CASE STUDY

ECUADOR 2023–2024 / COMPLEX CRISIS

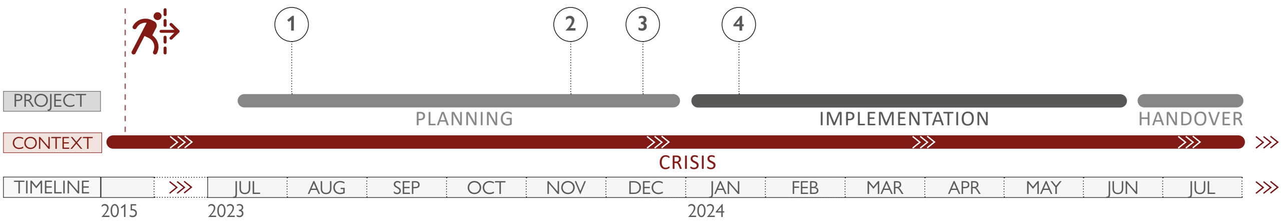
CONTEXT SETTLEMENT TYPE SUPPORT METHODS

CRISIS	**Complex regional migration dynamics**
PEOPLE DISPLACED	**444,778 individuals of Venezuelan nationality** in Ecuador, as of 31 March 2024*
LOCATIONS	Quito (Pichincha), Lago Agrio (Sucumbíos), Guayaquil (Guayas), Manta (Manabí), Huaquillas (El Oro)
PEOPLE SUPPORTED BY THE PROJECT	**785 individuals per month on average** (30% Venezuelans, 31% Colombians, 38% Ecuadorians, 1% other). **100** other individuals per month on average, accessing services such as dining rooms, legal assistance and health care.
PROJECT OUTPUTS	Improvements to accessibility, safety and comfort conditions and reduced operational costs in **six communal shelters** through an environmental and eco efficiency lens
SHELTER DENSITY	**2.05 m²** per person on average across the six shelters
PROJECT COST	USD **11,000-49,000** (range per shelter) USD **608** per bed on average across the shelters

* https://www.r4v.info/es/ecuador

PROJECT SUMMARY

The project upgraded six communal shelters located in five provinces, addressing shared problems such as excessive internal temperatures, insufficient accessibility, and substandard safety. Solutions included solar photovoltaic generation, solar water heating, motion sensor LED lighting, passive ventilation (eco coolers, cross ventilation openings, raised ridge vents), green walls, drinking water purification, timed flow taps and rainwater harvesting. In parallel, sanitary facilities and common spaces were reconfigured to improve safety and accessibility. Together, these measures enhanced habitability and dignity while cutting water and energy consumption and lowering running costs for shelter administrators.



2015: First migratory movement recorded outside Venezuela.

1. **Jul-Aug 2023:** Site visits and information gathering on habitability, safety and accessibility of the communal shelters; mapping of priority deficits in basic services.
2. **Nov 2023:** Presentation of proposed solutions to shelter managers for feedback and approval.
3. **Dec 2023:** Memoranda of Understanding to formalize roles, maintenance responsibilities and training commitments.
4. **Jan 2024:** Implementaion start, launch of works and monitoring/control of installations.

Interventions such as shading devices and green walls were implemented across six communal shelters, improving thermal comfort and reducing sun exposure.

The project selected six communal shelters providing services to migrants, refugees and vulnerable host populations, with the aim to improve habitability.

Using a direct implementation approach, shading devices and green elements were included to mitigate climate effects and increase comfort for the users.

BACKGROUND

Ecuador experienced sustained inflows of people on the move from neighboring countries, which significantly increased demand for shelter and essential services. Communal shelters, often housed in repurposed buildings, assumed a key role in providing emergency accommodation and basic services for refugees, migrants and vulnerable host populations. These facilities faced recurrent constraints: climatic stressors (heat and high humidity), infrastructure wear, gaps in accessibility and safety, and escalating utility costs. The combined effect undermined habitability, increased maintenance burdens and strained operating budgets.

SITUATION BEFORE THE CRISIS

Prior to the recent peaks in regional migration, Ecuador already faced housing quality issues in urban, peri urban and rural settings, alongside uneven access to services. Communal facilities were not designed for surge demand and lacked eco efficient systems. Most of the collective centres allocated for the Venezuela crisis were repurposed buildings, not initially designed for accommodation. Poor ventilation and weak WASH infrastructure were common, contributing to poor thermal comfort and degraded sanitary conditions.

SITUATION DURING THE CRISIS

As arrivals increased, collective shelters operated above desirable capacity. Temporary sites and communal facilities required frequent repair and upgrades. People resorted to host communities and ad hoc arrangements, heightening protection risks—particularly for women, children, older persons and LGTBI+ individuals—amid privacy constraints and overstretched services. Operational pressures intensified pre existing weaknesses, underscoring the need for shelter solutions adapted to local climatic realities and to the protracted character of displacement.

NATIONAL SHELTER RESPONSE

Local authorities, foundations, NGOs and international organizations supported communal shelters to provide safe and dignified accommodation with basic services and child friendly and GBV sensitive spaces. However, the absence of a centralized, adequately resourced national shelter framework and limited funding windows restricted the scale, consistency and sustainability of responses. In this context, a networked, multi stakeholder approach underpinned the project, positioning communal shelters as essential nodes in a broader migration management and provision of protection for the most vulnerable.

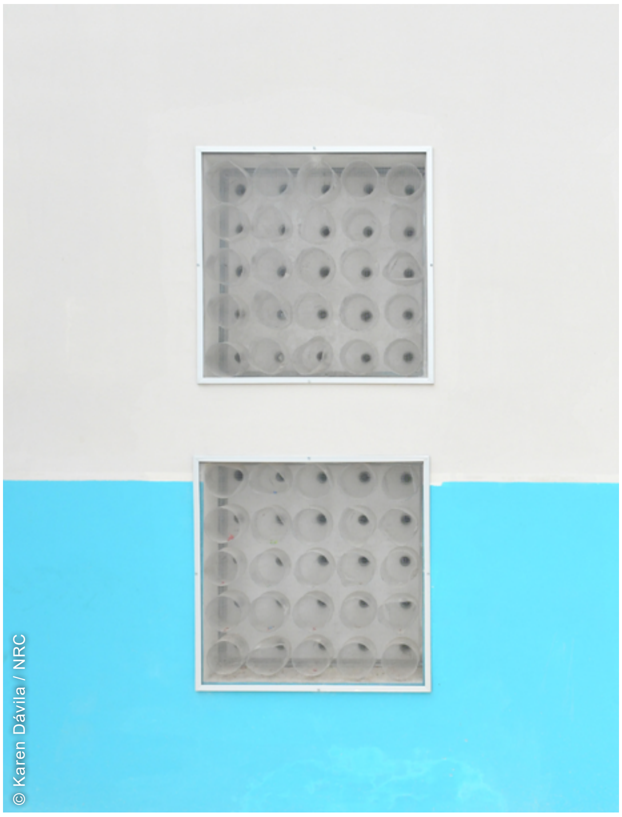
PROJECT DESIGN

The project's overarching goal was to transform six communal shelters into safer, more accessible and more sustainable environments through an integrated package of environmental and habitability improvements. The design approach was holistic and evidence based, starting from assessments of climatic exposure, protection risks and high cost operational hot spots or bottlenecks (notably water and electricity consumption), and progressing through solution design, user socialization, and tailored training for administrators and maintenance personnel.

An external consultancy team initially conducted technical visits and recommended measures such as green walls, renewable energy systems, wastewater treatment, dry toilets, composting, recycling and facade painting. The design team refined the proposals to fit the available budget, then reviewed the final package with donors and shelter administrators before execution. Consultations with communities continued throughout to ensure solutions addressed specific needs.

PROJECT IMPLEMENTATION

Activities were implemented directly by the organization, ensuring that site specific technical solutions were installed correctly and rapidly where most needed. For the construction works, local labor was recruited—both host and displaced—to support delivery and to catalyze acceptance, reduce xenophobic attitudes, and build shared capacities.



Eco-coolers were implemented to improve ventilation using a low-cost technique which utilises recycled plastic bottles and the so-called Venturi effect.

NATURE-BASED SOLUTIONS

- **Photovoltaic panels:** Solar PV panels, six solar water heaters and LED lighting reduced electricity use by about 3,600 kWh (around 10–15% annually), lowering operating costs. Seven panels were installed across two communal shelters, including one dedicated to powering a fan.
- **Eco-coolers:** Twenty eco coolers (10 per shelter) improved ventilation using a low cost system made from recycled plastic bottles. Bottles set into a narrow duct accelerate incoming air (Venturi effect), supporting cooler airflow indoors. Perforated masonry openings with a melamine panel aided intake, while perforated metal panels and mosquito nets protected the units. Raised roof ridges and wind driven extractors increased airflow, reducing indoor temperatures by an estimated 2–10°C without conventional mechanical cooling.
- **Rainwater harvesting:** Rainwater harvesting systems captured around 80,000 litres per year, improving water availability and easing pressure on municipal wastewater networks. Treated water was reused for irrigation and upkeep of green areas, helping cool the microclimate and reduce solar exposure on buildings. Collection drew from roughly 425 m^2 of roof area across four communal shelters.
- **Green walls:** Green walls installed on shelter façades reduced direct sun exposure and added shade, improving thermal comfort and limiting weathering of exterior surfaces. Around 140 m^2 of vegetated façades were installed across four communal shelters, contributing to lower indoor temperatures.
- **Grass and plants sowing:** Typical plants were sowed in three communal shelters in order to protect the soil and contribute to reducing the outside temperature.

Accessibility features were also implemented, such as ramps.

TARGETING

A comparative assessment covered 12 communal shelters in a strategic partner network. The analysis prioritized sites with the highest combined protection and sustainability risks: safety deficits (especially in WASH), thermal discomfort, degraded or insufficient facilities, water and energy inefficiencies, and limited accessibility. The profiling also considered the characteristics of the resident populations, such as the presence of GBV survivors, the proportion of women and girls, older persons and LGTBI+ residents. A needs matrix ranked the shelters, enabling selection of the first six sites to prioritize for implementation, while fundraising efforts were launched for the following.

COMMUNITY ENGAGEMENT

Initial resistance among some administrators reflected unfamiliarity with non conventional technologies and a preference for traditional, high consumption systems (e.g., air conditioning). The team responded with practical sessions, demonstrating how passive ventilation, shading and eco efficiency measures work, what maintenance they entail and how to measure results. Acceptance grew following early installations, to the extent that two shelters requested additional eco coolers after project completion. Administrator insights were integrated from design stage through handover, and their leadership was critical to adapt solutions to internal workflows and local regulations.

COORDINATION

Site selection and solution tailoring required close coordination among municipal administrators, NGOs, foundations and international actors. Clear operating arrangements with shelter managers prevented duplication of efforts, smoothed access for contractors and ensured compliance with local regulations. By aligning environmental upgrades with protection, accessibility and safety, the coordinated approach leveraged resources across sectors and reinforced a comprehensive, multi actor response.

Solar panels were installed in some of the shelters, to reduce electrical bills.

ENVIRONMENTAL IMPACT

The project mainstreamed environmental management from design to handover. Waste segregation points and bins were added to foster recycling; roof and façade interventions reduced cooling loads; renewable energy and water efficiency systems decreased the carbon and water footprints of shelter operations. Debris was transported in jute sacks and deposited in certified municipal landfills to minimize contamination risks. Beyond technical metrics, administrators reported positive behavioral shifts, including increased care for planted areas and improved cleanliness in common spaces.

MATERIALS AND SUPPLY

Prioritizing local procurement accelerated delivery and buoyed nearby markets without creating distortions, as purchases were distributed across six locations and multiple suppliers. Logistics integrated environmental safeguards: debris handling using jute sacks and disposal to approved landfills. Where supply gaps existed for novel items (e.g., eco cooler modules), on site fabrication using recycled or readily available materials allowed the works to proceed, albeit with additional time for prototyping and testing.

EXIT/HANDOVER

Handover combined technical closure with knowledge transfer. Administrators received a maintenance manual, warranties and refresher training. Final evaluations, including temperature spot checks and consumption readings, were shared to evidence performance and clarify operating expectations. Shelter managers acknowledged the practicality of the alternatives—solar and passive ventilation in place of air conditioning; rainwater harvesting and timed flow taps to reduce water use—indicating intent to retain and, where feasible, expand these solutions within their facilities.

Affordable passive cooling interventions had a tangible impact on user comfort.

Water points and water filtration were installed across the centres.

To foster a culture of recycling, waste segregation points and bins were added.

MAIN CHALLENGES

- Administrative processes: Finalizing agreements that formalized maintenance commitments and participation in training took longer than anticipated due to internal procedures within shelters, delaying project start.
- Data gaps: Limited access to baseline building information (floor plans, historic consumption bills) complicated planning and slowed some interventions.
- Suppliers and skills: Securing specialized suppliers for PV, irrigation and planting—plus artisans for bamboo and eco cooler fabrications—required additional market sounding and coordination.

CROSSCUTTING ISSUES

Beyond environmental sustainability, Protection, GBV risk mitigation, and accessibility were integrated throughout. WASH blocks were re-organized with gender-segregated facilities; movement routes and common areas were better lit; and accessible bathrooms were added in three shelters. Consultations with women and older people informed priorities.

Toilets were improved both in terms of physical accessibility and sex-segregation.

OUTCOMES AND WIDER IMPACTS

- **Resource efficiency and service quality.** Energy demand declined following installation of LEDs with motion sensors, PV panels and solar water heaters. Water consumption decreased due to rainwater harvesting, grease traps and timed flow taps. In aggregate, shelters recorded measurable reductions in electricity and water use, lowering operating costs and smoothing budget pressures.
- **Habitability.** Passive ventilation and green façades yielded meaningful improvements in thermal comfort and humidity control in dormitories and common areas, reducing the perceived need for air conditioning and improving sleep quality and well being.
- **Skills and ownership.** Training for administrators and maintenance personnel strengthened in house capacity to operate and care for the systems. Engagement of local workers left practical skills in the surrounding communities and fostered stewardship of the upgraded spaces.
- **Social cohesion and protection.** Better lighting, more organized flows, and improved thermal comfort reduced the tendency of residents to congregate in public or private external areas in search of cooler, better lit environments, easing

FURTHER READING ON SHELTER PROJECTS

On Ecuador: SP 9TH ED. / A.13 / ECUADOR 2020-2022

On the Venezuela regional crisis: SP 9TH ED. / A.11 / 2019-2023;

On collective centres: SP 13-14 / A.15 / LEBANON 2013; SP 15-16 / A.30 / SYRIAN ARAB REPUBLIC 2017-2018

On public spaces upgrade: SP 9TH ED. / A.25 / JORDAN 2018-23;

STRENGTHS, WEAKNESSES AND LESSONS LEARNED

STRENGTHS

√ **An environmental lens in the initial needs assessment** enabled prioritization of sustainable solutions from the outset, ensuring a tight fit between problems (thermal stress, consumption peaks) and remedies (passive ventilation, solar, water efficiency). This alignment maximized impact per dollar spent and advanced long term sustainability.

√ **Administrators and maintenance teams received structured capacity building,** plus a digital maintenance manual detailing cleaning routines, checks, supplier contacts and warranty procedures. This strengthened day to day operations and de risked the handover period by clarifying roles and schedules.

√ **Active community involvement and daily participation increased ownership** and care for the infrastructure, improving acceptance and long term prospects for maintenance. Engagement of local labor also seeded practical skills in the vicinity of the shelters.

√ **A holistic approach combined environmental upgrades with safety, protection and accessibility.** The result was not only "greener" facilities, but also more practical and dignified environments aligned with user needs and protection standards.

WEAKNESSES

× **Limited familiarity with innovative approaches generated initial resistance** among some shelter managers, slowing adoption and requiring additional sensitization to build trust in passive and renewable systems.

× **Local supply constraints for specialized items and skills**—solar components, bamboo works, plant selection and installation—affected planning and sequencing. Additional consultations with specialists were needed to ensure appropriate species, treatments and installation methods.

× **Lack of prior market analysis** for key components (eco coolers, rainwater harvesting assemblies) necessitated on site fabrication and prototyping with recycled materials and communicating vessels. While successful, these ad hoc solutions delayed testing and installation.

× **Introducing unconventional systems increases the risk of maintenance lapses** over time (e.g., cleaning PV modules, eco cooler grilles, grease traps, filter changes). While training and manuals were delivered, the absence of a formal post implementation monitoring plan made it harder to verify that upkeep practices were consistently applied.

LESSONS LEARNED

- **Demonstrate to shift behavior**: Early skepticism toward eco-efficiency measures decreases when results are evidenced through simple metrics (e.g., temperature readings, energy bills). Embedding basic measurement in project communication supports a transition from "active cooling" to "passive-first" approaches.
- **Prioritize continuous capacity building:** Ongoing training and clear communication—targeting managers, administrators and end-users from the outset—reduce resistance, strengthen maintenance practices and ensure long-term sustainability, particularly in high staff turnover contexts.
- **Strengthen data for better decisions:** Systematic collection of pre-intervention baselines (energy, water, layouts, equipment) during the assessment phase is critical to objectively measure impact and improve design and corrective decision-making.
- **Engage users and adapt in implementation:** Early involvement of administrators, maintenance staff and residents fosters ownership, while iterative, on-site adjustments during works improve functionality, efficiency and hygiene outcomes.

RECOMMENDATIONS MOVING FORWARD

- **Start early with integrated outreach and training.** Engage managers, administrators and users from project inception to facilitate adoption of alternative technologies and reduce resistance to change.
- **Make baseline data mandatory before design.** To jointly identify with the shelter managers that the use of traditional technologies such as air conditioning or electric water heaters impacts the cost allocated to these services, with the aim of raising awareness from the outset about the use of more environmentally friendly alternatives.
- **Institutionalize continuous capacity building.** Replace one-off trainings with ongoing programs, including induction modules and maintenance tools, to address staff turnover and sustain operations.
- **Embed participation and adaptive implementation.** Systematize user engagement and incorporate light, real-time evaluation loops to adjust designs and optimize performance during implementation.