

## CoolSafe Hubs 2.0– Climate-Resilient Community-Based Shelters for Heatwave Adaptation

**1. Project Title:** CoolSafe Hubs 2.0: Scaling Community-Based Cooling Solutions for Heatwave Resilience in South Punjab and Sindh

### 2. Background & Rationale

Pakistan is now ranked among the top ten countries most affected by climate change, and **South Punjab and Sindh** remain the epicentres of recurring and deadly heatwaves. Temperatures frequently exceed **50°C**, particularly in districts such as **Jacobabad, Dadu, Rahim Yar Khan, and Bahawalpur**, causing loss of lives, dehydration, and productivity decline among vulnerable populations.

In **2024**, with financial support from **xyz organization** piloted an **innovative short-term heatwave resilience initiative** across both provinces. The project established **5–7 temporary cooling centers**, trained **traffic police deployed under direct sunlight**, and engaged **youth volunteers** to sensitize communities on preventive heatwave measures. The team also distributed **umbrellas, ORS sachets, and water bottles** to laborers, commuters, and vulnerable residents.

This intervention proved *highly effective* in reducing heat stress and raising community awareness. However, due to **funding constraints**, the initiative could not be sustained beyond August 2024. The experience generated valuable data and lessons — revealing strong community demand for **permanent, low-cost, and climate-smart cooling structures** integrated into local emergency systems.

The **CoolSafe Hubs 2.0** project therefore seeks **follow-up support from the donor name** to scale up these proven interventions into **modular, semi-permanent cooling shelters** equipped with **passive cooling features, solar energy, and digital heat monitoring** across priority heat-affected districts.

### 3. Problem Statement

In Pakistan’s southern provinces of **Sindh and South Punjab**, climate monitoring indicates the emergence of increasingly severe **heatwave conditions**. In **May 2024**, **Karachi** recorded a maximum temperature of **40.2 °C**, about **4.4 °C higher<sup>1</sup>** than its long-term monthly average, while later that month, **Mohenjo-Daro** experienced extreme temperatures exceeding **52 °C<sup>2</sup>**, signaling an alarming escalation of heat exposure in these regions.

Such extreme heat places enormous stress on **human health and public systems**. In **June 2024**, severe heat spells in southern Sindh reportedly resulted in **hundreds of deaths** and **thousands of hospital admissions** for heat-related illnesses, including over **6,000 emergency cases** recorded in Karachi alone<sup>3</sup>. Vulnerable populations—**daily-wage labourers, women, children, older persons, and those with chronic diseases**—bear the heaviest burden of these conditions.

At the same time, **infrastructure and operational systems remain poorly equipped** to manage prolonged heat hazards. Most public shelters, humanitarian housing solutions, and informal settlements lack **passive cooling design** and are therefore unsafe during extreme heat. Common coping mechanisms—such as distributing water bottles, umbrellas, or temporary shading—are **short-term, fragmented, and unsustainable**, with no systematic monitoring of their effectiveness.

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<sup>1</sup> Dawn News, “Karachi sizzles at 40.2°C, 4.4°C above normal average,” May 2024

<sup>2</sup> Reuters, “Temperatures cross 52°C in Pakistan amid record-breaking heatwave,” May 2024

<sup>3</sup> NDMA Situation Reports, June 2024; Health Department Sindh, Heatwave Response Data.

These converging challenges underscore the urgent need to **move from reactive, short-term relief toward sustainable, scalable, and community-owned cooling infrastructure**, in line with the ECDF 2025 theme: **“Extreme Heat in Humanitarian and Emergency Settings.”**

#### 4. Project Objective

To **scale and institutionalize climate-smart, community-driven cooling solutions** that protect vulnerable populations in **South Punjab and Sindh** from extreme heat by establishing **CoolSafe Hubs** — modular, **passive-cooling shelters** powered by **renewable energy**, enhanced through **digital monitoring**, and sustained by **local social enterprises** that embed innovation, ownership, and resilience at the community level.

#### 5. Proposed Innovation and Approach

The **CoolSafe Hubs 2.0** initiative presents a multi-dimensional innovation framework that integrates **technical design, digital intelligence, community enterprise, and policy transformation** to tackle extreme heat in South Punjab and Sindh. The approach builds directly on FDO’s 2024 pilot (supported by xyz organisation) and aims to convert short-term relief efforts into **long-term, scalable climate adaptation systems**.

##### 1 Technical Innovation – Passive Cooling Reimagined for Low-Resource Settings

CoolSafe Hubs move beyond the traditional “tent-based” or “shade-only” cooling points commonly used in humanitarian settings. They introduce **semi-permanent, modular shelters** designed through **passive cooling science** and built from **locally available materials** such as clay, jute, lime, bamboo, and recycled agricultural waste.

Each hub employs **bioclimatic architecture**, combining reflective roofing, solar chimneys, and evaporative clay walls to maintain indoor temperatures **7–10°C lower** than outside — without relying on electricity or air conditioning. The integration of **solar-powered lighting and fans** ensures that these shelters are completely off-grid and self-sustaining, which is critical for **power-deprived southern districts** of Sindh and Punjab.

Compared to existing humanitarian shelters that are heat-insensitive, CoolSafe Hubs represent a **low-cost, climate-adaptive infrastructure** model suitable for both rural and urban environments, capable of protecting thousands of vulnerable individuals during recurring heatwaves.

##### 2 Digital Innovation – Data-Driven Humanitarian Design through National Integration

Instead of creating separate data systems, CoolSafe Hubs will **link directly with existing meteorological and disaster data platforms** operated by the **Pakistan Meteorological Department (PMD)**, **National Disaster Management Authority (NDMA)**, and **Provincial Disaster Management Authorities (PDMA)** of Sindh and Punjab.

Each hub will be equipped with **simple temperature and humidity loggers**, generating localized micro-climate data that complements national datasets used for **heatwave early warning, risk mapping, and adaptive planning**. This integration will support **informed decision-making** by enabling authorities to identify when to issue local heat alerts, where to deploy health or emergency response teams, and how to prioritize resource allocation for the most exposed areas.

By **bridging community data with institutional systems**, CoolSafe Hubs strengthen **transparency, interoperability, and national ownership**. They become **data contributors rather than isolated pilots**, feeding valuable ground evidence into Pakistan’s broader climate and humanitarian intelligence networks. This ensures that

the innovation is **embedded within national systems**, transforming humanitarian pilots into **policy-aligned resilience tools**.

**3 Social Innovation – Community-Led Cooling Enterprises**

The CoolSafe model is anchored in **local ownership and livelihood creation**. All hubs will be **co-designed, built, and managed by community cooperatives**, with a special focus on **women and youth** trained during the earlier xyz NGO-supported pilot.

These groups will form the backbone of **local micro-enterprises**, responsible for maintaining the shelters, producing affordable cooling materials (e.g., clay panels, reflective coatings), and conducting heat awareness campaigns. By transforming beneficiaries into **service providers**, the project not only enhances sustainability but also contributes to **green job creation**, social inclusion, and empowerment in underserved regions.

This **community-enterprise approach** ensures that each hub continues functioning beyond donor cycles — sustained by local income streams, partnerships, and public recognition as community assets.

**4 Policy and Systems Innovation – From Ad Hoc Relief to Scalable Infrastructure**

Pakistan’s current heatwave response is largely **reactive and short-term**, focusing on emergency distribution of water, ORS, and umbrellas. **CoolSafe Hubs 2.0** seeks to shift this paradigm by embedding **structured, scalable cooling systems** into the country’s **Heat Action Plans** and **disaster risk reduction frameworks**.

The project will undertake a comprehensive **policy and advocacy pathway** through:

- 1. **Alignment with National and Provincial Heat Action Plans** to formally integrate community-managed cooling shelters and passive design principles into government response systems.
- 2. **Policy dialogues and technical roundtables** with NDMA, PDMA, UN-Habitat, academia, and leading NGOs to present field evidence and develop localized heat management standards.
- 3. **Development of model guidelines and briefs** on “Heat-Resilient Community Infrastructure” to inform humanitarian clusters (Shelter, WASH, Health, DRR).
- 4. **Engagement of district-level disaster management committees (DDMCs)** to incorporate CoolSafe Hubs into local contingency plans and budgets.
- 5. **Mobilization of CSR and private-sector partners** (beverage, construction, and solar industries) to co-finance the scaling of cooling hubs through climate adaptation funds.

Through this multi-level engagement, **CoolSafe Hubs** evolve from short-term humanitarian responses into **institutionalized public infrastructure** — recognized as a best-practice model for **heatwave resilience and urban adaptation** across Pakistan.

 **The Innovation Flow in Summary**

| Innovation Area | Core Mechanism                                                   | Added Value                                                        |
|-----------------|------------------------------------------------------------------|--------------------------------------------------------------------|
| Technical       | Passive, solar-integrated modular shelters using local materials | Affordable, energy-efficient protection for heat-prone communities |
| Digital         | Integration with PMD/NDMA/PDMA data systems                      | Real-time, localized heat data to inform national early warnings   |
| Social          | Women & youth-led cooperatives managing hubs                     | Green jobs, sustainability, and social empowerment                 |

| Innovation Area | Core Mechanism                                          | Added Value                             |
|-----------------|---------------------------------------------------------|-----------------------------------------|
| Policy          | Embedding model into Heat Action Plans & DRR frameworks | Systemic scale-up and national adoption |

## 6. Expected Results and Key Indicators

| Result Area            | Key Indicator                                                                         | Target (12 Months)                              | Explanation / Expected Outcome                                                                                    |
|------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Infrastructure         | Number of functional <b>CoolSafe Hubs</b> established and operational                 | <b>15 total (10 new + 5 upgraded)</b>           | Semi-permanent, community-managed cooling hubs constructed in priority districts of South Punjab and Sindh.       |
| Health Protection      | % reduction in <b>heat-related health incidents</b> (self-reported)                   | <b>≥ 70% reduction in pilot zones</b>           | Improved access to safe cooling environments and awareness reduces heatstroke and dehydration cases.              |
| Community Preparedness | Number of <b>people trained</b> (youth volunteers, traffic police, community leaders) | <b>1,000 trained participants</b>               | Enhanced local capacity for early response, awareness, and community-based management of heat risks.              |
| Gender and Inclusion   | % of <b>women-led engagement or ownership</b> within community cooperatives           | <b>≥ 40% women participation</b>                | Strengthened leadership and participation of women in design, management, and maintenance of cooling hubs.        |
| Data and Learning      | Number of <b>CoolSafe Hubs with IoT monitoring operational</b>                        | <b>10 sites integrated with PDMA dashboards</b> | Real-time temperature and humidity data feeding into provincial and national systems for evidence-based planning. |

## 7. Geographical Focus

Target districts:

- **Sindh:** Jacobabad, Dadu, Khairpur
- **South Punjab:** Rahim Yar Khan, Bahawalpur, Multan

These districts represent Pakistan’s “heatwave red zone,” with maximum temperatures exceeding 49°C and populations highly dependent on outdoor livelihoods.

## 8. Implementation Plan (6–12 months)

| Phase                              | Key Activities                                                                                                                                                                                                                                                       | Expected Deliverables / Outputs                                                                                                                       | Duration          |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>1. Preparatory &amp; Design</b> | <ul style="list-style-type: none"> <li>• Conduct joint site selection with local authorities (PDMA, DDMCs, municipalities) in target districts.</li> <li>• Finalize engineering and architectural designs based on 2024 pilot feedback and local material</li> </ul> | <ul style="list-style-type: none"> <li>• Signed MoUs with local authorities and communities.</li> <li>• Final technical drawings and BoQs.</li> </ul> | <b>Months 1–2</b> |

| Phase                                        | Key Activities                                                                                                                                                                                                                                                                                                                                                                                                 | Expected Deliverables / Outputs                                                                                                                                                                                                                          | Duration            |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
|                                              | testing.<br>• Formalize community agreements and cooperative formation for hub management.                                                                                                                                                                                                                                                                                                                     | • Procurement and mobilization plan developed.                                                                                                                                                                                                           |                     |
| <b>2. Construction &amp; Deployment</b>      | <ul style="list-style-type: none"> <li>• Establish <b>10–15 modular CoolSafe Hubs</b> across South Punjab and Sindh.</li> <li>• Supervise local artisans and cooperatives in construction using local materials.</li> <li>• Integrate solar panels and passive-cooling elements (reflective roofs, evaporative walls).</li> </ul>                                                                              | <ul style="list-style-type: none"> <li>• 15 functional hubs completed and handed over to communities.</li> <li>• At least 40% women/youth engaged in construction process.</li> </ul>                                                                    | <b>Months 3–6</b>   |
| <b>3. Capacity Building &amp; Outreach</b>   | <ul style="list-style-type: none"> <li>• Conduct structured training sessions for <b>traffic police, youth volunteers, and community focal points</b> on heat-risk reduction and first aid.</li> <li>• Mobilize community awareness campaigns on hydration and self-protection.</li> <li>• Distribute <b>5,000 cooling kits</b> (umbrellas, ORS, water bottles) to high-risk workers and commuters.</li> </ul> | <ul style="list-style-type: none"> <li>• 1,000 participants trained across all sites.</li> <li>• 5,000 individuals receive cooling kits.</li> <li>• Behavior change and safety awareness improved.</li> </ul>                                            | <b>Months 4–8</b>   |
| <b>4. Monitoring &amp; Data Collection</b>   | <ul style="list-style-type: none"> <li>• Install <b>IoT-based heat and humidity loggers</b> in 10 hubs.</li> <li>• Link data to PDMA dashboards and develop visualization dashboard.</li> <li>• Collect usage data and feedback on comfort, attendance, and temperature impact.</li> </ul>                                                                                                                     | <ul style="list-style-type: none"> <li>• 10 sites transmitting live data to PDMA/NDMA systems.</li> <li>• Baseline and midline reports completed.</li> <li>• Real-time data used to issue localized heat alerts.</li> </ul>                              | <b>Months 6–10</b>  |
| <b>5. Evaluation &amp; Knowledge Sharing</b> | <ul style="list-style-type: none"> <li>• Conduct final evaluation of project results, efficiency, and user satisfaction.</li> <li>• Produce technical documentation, infographics, and short video case studies.</li> <li>• Host <b>policy roundtable</b> with NDMA, PDMA, xyz NGO, and UN partners to share lessons and policy briefs.</li> </ul>                                                             | <ul style="list-style-type: none"> <li>• Final evaluation and impact report published.</li> <li>• At least 3 policy briefs and 1 national dialogue conducted.</li> <li>• Model endorsed for inclusion in future provincial Heat Action Plans.</li> </ul> | <b>Months 10–12</b> |

## 9. Budget Overview (Indicative, USD)

| Budget Category                                  | Description                                                                                                                                                 | Estimated Cost (USD) |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <b>1. Construction of 15 CoolSafe Hubs</b>       | Procurement of local materials, fabrication of modular structures, installation of solar panels and passive-cooling elements across South Punjab and Sindh. | <b>40,000</b>        |
| <b>2. IoT Sensors &amp; Monitoring Dashboard</b> | Installation of temperature and humidity loggers in 10 hubs, data integration with PDMA/NDMA systems, and maintenance of the digital dashboard.             | <b>10,000</b>        |

| Budget Category                                        | Description                                                                                                                             | Estimated Cost (USD) |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <b>3. Training &amp; Community Mobilization</b>        | Capacity-building for traffic police, youth volunteers, and community groups; awareness campaigns on heat-risk reduction and first aid. | <b>15,000</b>        |
| <b>4. Cooling Kits (Umbrellas, ORS, Water Bottles)</b> | Procurement and distribution of 5,000 heat-protection kits for high-exposure groups (laborers, street vendors, commuters).              | <b>10,000</b>        |
| <b>5. Project Management &amp; Coordination</b>        | Staff costs, logistics, travel, and coordination with partners (PDMA, local cooperatives, and xyz NGO).                                 | <b>10,000</b>        |
| <b>6. Evaluation, Learning &amp; Documentation</b>     | Midline and final evaluation, impact assessment, policy briefs, and knowledge-sharing events.                                           | <b>5,000</b>         |
| <b>◆ Total Estimated Budget</b>                        |                                                                                                                                         | <b>90,000 USD</b>    |

## 10. Sustainability and Scale-Up Strategy

The **CoolSafe Hubs 2.0** model is designed for long-term continuity and replication beyond the project’s initial 12-month cycle. Sustainability is embedded through **institutional, social, environmental, and financial mechanisms** that ensure ownership, local relevance, and national policy alignment.

### **1** *Institutional Integration*

The project will be aligned with the **National Heat Action Plan** led by the **National Disaster Management Authority (NDMA)** and supported by **Provincial Disaster Management Authorities (PDMAs)** of Sindh and Punjab.

By establishing **formal cooperation agreements** and feeding localized heat-risk data into PDMA dashboards, the model will be institutionalized as part of Pakistan’s official **disaster-risk reduction (DRR) and climate-adaptation frameworks**.

This ensures that CoolSafe Hubs evolve from pilot interventions into **recognized, policy-anchored infrastructure** accessible for future funding and replication under government and donor programs.

### **2** *Social Sustainability*

Long-term management will be **transferred to trained youth and women’s cooperatives**, who will oversee daily operations, maintenance, and awareness activities.

Through capacity-building and micro-enterprise development, these groups will gain income from **producing local cooling materials, providing maintenance services**, and managing awareness campaigns — creating a **self-financing community enterprise model**.

This approach ensures **continued ownership, local employment, and gender empowerment**, embedding resilience within the community fabric.

### **3** *Environmental Sustainability*

All hubs will operate on **100% renewable solar energy** and be constructed using **recyclable, locally sourced, and biodegradable materials** such as bamboo, clay, and agricultural waste composites.

The design eliminates dependence on fossil fuels or mechanical cooling, reducing carbon emissions while improving community comfort and health.

This environmentally responsible approach supports Pakistan’s **National Climate Change Policy** and contributes directly to the **Sustainable Development Goals (SDGs 7, 11, 13)**.

#### *Scalability and Replication*

The CoolSafe model is intentionally **cost-efficient (~USD 2,600–2,700 per hub, all-in)** and modular, enabling rapid replication across districts.

The design and policy lessons from this project will be documented and shared through **national dialogues, policy briefs, and open-source technical manuals**, enabling other provinces — including **Balochistan, Khyber Pakhtunkhwa, and urban Sindh** — to replicate the model.

Partnerships with **NDMA, xyz organizations**----- will further support expansion through joint financing and integration into **provincial heat-resilience and housing programs**.

### 11. Partnerships

The **CoolSafe Hubs 2.0** project will be jointly implemented by ----- and the **Foundation for Development Organization (FDO)**, building on their complementary expertise in **community development, climate resilience, and rural innovation**.

- **Lead Implementers:** ----- – responsible for overall coordination, technical oversight, field implementation, and partnership management in Sindh and South Punjab.
- **Previous Funding Partner:** *xyz NG*) – supported the 2024 pilot phase on heatwave resilience and will continue to provide technical guidance and quality assurance.
- **Technical Partners:** *abc University/ xyz University* – provide expertise in passive-cooling architecture, data integration, and performance validation.
- **Institutional Partners:** *NDMA and PDMA Sindh & Punjab* – ensure alignment with provincial and national **Heat Action Plans** and host integrated heat-monitoring data.
- **Community & Operational Partners:** *Traffic Police Departments, Youth Volunteer Networks, and Local Cooperatives* – mobilize communities, manage cooling hubs, and deliver awareness campaigns.
- **Private Sector Partners:** *Local beverage, textile, and renewable-energy firms* – contribute through CSR co-financing of hydration kits and solar components.

Together, these partnerships form a **multi-stakeholder alliance** linking government, academia, private sector, and communities to ensure that **CoolSafe Hubs 2.0** is technically sound, socially owned, and institutionally embedded

### 12. Conclusion

The **xyz organization pilot (May–August 2024)** clearly demonstrated that **community-led, low-cost cooling solutions** can save lives and build lasting climate resilience in Pakistan’s most heat-affected regions.

Building on this success, the **CoolSafe Hubs 2.0** initiative seeks the support of the **Donor name** to **scale and institutionalize** these proven practices. By integrating **passive-cooling design, renewable energy, and data-driven coordination**, the project will transform short-term heatwave relief into a **sustainable, community-anchored adaptation model**.

This initiative represents a vital step toward **protecting vulnerable populations, strengthening local climate governance, and positioning Pakistan as a regional leader in innovative heatwave resilience**.

Annex A:

Logical Framework – CoolSafe Hubs 2.0: Scaling Climate-Resilient Cooling Solutions in South Punjab & Sindh

| Intervention Logic                                                                                                                                                                                   | Key Indicators                                                                                                                                                                  | Baseline                                       | Targets (12 Months)                                                                                                                                                    | Means of Verification                                          | Key Assumptions / Risks                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------|
| Overall Goal: Contribute to reducing heat-related morbidity and mortality in vulnerable communities of South Punjab and Sindh through climate-resilient infrastructure and community-led adaptation. | % reduction in reported heat-related illnesses in target areas<br># of people directly accessing CoolSafe Hubs<br># of government entities integrating passive cooling in plans | No structured cooling systems; fragmented data | ≥ 30% reduction in heat-related health cases (from baseline)<br>>10,000 people reached (direct + indirect)<br>2 provincial DRR bodies adopt passive cooling guidelines | Health facility records, PDMA/NDMA reports, M&E surveys        | Stable climate and security conditions; local government support continues  |
| Outcome 1: Vulnerable populations gain sustained access to safe, temperature-controlled environments during heatwaves.                                                                               | Avg. indoor temperature reduction achieved<br># of operational CoolSafe Hubs<br>% of users reporting improved comfort & awareness                                               | Ad hoc shading/tent solutions only             | 7–10°C average indoor temperature reduction<br>15 CoolSafe Hubs (10 new + 5 upgraded)<br>≥80% users report improved comfort and awareness                              | IoT sensor data, field monitoring reports, beneficiary surveys | Construction completed before peak heat season; materials locally available |
| Outcome 2: Strengthened institutional and data systems for evidence-based heatwave response and planning.                                                                                            | # of Hubs connected to PDMA/NDMA dashboards<br># of data reports or heat analyses using Hub data<br># of NDMA/PDMA staff trained on data use                                    | No community-linked data points                | 10 Hubs linked to PDMA dashboards<br>Quarterly joint analysis reports produced<br>30 officials trained in data-driven heat response                                    | Data-sharing MOUs, dashboard screenshots, training attendance  | Stable connectivity; PDMA cooperation for integration                       |
| Outcome 3: Local communities, especially women and youth, actively manage and sustain cooling hubs as micro-enterprises.                                                                             | # of women/youth trained and employed<br># of functional community cooperatives<br>% of hubs managed locally after donor phase                                                  | Limited technical or business capacity         | ≥25 women/youth trained (≥40% women)<br>5 cooperatives established<br>80% of hubs self-managed after donor phase                                                       | Training records, cooperative registration, income tracking    | Strong local participation; gender inclusion accepted socially              |
| Outcome 4: Policy and institutional frameworks                                                                                                                                                       | # of policy briefs/model guidelines developed<br># of policy                                                                                                                    | No formal policy on community cooling          | 3 policy briefs & 1 design guideline produced<br>≥3 dialogues held                                                                                                     | Policy briefs, minutes of dialogues,                           | Continued policy engagement and coordination                                |

|                                                                                                        |                                                                                  |                               |                                                                                                   |                                                            |                                                                    |
|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------|
| strengthened to mainstream passive cooling and heat adaptation.                                        | dialogues/roundtables held<br># of authorities adopting/replicating model        |                               | (provincial/national) $\geq 1$ formal replication commitment by NDMA/PDMA                         | government letters                                         | with NDMA/PDMA                                                     |
| Output 1: Design, construct, and operationalize CoolSafe Hubs in priority districts.                   | # of shelters constructed and operational<br>% using local sustainable materials | 0                             | 15 Hubs constructed (100% local materials)                                                        | Construction records, GPS photos, field monitoring reports | Supply chain stable; local artisans available                      |
| Output 2: Integrate heat monitoring and data systems with PDMA/NDMA.                                   | # of sensors installed<br># of sites reporting data monthly                      | 0                             | 10 sites reporting monthly via PDMA dashboards                                                    | Sensor logs, PDMA reports                                  | Technical issues resolved promptly; network coverage available     |
| Output 3: Conduct training and awareness for traffic police, youth volunteers, and communities.        | # of people trained<br>% knowledge improvement post-training                     | Fragmented local awareness    | 1,000 trained (300 police, 700 volunteers/community) $\geq 70\%$ knowledge improvement shown      | Pre/post tests, training reports                           | Partners available for participation; training materials localized |
| Output 4: Distribute life-saving cooling kits (umbrellas, water bottles, ORS) to high-exposure groups. | # of kits distributed<br>% daily wage workers covered                            | 0                             | 5,000 cooling kits distributed to exposed laborers/workers                                        | Distribution lists, receipts, partner reports              | Logistic access to target sites ensured                            |
| Output 5: Undertake advocacy and knowledge dissemination for policy uptake.                            | # of advocacy events/media stories<br># of stakeholders endorsing model          | Limited awareness or coverage | $\geq 5$ advocacy events<br>$\geq 3$ national media features<br>$\geq 10$ endorsing organizations | Media tracking, event reports, endorsement letters         | Sustained media and stakeholder interest                           |