5 October 2025 in collaboration with the Provincial Authorities, synthesizes institutional insights, field observations, and community perspectives from Gujranwala, Gujrat, and Sialkot. It argues that recovery must extend beyond reconstruction and adopt a transformative approach that integrates resilience, equity, and sustainability into Pakistan's development planning.

This policy brief aims to:

1. **Assess the economic, social, and institutional impacts** of the 2025 floods across Pakistan's industrial triangle and analyze the cascading effects on agriculture, industry, food systems, inflation, and livelihoods, identifying the interconnections between climate shocks and economic vulnerability.
2. **Evaluate gaps in disaster preparedness, early warning, and response coordination** at federal, provincial, and district levels, identifying weaknesses in institutional systems that exacerbated flood impacts and delayed recovery.
3. **Highlight the gendered and social dimensions of vulnerability**, emphasizing how women, children, and marginalized groups faced disproportionate challenges in evacuation, access to aid, and livelihood restoration, and how these dynamics perpetuate the poverty cycle.
4. **Propose a multidimensional recovery framework** that integrates *climate resilience, economic stability, social protection,* and *governance reform* through four interlinked pillars:
    - Climate-Resilient Infrastructure to safeguard lives and assets;
    - **Climate-Smart Agriculture** to ensure adaptive and sustainable food systems;
    - **Disaster Risk Governance** to enhance preparedness and coordination; and
    - Inclusive Social Protection and Livelihoods to promote equitable recovery.

These objectives collectively aim to inform policymakers and development partners in designing a coherent, evidence-based response to strengthen resilience and sustainable growth in Pakistan's flood-affected industrial regions.

Methodology:

This policy brief is based on a comprehensive situation assessment conducted in the flood-affected districts of Gujranwala, Gujrat, and Sialkot between 3 to 5 October 2025. The assessment provided a detailed understanding of the 2025 flood impacts and response mechanisms through a review of secondary data and reports. Key insights were drawn from the experiences of provincial authorities, including officials from the Provincial Disaster Management Authority (PDMA) and relevant departments responsible for infrastructure, social protection, and emergency response. Additionally, input was gathered from community representatives in both rural and urban settings to understand damage, displacement, coping strategies, and recovery needs. The assessment also included perspectives from local academic experts, including faculty, researchers, and students at a university in Sialkot, on issues of disaster management, climate adaptation, and community resilience. These discussions provided important context regarding regional knowledge networks and youth involvement in climate resilience initiatives. While the assessment captured valuable data, limitations arose from restricted access to inundated or remote areas, which impacted the ability to fully assess some community interactions and the dynamic nature of ongoing relief operations.

The Economic, Social, and Institutional Fallout of the 2025 Floods

The 2025 floods unleashed a chain reaction of economic, social, and institutional disruptions across Pakistan's industrial triangle, Gujranwala, Gujrat, and Sialkot, regions vital to the country's productive and export capacity. Beyond the immediate destruction of crops, homes, and infrastructure, the floods triggered deep structural shocks to agriculture, industry, and the local labour economy, setting off inflationary pressures that rippled across national markets. The collapse of connectivity and basic services further compounded humanitarian distress, disproportionately affecting women, children, and vulnerable communities. This section examines how the floods exposed the interdependence between climate vulnerability, economic fragility, and governance gaps, highlighting the multidimensional impacts that demand an integrated, resilience-driven recovery approach

Agricultural Devastation:

The 2025 floods inflicted severe short-term and long-term damage on agriculture across Punjab's industrial triangle, submerging over 1.3 million acres of farmland. Key Kharif crops such as paddies, sugarcane, and cotton were heavily damaged, with initial estimates indicating losses of up to 60% in paddy, 30% in sugarcane, and 35% in cotton. In the short term, farmers face delays in harvesting until floodwaters recede and land becomes arable again, disrupting the crucial wheat planting season and other crop cycles (Concave Agri, 2025). In the immediate term, farmers confront delayed harvesting until floodwaters recede, and land becomes arable, which risks missing the wheat planting window and disrupting subsequent crop cycles. The damage extends beyond yield loss. Irrigation infrastructure, canals, pumps, drainage networks, suffered severe impairment, and soil health has degraded through erosion and sedimentation (Government of Pakistan, NDMA, 2025). These longer-term degradations threaten agricultural productivity, increasing the time and capital needed for recovery (National Disaster Management Authority [NDMA], 2025).

As production falls, local food supply tightens. This constriction feeds into food supply chain disruptions, transport costs soar, storage and market capacity shrink, and post-harvest losses rise. These dynamics place upward pressure on food prices, contributing to a vicious cycle of inflation: households see their purchasing power erode, while farmers bear rising input costs and reduced returns. Furthermore, the flooding's impact is socially stratified. Women, who often engage in farm

labor, beading, and post-harvest processing, lose income and face added burdens of care work. Children in rural households face intensifying food insecurity and higher dropout risks when families cut education to cope. The shock to agriculture thus translates into nutrition deficits, income loss, and intergenerational poverty. The combined impact of disrupted agriculture and industrial slowdowns in affected areas significantly weighs on Pakistan's economic growth prospects and household welfare, intensifying the need for resilient recovery strategies.

Industrial Paralysis:

Sialkot, globally recognized for its export-driven industries, particularly in sporting goods, surgical instruments, textiles, and leather, experienced crippling losses as torrential rains and upstream water releases inundated vast industrial zones. Floodwaters submerged production facilities, warehouses, and access roads, forcing widespread shutdowns that paralyzed operations. As Sialkot hosts one of Pakistan's key export airports, flight delays and temporary closures compounded the crisis, severely restricting the shipment of high-value export goods. Damage to surrounding road networks further disrupted logistics, isolating industrial units and halting both inbound supply of raw materials and outbound delivery of finished products (PDMA Punjab, 2025). Floodwaters isolated industrial units, delaying material supplies and product dispatches, further disrupting business continuity and export activities. This breakdown in production and transport chains caused substantial financial losses for small and medium enterprises, many of which lacked the capital reserves to absorb prolonged downtime, while thousands of workers faced layoffs or wage suspensions (Reuters, 2025).

The industrial paralysis in Sialkot extended far beyond local boundaries. As one of Pakistan's principal foreign exchange earners, disruptions in its manufacturing base triggered ripple effects across the national economy, weakening export revenues, straining balance of payments, and amplifying inflationary pressures (Government of Pakistan, Ministry of Finance, 2025). The suspension of export shipments through the Sialkot International Airport and surrounding logistics routes cascaded into supply chain breakdowns across sectors, including packaging, textiles, and leather tanning, intensifying economic stagnation. Women and youth workers in small workshops were among the most affected, facing income insecurity without social safety nets. The floods underscored how deeply Pakistan's economic stability is tied to its climate resilience, demonstrating that industrial growth, trade continuity, and livelihoods all depend on investment in flood-resilient infrastructure, logistics, and energy systems to safeguard production and sustain exports during future crises.

Infrastructure Collapse:

Field observations revealed extensive destruction of critical infrastructure across both urban and rural areas in Punjab's flood-affected zones. Modern housing societies, industrial clusters, and entire neighborhoods were submerged under prolonged floodwaters, displacing thousands and rendering vast areas uninhabitable. Roads, bridges, and transport corridors vital for regional connectivity were washed away, effectively isolating communities and delaying the delivery of humanitarian assistance, raw materials, and reconstruction supplies (National Disaster Management Authority [NDMA], 2025). Damage to power distribution networks and

telecommunication systems further hampered emergency coordination and industrial recovery. The Sialkot–Gujranwala–Gujrat corridor, central to both domestic trade and export logistics, experienced severe accessibility constraints that stalled economic activity and obstructed the movement of goods toward ports and airports.

In rural regions, the destruction of houses, irrigation canals, and water management infrastructure deepened agricultural distress, threatening future crop cycles and food supply chains. The breakdown of transportation and market access also inflated commodity prices, contributing to localized inflationary spikes in essential goods and food items. Beyond economic losses, infrastructure collapse had profound social repercussions: damaged schools interrupted children's education; health facilities became inaccessible; and safe drinking water and sanitation systems failed, heightening disease risks. These combined effects magnified social inequality, as poor and remote households, particularly those headed by women, struggled to recover amid systemic neglect. The 2025 floods thus exposed how infrastructure fragility not only disrupts markets and mobility but also erodes human development, underscoring the urgent need for climate-resilient design standards and integrated recovery planning across Punjab's urban and rural landscapes.

Humanitarian and Social Crisis:

The 2025 floods unleashed a severe humanitarian crisis across Punjab, displacing millions and isolating entire communities. Access to essential services such as healthcare, education, clean water, sanitation, and housing was severely disrupted, leaving affected populations in prolonged vulnerability (UN OCHA, 2025). Entire neighborhoods were submerged, and displacement camps became overcrowded, lacking adequate hygiene facilities and basic protection measures. The loss of infrastructure also interrupted community networks, particularly in rural and peri-urban areas where households rely heavily on local support systems for survival and recovery.

Reflecting on the situation and drawing from the 2022 floods reported by UNFPA, it is clear that women and girls bear a disproportionate burden during such crises. The 2022 UNFPA report highlighted how nearly 6.2 million women and girls were in need of assistance, facing challenges in accessing reproductive healthcare and protection from gender-based violence (UNFPA, 2022). During field visits, many women described difficulties in evacuating safely, accessing reproductive healthcare, and protecting their children in displacement settings. Pregnant women struggled to receive maternal care due to overwhelmed facilities, while overcrowded shelters exposed women and girls to risks of harassment and exploitation. Children, meanwhile, experienced widespread education disruption. The humanitarian fallout also exposed critical gaps in social protection and governance. Many displaced families struggled to access relief due to inadequate registration systems and weak coordination among agencies. Vulnerable groups, women-headed households, children, persons with disabilities, and the elderly, were often left without targeted support. These realities underscore that humanitarian response cannot remain gender-neutral; it must be gender- and child-responsive, ensuring equitable access to assistance, safety, and recovery opportunities. Integrating protection, psychosocial support, and inclusive service delivery within disaster planning is essential to rebuild not only infrastructure but also community resilience and human dignity in the aftermath of climate-induced crises.

Systemic and Institutional Vulnerabilities Exposed by the 2025 Floods

The catastrophic floods of 2025 in Pakistan did not emerge as an isolated natural disaster but as a manifestation of deeper systemic and institutional weaknesses. These floods transformed from an environmental crisis into a multidimensional humanitarian and governance emergency, revealing long-standing structural deficiencies in preparedness, infrastructure resilience, and inter-agency coordination. The disaster highlighted how inadequate planning, fragmented governance, and limited institutional capacity amplified the socio-economic and humanitarian fallout.

This section explores why the 2025 floods evolved into a systemic crisis rather than a purely climatic event. It analyzes how fragile infrastructure, uncoordinated governance frameworks, insufficient early warning systems, and disrupted market mechanisms compounded the scale of destruction. By connecting these failures across economic management, institutional response, and social protection systems, the section underscores that the floods were not only a test of physical endurance but also a reflection of institutional fragility.

Gaps in Disaster Preparedness and Early Warning:

The 2025 floods starkly exposed Pakistan's chronic weaknesses in disaster preparedness and early warning systems, particularly at the community level. Despite periodic forecasts from the Pakistan Meteorological Department (PMD), risk communication remained fragmented, generic, and poorly localized, leaving most communities unaware of the scale and timing of the floods. In the industrial triangle of Gujranwala, Gujrat, and Sialkot, early warnings were either delayed or failed to reach rural settlements entirely. Many residents first learned of the rising waters through informal channels such as mosque loudspeakers, mobile messaging groups, and social media posts, rather than formal alerts from disaster management authorities. The gap between technical forecasting and actionable community-level guidance revealed a fundamental disconnect in the national disaster communication chain.

Compounding this weakness was the lack of cross-border hydrological coordination between Pakistan and India. Sudden upstream water releases from Indian reservoirs intensified flooding along the Chenab and Ravi river catchments without prior notice. The absence of real-time data sharing and early warning protocols in these transboundary basins severely limited Pakistan's capacity for preemptive response. Furthermore, institutional preparedness and rapid evacuation

mechanisms remained underdeveloped, with limited pre-positioning of rescue assets or community-level evacuation plans. This systemic inertia led to delayed response times and a heavy reliance on improvised, community-led rescue operations.

In several affected areas, local residents and volunteer groups demonstrated remarkable resilience, using tractors, boats, and makeshift rafts to evacuate families and livestock. However, this self-organized effort underscored the absence of formal evacuation training, equipment, and coordination at the tehsil and union council levels. The floods thus revealed not only infrastructural and administrative shortcomings but also a deeper institutional gap in proactive risk governance, where the focus remains on post-disaster relief rather than preventive preparedness.

Inadequate Infrastructure Resilience:

The 2025 floods exposed the acute fragility of Pakistan's physical infrastructure, illustrating how years of underinvestment, unregulated development, and poor maintenance have magnified climate-induced losses. In rural areas, housing vulnerability was particularly pronounced. The majority of homes were constructed using non-durable materials such as mud, thatch, and unreinforced brick, leaving them unable to withstand prolonged inundation. Thousands of households were displaced as dwellings collapsed or became unsafe, with limited options for relocation or reconstruction. This destruction not only deepened existing poverty but also disrupted rural livelihoods, revealing how the absence of climate-resilient housing standards perpetuates vulnerability in flood-prone regions.

In urban centers such as Gujranwala, Gujrat, and Sialkot, the crisis was intensified by poor drainage infrastructure, haphazard land use, and inadequate municipal planning. Encroachments on natural waterways and obsolete stormwater systems resulted in severe urban flooding, even in newly developed residential and industrial areas. Frequent power outages during the disaster further impeded drainage and rescue operations, exacerbating public hardship and service delivery failures. These challenges reflect a broader pattern of unplanned urbanization where development proceeds faster than the capacity of local governments to manage drainage, waste, and land zoning, leaving cities increasingly vulnerable to climate shocks. Beyond housing and drainage, the floods caused widespread damage to transportation, irrigation, and energy systems, crippling connectivity and economic activity. The collapse of roads and bridges disrupted the movement of goods, humanitarian aid, and agricultural supplies, delaying recovery and pushing up transportation costs. Damaged irrigation channels and pumping stations hindered water distribution, affecting post-flood cultivation and livestock care. Localized grid failures and damage to substations also curtailed energy supply, impacting industrial operations and small businesses. Collectively, these disruptions translated into higher input costs, constrained food supply, and inflationary pressures, reinforcing the economic fragility already intensified by the floods. The crisis revealed that infrastructure vulnerability is both a physical and economic risk, as damaged networks extend recovery timelines and amplify inflationary shocks. It underscores the need to view infrastructure not only as a construction challenge but as a cornerstone of economic resilience, linking climate adaptation with long-term fiscal and social stability.

Basic Commodities and Inflationary Pressures

The 2025 floods severely disrupted Pakistan's supply chains, exposing the fragility of its food distribution, transport, and market systems. With roads, bridges, and key logistical routes submerged or damaged, the movement of agricultural goods, fuel, and essential commodities came to a near standstill across Punjab's industrial triangle. The collapse of rural–urban connectivity led to market isolation, driving sharp increases in prices for staple foods such as wheat flour, rice, and vegetables, alongside surging transport and fuel costs. On the demand side, widespread displacement and loss of livelihoods reduced consumer purchasing power, while on the supply side, shortages of raw materials and food stocks triggered localized price spikes and hoarding behaviors. Together, these disruptions deepened food insecurity and eroded household resilience, particularly among the urban poor and newly displaced families, who faced immediate challenges in affording daily essentials.

These localized disruptions quickly evolved into macroeconomic pressures, amplifying inflation and fiscal strain at the national level. Food and energy price shocks contributed to an overall rise in the consumer price index, with inflationary effects spilling over into non-food sectors through higher input and transportation costs. The Ministry of Finance reported a temporary inflation uptick of around 3.5–4.5% in late 2025, reflecting both production losses and disrupted logistics (Finance Ministry Pakistan, 2025). These trends mirrored the "vicious cycle of poverty" observed in earlier flood crises, where declining agricultural productivity feeds into rising food prices, eroding real incomes and heightening vulnerability. In this context, Pakistan's import dependence for edible oils, pulses, and fuel added further strain on fiscal balances, forcing monetary tightening to contain inflation while constraining growth. The floods thus transformed a regional disaster into a national economic shock, linking infrastructure fragility, market volatility, and social vulnerability in a self-reinforcing cycle that underscores the urgency of resilient economic recovery.

Fragmented Governance and Response:

The 2025 floods exposed major governance and coordination weaknesses across Pakistan's disaster management framework. The National Disaster Management Authority (NDMA), Provincial Disaster Management Authorities (PDMAs), and district administrations operated in silos, with overlapping mandates and unclear lines of authority, resulting in confusion during the initial emergency phase. The absence of a unified command structure and real-time communication system led to delays in decision-making and fragmented implementation of relief operations. Critical information on flood levels, evacuation needs, and resource availability often failed to reach frontline responders. Furthermore, there was no widely known or functional emergency helpline, leaving affected citizens without a reliable channel to seek assistance or report emergencies. This communication vacuum forced communities to rely on informal networks and word-of-mouth coordination in moments where official guidance was essential.

The unequal distribution of state capacity further deepened these challenges. In major urban centers like Gujranwala and Sialkot, administrative presence, access to media, and better logistical networks facilitated relatively faster mobilization of aid. However, rural settlements and peri-urban areas remained marginalized in the response, receiving delayed or inadequate support. In these

areas, citizens, NGOs, and local volunteers became the de facto first responders, organizing evacuations, distributing food, and managing temporary shelters. These community-led efforts underscored both the resilience of local populations and the institutional absence of organized disaster management at the grassroots level. Overall, the 2025 floods revealed a governance system still anchored in reactive crisis management rather than proactive, coordinated preparedness—highlighting the urgent need for integrated communication systems, local empowerment, and accountability mechanisms to ensure timely and equitable disaster response.

Key Recommendations: A Framework for Resilient and Inclusive Recovery:

The 2025 floods have revealed that Pakistan's vulnerability is not merely environmental, it is systemic, embedded within fragile infrastructure, weak governance, and social inequities that magnify the impact of climate shocks. To move from crisis to resilience, recovery efforts must go beyond reconstruction and embed long-term adaptation into economic and social planning. Systemic resilience cannot be achieved through infrastructure or agricultural reform alone; it requires **institutional strengthening** at every level, through enhanced **governance**, **financing**, and **data systems**. This framework proposes four interlinked pillars, resilient infrastructure, climate-smart agriculture, disaster risk governance, and inclusive social protection, underpinned by strong coordination, gender equity, and local empowerment. Together, they outline a roadmap for building forward better: a recovery approach that not only restores what was lost but transforms vulnerability into resilience, instability into opportunity, and climate risk into sustainable development readiness.

Pillar 1: Invest in Climate-Resilient Infrastructure

Investing in climate-resilient infrastructure is critical to safeguarding Pakistan's development gains and insulating communities from the growing frequency and intensity of extreme weather events. The 2025 floods exposed how fragile roads, bridges, drainage, and irrigation systems can turn local disasters into nationwide economic crises. Rebuilding efforts must therefore shift from short-term restoration to long-term resilience, embedding climate risk assessments, improved engineering standards, and sustainable materials into every phase of design and construction. Strengthening embankments, bridges, and irrigation channels to withstand extreme rainfall and prolonged inundation will not only reduce losses in future disasters but also help stabilize markets and curb inflationary pressures by preventing repeated supply chain breakdowns and costly recovery cycles that burden the national budget.

Beyond traditional "grey" infrastructure, the integration of nature-based solutions, such as watershed management, wetland restoration, and reforestation, offers a sustainable way to enhance resilience. Healthy ecosystems act as natural buffers, absorbing excess floodwater, reducing erosion, and improving groundwater recharge. Countries across South Asia have demonstrated how hybrid models of engineered and ecosystem-based infrastructure can protect

livelihoods and reduce long-term recovery costs. For instance, Bangladesh's mangrove restoration and Nepal's community-managed watershed systems combine local knowledge with modern engineering to yield durable, low-cost protection. Pakistan can replicate and localize such models by linking watershed restoration with flood embankment strengthening and ensuring that both infrastructure and ecosystems work in tandem to protect communities.

To make this transformation sustainable, local universities and research centers such as UET Lahore, NUST, and GCU can play an essential role in flood modeling, material innovation, and resilience mapping to inform climate-smart construction. Furthermore, establishing dedicated maintenance financing mechanisms is critical to ensure that repaired and newly built infrastructure does not deteriorate over time, as recurring neglect has historically worsened vulnerabilities. By investing in a balanced mix of resilient grey and green infrastructure, supported by local expertise, consistent upkeep, and participatory governance, Pakistan can lay the foundation for climate-resilient growth that protects livelihoods, reduces inflationary shocks, and strengthens economic stability in the face of future climate disruptions. Importantly, provincial and local governments must be integrated into the national climate adaptation strategy, as they are central to implementation, local planning, and community engagement.

Pillar 2: Transition to Climate-Smart Agriculture

Promoting climate-smart agriculture (CSA) is essential for safeguarding rural livelihoods and stabilizing Pakistan's food systems amid growing climate volatility. The 2025 floods devastated major Kharif crops and disrupted the wheat planting cycle, underscoring the vulnerability of current farming systems and their dependence on stable weather patterns. Transitioning toward CSA through flood- and drought-tolerant crop varieties, efficient irrigation systems, and integrated pest management can help farmers sustain yields under unpredictable conditions. Strengthening agricultural resilience directly supports food price stability and inflation mitigation, as steady harvests and uninterrupted supplies reduce market shocks and safeguard household purchasing power.

At the institutional level, expanding agricultural insurance schemes and improving access to affordable credit are critical to enable farmers to recover from climate shocks and invest in adaptive technologies. Building resilient value chains and market linkages further ensures that agricultural recovery extends beyond production to encompass storage, transport, and processing. These measures prevent post-harvest losses and stabilize rural incomes. Integrating digital extension and advisory systems, providing localized weather forecasts, pest alerts, and market price updates, can strengthen farmers' decision-making, improve timing of sowing and harvest, and reduce climate-related uncertainty.

Given that women represent a significant share of Pakistan's agricultural workforce, gender-responsive CSA initiatives must remain central to policy design. Training programs, access to credit, and digital tools tailored for women farmers enhance productivity and equity. Collaboration among agricultural universities, research centers, and provincial departments can accelerate the development and dissemination of localized CSA innovations. By strengthening production, finance,

and market systems together, Pakistan can build a climate-resilient agricultural economy that ensures food security, moderates inflationary shocks, and supports inclusive rural growth.

Pillar 3: Strengthen Disaster Risk Governance

Strengthening disaster risk governance is central to reducing Pakistan's vulnerability to climate-induced hazards. The 2025 floods demonstrated that institutional fragmentation and reactive crisis management magnify human and economic losses. A coordinated, multi-tiered governance framework, linking the National Disaster Management Authority (NDMA), Provincial Disaster Management Authorities (PDMAs), and District Disaster Management Authorities (DDMAs), is needed to ensure preparedness, communication, and response are consistent from federal to community levels. Clearly defined mandates, resource sharing, and interoperable data systems can prevent duplication and delays during emergencies, ensuring faster and more equitable relief delivery. Equally critical is strengthening early warning and cross-border coordination. Pakistan's vulnerability is compounded by its dependence on upstream water flows from India, highlighting the urgent need for transboundary data-sharing protocols and joint water management mechanisms. Institutionalizing regular information exchange between meteorological and water authorities of both countries would improve flood forecasting and reduce the unpredictability of reservoir releases.

Establishing a national flood emergency helpline, operational at both district and tehsil levels, would ensure timely dissemination of alerts and coordination of evacuation efforts. Universities and research centers such as NUST, GCU, and UET Lahore can serve as technical partners, developing hazard mapping tools, risk modeling, and community training programs that enhance institutional responsiveness and data accuracy. At the local level, empowering community-based disaster response committees, such as Village or Union Council Disaster Management Committees, remains critical. These committees should include women, youth, and persons with disabilities to ensure inclusive representation. Regular drills, first-aid training, and resource mobilization programs build community confidence and capacity to act as first responders. Integrating these community mechanisms into official disaster response structures transforms governance from a reactive to a proactive resilience model, where local knowledge, institutional coordination, and digital innovation work together to safeguard lives and livelihoods.

Pillar 4: Prioritize Inclusive Social Protection and Livelihoods

Ensuring an inclusive and equitable recovery requires strengthening social protection systems that address both immediate humanitarian needs and long-term livelihood security. The 2025 floods exposed the fragility of existing safety nets, leaving millions, especially women, informal workers, and displaced families, without adequate support. Targeted cash-for-work and community infrastructure rehabilitation programs can provide immediate income while rebuilding essential assets such as local roads, schools, and water facilities. These programs not only restore livelihoods but also inject liquidity into local economies, curbing post-disaster inflationary pressures and stimulating market recovery.

Special attention must be given to rebuilding resilient housing and restoring access to essential public services, including healthcare, education, and sanitation. Gender-sensitive and disability-

inclusive shelter design is critical, ensuring safety, privacy, and accessibility for vulnerable groups in displacement camps and reconstruction efforts. Women, often primary caregivers and agricultural laborers, should be integrated into livelihood recovery programs through targeted skill development, microcredit access, and support for home-based or agricultural enterprises. These interventions reduce long-term dependency while promoting women's economic empowerment and community resilience.

To ensure sustainability, social protection must be linked with disaster risk management and local governance systems. Establishing adaptive safety nets that trigger automatically in the event of floods or droughts can ensure timely financial support to at-risk households. Partnerships with local institutions, universities, and digital platforms can facilitate real-time beneficiary identification, cash transfers, and service delivery monitoring. By embedding inclusion, accountability, and climate sensitivity within social protection systems, Pakistan can move from reactive relief toward a resilience-centered welfare model, one that strengthens livelihoods, stabilizes inflationary shocks, and ensures that no vulnerable group is left behind in the process of recovery.

Conclusion: Building Forward with Resilience and Equity

The 2025 floods in Pakistan's industrial triangle revealed the deep interlinkages between climate vulnerability, economic fragility, and governance gaps. What began as an environmental shock quickly escalated into a multidimensional crisis, disrupting agriculture, industry, infrastructure, and livelihoods, while driving inflation and poverty across both urban and rural economies. The disaster underscored that recovery cannot rely on short-term relief alone; it must confront the systemic weaknesses that amplify such shocks. This catastrophe has made one reality clear: resilience must be built into the very fabric of Pakistan's economic and social systems.

A swift and coordinated recovery of Punjab's industrial triangle is vital for ensuring national socio-economic stability, given its role as a backbone of Pakistan's agricultural and manufacturing sectors. The floods exposed critical vulnerabilities but also demonstrated remarkable community strength and adaptability. The opportunity to "build back better" must now translate into sustained, inclusive action across four interconnected pillars, climate-resilient infrastructure, climate-smart agriculture, robust disaster governance, and inclusive social protection. Achieving this will require long-term investment, decentralized implementation, and active collaboration among government institutions, civil society, academia, and the private sector. With targeted climate finance, cross-border coordination, and community-driven innovation, Pakistan can turn this crisis into a foundation for durable resilience, economic stability, and social equity.

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