



Sindh's Strategic Policy for Floods Response 2022

Priority Setting in the Post-Floods Context

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I. Executive Summary

As delineated in the ‘Post-Disaster Needs Assessment’ report, Sindh has been at the receiving end of disproportionately significant damages and losses due to the recent floods. The adverse impact of climate change has disrupted every conceivable facet of life in the province. In this catastrophic context, ‘Business-as-Usual’ approach would be extremely detrimental to the province. The devastating impact of floods has ‘undone’ a significant chunk of public sector investments in the province as it permeated across all sectors. The well-documented scale of devastation should serve to catalyze the public sector development paradigm towards sustainable climate-resilient planning, programming, and investments.

A ‘Transformational Path’ needs to be pursued that is centered on addressing the ‘systemic’ issues that exacerbate the climate change impact and embedding environment-friendly practices in the public sector planning and development systems. The strategic policy is a ‘live document’ that aims to guide Sindh’s Flood Response, from a medium- to long-term perspective, to foster climate-resilient policies and strategies. The document may be recalibrated, reconfigured, and updated as per the evolving situation. The core focus of the policy is to serve as a guide for strategic prioritization for planning, programming, and implementation for Sindh in the post-flood context.

Before delving into the specifics of sectoral prioritization of ‘Sindh Floods Response: Strategic Policy’, it is imperative to conceptualize the strategy and its contours. On an immediate basis, ‘Dewatering’ should be prioritized expeditiously dispose of the excess floodwater. The Strategy should prioritize critical intervention areas to address systemic issues plaguing the province, especially concerning disasters. Simply put, setting unrealistic goals for recovery is ‘counter-intuitive’ without addressing the longstanding issues of the drainage systems. Public investments will again be jeopardized if the inefficiencies of the drainage network continue.

The four pillars of the Strategic Policy are centered on:

- Rectifying the Systemic Issues
- People-Centered Approach
- Building Upon the Existing Models
- Aligning Existing Budgetary Framework with Resource Commitments

1. The first pillar of ‘rectifying the systemic issues’ is to prioritize the longstanding problems that have plagued the province. The core issue that has come to the forefront is the persistent problems with the drainage system that significantly exacerbated the impact of the recent floods. The recurrent delays in rectifying the drainage problems and completion of drainage networks point to the broader systemic issues pertaining to misplaced priorities in the public sector development framework.
2. The second pillar of ‘People-Centered Approach’ is to prioritize the human impact of floods that have directly disrupted the lives of more than 12.36 million people in Sindh. The focus on quantifying and monetizing damages and losses must not undermine that the floods have affected every conceivable facet of lives for the affected segments. The adverse impact has disproportionately affected the vulnerable groups, like women and children. The significant impact has permeated across sectors, like health and education, where daunting challenges of reducing out-of-school children, poor learning outcomes, and immunization & nutrition outcomes of children is already a challenge. The mental toll and trauma of losing livelihood and loved ones require an empathetic, inclusive, and holistic approach to recovery and rehabilitation. The meta-narrative must not shift from rescue & relief towards rehabilitation yet as there are significant relief efforts still needed to address humanitarian needs.
3. The third pillar of ‘Building Upon the Existing Models’ is to leverage the existing models to address Sindh’s recovery plan and not necessarily reinvent the wheel. The plans for flood management that were conceived in the aftermath of 2010 floods may still be relevant. Similarly, the ‘Village Rehabilitation Program’ under the ‘People’s Poverty Reduction Program’ and concepts of ‘cluster-based growth nodes’ and ‘secondary cities development’ may offer useful lessons for viewing the reconstruction and rehabilitation from a ‘meso-level’ perspective to make truly resilient communities.
4. The fourth pillar of ‘Aligning Existing Budgetary Framework with Resource Commitments’ entails that despite the resource constraints, there is significant space available to review and refine the existing development portfolio and realign operational allocations to the sectors which will contribute towards human development and economic recovery.

Rather than ‘diluting’ the strategy by spreading the focus upon superfluous sectors, the strategic policy focuses on the following priority thematic areas:

- Rectifying the Drainage Systems (including Irrigation)
- Housing and Community Facilities
- Livelihood
- Communications (Roads Infrastructure)
- Health
- Education
- Human Impact (Poverty, Food Security, Psycho-Social impact)

The Strategic Policy has clearly delineated the prioritization of investments that must hinge upon rectifying existing systems, building upon existing models, people-centered approach, and aligning budgetary framework with resource commitments. For optimizing flood-related interventions and investments, a set of focused recommendations are proposed with regard to improving governance structures and institutional strengthening vis-à-vis strategic imperatives to effectively deal with disasters and calamities.

A ‘Transformational Path’ needs to be pursued that is centered on addressing the ‘systemic’ issues that exacerbate the climate change impact and embedding environment-friendly practices in the public sector planning and development systems. The strategic policy document is a ‘live document’ that aims to guide Sindh’s Flood Response, from a medium- to long-term perspective, to foster climate-resilient policies and strategies. The document may be recalibrated, reconfigured, and updated as per the evolving situation. The core focus of the strategy is to serve as a guide for the prioritization of the planning, programming, and implementation for Sindh in the post-flood context.

It is worth mentioning that at the time of estimations for Post-Disaster Needs Assessment (October 2022), the exercise of the in-depth ‘joint survey’ to ascertain the housing damages was not undertaken. Hence, the estimates were based on 1.8 million houses being damaged instead of 2.1 million damaged houses (as per the in-depth joint survey). Similarly, the preliminary damages to educational institutes for PDNA were based on rough estimates. The in-depth assessment revealed that 19,808 schools had been damaged. The aforementioned in-depth assessment has implications in terms of actual financing needs and gaps, particularly for housing and education which will be encapsulated in the provincial action plan.

II. Introduction

Even though it is an often-repeated statement, it is worth reiterating that despite being one of the lowest contributors to global greenhouse gas emissions, Pakistan is one of the most vulnerable countries to climate change. As a lower riparian province, Sindh has been at the receiving end of flood-related disasters that occur anywhere in the country. The devastation caused by the recent unprecedented rains and floods in almost the entire province of Sindh has severely disrupted the lives and livelihood of the people. Sindh has not only suffered in terms of loss of human lives but the critical infrastructure has also been impacted at a large scale. Torrential rains during the month of July were more than 307% compared to the average rainfall during the month and those during August were 726% compared to the average rainfall during the month. With 24 out of the 30 districts being declared ‘calamity-hit’, more than 1.8 million houses are estimated to have been damaged. With more than 3.8 million acres of crop area in Sindh being affected, the recent floods have permeated all the conceivable facets of lives.

The Government of Sindh is collaborating with the Federal Government, International Development Partners, NGOs, and other relevant stakeholders to undertake its rescue and relief operations, including the provision of relief items, in the flood-affected areas. Concurrent with the rescue and relief efforts, the Government of Sindh has been focusing on rehabilitating the affected population through the core principle of ‘build-back-better’ to withstand such disasters in the future. The recent report on ‘Post-Disaster Needs Assessment’ prepared by international experts from the World Bank, Asian Development Bank, European Union, and UNDP have attempted to quantify the scale of damages, losses, and needs with preliminary estimates.¹

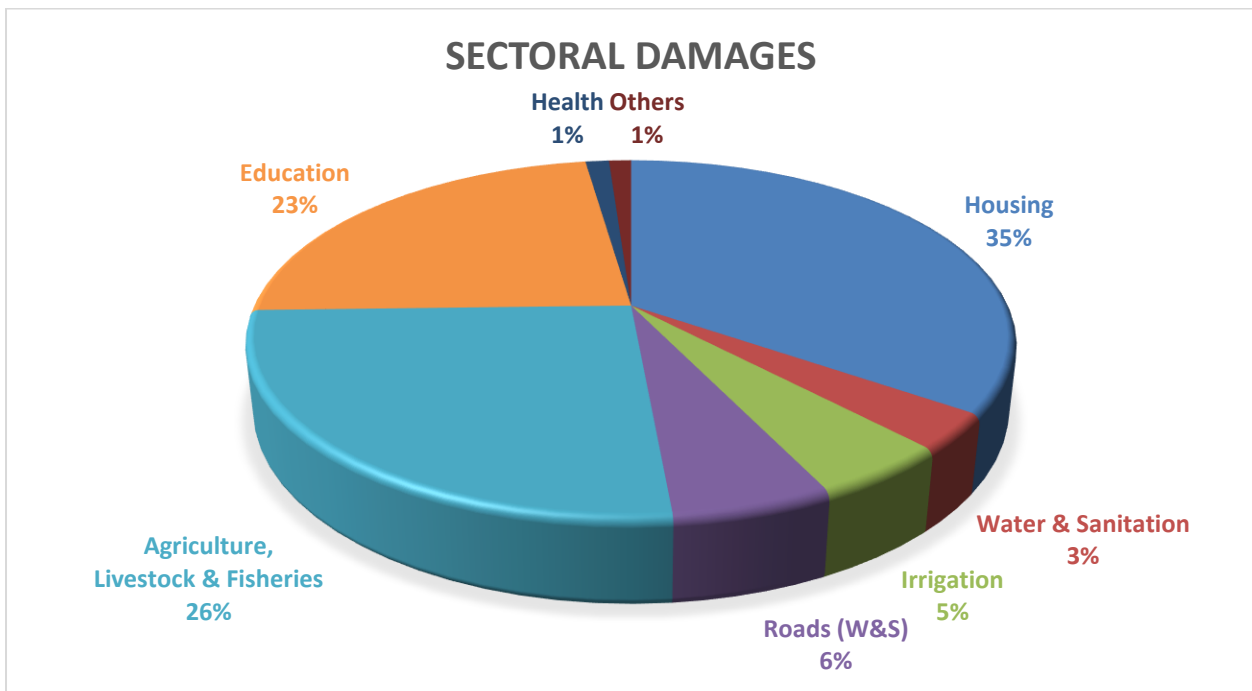
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- ¹ **Damage** is defined as direct costs of destroyed or damaged physical assets. It is valued in monetary terms with costs estimated based on replacing or repairing physical assets and infrastructure, considering the replacement price prevailing before the crisis.
 - **Loss** is defined as changes in economic flows resulting from the disaster and valued in monetary terms. Together, damage and loss constitute the effects of the crisis.
 - **Needs** costing draws on the monetary value of damage and loss but is not equal to the sum of those estimates.
 - **Recovery and reconstruction needs** are calculated in terms of replacement costs according to current prices and include a premium linked to building-back-better principles, and needs associated with the recovery of the sector. The reconstruction and recovery needs include short (up to 12 months) and intermediate to long-term (up to five years) activities.

Damages

Setting aside the indirect losses such trauma and psychological disturbances due to the loss of lives, shelters, livelihoods and properties, and the secondary losses due to the forgone economic activity, the financial losses of alone have an estimated cost to Pakistan of more than 30 Billion US Dollars. Sindh, being the most affected province, has suffered the most adverse impact of the recent floods. The devastations due to the floods are multi-faceted that have impacted the economy, housing, irrigation, water supply & sanitation, livelihood, communications, and several other sectors. The estimated financing needs, especially for reconstruction, for Sindh as per the ‘Post-Disaster Needs Assessment’ report is around 1.69 Trillion Pakistani Rupees (that is 7.86 Billion US Dollars). With flood-related financing committed by the donors standing at around 395.6 Billion Pakistani Rupees (that is 1.84 Billion US Dollars), **a financing gap of at least 1.29 Trillion Rupees (that is 6.02 Billion US Dollars) remains for Sindh.**

Damages	Losses	Financing Needs	Financial Gap
9.07 Billion USD	11.4 Billion USD	7.86 Billion USD	6.02 Billion USD

The assessment of sectoral share of the damages by the Government of Sindh is summarized below:



III. Summarizing Government of Sindh's Response

Government of Sindh's Priority of Response

- Providing Shelter, food, water, health & education to the displaced population
- Conducting in-depth Damage Assessment with a joint survey to ascertain damages
- Providing Low-Cost Climate-Resilient Housing
- Reviving livelihood by revitalizing livelihood, particularly agriculture activity (including livestock)
- Rehabilitating Damaged Irrigation Infrastructure
- Rehabilitating Health & Water and Sanitation facilities
- Rehabilitating Damaged Education Institutes
- Rehabilitating Damaged Provincial Highways and Internal Roads Infrastructure
- Repurposing Existing Projects and Conceiving New projects with International Partners (including World Bank, Asian Development Bank, Asian Infrastructure Investment Bank, and European Union)
- Realigning Provincial Budget with Flood-Related Projects

Collaboration with Development Partners:

The government of Sindh has been working in close coordination with the development partners, especially the World Bank, which has agreed to provide financial support of about 500 Million US Dollars each for 'Sindh Flood Emergency Rehabilitation Project' and 'Flood Response Emergency Housing Project'. The Sindh Flood Emergency Rehabilitation Project will cater to the following aspects:

- Rehabilitation of critical infrastructure for the priority sectors of Irrigation & Drainage Infrastructure, Water Supply & Sanitation, and Roads
- Provision of Livelihood Support through the provision of subsidy on agriculture inputs and 'Cash-for-Work' programs
- Expansion of Rescue 1122 in priority districts and capacity building of PDMA Sindh

The latter (that is Flood Response Emergency Housing Project) is centered on the reconstruction and rehabilitation of damaged houses vis-à-vis the low-cost housing model. Asian Development Bank is also supporting the Government of Sindh through the ‘Flood Emergency Road Rehabilitation Project’ to rehabilitate the road network affected by the floods.

The World Bank-assisted ‘Sindh Water & Agricultural Transformation (SWAT)’ project was already under negotiation with the donor before the devastating floods. The project intended to revolutionize the irrigation and agriculture sectors by adopting modern water conservation, hydroponics, and high-efficiency irrigation systems (HIES). However, the project was restructured to make space for supporting agriculture by providing subsidies to farmers in their bid to prepare for winter (rabi) crops and prevent the looming threat of food security facing the country. Provision is created to assist farmers in forthcoming crops in the form of, fertilizer, and land preparation. Additionally, a ‘Contingent Emergent Response Component’ (CERC) has been added to cater to any subsequent disasters (via reappropriation from other components) during the six years of the project.

World Bank-funded projects on ‘Sindh Human Capital Investment’, with ‘healthcare services’ and ‘social protection’, components have also been realigned to rehabilitate primary healthcare services and provision of social protection via social registry. Cash transfers targeted the ‘First 1000 Days’ for Pregnant and Lactating Women throughout the province of Sindh.

The provincial government is working proactively to realign its Provincial ADP with relief and rehabilitation efforts along with foreign-funded projects with international development partners. However, the provincial resources are insufficient in accomplishing the monumental task of rehabilitating the flood-affected sectors, areas, and the population.

The aforementioned 'Flood Rehabilitation Emergency Projects' are summarized below:

Name of Project/Program	Duration (Years)	Relevant Cost (USD Million)
Sindh Water and Agricultural Transformation (SWAT) (Total Cost USD 322 Million); Project Subsidy on Agriculture Inputs (USD 110 Million)	5	Total: 110 WB: 110
Sindh Human Capital Investment, 1000 Days Integrated Health & Population Project (USD 280 Million)	5	Total: 280 WB: 200 IsDB: 50 GoS: 30
Strengthening Social Protection Delivery System in Sindh (USD 230 Million)	5	Total: 230 WB: 200 GoS:30
Sindh Post Flood 2022 Housing Reconstruction Project (Estimated Cost USD 500 million)	5	500
Sindh Flood Emergency Rehabilitation Project	3	500
a) Rehabilitation of Irrigation System	3	215
b) Livelihood, Rescue 1122, Rehabilitation of Roads, Water Supply & Drainage	3	285
Flood Emergency Road Rehabilitation Project (ADB-Assisted) (USD 220 Million)	3	Total: 220 ADB: 200 GoS: 20
TOTAL		1,840

Joint Flood Damage Assessment Survey 2022 (Sindh)

Joint Survey

Government of Sindh in collaboration with the Urban Unit initiated joint survey in flood-stricken areas of Sindh. The objective of this survey was to assess the damage and loss incurred by the inhabitants of Sindh due to floods. In this regard, the Urban Unit developed an android application to undertake digital survey of affectees. In addition, a monitoring dashboard was also developed to provide oversight to the survey activities being undertaken.

To assess the damage and loss in these areas a joint survey team was formulated. This comprised of representatives of District Administration, Local Government (UC Secretary), PDMA, NDMA and Pakistan Army officials. Before start of field operations, the Urban Unit representative imparted training to field teams on undertaking survey through the use of android application. More than 1400 joint-teams were constituted to undertake survey in 24 calamity-hit districts.

Data Collection through survey was undertaken as per the following steps:

- Foremost, the extent of flood water was assessed and total area estimated through **Satellite Image processing techniques**.
- Survey form was formulated. Subsequently, **an Android Application was developed** for collection of data.
- **Joint teams were formulated**, which included representatives from PDMA, Army & District Administration.
- **Each team was assigned a specific area**, based on the administrative boundaries. User IDs were assigned to each team for accessing Android Application.
- Alongside descriptive information, survey team collected geo-tagged location along with a picture of the CNIC, individual and damaged property.
- **Web-Based Dashboards at Each Administrative Tier** were developed for Monitoring of Survey Activity.
- **Web Based Dashboard has been developed for the Validation and Rectification** of data collected through field survey.

In this Joint Damage Assessment, 2.1 Million households have been surveyed and it was found that 31% houses are Partially Damaged and 69% are Fully damaged. Out of this, 79% houses are Kacha while 21% are Pakka. (Details at Annexure – II)

IV. Sector Prioritization for ‘Strategic Policy for Sindh Floods Response’ (Conceptualization of the Strategy)

The creation of deltaic plains has remained the function of millions of yearly episodes of riverine floods. Though floods in Sindh have remained a reasonably predictable phenomenon over the last century, their severity and frequency has noticeably increased over the last two decades due to climate change. This poses a simple question: Are we ready to withstand and prosper in face of increasing flood hazard and find out ways to stop turning these events into devastating disaster? These extraordinary times, require extraordinary thinking and level of seriousness. Long-term and strategic planning needs to be adopted without falling into the ‘best practice’ trap. The adverse impacts of disaster vary in time and space depending not only on the physical properties of the damage, but also on the ability of the nations to cope, recover, and reconstruct with localized solutions to guide the strategic direction of Pakistan, especially Sindh.

Recurrent floods have demanded a lot of energy that is often invested in rescue efforts. A long-term strategic view is often missed out, leaving behind no resources for sustainable solutions to the challenges that we face as a nation. While rescue and relief may be a good strategy in some circumstances, it may be difficult to sustain financially. It becomes increasingly problematic when the number of those needing rescue is growing exponentially. From infrastructure to social, the long-term sustainability and looming threats to our collective survival due to climate change needs to be a cornerstone of our investment decisions. The essence of all our rehabilitation and reconstruction planning needs to be working with nature and not against it. The strategic imperative should always be directed towards finding ways to maintain a symbiotic human-environment interaction in the Indus plains that allowed a thriving civilization for thousands of years. Building on this, a four pillars strategy is proposed as depicted in the diagram below.

Before delving into the specifics of sectoral prioritization of ‘Sindh Floods Response: Strategic Policy’, it is imperative to conceptualize the strategy and its contours. On an immediate basis, ‘Dewatering’ should be prioritized expeditiously to dispose of the excess floodwater. The Strategy is focused on prioritizing critical intervention areas that need to address systemic issues plaguing the province, especially pertaining to disasters. Simply put, undertaking huge investment and lofty goals is ‘counter-

intuitive' without addressing the longstanding issues of the drainage systems. Public investments will again be jeopardized if the inefficiencies of the drainage network continue. Being the lowest riparian province, Sindh is highly vulnerable to disasters across the country.



The **first pillar of 'Rectifying the Systemic Issues'** is to prioritize the longstanding problems that have plagued the province. The core issue that has come to the forefront is the persistent problems with the drainage system that significantly exacerbated the impact of the recent floods. The recurrent delays in rectifying the issues with irrigation, especially the drainage problems and completion of drainage

networks point to the broader systemic issues pertaining to misplaced priorities in the public sector development framework.

The **second pillar of ‘People-Centered Approach’** is to prioritize the human impact of floods that have directly disrupted the lives of more than 12.36 million in Sindh. The focus on quantifying and monetizing damages and losses must not undermine that the floods have affected every conceivable facet of lives for the affected segments. The adverse impact has disproportionately affected the vulnerable groups, like women and children. The significant impact has permeated across sectors, like health and education, where daunting challenges of reducing out-of-school children, poor learning outcomes, and immunization & nutrition outcomes of children is already a challenge. The mental toll and trauma of losing livelihood and loved ones require an empathetic, inclusive, and holistic approach to recovery and rehabilitation. The meta-narrative must not shift from rescue & relief towards rehabilitation yet as there are significant relief efforts still needed to address humanitarian needs.

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The **fourth pillar of ‘Aligning Existing Budgetary Framework with Resource Commitments’** entails that despite the resource constraints, there is significant space available to review and refine the existing development portfolio and realign operational allocations to the sectors which will contribute towards human development and economic recovery.

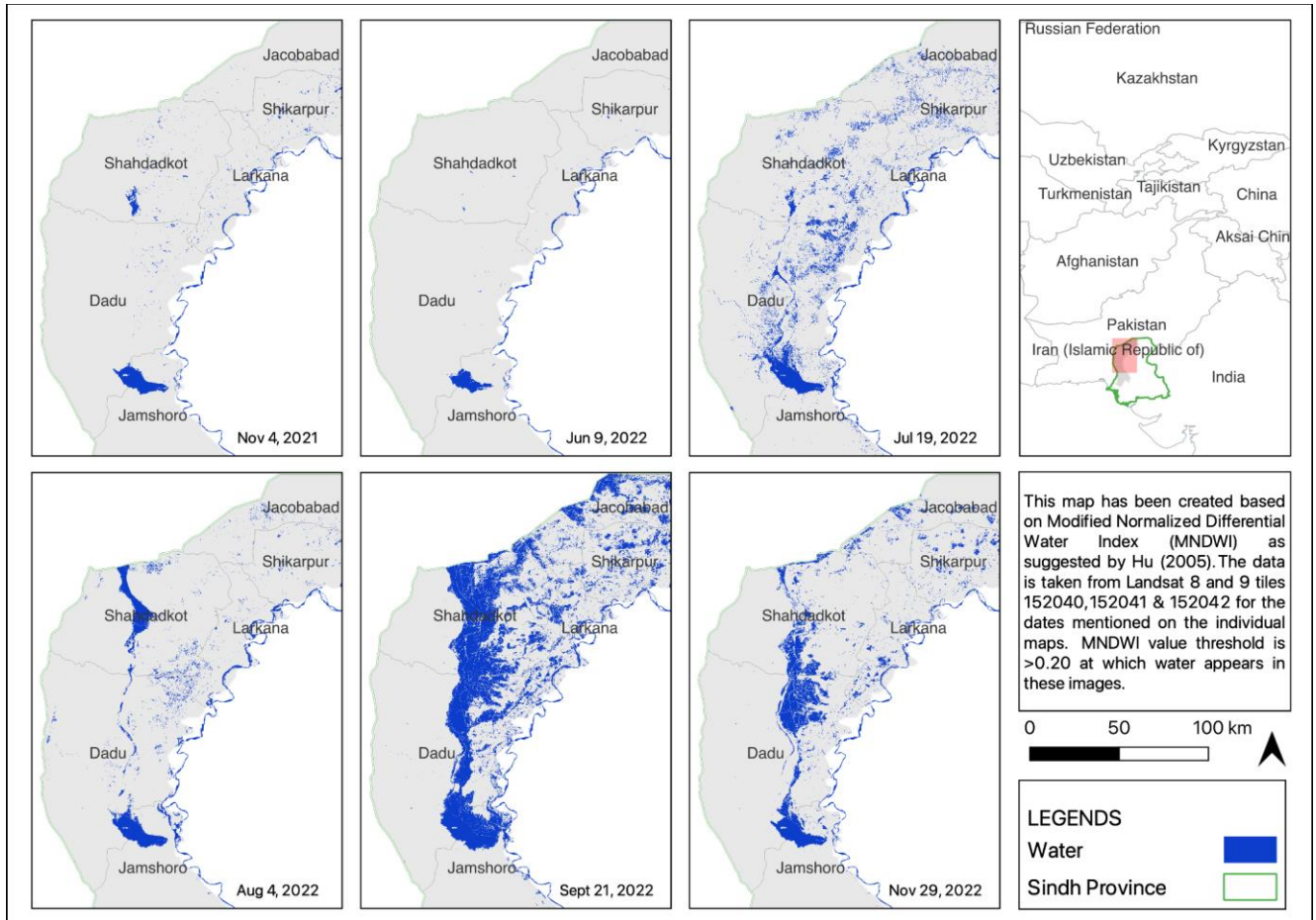


A. Drainage System (including Irrigation & Water Resources)

Impact

The dysfunctional drainage system (flood-water, storm-water and municipal) has been a critical factor in exacerbating the colossal impact of the floods. Preliminary estimates showed that the Irrigation Sector alone in Sindh suffered damages of around Rs. 95 billion with significant damages to -Barrages, Headworks & Related Dykes, -Canals/Water Channels, -Drains & Appurtenant Structures, and -Flood Protection Embankments. Due to non-availability of drainage for natural water course, every sector has suffered including roads, housing, agriculture, education, etc. Over the period of time, the natural waterways of the Indus Basin are being choked with the added irrigation infrastructure obstructing the natural flood routes. This recurring phenomenon has been glaringly obvious after the 2010 super floods. Therefore, clearing the encroachments on the natural waterways is critically essential

and must be coupled with strengthening embankments and designing & enforcing regulations pertaining to flood plains.



The temporal analysis of the flood in the selected districts on the Right Bank of Indus shows that the torrential rains have devastated the region disturbing the entire physical makeup (see tile 21 Sept 2022 below). The natural waterways in these districts were barely able to drain the local rainfall that occurred between 5 July and 4 August 2022. However continuous rainfall and rainwater from Khirthar and Suleman mountain ranges overwhelmed the drainage capacity and brought some 5000 km² of land area under water. Water seems to have been gradually receding afterward due to the completion of monsoon season, but even a highly conservative estimate suggests that some 1500 km² of land was still submerged by 29th November 2022.

Estimated No. and the Extent of Right Bank UCs Inundated by 29 Nov 2022

Flood Severity	No of UCs	Mean % of UCs area under water	Mean km² area under water	Total km² area still under water
No Flood water	15	0	0	0
Flood water in 1 - 5% of the total area	127	1.75	1.80	228.6
Flood water in 6 - 10% of the total area	34	6.79	9.44	320.96
Flood water in 11 - 20% of the total area	20	14.06	12.24	244.8
Flood water in 21 - 30% of the total area	5	27.41	39.92	199.6
Flood water in 31 - 40% of the total area	8	33.70	28.34	226.72
Flood water in 41 - 60% of the total area	2	53.45	24.27	48.54
Flood water in 61 - 80% of the total area	4	67.177	40.44	161.76
Flood water in more than 80% of the total area	3	84.26	32.71	98.13
Total	218			1529.11

Statistical analysis of corresponding figures of the submerged area reveals that more than 203 Union Councils were still inundated to varying degrees with a few almost entirely underwater even on 29 November 2022. These figures may be taken as very conservative estimates as these were reached after excluding all permanent waterbodies, slightly submerged areas, or recently drained areas. The corresponding estimates of PDMA for these districts suggest that the magnitude of the area under water in the same region may be as high as 2850 km² and water from this region may be receding at a daily rate of less than 2 percent.

Proposed Strategy

A well-designed and integrated drainage system is a prerequisite to properly channel and discharge the excess water into the sea. It must be acknowledged that the recent torrential rains were unprecedented, but the situation was exacerbated due to the flaws in the drainage systems that cannot be put on the back burner anymore. Without an integrated water drainage system in Sindh, the province will remain at risk and vulnerable to flood-related disasters. It is also imperative to overhaul the surface drainage including the expeditious completion of the Right Bank Outfall Drain (RBOD). Rehabilitation and widening of the existing drainage infrastructure of the Left Bank Outfall Drain (LBOD) should also be proactively pursued along with the augmentation of its drainage area. ‘Salinity Control & Reclamation Project’ (SCARP) initiated several decades ago has not provided desired results due to many reasons, including technical and governance-related issues. It is important to revitalize the SCARP system by handing over the tube-wells with solar panels to farmers with the responsibility to maintain and sustain them (as being done in Punjab). Constructing new infrastructure to channelize the water coming to Sindh from the adjoining hilly regions of Balochistan must be prioritized. This would help ensure a smooth passage to river Indus without the constant threat of flooding to cities, like Kamber-Shahdadkot, K. N. Shah and Johi etc., on the right side of Indus.

Restoration of drainage and irrigation infrastructure must be prioritized in the short, medium, and long-term. Medium and long-term planning must embed the rectification of longstanding issues with the province’s drainage systems. Synchronization of ADP, PSDP, and Donor-assisted programs to address these systemic issues need to be undertaken by rethinking, reviewing and rationalizing the development portfolio in terms of creating fiscal space to finance these strategic interventions.

The strategy suggests that existing programs require a serious review after 2022 floods, and more focus needs to be centered on drainage improvement and infrastructure development.

Analysis of ADP 2022-23 at a glance shows that out of the total allocation (including Foreign Project Assistance) of more than Rs. 32 billion for Irrigation, only Rs. 5.76 billion (18%) have been allocated for reclamation of tubewells and pumping stations. Furthermore, 17 out of the 50 ongoing schemes date back to 2011-2015 and 13 schemes of almost similar nomenclature have been incorporated as ‘new’ schemes in ADP 2022-23. Floods of 2022 have clearly shown that pumping stations alone, without any linkage to the main surface drain, are futile when it comes to the reclamation of agricultural land.

Analysis of PSDP shows negligible investment priority in terms of improving drainage system in Sindh despite being a lower riparian province which carries drainage with and without disaster from all over Pakistan. Non-completion of RBOD since 1990s is a glaring example of neglect to the drainage sector. This makes a compelling case for special attention to complete the same on war footing as well as the writing off of ‘cash development loans’, especially on drainage-related projects.

B. Housing and Community Facilities

Impact

According to the findings of the PDNA, the floods caused the complete destruction of 0.654 million houses while more than 1.05 million houses were partially damaged. The on-ground evidence suggested that these partial damages require considerable rebuilding of infrastructure as in current positions they may be presumed to be significantly damaged.

The Government of Sindh launched house to house physical survey (Joint Survey) with collaboration of Federal and Provincial Agencies. This recently completed joint survey estimates that about 2.1 million houses have been damaged (1.44 million fully damaged and 0.65 partially damaged houses). The quantum of damages warrants a rethinking of the living habitats of communities. Rural houses were particularly impacted, especially in Sindh province, which accounts for more than 83 percent of the total housing damages. The extent of damage incurred to katcha(mud) houses has been higher than that to pucca (brick/stone) houses. As per the PDNA report, housing damages are estimated at about US\$5.5 billion, mostly affecting Sindh (83% of total housing damages). The actual cost of housing damages in Sindh is higher than PDNA estimates (2.1 million vs 1.7 million), given that 0.4 million more houses have been ascertained to be damaged as per the recently completed joint survey. The devastating floods also significantly damaged the infrastructure of cities like K. N. Shah, Thari Mirwah, Kot Diji, etc. The extent of damage incurred to katcha (mud) houses has been higher than that to pucca (brick) houses.

According to the National PDNA estimates, WASH, Community Infrastructure and Municipal Services faced losses and damages of over US\$687 million. A total of 1,346 water and sanitation schemes have been fully destroyed, while 5,714 are partially damaged, requiring major repair and rehabilitation. Out

of this, Sindh's damaged Water Supply & Sanitation schemes are 5,318 (75.3% of the total country's damage). WASH, Community Infrastructure, and Municipal Services in Sindh faced losses and damages of over US\$509 million (74.1% of the total country's damages).

The scattered rural settlements in Sindh makes the service provision a problematic task for the government and other relevant organizations. The dysfunctional water supply & sanitation systems in Sindh have long plagued the province even before the floods. Government of Sindh significantly increased attention to plug points where different types of sewerage and solid waste were polluting the fresh water bodies and resulting in several health issues. However, these issues still persist as the majority of initiatives remains incomplete. Damages and losses of the recent floods have further exacerbated the issue. Shelter-less people, along with non-availability of clean drinking water and sanitation facilities, is a forewarning of a major public health issue on the horizon.

For sustainable solutions vis-à-vis climate resilience, we need to rethink the organization of settlements and communities in a manner where all essential services, like housing, water supply & sanitation, and economic opportunities could be ensured. The deleterious effect of disaster can be turned into an opportunity to build affected villages better than they were before the onset of flood 2022.

Proposed Strategy

The housing strategy must be pursued in a way that paves the way for 'climate-resilience' to withstand the impact of recurring floods. The 'level' of planning needs to be directed at the community and village-level. Direct cash transfers to individuals for rebuilding damaged houses entail that the houses remain vulnerable to disasters. Unless a 'meso-level' perspective is adopted for the reconstruction of houses, as opposed to the 'micro-level' perspective, the essence of climate-resilient housing cannot be achieved. The climate change resilient rural housing and allied infrastructure should be undertaken through community-engagement by redesigning villages. Reconstruction and rehabilitation of partially and fully damaged houses should be pursued with allied facilities inside the house i.e., latrine, kitchen, handpump, and solar system, etc. The shared amenities like proper sewerage system through covered drains ending in disposal stations for the treatment of wastewater based on gravity. Raised street pavements (brick pavements or tuff-pavers) should be adopted to withstand inundation. The overarching idea for climate-resilient houses hinges upon creating climate-resilient communities and villages. The 'Village

Rehabilitation Program’ component incorporated after floods of 2010 into the ‘People’s Poverty Reduction Program’ offers a useful precedence and benchmark for emulation. Direct transfers to individuals for rebuilding houses can be an immediate response, but a more comprehensive climate-resilient housing strategy design needs to be undertaken.

WASH interventions must also be prioritized in tandem with community engagement, outreach, and social mobilization. With open defecation prevalence in the ‘pre-flood context’ as high as 45% in rural Sindh, there is an immediate need to design a more robust WASH strategy in the aftermath of floods.

To summarize, housing development in rural settings / village level may focus on the following goals:

- To rehabilitate the communities back to their villages by providing them low-cost flood resilient houses with allied facilities i.e., latrine, hand pump, kitchen and solar system
- To build flood-resilient brick pavement, sanitation with covered drains and disposal unit/station
- To make the flood-affected villages livable with associated amenities
- To create replicable sustainable low-cost and DRR village infrastructure / development model for other areas of Sindh and Pakistan

For the urban settings, on a strategic level, it won’t be out of place to emphasize on the development of Sindh’s secondary cities holistically. While half of the population in the province live in urban areas, about 25 percent live in secondary cities and is also rapidly growing. Most secondary cities are spreading out at a faster rate than their population growth, growing as ‘pancakes’ with low average densities. Sindh’s physical growth on average is 3.2 percent per year compared to 1.5 percent per year in other provinces, resulting in lower density expansion of cities at their fringes. This limits the opportunity to foster the agglomeration economies necessary to create denser cities but also significantly increases the cost of providing services such as transport, water, education, health and electricity on the one hand. On the other hand, this unplanned growth also locks up fertile agricultural land into a non-productive real estate venture.

There are substantial infrastructure and service delivery gaps in Sindh’s secondary cities. Based on the urban strategies and masterplans developed for 17 cities in Sindh, priority sectors for infrastructure/service improvement include: water supply, sewage, solid waste management, road infrastructure, housing including Katchi Abadis and slums, education, health, recreation, communication network, and economy.

Given this context and recent destruction caused by the floods and rains, the focus of the GoS should be on holistic and integrated development of secondary cities in Sindh focused on improving basic infrastructure and service delivery, building on the completed and ongoing analytical work - specifically the city strategies and master plans.

The World Bank-funded projects, Flood Emergency Housing Project and Sindh Flood Emergency Rehabilitation Program, focus on much needed investments required for housing, WASH, municipal services, food security & livelihood. However, more attention is required on converging efforts and investments to the overall development of rural and urban settlements.

Given the colossal damages to the housing and allied infrastructure, there is a significant financing gap even after incorporating the contribution of above-mentioned projects. The ‘financing gap’ needs to be reduced by redoing and repurposing the existing ADP, PSDP, and FPA projects. The livelihood component, mainly agriculture & livestock, needs to be prioritized at the Federal government level as agriculture sector revitalization is tied to the national food security.

C. Livelihood

Impact

At the national level, the floods have caused losses and damages to the agriculture sector to the tune of US\$13 billion. The affected communities also suffered losses to livelihoods exceeding US\$600 million. PDNA reported about US\$9.2 billion of damages and losses for Sindh to the entire agriculture sector, including livestock & fisheries (71% of the total country’s damage & losses).

According to PDNA estimates, an additional 7.6 million people face food insecurity at the national level, increasing from 7 million to 14.6 million people due to loss of production and price increases. In the pre-flood context, the prevalence of food insecurity was 56 percent of households in the calamity-hit districts in Sindh (3.9 million people). In the post-flood context, the total number of food-insecure people in Sindh is expected to increase to 8.2 million. The biggest share of job losses (50% of national) has been estimated to be in Sindh, i.e. about 2.15 million job losses. The expected delays in the sowing of rabi crops, particularly wheat, will in all likelihood, further reduce food availability and drive price increases in the coming months, making access to food more difficult, particularly for low-income

groups in hard-hit areas. Already being the vulnerable segments of the society, women will be disproportionately impacted by the losses in the agricultural sector affecting maternal health and food security. The dysfunctional market systems have long plagued the agriculture sector with sub-par productivity. The recent floods have disrupted the already underdeveloped value-chains.

The short-term response may be centered on the provision of direct transfers for livelihood losses and wheat seeds (and oil seeds) for agricultural crop losses. However, medium- to long-term measures may be centered on creating incentives for climate-smart agriculture, technology transfer, and enterprise development for improved productivity.

Proposed Strategy

Floods have disrupted the livelihood of the 24 calamity-hit districts of Sindh. The preliminary PDNA estimates for the agriculture sector (including damage to the storage godowns) for Sindh amounted to Rs. 455 billion out of which Rs. 421 billion were attributed to crops damage with more than 3.6 million acres (81%) of cultivated areas being damaged. Additionally, livestock & fisheries also suffered damages of about Rs. 46 billion with the deaths of about 393,000 animals along with damages of about 28,000 animal sheds, 1200 poultry sheds, and 3500 fish farms. Restoration of livelihood is important from an economic standpoint as well as from the food security perspective. Proposed Strategy focuses on improved yield, storage, technology, value-addition, and market reforms with a special emphasis on small farmers (with or without land ownership) and small enterprises.

Although the provision of fertilizers, wheat seeds, and oilseeds is important as an immediate response, it is imperative to pivot toward climate-smart agriculture. The concept of climate-smart agriculture encompasses the concepts of production efficiency, including improvements in climate adaptive technologies, appropriate cropping patterns, feeding strategies, animal health, breeding, manure & waste management, water-use efficiency, and other innovative practices. Augmenting agricultural productivity is essential for 'food-security'. There is significant potential for revitalizing on-farm and off-farm economic activities in Sindh. Small growers, small farmers, and micro-entrepreneurs need to be incentivized to start businesses, improve their productive capacity and generate livelihood opportunities for the downtrodden.

Agricultural hubs need to be created in the secondary cities. Agricultural inputs subsidy restricted to landowners of 1-12 acres and landless people associated with agriculture. Access to agricultural financing, other than microfinance, needs to be explored and implemented. Establishment of silos need to be prioritized to reduce post-harvest storage losses. There is a dire need of investment in agri-

warehousing by incentivizing private sector, and public-private partnership mode and giving due emphasis on other cereals, mainly rice.

For indigenous technology upgradation in the agriculture sector, home-based agricultural technology production needs to be incentivized. Local engineering universities can play a major role in developing such low-cost technologies that can be scaled for localized solutions in agriculture.

Enterprise Development

Every crisis offers an opportunity to undertake substantial reforms that cannot be pursued in the default ‘business-as-usual’ state of affairs. Sindh needs to proactively pursue ‘enterprise development’ to truly initiate an economic transformation. ‘Sindh Poverty Reduction Strategy - 2018’ offers useful prescriptions in this regard to create agglomeration economies vis-a-vis ‘Rural Growth Hubs’ and ‘Urban Economic Clusters’. ‘Enterprise Development’ component of the ‘People’s Poverty Reduction Program’ can be mainstreamed and scaled for amplified impact in rural areas. The fragmented projects aiming to reduce poverty and provide social safety nets need to be integrated for amplified impact.

Digital Inclusion also needs to be pursued to create robust ‘Market Information Systems’ and ‘E-Commerce Ecosystem’ with the objective of diffusion of market information and inter-linkages with the local and international markets. Sindh Domestic Commerce Policy needs to be prioritized and undertaken with a special focus on the flood-affected districts.

Green investments also need to be fostered to mitigate the effects of climate change. The ILO estimates that “100 million jobs can be created by 2030 by ensuring a green transition that fully takes into account its social dimensions.” Being the fifth most populous country in the world, Pakistan can leverage significant benefits with increased demand for green jobs. This may include afforestation on the extended banks of the River Indus, hilly areas, plantation of mangroves in deltaic areas, and urban afforestation. Community members need to be effectively engaged and compensated for the plantation and protection of plants, along with other rebuilding and reconstruction projects. ‘Circular economy’ approach, like recycling units (solid waste and agricultural waste/by-products) with backward and forward linkages at the Union-Council level, can yield substantial benefits for the economy and environment. Post-2022 floods, the government’s commitment to huge reconstruction activities in different sectors (like housing, roads, water supply & sanitation, etc.) presents an opportunity for effectively engaging the local population for job creation and revitalizing the local economy. The untapped potential of green sectors can be illustrated by the handicrafts sector. Pakistan handicrafts’

annual exports hover around US\$255 million compared to US\$3 billion exports by India and about US\$22 billion by Belgium.

D. Communications

Impact

According to the PDNA estimates, the reconstruction needs in Sindh for the 'Roads' sector damaged by the floods amount to the tune of Rs. 102 billion. The damages to the roads network due to the floods in Sindh have significantly disrupted connectivity. Provincial Works & Services Department estimated that a total of 8,463 kilometers of road network has been damaged in Sindh.

The short-term measure of the Government is to rehabilitate the damaged provincial highways and internal roads infrastructure. However, medium to long-term measures must be oriented toward climate-resilient roads infrastructure.

Proposed Strategy

The adaptation of a particular method or combination of different road construction methods is quite site-specific. Adequate field investigation, flood water hydraulics calculation, soil study, and so on should be carried out by competent technical experts; likewise, suitable protection measures may also have to be chosen. The protection measures so chosen should be technically sound, locally feasible, economically viable, and environment-friendly. Protection measures may include flexible pavement, embankment protection, floodways, or causeways. Investment in climate-resilient roads removes the need to spend more money on the frequent maintenance and reconstruction of damaged roads. It helps in the better distribution of supplies and relief materials during and after natural disasters and the quick restoration of normal service.

For the restoration of roads that will be undertaken under the 'Sindh Flood Emergency Rehabilitation Project' and local resources, it is imperative to create backward linkages with the aim of creating local industries and generating local employment. Use of the green techniques for road rehabilitation components, including the use of vegetation, geomesh, gabions, pavement seals, etc. should be coupled with knowledge and technology transfer at local level in the first instance.

The proposed roads rehabilitation activity will focus on damaged roads comes under the municipal and rural roads sector which has hampered the mobility of the local communities. The priority of districts and schemes will be set by the consultation of the concerned line department.

E. Health

Impact

According to the preliminary estimates of the Health Department in Sindh, the floods have caused damages to the tune of Rs. 22 billion. 103 health facilities have been reported to be completely destroyed and 839 have been partially damaged. The Population Welfare Department reported damages of about Rs. 0.93 billion with 165 facilities reported to be completely destroyed and 412 facilities partially damaged.

The short-term measure of the Government is to rehabilitate the damaged infrastructure to restore critical services. However, medium to long-term measures must be oriented toward climate-resilience healthcare infrastructure along with streamlined emergency preparedness and response mechanisms coupled with contingency plans.

Proposed Strategy

The immediate healthcare response must be focused on the resumption of healthcare services along with the prevention of epidemics via proactive disease surveillance. Dewatering of healthcare facilities and their functionalization must be pursued in tandem with the outreach services for critical areas, like immunization and nutrition-related services.

With the current disaster and health emergency, it is imperative to rethink health sector service delivery through a 'systems approach'. Whereby, improvement of referral, functional healthcare facility, availability of essential medicines, reserve medical personnel, mobile healthcare units, etc. should be prioritized to readily deal with disasters. The emergency health services should incorporate 'early warning systems' by building on the already developed rescue services.

In the medium to long term, investment in climate-resilient health infrastructure must be prioritized. The preparation of healthcare response systems must also be mainstreamed and prioritized along with updated health information systems for a proactive response. Human and financial resources need to be augmented to effectively deal with disasters and improve the coverage of emergency services. The contingency plans must be prepared in order to deal with anticipated recurring disasters owing to climate change. Effective Disaster Risk Reduction and Management needs to be incorporated in the health sector plan/strategy. Outreach efforts for health services need to be prioritized with a focus on immunization and nutrition-related services. Augmentation of human resources, mobile health units, and supplies can be priority interventions in the aftermath of floods.

The financial gap of health sector investments can be met by repurposing the existing FPA projects, (like Sindh Human Capital Project, Strengthening Social Protection Delivery Project, Universal Health Coverage), ADP, and Vertical Programs. ADP 2022-23 analysis shows that there are 8 health department's schemes in CFY that were approved before 2010 with total allocation of over Rs. 3.5 billion and throw-forward of Rs. 5 billion. Similarly, there are 96 schemes in ADP 2022-23 that were approved during 2010-18 with total allocation of over Rs. 9.7 billion and throw-forward of Rs. 14.5 billion. If we analyze the impact of such 'lingering' schemes on the improvement of health status of population, and compare with the time and money invested, it clearly shows that the sector is not moving in any direction.

F. Education

Impact

The prevalent multiple problems facing the education sector in Sindh, particularly the significant number of over six million 'out-of-school' children and sub-par learning levels, insufficient infrastructure and compromised regulatory system have been further exacerbated by the impact of floods. According to the preliminary estimates of PDNA for the Education Sector in Sindh, the floods have caused damages to the tune of Rs. 80.3 billion. The damages to the education sector due to the floods in Sindh included Schools, Colleges, Technical & Vocational Institutes, Special Education, and Universities.

A recent in-depth damage assessment by the 'School Education & Literacy Department' of Sindh has estimated that 19,808 schools have been damaged (45% of the total 44,219 schools) with enrolment of over 2.3 million children. The reconstruction and upgradation cost of the damaged schools (Fully: 7,503

and Partially: 12,305) amount to US\$ 1.97 billion. Education has been halted over the last five months in the 24 calamity-hit districts with education facilities either inundated or converted into camps.

The Education Sector requires complete revamp in terms of strategy that focuses on building / availability of building, reducing number of out of school children – by means of engaging public and private sectors, and also PPP by encouraging small education entrepreneurs through financial services.

Proposed Strategy

The immediate response must be focused on the resumption of education services to avoid any further learning losses. The medium to long-term strategy must focus on climate-resilient education infrastructure along with the consolidation of facilities (esp. one-room and or non-functional schools). Temporary learning facilities, Virtual learning, and digital inclusion must also be prioritized, especially in the rural areas of Sindh. The crisis must be used as an opportunity to rationalize and consolidate the education facilities (as per international catchment population standards) for adequate climate-resilient infrastructure and improved service delivery. As with other prioritized sectors, the Government can work on repurposing existing projects in education for flood-responsive programming.

In the medium term, the community can also be engaged to provide learning spaces on rental basis for schools, whereas teachers and other man-power could be the joint responsibility of the Government and the Community. For this purpose, the funds available in the district as part of development funds by the corporations may also be utilized. District Education Board, with representation from the government, relevant organizations, and community, can be a potential pathway for inclusive decision-making regarding all the facets of education in the respective districts. Substantial fiscal space can be created by off-loading ADP schemes of non-significant value which are not translating into desired educational services. FPA Projects (e.g. Sindh Early Learning Enhancement through Classroom Transformation, Development through Enhanced Education Program, Sindh Secondary Education Improvement Project, etc.) can be realigned with the strategic objectives of reducing ‘out-of-school’ children by 50 percent, improvement of classroom learning environment, and reducing drop-out rate. ADP 2022-23 analysis shows that there are 9 school education schemes in CFY that were approved before 2010 with total allocation of Rs. 0.13 billion and throw-forward of Rs. 5.73 billion. Similarly, there are 33 schemes in ADP 2022-23 that were approved during 2010-18 with total allocation of over Rs. 3.24 billion and throw-forward of Rs. 5.34 billion. Although the amount is not substantial; however, the continuity of such schemes neither contribute to the development nor to improving learning levels of children.

The existing model of education needs to be rethought and redesigned to impart functional literacy and vocational skills in both public and private schools for adolescents. Self-paced learning with a focus on transferable, vocational, and entrepreneurial skills may yield the intended results that the prevalent education system has failed to achieve. Skills development needs to be mainstreamed in schools to spur socio-economic transformation. The focus of the strategy must encompass the entire spectrum of private, public, and public-private partnership schools. Lastly, the previously run ‘school health’ projects must be revived to address critical areas of nutrition, eyesight checkups, and bi-annual screening of children.

G. Human Impact (Poverty, Food Security, Psycho-Social Impact)

Impact

While it may be tempting to quantify the impact of damages caused due to floods, it is important to center the narrative on the ‘human impact’. The mental trauma of losing your loved ones, livelihood, and belongings cannot be monetized. Millions of people that have been affected are in the need of psycho-social support services for returning to some semblance of normalcy. The incidence of ‘Gender-Based Violence’ might be on the rise due to the mental toll of the damages due to floods.

It is estimated that poverty in Sindh might increase by 9.7 percentage points. This essentially means that an additional 5 million people might fall below the poverty line (17.15 million people in total). Additionally, the incidence of food insecurity is a certainty for the province. According to the PDNA report, Sindh already has the highest prevalence of food insecurity in the calamity-hit district, i.e. 56 percent (3.9 million). An additional 4.3 million people in the province are estimated to face food insecurity due to the floods. Beyond the deliberation of monetary damages, it is essential to empathize with the multi-faceted adverse impacts on the flood-affected population. The decade-long poverty-related investments in Sindh have been ravaged by the floods.

Proposed Strategy

Sindh’s ‘People’s Poverty Reduction Program’ has been ongoing in the province for a decade with multi-pronged interventions like vocational training, community investment funds, village rehabilitation, income-generating grants, low-cost housing, and other components. With a community-based model of local development, the Program has been scaled to all the impoverished districts of Sindh with an outreach to more than 1.4 million households belonging to lowest income quintile. Over time, the

provincial government has built upon the cumulative learnings of the ‘People’s Poverty Reduction Program’ (PPRP) to consolidate the programmatic efforts into a ‘Sindh Poverty Reduction Strategy’ in 2018 to offer sustainable solutions to both urban and rural poverty. The Strategy must be operationalized expeditiously in order to alleviate the sufferings of the flood-affected population and ensure their socio-economic empowerment. Similarly, the mental health aspect of the flood-affected population must not be overlooked. The Strategy focuses on further strengthening existing programs and initiatives (PPRP, PRS, SEDF, etc.) and other cross-cutting investments reflected in ADP, EU-funded GRASP and PAIDAR² projects, and aligning them with the core pillars of community-driven local development, rural growth/service hubs, and urban economic clusters.

A comprehensive package of psycho-social support services, including GBV-focused interventions, must be integrated within the existing healthcare facilities. Vulnerability assessments can be undertaken across multiple dimensions spatially to prioritize the phase-wise rollout of initiatives and earmarking resources. The well-being of women and children must be central to any flood-related strategic policy.

² Growth for Rural Advancement and Sustainable Progress (GRASP) & Poverty Alleviation & Inclusive Development Across Rural Sindh (PAIDAR)

V. Budgetary Framework: Provincial ADP Analysis

While it is clear that the quantum of damages caused by the recent floods is unprecedented that cannot be met solely through local resources, it is a worthwhile exercise to undertake a critical analysis of the Provincial Annual Development Program for the current financial year. The analysis would help deconstruct the primary instrument of public sector development in the province to ascertain the potential of creating 'fiscal space' for conceiving new development projects aligned with climate change.

Ongoing Schemes included in FY 2022-23:

The analysis of ongoing schemes included in the ADP for CFY that were approved before 2010 shows the following insights:

62 schemes are included in the ADP for CFY with an estimated cost of about Rs. 58.5 billion and a throw-forward of Rs. 21.1 billion. The cumulative allocation for these schemes in CFY is Rs. 8.1 billion (38.5% of the throw-forward).

The summary of schemes approved before 2010 is as follows:

(In Rs. Million)

S. No.	Department	No. of Schemes	Cost	Throw-Forward	Allocation
Total		62	58,487.89	21,120.03	8,139.29

The analysis of ongoing schemes included in the ADP for CFY that were approved between 2010 and 2018 shows the following insights:

567 schemes are included in the ADP for CFY with an estimated cost of about Rs. 416.6 billion and a throw-forward of Rs. 171.8 billion. The cumulative allocation for these schemes in CFY is Rs. 65.8 billion (38.3% of the throw-forward).

The summary of schemes approved between 2010-18 is as follows:

(In Rs. Million)

S. No.	Department	No. of Schemes	Cost	Throw-Forward	Allocation
Total		567	416,572.49	171,754.74	65,840.82

The analysis of ongoing schemes included in the ADP for CFY that were approved after 2018 shows the following insights:

1,867 schemes are included in the ADP for CFY with an estimated cost of about Rs. 405.6 billion and a throw-forward of Rs. 314.2 billion. The cumulative allocation for these schemes in CFY is Rs. 178.7 billion (56.9% of the throw-forward). (Annexure-I)

Key Takeaway: A total of 629 ongoing schemes that were approved before FY 2018-19 have been included in the Provincial ADP for CFY with an allocation of about Rs. 74 billion. In terms of the total allocation of the CFY, this essentially means that the allocations for pre-FY 2018 approved schemes are about 29.3% of the total allocations for the ongoing schemes.

Interestingly, the (allocation/throw-forward) for the schemes approved before FY 2018 is about 38% compared to about 57% for the schemes approved after FY 2018. The aforementioned analysis warrants a serious consideration of deleting ‘lingering’ schemes with a token allocation that have been approved in the last five years or before that.

Repurposing of Provincial ADP

Government of Sindh has created a fiscal space of ‘Rs.87 billion’ from 991 ongoing and 1652 new schemes included in the ADP 2022-23 that have been re-purposed for rehabilitation of emergent works in Post Flood Scenario:

- Reducing 50% allocation from 991 ongoing schemes, i.e. Rs. 47.98 billion revised instead of Rs. 95.97 billion of the original allocation
- Reducing 50% allocation from 1652 new schemes, i.e. Rs. 39.5 billion revised instead of Rs. 79.01 billion of the original allocation

Identification of Provincial ADP Schemes Contributing to Floods Rehabilitation

Government of Sindh has identified a total of 1,128 schemes with an allocation of about ‘Rs.47.3 billion’ from 808 ongoing schemes and 320 new schemes included in the ADP 2022-23 and will contribute to the emergent works in Post Flood Scenario

Reorienting New Development Schemes within the Provincial ADP

Government of Sindh has allocated a total of ‘Rs.79.01 billion’ for 1,652 new schemes included in the ADP 2022-23. A principle decision can be taken to reorient all the new development schemes, especially in the calamity-hit districts, towards flood response. These may include directly contributing towards flood response or indirectly contributing towards flood response. Examples of indirect contribution may include embedding climate-resilient, hazard-resistant, and/or environment-friendly components in the social, production, and infrastructure sector projects. Similarly, production sector projects may focus on projects that are centered on promoting green investments. For example, the Agriculture sector may prioritize climate-smart agriculture investments, deep-well bore drilling technology, and rain harvesting. New schemes that prioritize ‘green investments’ may be incentivized by the competent fora via expeditious appraisal and subsequent approval after fulfilling codal formalities.

Embedding Climate Change Policy in Planning Systems

The normative goals of **Sindh Climate Change Policy 2022** may be taken into consideration for conceiving, planning, appraising, approval, and implementing of new schemes:

- Promote renewable energy resources to reduce Green House Gases (GHG) emissions from industries
- Control emissions and effluents from the industries and transport sectors
- Encourage efficient and green transportation modes
- Reduce aviation emissions to combat climate change
- Ensure Nature Based Solutions (NbS) to achieve mitigation and adaptation
- Steps to minimize marine pollution
- Develop resilience for the Province against Climate Change & Climate-induced impacts

VI. Public-Private Partnerships

In the post-devolution context, Sindh has already been at the forefront of leveraging public-private partnerships across energy, infrastructure, production, and social sectors for improved service delivery. Sindh was the first province to enact the ‘Public-Private Partnership’ law (i.e. Sindh PPP Act of 2010) to mainstream PPP as an instrument for improved service delivery. The focus of the policy should be to build upon the successful PPP models to enhance the level of private-sector partnerships and investments by simplifying the regulatory regime.

The Institutional Arrangements for PPP in Sindh

- A high-level Public Private Partnership Policy Board, headed by the Chief Minister of Sindh, to formulate PPP Policy based on strategic goals and implementation in the Province
- A central PPP Unit established in the Finance Department to assist the PPP Policy Board in formulating and implementing PPP policies
- PPP Nodes as focal points for specific PPP projects in line departments, like the PPP Node established in the School Education & Literacy Department

As the discourse for the transition towards the green economy and climate-resilient investments has come to the forefront, it is imperative that Sindh effectively leverages public-private partnerships for sustainable investments. For example, the private sector can be effectively channelized on an equity-based model for investments in the Solar Parks to be developed by the Government. The government’s land can be utilized as equity in a Solar Park while subsidizing service providers for providing solar systems on newly-built houses after floods. Similarly, the market for agriculture implements can be a fertile ground for private sector investments. For increasing productivity and farm mechanization, a ‘machine pool’ (like tractors, bulldozers, levelers) may be expanded with the help of public-private equity and revenue generated through rents. The revenue can be used for the operation & maintenance of the ‘machine pool.’ Another avenue is to harness the private sector investments for business development services for small & medium enterprises to incentivize innovative climate-adaption and mitigation solutions.

The economic revival and employment can be fostered by harnessing public-private partnerships across sectors with the potential of creating green jobs, particularly at the ‘bottom of the pyramid’. The focus on the ‘recycling’ sector can yield dual benefits on revitalizing local economy and gaining access to carbon markets through greenhouse gases reduction/sequestration. Cost-Effective Recycling Units can be created at the Union-Council level to tap into the economic potential and multiplier effects of the recycling sector. Local Government Department – Sindh Solid Waste Management Board (SSWMB) can play an instrumental role in harnessing the untapped economic potential of waste recycling in Sindh (solid waste and agricultural waste).

The Government of Sindh is planning to implement a ‘Forestation’ project, under PPP mode, over 100,000 hectares spanning four districts along the riverine area. Similarly, a community-based project to convert cow dung into biogas is being conceptualized under the public-private partnership framework. Such initiatives can go a long way in terms of promoting carbon sequestration and catalyzing inclusive economic growth.

Sindh Enterprise Development Fund (SEDF) is the relevant agency for bridging the financing gap between micro- & small-enterprises and microfinance institutions in rural Sindh. With microfinance institutions charging exorbitant interest rates on loans, SEDF’s scope can be reconfigured to absorb the mark-up on loans from MFIs to these enterprises. Micro- and small-enterprises that lack collateral and unreasonable documentation requirements can benefit immensely through SEDF’s intervention in facilitating access to finance.

The relevant projects with the Public-Private Partnership Unit that can be considered for green financing are as follows:

- Mango Processing Project
- Larkana Fruit & Vegetable Wholesale Market Project
- Khairpur Khajoor Wholesale Market Project
- Dates Dehydration Project

Public-Private Partnership and International ‘Green’ Funds

International Funds, like (Green Climate Fund, Adaptation Fund, Least Developed Countries Fund & Special Climate Change Fund) can be a potential avenue for financing climate-resilient initiatives and incentivizing green economy and entrepreneurship. The recently approved ‘Loss and Damage Fund’ at the COP 27 can also be a potential funding source, once the institutional arrangements and implementation modalities are finalized, to harness public-private partnerships for climate-resilient investments. Given the ‘stressed’ economic conditions in the country, **the Government needs to proactively work with the private sector to conceptualize and concretize ‘green’ projects to access and effectively utilize the aforementioned international funds.**

Public-private partnerships can be streamlined, channelized, and harnessed to catalyze the development of green projects across prioritized areas with the dual objective of revitalizing the economy and focusing on sustainable investments, including international financing arrangements. ‘Common Facility Centers’ can be introduced across districts for providing the most commonly needed facilities such as marketing, testing & quality measuring centers, and other business development services to facilitate enterprise development and reduce their respective operational costs and investments. The incubation centers and accelerators need to be reoriented to foster localized innovative green solutions to invigorate job creation and economic revitalization.

VII. Summarizing the Financing Gap

Post-Disaster Needs Assessment mentions that the estimated reconstruction financing needs for Sindh amount to US\$7.86 billion. The financing needs are the bare-minimum reconstruction needs that are lower than the damages (US\$ 9.07 billion) and losses (US\$ 11.4 billion). With estimated donor commitments of about US\$ 1.84 billion, a significant financing gap of US\$6.02 billion remains for Sindh. It must be reiterated that the in-depth damage assessments of housing and education sectors entail that the financing needs and gaps for Sindh are anticipated to be more than the PDNA estimates.

Local financial constraints dictate that global support is mobilized and channelized towards the priority sectors in Sindh for expeditious interventions. The investments need to be undertaken for not only providing immediate humanitarian support, but also addressing the underlying longstanding issues that have exacerbated the drainage. Given the resource constraints, it is imperative to prioritize addressing the drainage systems, strengthening the poverty reduction programs, enterprise development, and education sector.

Streamlining Investments to Bridge the Climate Change Financing Gap

In addition to pursuing global financing, the government(s) should undertake a serious review of the provincial ADP, PSDP, and FPA projects to:

- Realigning overall development portfolio with prioritized sectoral investments
- Repurposing existing projects to address the adverse climate change impact
- Conceiving new projects in consonance with holistic climate-change considerations
- Removing 'lingering' schemes that are persisting with no anticipated completion on horizon
- Creating 'green cooperation' mechanisms to mainstream and channelize green investments towards the priority sectors

VIII. Recommendations for Institutional Strengthening and Governance Structures

The Strategic Policy has clearly delineated the prioritization of investments that must hinge upon rectifying existing systems, building upon existing models, people-centered approach, and aligning budgetary framework with resource commitments. For optimizing flood-related interventions and investments, recommendations are proposed with regard to improving governance structures and institutional strengthening:

- All relevant departments must have key agency/action plans to cope with the impact of floods and improve institutional readiness to deal with such calamities in the future
- The longstanding issue of ‘drainage’ needs a more focused institutional emphasis as SIDA in its present state seems to be complementing the work of the Irrigation Department which needs to be reoriented towards drainage as well
- The existing Monitoring & Evaluation Systems should also be reconfigured to provide effective decision support system (including real-time data) to counter any calamity or disaster
- Government should take necessary measures to establish and institutionalize ‘Climate Resilient Infrastructure Fund’ and ‘Climate Change Financing Arrangements’
- The overarching goals and core objectives of ‘Sindh Climate Change Policy 2022’ must be embedded in the government’s planning and development systems to promote and prioritize green investments
- Institutional Strengthening of the ‘Provincial Disaster Management Authority’ needs to be undertaken in tandem with a robust cross-sectoral ‘Disaster Risk Reduction and Management Strategy’

IX. Conclusion

As delineated in the ‘Post-Disaster Needs Assessment’, Sindh has been at the receiving end of disproportionately significant damages and losses due to the recent floods. The adverse impact of climate change has disrupted every conceivable facet of life in the province. In this catastrophic context, ‘Business-as-Usual’ approach would be extremely detrimental to the province. The adverse impact of floods has ‘undone’ a significant chunk of public sector investments in the province as it permeated across all sectors. The well-documented scale of devastation should serve to catalyze the public sector development paradigm toward sustainable climate-resilient planning, programming, and investments.

A ‘Transformational Path’ needs to be pursued that is centered on addressing the ‘systemic’ issues that exacerbate the climate change impact and embedding environment-friendly practices in the public sector planning and development systems. The strategic policy document is a ‘live document’ that aims to guide Sindh’s Flood Response, from a medium- to long-term perspective, to foster climate-resilient policies and strategies. The document may be recalibrated, reconfigured, and updated as per the evolving situation. The core focus of the strategy is to serve as a guide for the prioritization of the planning, programming, and implementation for Sindh in the post-flood context.

The four pillars of the strategic policy hinge upon ‘Rectifying the Systemic Issues’, ‘People-Centered Approach’, ‘Building Upon the Existing Models’, and ‘Aligning Existing Budgetary Framework with Resource Commitments’. The priority sectors of Drainage Systems (including Irrigation), Housing and Community Facilities, Livelihood, Communications, Health, and Education are focused as pivotal paths to sustainable recovery. However, it is important to center the narrative on the ‘human impact’. The mental trauma of losing your loved ones, livelihood, and belongings cannot be quantified or monetized. It must be acknowledged that the recent floods have incurred irreversible damages to countless lives in Pakistan, especially Sindh. The strategizing of flood response must put the affected population and its problems at its central core. The mainstream narrative must not shift from the massive humanitarian needs of the communities due to this catastrophe.

From 2010 floods to the recent floods of 2022, the recurring devastation in Sindh needs to be seriously considered at the national level. Every disaster Sindh faces, being a lower riparian province, poses three types of losses: i) Loss of existing infrastructure, ii) expenses on early response & recovery, iii) expenditure incurred on reconstruction. It takes time and money to build such resilient structures. It is unsustainable to undertake such investments which are prone to disasters every ten years. Hence, resilient infrastructure development, and sustainability requires constant hand-holding and investments. For this, Federal Government and International Development Agencies can play their role. As a bare-minimum, Sindh should get 1% from the National Finance Commission (NFC) on account of being disproportionately affected by the climate-change phenomena. Similarly, the province should also get its due share from the recently announced 'Loss and Damage Fund' at COP 27.

Public sector resource constraints might limit the fiscal space for dealing with the scale of devastation in Sindh. However, the process of repurposing existing projects along with the conceptualization of new climate-resilient projects should continue. The role of the 'private sector' must not be overlooked as government can create an enabling environment for private sector investments in the green sector. Redirecting the development paradigm towards 'green investments' can provide an impetus to revitalize the economy, especially for the vulnerable and marginalized segments of the provincial population. With a global shift towards 'green transition', multi-pronged public-private partnerships can be leveraged to address the climate-related issues facing the country, especially Sindh.

Annexure – I

The departmental breakdown of the schemes approved before 2010 is as follows:

(In Rs. Million)

S. No.	Department	No. of Schemes	Cost	Throw-Forward	Allocation 2022-23
1	Agriculture	1	490.50	117.95	67.95
2	Board of Revenue	3	2,697.90	367.57	201.25
3	Culture, Tourism, Antiquities & Archives	1	86.90	39.74	0.50
4	Education (School)	9	13,691.30	5729.49	131.01
5	Education (College)	2	3,211.60	482.31	327.83
6	Education (U & B)	2	1,301.50	174.83	152.14
7	Education (STEVTA)	1	110.30	47.13	47.02
8	Excise & Taxation	1	86.50	0.18	0.18
9	Health	8	13,510.50	5,035.84	3,513.70
10	Home	3	1,110.40	190.36	50.00
11	Industries & Commerce	2	301.60	212.99	58.69
12	Law, P.A. & Prosecution	4	748.80	265.50	35.04
13	Livestock & Fisheries	4	2,954.70	191.54	4.00
14	Matching Allocation	2	3,555.80	3,555.80	48.00
15	Provincial Ombudsman	1	75.00	19.06	3.75
16	Public Health Engineering	4	1,595.80	269.58	296.97
17	Social Welfare	1	265.00	121.22	69.66
18	Sports & Youth Affairs	5	4,238.50	880.08	155.20
19	Transport & Mass Transit	1	102.20	25.71	0.10
20	Works & Services	7	8,353.20	3,393.21	2,976.30
	Total	62	58,487.89	21,120.03	8,139.29

The departmental breakdown of the schemes approved between 2010-18 is as follows:

(In Rs. Million)

S. No.	Department	No. of Schemes	Cost	Throw-Forward	Allocation 2022-23
1	Agriculture	6	8,835.50	5,838.71	1,822.13
2	Auqaf, Zakat, Ushr, RA	3	325.90	94.01	47.71
3	Cooperative	1	118.40	11.00	11.00
4	Culture, Tourism, Antiquities & Archives	14	5,381.80	1,443.61	791.92
5	Education (School)	33	22,685.40	5,339.25	3,244.68
6	Education (College)	13	14,607.60	6,732.42	2,861.43
7	Education (U & B)	27	25,103.90	15,452.53	4,026.90
8	Education (STEVTA)	17	7,919.00	4,680.79	1,030.04
9	Education (DEPD)	1	199.90	101.29	98.28
10	Energy	1	440.11	275.19	114.00
11	Environment	3	288.00	148.71	148.71
12	Finance	2	6891.40	6293.49	1016.90
13	Food	2	1052.70	692.68	235.47
14	Health	96	42,847.40	14,563.40	9,739.81
15	Home	31	13,205.10	8,002.36	2,172.65
16	Human Settlement	2	78.60	27.40	21.05
17	Industries & Commerce	3	1899.33	558.18	113.64
18	Information S&T	1	382.70	264.57	261.94
19	Irrigation	49	42,213.40	7,975.40	2,838.78
20	Law, P.A. & Prosecution	26	5,572.50	1,848.59	666.36
21	Lining of Main Canals	1	9,989.70	3,139.34	800.00
22	Livestock & Fisheries	6	4,896.30	3,564.05	351.30
23	Local Government	85	87,284.60	37,213.85	12,455.17
24	Matching Allocation	2	6,308.50	797.25	382.00
25	Mega Projects Khi	1	214.50	102.34	102.34
26	Mines and Minerals	1	39.80	39.80	19.50
27	Minorities Affairs	4	2,514.00	1,532.33	138.44
28	Planning & Development	8	12,979.30	5,939.76	4,074.18
29	Population Welfare	2	2,554.60	1,429.75	159.82
30	Public Health Engineering	52	26,228.80	9,071.69	5,898.70

S. No.	Department	No. of Schemes	Cost	Throw-Forward	Allocation 2022-23
31	Rehabilitation	1	891.90	315.20	220.00
32	Rural Development	3	6,827.00	1,158.11	502.00
33	SGA&CD	12	13,349.50	10,976.57	793.69
34	Sindh Revenue Board	2	2,460.20	2,460.17	10.00
35	Social Welfare	5	276.30	99.10	43.38
36	Thar Coal Infrastructure	2	5,186.40	1,695.53	34.72
37	Transport & Mass Transit	3	4,707.70	1,290.88	1,248.05
38	Women Development	6	799.90	393.20	202.55
39	Works & Services	40	29,015.20	10,192.27	7,141.58
Total		567	416,572.49	171,754.74	65,840.82

Annexure – II

Joint Survey – Flood Damage Assessment 2022 (Housing in Sindh)

District	HHs (Fully Damaged)	HHs (Partially Damaged)
Khairpur	224,346	54,820
Dadu	133,295	34,714
Kambar Shahdadkot	118,132	29,478
Naushahro Feroze	105,110	43,688
Larkana	102,163	30,455
Jacobabad	89,784	24,073
Shaheed Benazirabad	72,791	41,588
Shikarpur	72,212	19,047
Sanghar	66,464	39,443
Badin	62,124	49,125
Ghotki	52,152	32,668
Sukkur	51,334	32,958
Mirpur Khas	49,943	36,516
Kashmore	44,540	32,027
Jamshoro	43,290	18,460
Umerkot	31,797	36,811
Matiali	26,662	20,043
Sujawal	25,531	27,168
Tando Allahyar	20,597	9,555
Tando Mohammad Khan	18,801	9,628

Thatta	11,684	13,084
Hyderabad	9,069	11,119
Tharparkar	5,056	3,786
Malir	37	18
Total	1,436,914	650,272
