



## NDRMF Completes Restoration of the **SURJANI COMPLEX BUND, DISTRICT SUJAWAL SINDH**

**5.6 kilometer river training structures has been rehabilitated to protect communities along the Indus River**

Located in south-eastern Pakistan, Sindh spans 140,914 square kilometres, nearly 18 percent of Pakistan's landmass. As the downstream province of the Indus Basin, it receives vast volumes of water from the Indus and its tributaries before they reach the Arabian Sea. During the July – September monsoon, peak river flows, including hill torrents from Balochistan, pass through Sindh and can cause the Indus to overflow. The province's flat terrain, along with sea intrusion, cyclones and coastal storms, further increases its flood vulnerability.

Sindh faces multiple flood hazards, including high river flows, riverine flooding, embankment breaches and backwater flooding, threatening communities, infrastructure and livelihoods.

NDRMF funded project: Rehabilitation, Raising and Strengthening of Spurs along Surjani Complex Bund, Village Lower Pinyari, UC Pinyari, district Sujawal, Hyderabad Division, Sindh



### The Devastation of 2022

The unprecedented floods of 2022 exposed the immense challenges faced by Sindh, as



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torrential rains and exceptionally high river flows inundated large parts of the province, damaging infrastructure, affecting communities and disrupting livelihoods. With Sindh accounting for approximately **50% of rehabilitation and reconstruction** needs, the disaster highlighted the need for timely investment in resilient flood protection infrastructure to safeguard lives, livelihoods and public assets against future floods and climate-related risks.

### Sujawal: On the Frontline of Floods

Among Sindh's most vulnerable districts, **Sujawal** lies in the lower Indus Basin, exposed to

**Complex Bund** lies along a highly vulnerable river reach where the river directly strikes the bund, making it a critical **first line of defence** for nearby

settlements, agricultural lands and infrastructure.

Constructed in **1965**, the bund has faced increasing pressure as the river shifted towards the left bank. A breach in 1988 led to the construction of five protective spurs to divert river flows from vulnerable sections. Despite these measures, floods in **2010, 2015 and 2020** caused significant erosion and damage, while the **2022 floods further weakened the embankment system and heightened the risk of failure.**

### When 650,000 Cusecs Threatened Sujawal

During the 2022 floods, approximately **650,000 cusecs**

Despite these measures, severe floods in 2010, 2015 and 2020 caused significant erosion and damaged critical structures. The unprecedented floods of 2022 further weakened the embankment system, pushing it to the brink of failure.

the shifting course and force of the river. Situated downstream of Kotri Barrage, the **Surjani**

of water passed through the Surjani Complex Bund area. The intense flow severely eroded the

embankment and damaged the protective spurs, leaving portions of their lower sections washed away and their levels below the **High Flood Level (HFL)** increasing risk of catastrophic breach.

The high flows also generated powerful **vortex/eddy** near the bund, causing intense turbulence and deeper-than-normal scour. As the spurs played a vital role in diverting floodwater away from the main bund, raising and strengthening the eroded sections became essential to control the river and protect the bund from further damage.

Accordingly, the **apron, spurs, studs and stone pitching** required strengthening to restore the system's stability and ensure its long-term protection against high flood flows.

### NDRMF Invested in a Stronger Flood Defence System

Recognizing the need to restore flood mitigation infrastructure damaged during the 2022 floods, the **Asian Development**

National Disaster Risk Management Fund (NDRMF) provided 100% financing for the rehabilitation, raising and strengthening of the Surjani Complex Bund under the "Building Resilience of Damaged Flood Mitigation Structures Along River Indus in Sindh."

**Bank (ADB)** provided financing for rehabilitation, restoration and reconstruction. Within this financing window, the **National Disaster Risk Management Fund (NDRMF)** provided **100% financing** for the rehabilitation, raising and strengthening of the

Surjani Complex Bund under the project “**Building Resilience of Damaged Flood Mitigation Structures Along River Indus in Sindh.**”

Implemented by the **Irrigation Department, Government of Sindh**, the intervention was designed to **stabilize the riverbank, strengthen vulnerable sections of the embankment and divert flood waters away from populated areas**, thereby improving the bund’s ability to withstand future flood events.



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### Major Rehabilitation Works

The project rehabilitated and strengthened **5.64 kilometres** of flood protection infrastructure, including:

- **Bund Apron:** The existing apron was restored to the required design provision to provide protection against **severe scour and erosion** caused by direct river action and vortex formation.
- **Bund Top:** The bund top was upgraded to **30 ft**, improving its overall stability, strength and flood resistance.
- **Spurs and Studs:** Existing spurs and studs were raised/ upgraded to **30 ft** to strengthen protection against **direct river attack, hydraulic forces, erosion and deep scouring**.
- **Stone Pitching:** Damaged and deteriorated stone pitching was restored in

accordance with the approved design, strengthening the river-side slope against **high-velocity flows and severe erosion**.

- **Protection against Severe Hydraulic Action:** Particular attention was given to the bund’s exposure to **direct river flow and powerful vortex/eddy action**, where scour depths were considerably greater than normal. The rehabilitation measures therefore strengthened vulnerable sections against **severe hydraulic forces and deep scour**, addressing deterioration and other deficiencies in the pre-project structure.

The completed works have enhanced the structural stability, flood protection capacity and reliability of the

Surjani Complex Bund, strengthening its resistance to erosion, scour and hydraulic stresses.

The intervention goes beyond the restoration of damaged works, upgrading the bund to a stronger and more reliable flood protection asset with improved operational performance and an expected longer serviceable life, subject to proper inspection and maintenance.

This provides more reliable protection for surrounding communities, agricultural areas and critical infrastructure against future flood conditions.

### Flood 2025: Water Passed Safely Through Surjani

The rehabilitation and strengthening measures have improved the reliability and flood protection capacity of the Surjani Complex Bund. During the **2024 and 2025** flood events, the bund withstood direct river attack and associated hydraulic pressures without major damage.

In 2025, approximately 400,000 cusecs of water passed safely through the area, while the



Surjani Complex Bund

rehabilitated embankment and strengthened spurs remained intact, demonstrating the effectiveness of the protection measures and the value of the rehabilitation investment.

The rehabilitation has **substantially addressed the visible deficiencies of the Surjani Complex Bund**, improving its structural stability, scour protection, resistance to direct river attack and overall flood protection capacity. The intervention has transformed a highly vulnerable river reach into **a stronger and more resilient flood protection system**, with improved long-term serviceability.

### Protecting Lives, Livelihoods and Critical Infrastructure

The rehabilitated bund provides a stronger line of defence against high flood flows, reducing the risk of overtopping, breaching, erosion and structural deterioration.

Today, the Surjani Complex Bund protects **78,000 people**, along with agricultural lands and livelihoods, irrigation and water infrastructure, roads, schools, public facilities and community assets.

The rehabilitation represents an important **disaster-risk-reduction intervention**, strengthening Sujawal's

preparedness and resilience while enhancing the long-term protection and serviceability of critical flood infrastructure against future flood events and climate-related hydraulic stresses.

### Building Resilience for Future Generations

The rehabilitation of the Surjani Complex Bund is an **investment in resilience**, strengthening protection for lives, livelihoods and critical infrastructure against future flood risks. By reinforcing this critical flood defence system, NDRMF has helped transform vulnerability into greater preparedness and resilience.

From the devastating floods of 2022 to safely withstanding **400,000 cusecs in 2025**, the Surjani Complex Bund now stands stronger – protecting communities along the Indus and supporting a more resilient future



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