# Climate-Resilient WASH Governance:

## Forecasting-based, community-owned adaptation (2018–2025) in Jaipur and Bhubaneswar

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# Introduction and Statement of the Problem

- Climate extremes and system failures are no longer peripheral shocks but routine stresses shaping WASH outcomes
- Evidence drawn from informal settlements across two climate-vulnerable Indian cities of Bhubaneswar and Jaipur
- Focus on governance systems that anticipate, absorb, adapt, and recover WASH services under stress
- Translating climate and contamination risk information into local WASH action
- Lowering long-term risk through institutionalised routines and controls

**Operating principles across all components:**

- Community ownership and continuous monitoring as an operating logic
- System strengthening, not parallel delivery
- Inclusion, gender responsiveness, and last-mile reach

# Why Climate-Resilient WASH Governance is Necessary

- Floods, cyclones, heatwaves, and prolonged water scarcity now directly disrupt: water supply continuity, toilet functionality, and drainage and containment systems
- Informal settlements face: **higher exposure to contaminated water**, longer service downtimes, delayed emergency response
- Evaluations and ward planning processes show climate risk is now a primary determinant of: public health outcomes, gendered care burdens, equity in access to WASH services
- **Core problem:** Traditional WASH systems are reactive and infrastructure-centric

*These findings emerge in a period of declining programme credibility and fragmented accountability in urban and rural WASH, making micro-governance evidence especially critical.*

# Context and Institutional Architecture

This focuses on contribution, not attribution, and on relative performance under stress rather than absolute service outcomes.

**Settlement level:**

- Community Management Committees (CMCs)
- Sanitation Sub-Committees (SSCs)
- Frontline monitoring of toilets, water points, drains

**Ward level:**

- Single Window Forums
- Engineers, PHED/WATCO, SWM, health staff, SHGs, MAS

**City level:**

- Multi-Stakeholder Forums
- Municipal corporations, PHED/WATCO, women & child development, health departments

**Function:** Pre-agreed triggers, roles, budgets, and response protocols for preparedness, emergency action, and follow-up.

# Early Warning & Communication Systems: From Climate Data to WASH Decisions

**IVRS & Community Radio (Jaipur Vaani, Janhit Vaani)**

- Heatwave, heavy rainfall, flood alerts
- Water storage, chlorination, and toilet-use advisories
- Emergency contamination warnings (do not drink, boil water, alternate sources)
- Caller Clubs ensured outreach beyond phone-owning households

**IEC Wall Posters**

- Seasonal and emergency checklists displayed in settlements
- Pre-monsoon, heat-season, flood, and contamination-response actions
- Reinforced routine preparedness and rapid response behaviours

**Initial gaps identified:**

- Climate and rainfall alerts did not guide WASH operations
- Water contamination risks were detected late, after illness spread
- Smartphone-based systems excluded the poorest households
- Alerts reduced information gaps but did not eliminate service disruptions during extreme events.

**Governance response:**

- Forecasts and alerts were experimentally translated into **specific, localised WASH actions**

# Saniwall – From Monitoring to Emergency Response Tool

**Original function:** Public, ward-level dashboard tracking water, toilet and solid waste management functionality

**Redesigned to include:**

Early warning indicators:

- Water colour, smell, turbidity complaints
- Sudden diarrhoeal cases
- Pipeline breakage or backflow risk

Emergency response columns:

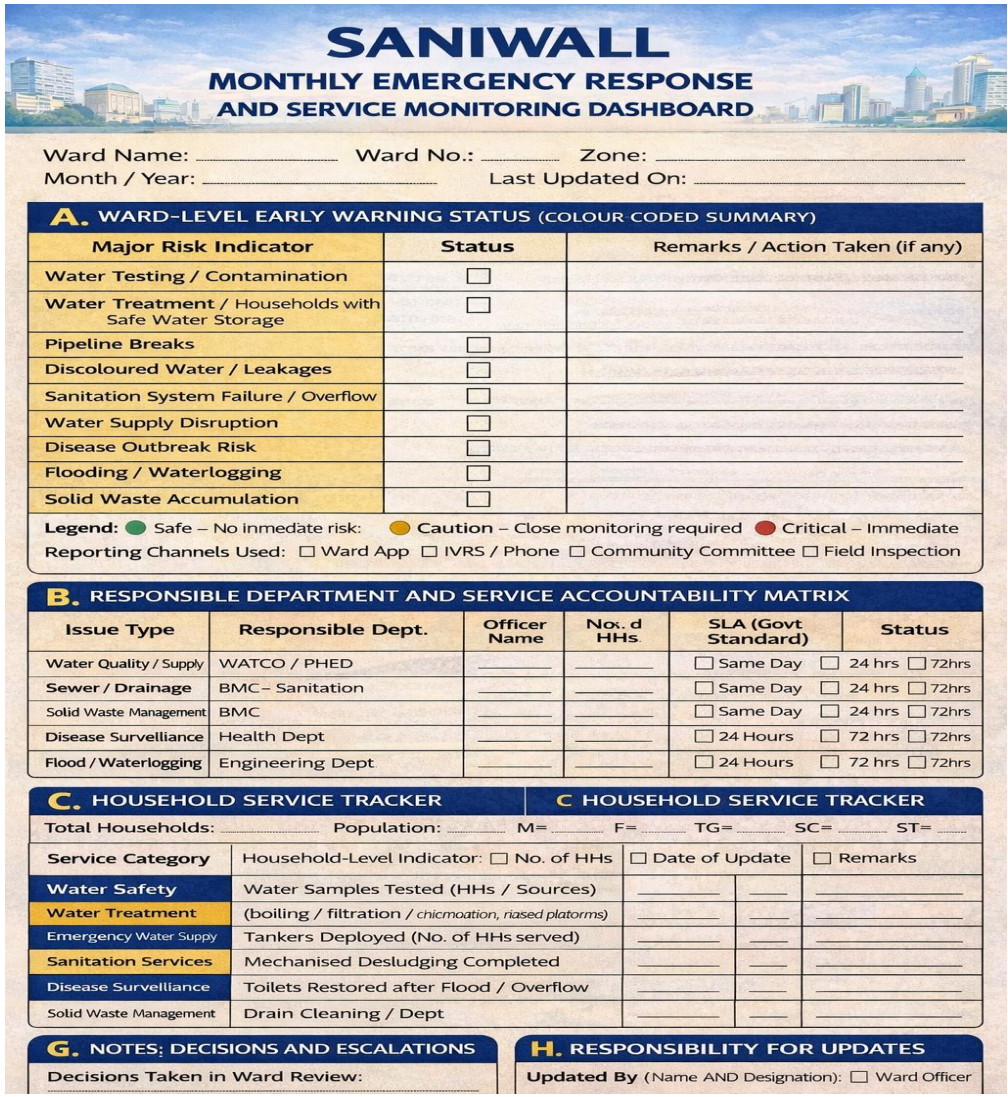
- Date/time of alert
- Temporary water supply provided
- Chlorination/flushing status
- Resolution timeline

**Saniwall-triggered alerts based on community complaints.**

**Value:**

Makes invisible service failures publicly visible

Associated with earlier detection and more coordinated initial municipal responses in select wards



SANIWALL

MONTHLY EMERGENCY RESPONSE AND SERVICE MONITORING DASHBOARD

Ward Name: _____ Ward No.: _____ Zone: _____

Month / Year: _____ Last Updated On: _____

**A. WARD-LEVEL EARLY WARNING STATUS (COLOUR CODED SUMMARY)**

| Major Risk Indicator | Status | Remarks / Action Taken (if any) |
|---|---|---|
| Water Testing / Contamination | ☐ | |
| Water Treatment / Households with Safe Water Storage | ☐ | |
| Pipeline Breaks | ☐ | |
| Discoloured Water / Leakages | ☐ | |
| Sanitation System Failure / Overflow | ☐ | |
| Water Supply Disruption | ☐ | |
| Disease Outbreak Risk | ☐ | |
| Flooding / Waterlogging | ☐ | |
| Solid Waste Accumulation | ☐ | |

Legend: Safe – No inmediate risk: Caution – Close monitoring required Critical – Immediate

Reporting Channels Used: ☐ Ward App ☐ IVRS / Phone ☐ Community Committee ☐ Field Inspection

**B. RESPONSIBLE DEPARTMENT AND SERVICE ACCOUNTABILITY MATRIX**

| Issue Type | Responsible Dept. | Officer Name | No. d HHs | SLA (Govt Standard) | Status |
|---|---|---|---|---|---|
| Water Quality / Supply | WATCO / PHED | _____ | _____ | ☐ Same Day | ☐ 24 hrs ☐ 72hrs |
| Sewer / Drainage | BMC– Sanitation | _____ | _____ | ☐ Same Day | ☐ 24 hrs ☐ 72hrs |
| Solid Waste Management | BMC | _____ | _____ | ☐ Same Day | ☐ 24 hrs ☐ 72hrs |
| Disease Surveillance | Health Dept | _____ | _____ | ☐ 24 Hours | ☐ 72 hrs ☐ 72hrs |
| Flood / Waterlogging | Engineering Dept | _____ | _____ | ☐ 24 Hours | ☐ 72 hrs ☐ 72hrs |

**C. HOUSEHOLD SERVICE TRACKER** | **C HOUSEHOLD SERVICE TRACKER**

Total Households: _____ Population: _____ M= _____ F= _____ TG= _____ SC= _____ ST= _____

| Service Category | Household-Level Indicator: ☐ No. of HHs | ☐ Date of Update | | ☐ Remarks |
|---|---|---|---|---|
| Water Safety | Water Samples Tested (HHs / Sources) | _____ | ____ | _____ |
| Water Treatment | (boiling / filtration / *chicmoation, riased platorms*) | _____ | ____ | _____ |
| Emergency Water Suppy | Tankers Deployed (No. of HHs served) | _____ | ____ | _____ |
| Sanitation Services | Mechanised Desludging Completed | _____ | ____ | _____ |
| Disease Surveillance | Toilets Restored after Flood / Overflow | _____ | ____ | _____ |
| Solid Waste Management | Drain Cleaning / Dept | _____ | ____ | _____ |

**G. NOTES: DECISIONS AND ESCALATIONS**

Decisions Taken in Ward Review: _____

**H. RESPONSIBILITY FOR UPDATES**

Updated By (Name AND Designation): ☐ Ward Officer

# Climate-Resilient Water Safety Plans (CR-WSPs)

**Expanded scope of CR-WSPs**

- Climate hazards (floods, heat, scarcity)
- Water-quality hazards (contamination, backflow, stagnation)

**Key components**

Hazard mapping from source to point-of-use

Event-specific SOPs for:

- Flood-related contamination
- Pipeline breaches
- Heat-induced water quality deterioration

Clear role allocation:

- Community monitoring
- Engineer action
- Health response

**Adaptive actions**

- Raised toilets and water points in flood-prone settlements
- Pipeline slope correction and valve checks
- Dynamic service prioritisation for schools, anganwadis, health centres
- Continuous monitoring by Jalasathis, SHGs, and MAS during events

# Institutionalising Resilience in Everyday Governance

Ward-level seasonal calendars institutionalised:

- Monsoon drain cleaning
- Heat-season conservation and storage practices
- Contamination risk checks during heavy rainfall

Annual updating of SOPs by:

- Engineers
- SHGs, MAS
- Caller Clubs and community committees

KPIs tracked:

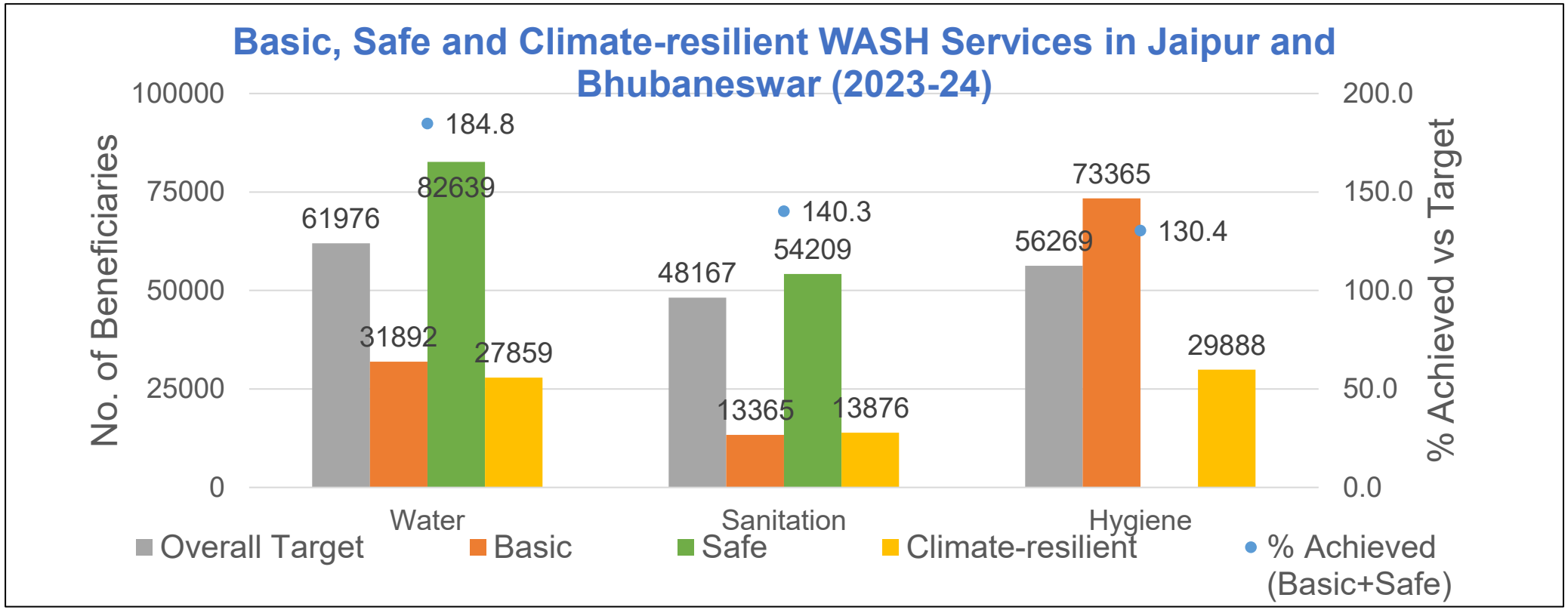
- Toilet functionality during heavy rain days
- Time taken to respond to contamination alerts
- Service restoration timelines

In select wards, resilience practices began to shift from time-bound project activities toward more routine service management behaviours.

# Scale and Impact

## Scale & outcomes

- Total beneficiaries: 393,376
- Direct access to climate-resilient WASH: 71,623 (18.2%)
- 39% reported improved reliability and perceived safety of water access



# Key Takeaways and Way forward

**Key takeaways**

- To sustain the progress made and prevent slippage, continued vigilance and governance attention are required to ensure that gains are sustained over time.
- Forecasts and contamination alerts must translate into ward-level action
- Ownership with communities multiplies system resilience

**Priority actions going forward**

- Integrate CR-WSPs and Saniwall indicators into municipal MIS
- Standardise contamination emergency SOPs at ward level
- Scale IVRS-based early warning and advisory systems
- Make inclusive retrofits and frontline PPE non-negotiable

## Call to Action:

*Let data lead, and people guide the way.*

# Thank You

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