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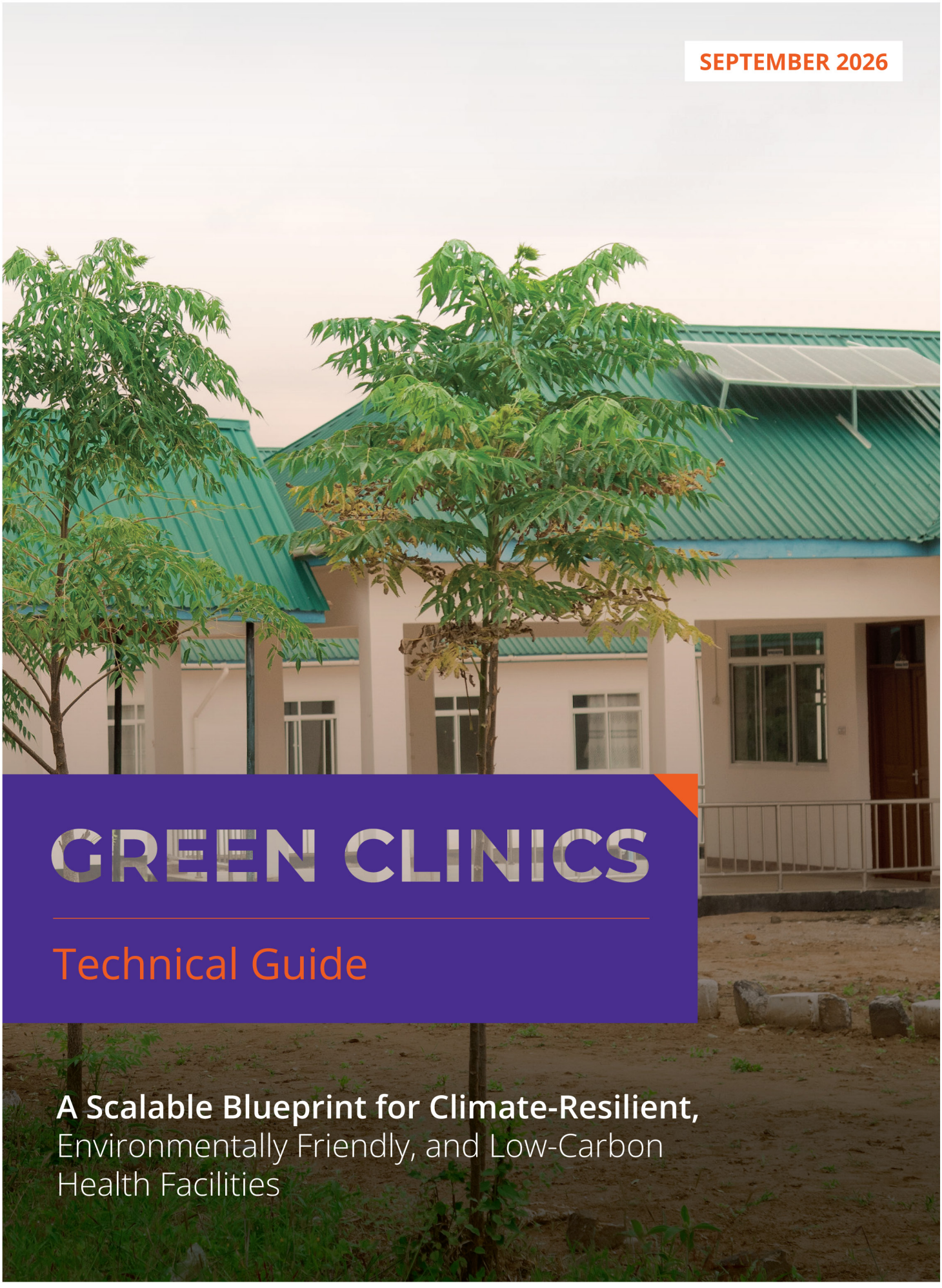
SEPTEMBER 2026



GREEN CLINICS

Technical Guide

A Scalable Blueprint for Climate-Resilient,
Environmentally Friendly, and Low-Carbon
Health Facilities

Suggested citation: *Green Clinics Technical Guide: A Scalable Blueprint for Climate-Resilient, Environmentally Friendly, and Low-Carbon Health Facilities. Pathfinder International, 2026.*

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01 Introduction



Bangladesh, 2025.

Climate change is no longer a distant environmental concern. It is reshaping the world in which we deliver health services. Health facilities are experiencing more frequent and intense heatwaves, floods, droughts, storms, and water shortages. These hazards weaken the ability of clinics to provide safe, uninterrupted, and quality care, especially for women, newborns, children, and adolescents.

In arid and semi-arid contexts, ambient design temperatures regularly exceed 40–45°C in summer months, so facility infrastructure and equipment specifications should be rated for these conditions rather than temperate-climate defaults. Because aridity and semi-aridity typically bring annual rainfall below 250–500mm, water scarcity rather than flooding is frequently the dominant chronic hazard

in these settings, even though the same locations can also experience severe, short-duration flash flooding. Dust and sand-laden winds are also a recurring, near-daily operational factor in MENA and Sahelian settings, degrading solar output, clogging air filters and HVAC systems, and contributing to the respiratory illness burden noted earlier in this section. Given these dynamics, a rapid arid-context screening of rainfall regime, dust-storm frequency, and groundwater salinity should be included in the earliest facility scoping visit, before technical design begins.

Based on the climatic realities of Pathfinder's areas of operation, which include arid and semi-arid zones in Egypt, parts of Ethiopia, and Pakistan, ambient design temperatures frequently surpass 40 to 45 degrees Celsius during the summer months. Consequently, all facility infrastructure and equipment specifications must be rated for these extreme heat conditions rather than the default standards suited for temperate climates. Furthermore, dust and sand-laden winds represent a recurring, nearly daily operational factor across the Middle East and North Africa (MENA) and Sahelian regions, which not only degrades solar panel output and clogs air filters and HVAC systems but also directly contributes to the elevated burden of respiratory illnesses (see Box 1).

The World Health Organization (WHO) further emphasizes this, noting that facilities should be climate-resilient (adapting to climate risks) and environmentally sustainable (reducing their own environmental footprint) to protect communities, reduce environmental harm, and support universal health coverage by improving the affordability and continuity of services. WHO identifies four foundational requirements for such facilities: (a) a capable health workforce, (b) water, sanitation, and hygiene (WASH) services and waste management, (c) sustainable energy services, and (d) appropriate infrastructure, technologies, and products.[1] Evidence from global climate-health assessments shows that vulnerabilities are rising and unevenly distributed.[2]

Box 1. Key Climate-Health Facts

- Across the globe, climate change affects the health workforce, infrastructure, logistics, and operational capacity of health systems.[3]
- Every two seconds, a woman gives birth in a health facility without clean water, decent toilets and good hygiene.[4]
- For every 1°C temperature rise, there is a 6% increase in risk of preterm birth and low birth weight.[5]
- During climate events, 45% of young respondents have difficulty accessing sexual and reproductive health (SRH) services, and over 73% faced limited access to contraceptives and treatment for sexually transmitted infections.[6]
- Low-resource settings are disproportionately affected due to weak infrastructure.[7]
- In Africa and Southeast Asia, climate-induced droughts and floods strain health infrastructure, increasing disease burdens.8 In the Middle East, extreme heat worsens chronic diseases and strains emergency services, and dust storms increase respiratory illnesses.

Primary health care clinics are on the front line of these climate impacts. When electricity fails during extreme weather, essential services such as vaccine cold chains, surgical lighting, and diagnostic equipment fail. When water becomes contaminated or unavailable, infection prevention and control break down. When floods cut off roads, supplies cannot reach the facility, and patients cannot access care. These disruptions are especially dangerous for reproductive, maternal, newborn, child, and adolescent health (RMNCH) services.[9]

02

What Are Green Clinics?



Pakistan, 2025.

There is no single global definition of a **Green Clinic**. At Pathfinder, we use the term to describe health facilities where infrastructure, services, and operations are climate-resilient, environmentally sustainable, and provide inclusive health services, including SRH services. Green clinics are designed to continue serving clients safely, even during climate shocks, while reducing their environmental impact.[10] Green clinics are not just about installing solar panels or rainwater harvesting tanks. They represent a whole-facility transformation: in how buildings are designed, how staff are trained, how communities are engaged, and how care is delivered. They blend innovative solutions with proven practices to meet the specific climate and health needs of each location. When describing a facility as a 'green clinic' in arid settings, teams should name heat and water scarcity, not only flooding, as primary hazards in facility documentation and donor reporting.

Key Features of a Green Clinic

Feature	What It Means	Why It Matters
Continuous Quality Services	Meets or exceeds standards for uninterrupted, accessible, quality, and inclusive care for all, including women, youth, people with disabilities, and displaced persons.	Climate shocks should not stop essential services. Continuity protects lives.
Climate-Adapted Infrastructure	Buildings, utilities, and systems are designed to withstand climate shocks (flooding, extreme heat, drought, and storms).	Infrastructure failure during a climate shock directly endangers clients and staff.
Emergency Preparedness	Emergency plans and supply chain protocols are in place, staff are trained, and facilities are connected to early warning systems.	Being prepared prevents reactive response and saves lives during disasters.
Evidence-Based Climate Care	Staff understand how climate affects health locally and provide care responsive to those risks. Robust data systems track climate-related health patterns.	Climate change is changing disease patterns. Staff need to know what to expect and how to respond.
Community Connection	Staff collaborate closely with community members, organizations, and leaders to improve emergency preparedness and response and access to services, build trust, and facilitate behavior change.	Communities are the first line of resilience. Clinics that are disconnected cannot respond effectively.
Environmental Sustainability	Facilities use renewable energy, manage waste safely, conserve water, plant trees, and reduce carbon emissions through technology and behavior change.	Facilities must limit/eliminate infrastructure and practices that contribute to the climate crisis.

The key features apply equally in all settings, including arid, semi-arid, and dusty settings, but 'Climate-Adapted Infrastructure' and 'Environmental Sustainability' take on setting-specific engineering content (dust-rated solar, evaporation-adjusted water storage, heat-tolerant landscaping) detailed throughout Section 4.

03



Tanzania, 2026.

Pathfinder's Country Experiences

Pathfinder's green clinic work spans multiple countries, each with distinct climate risks and health system contexts. This practical experience informs this guideline.

Egypt	Green clinics are central to the Women-Led Climate Resilience project, which combines facility upgrades (solar, water filtration, smart irrigation) with mobile clinic improvements, health worker education, behavior change, and economic empowerment activities with women in the community. Sustainability and pro-environmental activities are core elements. The project also informs the Sustainable Adaptation for Healthcare Advancement (SAHA) initiative in the MENA Region, supported by the Green Climate Fund.
Pakistan & Bangladesh	The Takeda-funded project focused on health system strengthening and facility infrastructure improvements, applying the WHO-guided facility assessments. It integrated women's leadership and climate innovation components while readying health facilities for climate-driven emergencies, ensuring they maintain essential services through floods, heatwaves, and other shocks.
Tanzania	An early-stage green clinic project funded by the Margaret A Cargill Philanthropies draws on Tanzania's deep experience with population, health, and environment programming. Facilities are called 'green and inclusive clinics', deliberately signaling the importance of accessibility for women, youth, people with disabilities, and other vulnerable groups alongside environmental sustainability.
Ethiopia	USAID, Gates Foundation, and KOICA-funded projects integrated green clinic principles into adolescent and youth health programming, expanding beyond traditional service delivery to include climate adaptation components.
Burkina Faso	With support from the Kingdom of the Netherlands through Projet Sauver la Vie, Pathfinder International Burkina Faso partnered with universities, local communities, and government to design and build six climate-resilient green community health posts across three regions hosting internally displaced populations. Each health post is solar-powered for energy independence, built with climate-smart architecture that maximizes natural light and ventilation, cooled by strategic tree planting, and designed for accessibility for people with limited mobility. Local university architecture students helped design eco-friendly models adapted to Burkina Faso's climate, while communities contributed labor, materials, and sustained engagement throughout construction, building ownership alongside the infrastructure itself.

04



Purpose of This Guideline

This guideline is intended for Pathfinder country teams interested in designing, implementing, and monitoring green clinic programming. It translates global standards and Pathfinder's field experience into practical, actionable guidance that can be adapted to different country contexts.

This guideline will help you:

- Understand what makes a clinic 'green and climate-resilient' and why it matters for RMNCAH service delivery.
- Assess a facility's current state against international minimum standards across energy, water, waste, environment, and inclusivity.
- Identify what upgrades and interventions are most needed and impactful in your context.
- Plan and implement green clinic activities in a structured, evidence-based way.
- Monitor progress and report results to donors, governments, and communities.
- Connect your work to national climate and health strategies, and international financing opportunities.

How to Use This Guideline

The guideline is organized into sections. The next section describes the eight core components of a green clinic, along with standards, field examples, and replication guidance for each. The following provides a step-by-step process for developing green clinic programming, from assessing climate risks to selecting activities and measuring success. The annexes offer practical tools you can use in the field.

Alignment with Global Frameworks

This guideline aligns with the WHO Guidance for Climate-Resilient and Environmentally Sustainable Health Care Facilities, IFC Performance Standards, LEED Healthcare Principles, the UN Framework Convention on Climate Change (UNFCCC) Nationally Determined Contributions (NDCs), and the WHO WASH FIT tool. Where relevant, specific standards from these frameworks are referenced throughout.

05



Egypt, 2023.

Core Components of a Green Clinic

Green and climate-resilient clinics are built on eight interconnected components. Each component addresses a different dimension of climate resilience and environmental sustainability. Together, they form a comprehensive framework that protects service continuity, reduces environmental impact, and ensures inclusive care for all populations.

For each component, this section explains:

- **Why it matters,**
- **What international standards require,**
- **What Pathfinder has learned, and**
- **Key requirements for replication and entry**

A. Energy Systems & Solar Infrastructure

Why This Matters

Reliable electricity is a critical requirement for health facilities. Maternity wards need light during nighttime deliveries. Temperature-sensitive commodities, including essential medicines like oxytocin, require a reliable cold chain and refrigeration, while emergency procedures such as a lifesaving cesarean depend on uninterrupted power for theatre and diagnostic equipment, anesthesia, and surgical instrument sterilization to remain functional. When the power goes out, these life-saving services stop. The scale of the problem is significant. The WHO estimates that up to one in every four health facilities in low- and middle-income countries have no electricity access at all, and upwards of 40% experience chronic supply interruptions. In Sub-Saharan Africa, 15% of facilities lack any electricity, and in South Asia, 12% lack electricity.[11]

In low- and middle-income countries, most health facilities use fuel-based standby generators, a major source of greenhouse gases (carbon dioxide, methane, nitrous oxide). Green clinics are designed to replace these generators with low-carbon, environmentally friendly energy sources. Solar energy, both grid-connected and off-grid battery-backed systems, is a practical and cost-effective solution. When combined with energy efficiency measures, solar power systems can keep critical services running even during grid failures or extreme weather events.

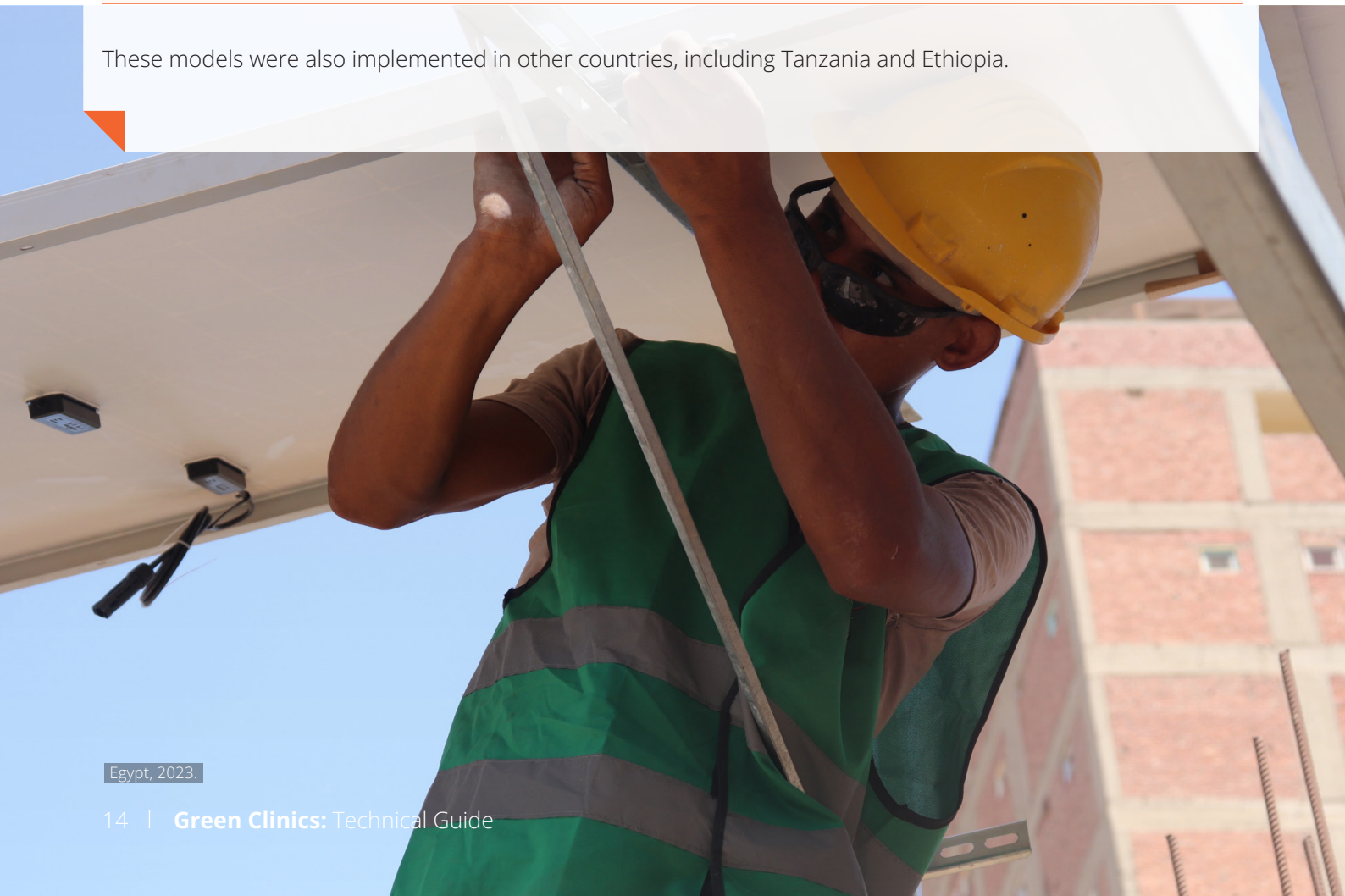
Pathfinder's Field Experience

Dual Solar Architecture in Egypt

Egypt's Green Clinic Model uses a dual approach, combining on-grid and off-grid solar power systems to optimize financial sustainability and service continuity.

On-Grid Solar (Grid-Tied PV)	Solar panels are connected to the national grid through a bidirectional meter. When the facility generates more power than it uses, the surplus is fed back to the grid under net-metering arrangements. This generates revenue or credit that offsets utility bills, directly supporting the financial sustainability of the facility.
Off-Grid Solar (Battery-Backed)	In facilities with unreliable grid supply or in crisis-prone zones, battery-backed off-grid systems are deployed. These systems ensure that critical services, operating theatres, labor rooms, and laboratory refrigeration continue running even during extended power outages, grid failures, or climate-related disruptions. Critical loads are placed on dedicated circuits. In Egypt and comparable settings, heavy thermal sterilization loads (e.g., autoclaves) are strictly budgeted or kept on separate, non-critical circuits, since their high wattage draw can rapidly deplete battery arrays otherwise reserved for vaccine refrigeration and pharmacy cooling.
Efficiency Measures	LED lighting retrofits and solar water heaters reduce overall energy demand. This means smaller, less expensive solar power systems can power the same services, improving return on investment and extending battery backup duration.

These models were also implemented in other countries, including Tanzania and Ethiopia.



Egypt, 2023.

International Minimum Standards

Domain	Minimum Standard	Verification
Energy Access	All life-critical departments have uninterrupted power. For primary health care facilities, critical loads are isolated on a battery/uninterrupted power supply backup.[12]	Load analysis report; Commissioning certificate
Maternity Ward & Operating Theatre	24/7 uninterrupted power is mandatory for facilities providing basic and comprehensive emergency obstetric and newborn care (BEmONC and CEmONC), blood transfusions, maternity ward, and operating theatres.[13,14]	On-site verification; Nighttime observation checklist
Oxygen facility	Oxygen therapy is a life-saving medical intervention to treat hypoxemia (low blood oxygen). 24/7 uninterrupted power in emergencies is critical to maintain oxygen supplies for the delivery room and operating theatre.	On-site verification; Nighttime observation checklist
Energy Efficiency	Demand-side management is required alongside energy generation. LED lighting and energy-efficient equipment across all clinical areas.[15]	LED inventory; Equipment energy ratings
Backup Power	Backup power is critical for facilities providing BEmONC and CEmONC, blood transfusions, and surgical procedures. Battery or backup energy sources/uninterrupted power supply for at least 8 hours for life-critical loads.[16]	Battery specification sheet; Generator fuel log
Economic Sustainability	Net metering or cost-saving documentation for on-grid systems. Energy cost reduction linked to financial sustainability plans.[17]	Quarterly energy cost reports

Solar Power System Design Reference

The following table provides reference parameters for solar PV system design at a typical primary health facility based on WHO guidance. Figures vary significantly depending on whether energy-efficient equipment is in use, demonstrating why efficiency measures should come first.

Parameter	Traditional Equipment (Low Sun)	Traditional Equipment (High Sun)	Efficient Equipment (Low Sun)
Maximum load	7,870 W	7,870 W	4,620 W
Max units per day	18.4 kWh	18.4 kWh	10 kWh
Solar capacity needed	10.11 kW	6.6 kW	6 kW
Battery capacity	6,100 Ah (12V)	6,100 Ah (12V)	3,300 Ah (12V)
Inverter capacity	20 kVA	12.5 kVA	7.5 kVA

Note: *Always conduct an energy needs assessment before designing a solar power system. Use energy-efficient equipment first to reduce system size and cost.*

Recommendations for Replication

Dust-prone and arid settings: Uncleaned PV arrays can lose 15–30% of rated output between cleanings, so replication plans should budget a fixed panel-cleaning schedule, typically every 2–4 weeks in high-dust seasons, and size arrays with this derating in mind rather than nameplate capacity alone. PV modules and inverters also lose efficiency above their rated test conditions of around 25°C, so at sustained 40–45°C+ ambient temperatures, teams should specify components rated for high-ambient operation and ensure ventilated, shaded mounting for inverters and battery enclosures.

Battery capacity and cycle life degrade faster at sustained high ambient temperature, so battery rooms and cabinets should be shaded, ventilated, and, where possible, temperature-controlled, with a high-ambient safety margin applied to capacity sizing. As reflected in the example from Egypt, heavy thermal loads, such as autoclaves, should remain on separate, non-critical circuits to preserve dust- and heat-stressed battery arrays for vaccine refrigeration and pharmacy cooling. Accordingly, PV soiling-loss and high-ambient derating factors should be added as standard line items in every arid and semi-arid load analysis and system-sizing worksheet, and a fixed-interval panel-cleaning and dust-filter maintenance service should be contracted as part of every solar installation maintenance agreement.

Humid, high-rainfall, and flood-prone settings: Elevated ambient humidity accelerates corrosion of inverter terminals, battery contacts, and junction boxes, so components should be conformal-coated or IP65-rated, and enclosures ventilated to prevent condensation build-up. Ground-mounted battery banks and inverters should be sited above the documented flood level, or on raised plinths where elevation is not possible, with cabling routed to avoid submersion.

Coastal, cyclone, and high-wind settings: Solar array mounting structures should be engineered to local wind speed with hurricane clips, ballast, or wind-rated racking. Salt-laden air requires marine-grade, corrosion-resistant hardware, and more frequent panel-cleaning cycles, comparable to the dust-cleaning schedule used in arid contexts.

Cold, high-altitude, and low-solar-irradiance settings: Battery performance and capacity drop sharply below freezing, so battery enclosures should be insulated and, where feasible, thermostatically heated rather than shaded/ventilated as in hot climates. Solar arrays should be sized against the lowest-irradiance month (i.e., in winter or the cloudiest monsoon month), not the annual average, and mounting should account for snow or ice loading where relevant.

All settings:

- Conduct a criticality-tiered load analysis classifying all electrical loads as: (i) life-critical, maternity, theatre, intensive care unit (ii) essential, laboratory, pharmacy refrigeration, sterilization; and (iii) non-critical, administration, waiting areas.
- Design solar power systems with dedicated off-grid battery circuits for all life-critical loads, regardless of national grid reliability.
- Install LED lighting and other efficient measures **before or alongside** solar installation to reduce system size and cost.
- Establish net-metering or feed-in-tariff agreements with national utilities where on-grid systems are deployed.
- Document energy cost savings quarterly and integrate findings into facility financial sustainability reports.
- Ensure all solar power system installations include maintenance agreements, and that facility staff are trained in basic system monitoring.

B. Water, Sanitation, and Hygiene (WASH)

Why This Matters

Safe water is the foundation of infection prevention in health facilities. Without it, handwashing fails, surgical equipment sterilization cannot occur, and clients are at serious risk of health-care-associated infections. It is critical for maintaining oral rehydration therapy corners in the facility to treat diarrheal diseases and vomiting in children under five. Furthermore, consistent water access is necessary for toilets to function and be accessible for all users, including women who may be pregnant or recently postpartum, people with disabilities, and adolescent girls for menstrual health and hygiene. The WHO's and UNICEF's Joint Monitoring Program (JMP) estimate that one in four health facilities globally lack basic water services.[18] Climate change makes water access more uncertain, droughts reduce supply, floods contaminate sources, and infrastructure failures become more frequent. Poor sanitation in a health facility is both a health risk and a barrier to care-seeking. Facilities must be designed to maintain water availability during these shocks by storing sufficient water, treating it safely, and using it efficiently.

Pathfinder's Field Experience

Water Filtration and Smart Irrigation in Egypt

Egypt's model addresses both water quality and operational efficiency. Point-of-use water filtration systems ensure safe water for clinical procedures, hand hygiene, and client care, independent of variations in municipal water quality. This is critical given Egypt's Nile delta water quality challenges, where municipal water may contain contaminants that are unsafe for clinical use.



Tanzania, 2019. Photographed by Roshni Lodhia for the Endangered Ecosystems of Northern Tanzania project.

Smart irrigation systems are deployed for facility grounds maintenance, reducing non-clinical water consumption by an estimated 30–50% compared to conventional irrigation. Smart irrigation systems integrate advanced technologies, such as the Internet of Things (IoT), Wireless Sensor Networks (WSNs), cloud computing, and Artificial Intelligence (AI), to enable real-time, data-driven monitoring and control of irrigation practices. As water scarcity worsens due to climate change, the efficiencies of smart irrigation systems reduce costs and ensure that critical water needs are prioritized.

Arid and semi-arid settings bring a distinct hazard profile: facilities are exposed to severe, sudden flash floods. Site assessments, therefore, include localized defensive structures against flash flooding, identification of accumulation hotspots in and around the facility premises, and defined safe runoff discharge pathways, complementing the rainwater-harvesting approach used in wetter contexts.

Rainwater Harvesting System in Tanzania

The supported facilities implemented a comprehensive rainwater harvesting system that significantly improves water security during the dry season, when municipal supply is frequently constrained. The system comprises: collection gutters on all major roof surfaces; a 50,000-litre underground primary storage tank; two elevated secondary storage tanks for gravity-fed distribution; and a solar-powered pump for transferring water between storage levels. The use of a solar-powered pump is a critical design feature because it eliminates dependency on grid electricity for water distribution, ensuring that water access is maintained even during power outages.

International Minimum Standards

Domain	Minimum Standard	Verification
Water Source Resilience	Joint Monitoring Programme recommends piped water, treated and available. Facilities must maintain supply during shocks. Minimum 3 days of water storage on-site and a functional backup source.[19]	WASH FIT assessment; Daily water availability log
Water Quality	Documented water treatment (chlorination or UV) and biannual water quality testing. WHO WASH FIT: treatment mandatory; testing ≥2x/year.	Laboratory water quality report; Treatment log
IPC Water Access	Functional handwashing stations at every point of care with water availability 24/7.[20]	IPC observation checklist
Disability-Inclusive WASH	At least 1 Convention on the Rights of Persons with Disabilities (CRPD) article 9 compliant and accessible toilet (grab bars, accessible sink, non-slip floor, and sufficient turning radius) per facility.[21]	Disability access audit
Water Efficiency	As per IFC Performance Standard 3 and LEED health care facilities projects standard, water use reduction targets are required for certification pathways. Documented water use reduction measures: target 20–30% reduction versus baseline.	Water consumption meter; Efficiency audit

Recommendations for Replication

Dust-prone and arid settings: Open or poorly insulated water storage in hot, arid climates can lose a significant share of stored volume to evaporation, so storage sizing should apply an evaporation margin, typically an additional 10–20% over calculated demand, on top of the minimum 3-day/90-day storage standards, and closed or shaded tanks should be prioritized over open reservoirs. Brackish groundwater with total dissolved solids above roughly 1,000 mg/L is common in arid settings, so where salinity exceeds levels suitable for clinical and drinking use, reverse osmosis or equivalent treatment should supplement chlorination/UV. Arid settings face sudden, severe flash floods rather than sustained rainfall, so storage tanks, wellheads, and treatment equipment should be sited or protected above documented flash-flood levels to prevent contamination of an already scarce water supply. Dust deposition on rooftop catchment surfaces also increases first-flush contamination risk, making a first-flush diverter a minimum requirement for any rainwater harvesting system in dust-prone settings. Teams should commission a water-source salinity/TDS test as part of every baseline WASH FIT assessment in facilities before selecting a treatment technology, and size all new water storage using local evaporation-rate data from the national meteorological service, in addition to the 10-year drought scenario already required in Replication Requirements.

Humid, high-rainfall, monsoon, and flood-prone settings: Here water scarcity is rarely the dominant chronic hazard; contamination and infrastructure disruption during flooding are. Wellheads, storage tanks, and treatment equipment should be sited or sealed above the documented flood level, with backflow prevention on any connection to municipal supply. Test for saline intrusion where relevant, applying the same TDS-testing and above-flood-siting logic used in arid facilities. Because sustained rainfall and humidity raise microbial contamination risk, chlorination/UV treatment protocols should be verified more frequently than the biannual minimum during peak rainy season, and rainwater-harvesting systems need first-flush diverters and overflow management sized for monsoon-intensity rainfall rather than drought-year storage.

Coastal and saline-intrusion settings: Where groundwater or surface sources are affected by saltwater intrusion, teams should test salinity/TDS alongside microbial quality and budget reverse osmosis or equivalent desalination where levels exceed safe thresholds for drinking and clinical use, following the same TDS-testing principle used in arid, brackish-groundwater contexts.

Cold and high-altitude settings: Exposed pipework, storage tanks, and treatment units are vulnerable to freezing and pipe bursts. Insulate or bury exposed water infrastructure below the frost line to prevent freeze damage and supply interruption, budget for heat-tracing, and account for backup water storage for freeze-related supply interruptions in addition to the standard three-day minimum.

All settings:

- Apply WASH FIT as the primary diagnostic tool before any facility investment to identify gaps and set baselines.
- Install solar-powered pumping systems as the default for all water distribution in off-grid or unreliable grid contexts.
- Implement documented water treatment protocols (chlorination, UV, or multi-stage filtration) with bacteriological quality testing at least twice per year.
- Retrofit at minimum one toilet per gender with full CRPD-compliant accessibility features.
- Deploy point-of-use filtration in all clinical areas providing sterile procedures regardless of municipal water quality claims.

C. Health Care Waste Management (HCWM)

Why This Matters

Health facilities generate waste that can kill. Used sharps infect healthcare workers. Pathological waste spreads disease. Improperly discarded chemicals contaminate groundwater. The WHO estimates that 15% of all waste generated by health facilities is hazardous, and improper disposal contributes to health-care-associated infections, community disease transmission, and environmental damage. Climate change increases these risks. Flooding can breach waste storage areas and spread hazardous materials. Extreme heat accelerates pathogen growth in poorly managed waste. Supply chain disruptions can reduce access to proper disposal materials, increasing improvised and dangerous disposal practices. Effective waste management is not just a legal and regulatory requirement; it is an ethical obligation to workers, clients, and communities. It is also a sustainability issue: poor waste management releases greenhouse gases, toxins, and pollutants that contribute to the climate crisis that health facilities are trying to adapt to.

Pathfinder's Field Experience

Tanzania: Health Care Waste Management Infrastructure Assessment

The facility in Tanzania demonstrates a functional waste management system with dedicated infrastructure for different waste streams. A well-maintained placenta pit ensures safe disposal of pathological waste from maternity services. An electric incinerator with a dedicated ash pit for hazardous and general combustible waste. The facility compound is fenced and secured against unauthorized access.



Tanzania, 2025.

International Minimum Standards

Domain	Minimum Standard	Verification
Waste Segregation	Three-stream color-coded segregation mandatory at point of care: yellow (infectious/pathological), red (sharps/highly hazardous), black/green (general).[22]	Health care waste management audit; Bin placement observation
Sharps Disposal	Sharps containers must be puncture-proof, leak-proof, and replaced before full. Puncture-proof sharps containers that are never filled beyond 75% capacity before sealing and routing.	Waste handling observation; Sharps log
Incineration Standards	Dual-chamber incinerators: primary chamber ≥850°C; secondary chamber ≥1,100°C; emissions monitored. These temperature specifications are required to prevent dioxin/ furan emissions.	Temperature logs; Maintenance register
Site Safety	As per IFC PS3 and WHO HCWM guideline, designated, paved access routes are required for safe waste transport. Fenced, secure waste storage area. Paved, covered access path of minimum 1.2m width to disposal area.	Site inspection checklist
HCWM Policy	Written HCWM plan updated annually, quarterly staff training, and an incident log maintained.	Document review: Training records

Waste Stream Reference: Three-Bin System

Every consultation room, delivery suite, and laboratory must have a standardized three-bin layout. There should be no exceptions. The table summarizes each stream.

Bin	What Goes In	Container Requirements
BLACK/GREEN: General Waste	Non-clinical papers, packaging, food scraps, and administrative waste.	Standard bin with lid. Emptied daily.
YELLOW: Infectious/ Pathological Waste	Blood-soaked gauze, used gloves, dressings, placental tissue, and laboratory cultures.	Heavy-duty, leak-proof plastic liner. Sealed and routed when 75% full.
RED: Sharps/ Highly Hazardous	Needles, syringes, scalpels, lancets, broken glass, expired pharmaceutical containers, and chemical reagents.	Rigid, puncture-proof polypropylene sharps container. Never filled beyond 75%.

Special Infrastructure Considerations

Facilities must also manage liquid waste from clinical procedures safely. Key requirements include:

- Laboratory and clinical sinks must use corrosion-resistant polypropylene (PP) or high-density polyethylene (HDPE) pipes, not standard PVC, which degrades under chemical agents and can cause underground contamination.
- Sinks in orthopedic, casting, and dental rooms must have physical sediment traps to catch heavy materials (gypsum, dental stone) before they enter drainage systems.
- Highly acidic or alkaline liquid waste must be neutralized before discharged into septic systems.
- Chemical and infectious liquids must never mix with general greywater plumbing without dedicated on-site pre-treatment.

Recommendations for Replication

Dust-prone and arid settings: High ambient temperatures accelerate pathogen growth and odor generation in stored infectious and pathological waste. In sustained-heat arid settings, yellow-bin collection intervals should be shortened relative to temperate-climate defaults, and waste storage areas should be shaded and passively ventilated even where not flood-exposed. Dust and sand infiltration can also compromise ash-pit seals and incinerator maintenance access, so ash pits and waste storage should use sealed, sand-resistant covers, with access-path paving kept clear of windblown sand accumulation. Where dust storms periodically restrict safe outdoor movement, facilities should define an interim safe-holding protocol for sharps and infectious waste, so segregation standards are not compromised during multi-day storm events. A shaded/ventilated waste-storage requirement and a dust-storm interim-holding protocol should therefore be added to every facility's written HCWM plan in arid settings.

Humid, high-rainfall, and flood-prone settings: The dominant risk is contamination and access disruption: sharps and infectious-waste storage should be elevated above documented flood levels (see Tool 3, item E1) with sealed, water-tight containment rather than only heat-ventilation, and facilities should define an alternative treatment or interim-holding protocol for periods when floodwaters or washed-out roads prevent off-site disposal or routine collection.

Coastal and cyclone-prone settings: Waste storage structures should be wind-rated and anchored against storm damage, and an interim safe-holding protocol (like the dust-storm protocol used in arid facilities) should cover the period during and immediately after a cyclone when outdoor movement and off-site disposal/transport are unsafe.

Cold and high-altitude settings: Low temperatures slow pathogen breakdown less urgently but can affect liquid-waste neutralization chemistry and freeze standing wastewater in holding tanks. Teams should verify that neutralization and containment systems remain functional across the local temperature range.

D. Environmental Conservation & Biodiversity

Why This Matters

Green space in and around health facilities is clinically and operationally beneficial. The WHO's 2023 Health Sector Climate Roadmap and UNEP's Nature-Based Solutions recognizes that vegetative cover reduces the urban heat island effect (lowering building temperatures), improves air quality, and supports the psychological well-being of clients and staff.[23] Thus, tree planting contributes to climate mitigation by sequestering carbon, which can be eligible for carbon credit generation if properly documented, and can help reduce local climate impacts. For facilities in food-insecure settings, fruit-bearing trees provide nutritional supplementation and potential income for facility communities. Environmental programming positions health facilities as anchor institutions for sustainable community development, extending their positive impact well beyond clinical walls.

Pathfinder's Field Experience

Tree Planting Program in Tanzania

Supported facilities established an active tree planting program, including both indigenous shade trees (i.e., Terminalia species/Mi-Dodoma) and fruit-bearing trees (i.e., mango, passion fruit, avocado), in its compound. Of the trees planted, 56% survived and are being maintained by facility staff. This provides multiple co-benefits: shading reduces the building's heat load and cooling requirements; fruit trees contribute to nutrition for clients and staff; the canopy improves air quality; and the aesthetic environment supports trauma-informed, client-centered care. To improve the trees survival rate, the facilities will focus on watering, mulching, and pest management protocols.



Niger, 2026.

Community Environmental Awareness and Economic Empowerment in Egypt

Egypt's model extends environmental action beyond the facility compound. The Women-Led Climate Resilience project integrates multi-generational community awareness programming and women's economic empowerment through green handicrafts.

This approach positions the health facility as an anchor institution for sustainable community development, with health providers and community health workers serving as climate educators. Integrating environmental awareness into clinical services and community outreach creates a scalable, low-cost mechanism for behavior change in alignment with the WHO Health Promoting Hospitals Framework. Women who participate in green handicraft enterprises gain income, agency, and a stake in the environmental outcomes of their community.

International Minimum Standards

Domain	Minimum Standard	Verification
Green Space Coverage	WHO Healthy Settings / LEED HC: 5% minimum; canopy for outdoor waiting areas.[24]	Site area measurement; Green space percentage calculation
Species Selection	UNEP NBS: Indigenous species prioritized for ecosystem integration and water efficiency.[25] Prioritize fruit trees where food insecurity exists.[26]	Tree species inventory register
Survival & Maintenance	FAO Agroforestry Standards target ≥70% tree survival at 24 months post-planting; structured watering, mulching, pest management required; establish maintenance protocols.	Tree inventory register; Tree mortality log
Community Integration	Facilities as nodes for community environmental health education; linked to clinical contacts (antenatal care, immunization, family planning visits).	Community program records; Training logs
Carbon Documentation	According to UNFCCC, national NDCs require documentation for carbon credit generation. Tree inventory with species, planting dates, and survival rates to enable carbon sequestration calculations.	Facility environmental register



Photo credits

Recommendations for Replication

Dust-prone and arid settings: Species selection should prioritize drought-tolerant, indigenous xerophytic species, such as acacia, olive, date palm, and other locally adapted trees, which can meet the ≥70% survival target with realistic watering budgets, rather than water-intensive ornamental species. Greywater reuse for irrigation, drawn from handwashing and non-clinical sinks after basic filtration, can substantially reduce the freshwater demand of the minimum 5% green-space target in water-scarce settings, complementing a smart-irrigation approach. Mulching and windbreak planting also reduce soil-moisture evaporation and wind-driven soil erosion, both significant maintenance challenges for young trees in dust-prone, low-rainfall environments. Teams should work with local forestry or agricultural extension services to develop an indigenous/drought-tolerant species list before any tree-planting activity begins in arid facilities and should evaluate greywater reuse feasibility as a standard line item in every facility's irrigation design.

Humid, tropical, and monsoon settings: Species selection should shift from drought-tolerant xerophytic species toward fast-growing, flood- and waterlogging-tolerant natives, and planting beds should incorporate raised mounds or French drains where compound soils are prone to waterlogging during the rainy season. Species selection and planting calendars should align with the monsoon/rainy-season window to maximize survival without irrigation.

Coastal settings: Salt-tolerant species (e.g., coconut, casuarina, mangrove associates, where appropriate to the site) should be prioritized in salt-spray zones, and a vegetated buffer or windbreak can also reduce cyclone wind damage to the facility.

Cold and high-altitude settings: Frost-hardy, locally native species adapted to the elevation and temperature range should be prioritized over tropical ornamentals, and planting should avoid the frost season.

All settings:

- Integrate fruit tree planting in all facilities serving food-insecure populations as a nutrition security co-investment.
- Adapt community environmental awareness curricula linked to clinical contacts.
- Document tree inventory, species, planting dates, and survival rates in a facility environmental register to enable future carbon sequestration calculations.



Photo credits

E. Human Resources, Change Management, & Emergency Preparedness

Why This Matters

The people working in a facility – clinical staff, cleaners, maintenance workers, administrators, and managers – determine whether infrastructure investments improve service quality and environmental performance. Without trained, motivated, and prepared staff, even the best-designed green clinic will underperform. Change management is the process of helping people adapt to new ways of working. Moving from a conventional clinic to a green clinic involves behavioral change: staff must learn to use new systems, adjust routines, communicate differently with clients, and maintain new infrastructure. If this transition is not managed well, staff may resist, misuse, or simply ignore new systems.

Climate-induced health emergency preparedness is equally critical. Climate shocks (floods, heatwaves, storms) require coordinated and rapid response to meet demand. Facilities without documented plans and trained staff cannot respond effectively, increasing preventable morbidity and mortality.

Pathfinder's Field Experience

A Model for Change Management in Egypt

Egypt's Green Clinic Model's change management and climate risk training for health providers is a core implementation pillar. The model recognizes that behavioral change among staff is the mechanism through which infrastructure investments produce sustained results. If staff do not conserve water, segregate waste, communicate with clients about climate-related health risks, and operate new systems correctly, investments will not achieve their potential. Egypt's training is structured around three competency domains:

Technical Competency	Staff learn to operate and perform basic maintenance of solar power systems, water filters, irrigation controls, and waste infrastructure. This reduces dependency on external technicians and ensures systems are maintained correctly.
Behavior Change Communication	Staff learn to engage clients, families, and community members in clinic-based environmental awareness and climate-related health risk education. This extends the green clinic's impact on the community.
Organizational Change Adaptation	Staff understand the phased transition from conventional to green operations, how to manage resistance from colleagues, and how to document lessons for institutional learning.

Egypt's experience shows that green clinic sustainability requires action at three systemic levels simultaneously:

Level	What It Means	Egypt's Approach
Behavioral	Individual and community behavior changes driven by awareness and education embedded in routine clinical interactions.	Multi-generational awareness activities; climate-related health education integrated into clinical contacts.
Institutional	Government buy-in: green features integrated into national clinic accreditation standards and recurrent budget allocation for maintenance.	Green clinic features are formally incorporated into national health facility accreditation criteria so that government staff co-own the model.
Financial	Pilot data from green clinic operations used to access international climate finance. Modular design allows incremental upgrading aligned with available funding.	Pilot data shared with donors for continued or new investments. Net metering revenues reinvested in care.

Health Facility Readiness in Pakistan and Bangladesh

Pathfinder's Women-Led Climate Resilience project equipped health facilities to deliver SRH services during climate crises through provider training, facility upgrades, contingency planning, and collaboration with local governments and disaster management committees.

Facilities in both countries saw their emergency preparedness scores improve significantly. In Bangladesh, the top gains came from elevating power supplies above flood level, establishing emergency staffing plans, and creating protocols for communicating climate-related health risks. In Pakistan, the largest improvements were in waste management emergency plans, backup power for critical health and protection-related interventions, solar panels in spaces for women and girls in displacement camps to improve their access to gender-based violence (GBV) services, and water quality monitoring. These efforts measurably strengthened health system resilience across climate-affected settings. Sustained progress will depend on continued collaboration between health systems, local governments, and women champions embedded in district-level disaster risk reduction planning.



Pakistan, 2026.

International Minimum Standards

Domain	Minimum Standard	Verification
Staff Training	Formal induction and annual refresher training on green infrastructure operation, waste management, and climate-related health risks for all relevant staff.	Training records; Attendance registers
Emergency Preparedness Plan	The written plan is up-to-date. Simulation drill at least once per year. Staff refresher training at least annually.	Documented plan; drill records; Training log
Stock Management	Maintain clear categorization of stock (working, safety, preparedness) and set minimum stock levels based on program needs, lead times, and risk appetite. Replenishment is triggered by reaching a predetermined reorder point (ROP), calculated as (average daily usage × lead time) + safety stock. Order quantity (ROQ) is based on lead-time demand.	Regular physical inventory counts and reconciliation with records
Change Management	Structured process for transitioning to green operations, including managing staff resistance and documenting lessons.	Change management documentation; Lessons learned register
Government Integration	Green features integrated into national accreditation standards; government ownership and budget allocation pursued.	Policy documents; Government meeting records
Climate Finance	Documented performance data and NDC alignment maintained for climate finance applications.	Performance reports; Financing strategy document

Recommendations for Replication

Dust-prone and arid settings: Staff schedules and outdoor or manual tasks, such as waste transport, garden maintenance, and generator servicing, should avoid peak-heat hours, with mandatory shade, rest breaks, and hydration during extreme heat periods (see Annexes, Tool 2). Emergency preparedness plans in dust-prone arid settings should also include a specific dust-storm protocol covering indoor sheltering, respiratory protection for vulnerable clients and staff, and temporary suspension of non-essential outdoor movement. Backup generators and fuel storage in hot, dusty environments require more frequent filter changes and fuel-quality checks since heat accelerates fuel degradation and dust accelerates filter clogging. A dust-storm scenario should be added to the annual simulation drill cycle in arid facilities, alongside heat, flood, and storm drills. Heat-stress and dust-storm response should become standing agenda items in quarterly HCWM/green infrastructure operations staff training.

Humid, flood-prone, and monsoon settings: Emergency preparedness plans should include a flood protocol covering safe evacuation routes, elevation of critical equipment before the rainy season peaks, and a waterborne-disease response plan (see Annexes, Tool 3, item A3). The annual drill cycle should include a flood simulation alongside heat and storm drills.

Coastal and cyclone-prone settings: Plans should include a cyclone/storm-surge protocol with pre-identified evacuation routes and shelter points, and generators and fuel storage should be secured against wind and flood damage. A cyclone drill should be added to the annual simulation cycle.

Cold and high-altitude settings: Staff schedules and outdoor tasks should account for cold-exposure risk, with cold-weather personal protective equipment and shelter available. Emergency plans should include a cold-wave/snow-access protocol covering road accessibility and heating fuel or backup power for cold-sensitive medical storage.

All settings:

- Design and deliver structured training on green infrastructure operation, climate-related health risks, and waste management for ALL staff before or at the time of facility upgrades.
- Establish or update a written emergency preparedness plan for every facility and review annually. Conduct simulation drills at least once per year.
- Identify and support a 'Green Clinic Champion' at each facility, a staff member responsible for monitoring green system performance and supporting peer learning.
- Pursue government integration from the outset: present green clinic data to district health officers and national health quality teams, and advocate for integration into accreditation standards.
- Document performance data systematically from the start, including energy savings, water use, waste audit results, and emergency drill outcomes, to support future climate finance applications.

F. Green Spaces & Therapeutic Gardens

Why This Matters

A health facility's physical environment shapes client experience, staff well-being, and even clinical outcomes. Green spaces, gardens, planted courtyards, tree-shaded waiting areas, and rooftop plantings have well-documented benefits. They reduce ambient temperatures, improve air quality, reduce client anxiety and stress, support faster recovery, and make facilities more welcoming to marginalized groups who might otherwise feel excluded. Many of the facilities Pathfinder supports serve pregnant women, children, and people who may be experiencing trauma, fear, or grief. Thus, the therapeutic dimensions of green space are especially important. A well-designed, planted waiting area conveys dignity and care, and that a facility values the whole person, not just the clinical transaction.

Green spaces also support climate resilience: trees and plants reduce the 'urban heat island effect,' keeping facility temperatures lower during heatwaves; permeable planted surfaces reduce flooding risk by absorbing rainfall; root systems reduce soil erosion; and green roofs provide additional insulation, reducing energy requirements for cooling.

Pathfinder's Field Experience

Ethiopia Health care Facilities Gardening

Pathfinder Ethiopia supports a youth-led gardening initiative to enhance the capabilities of health facilities, nearby schools, women's self-help groups, and households. This initiative aims to raise awareness about vegetable and fruit gardening and demonstrate its benefits, improving participants' skills in cultivating vegetables both at home and in community spaces. Pathfinder provided the necessary tools and seeds for vegetable and fruit production to ensure environmental sustainability. Since 2019, Pathfinder introduced integration of this gardening initiative to facilities providing youth-friendly health services, schools, households, and communities in collaboration with peer educators, providers, health facility management, and local agriculture offices. With technical support from local agriculture offices and horticulture experts, peer educators, health facility staff, and students received hands-on training in all aspects of gardening, from land preparation to transplanting. Facilities were supplied with tools, seeds, and seedlings. Beyond their primary health promotion roles, peer educators led community outreach on the benefits of utilizing open spaces for food production, demonstrating the value of integrating livelihoods and nutrition into health-centered programming. Since then, more than 71 health facilities and schools have expanded the initiative into adjacent households in the community. The health facilities were selected based on preset criteria: commitment to the initiative, youth-friendly services supported by peer educators, availability of adequate water sources, and a well-fenced and safe space that is free from biohazardous materials.

International Minimum Standards

Domain	Minimum Standard	Verification
Green Space Coverage	WHO Healthy Settings/LEED: Minimum 5% of facility compound area as planted green space; outdoor waiting areas should have canopy or shade cover.[27]	Site measurement; Percentage calculation
Therapeutic Design	WHO Person-Centred Care / HCWH: Green spaces should be accessible, welcoming, and designed with client groups in mind, including pregnant women, elderly clients, and people with disabilities.[28]	Client and staff feedback; Accessibility audit
Heat Mitigation	Shade trees are planted to cover outdoor waiting areas and reduce building surface temperatures. Nature-based solutions for urban heat mitigation are recommended.	Temperature monitoring before and after planting
Maintenance Protocol	Formal watering, mulching, pruning, and pest management schedule; assigned responsibility.	Maintenance log; Assigned staff roster
Food Production	Fruit and vegetable gardens are encouraged in food-insecure settings; the harvest is used for client or staff nutrition. UNEP NBS / SDG 2 Zero Hunger: Food production in health settings is endorsed as a nutrition security measure.	Harvest records; Beneficiary documentation

Design Principles for Green Spaces in Health Facilities

- **Accessibility First:** Paths between green spaces and clinical areas must be paved, even, and wide enough for wheelchairs and stretchers. No step-entry gardens.
- **Native Species Priority:** Use locally indigenous plants that require less water, resist local pests, and integrate with local ecosystems. Consult local forestry or agricultural extension services for species selection.
- **Shade for Waiting:** Plant trees or install shade structures over all outdoor waiting areas. Clients, especially pregnant women, young children, and elderly individuals, should never wait in direct sun.
- **Multi-Purpose Planting:** In food-insecure settings, choose trees and plants that provide shade AND edible produce.
- **Community Ownership:** Involve community members in planting and maintenance. This increases survival rates, builds community ownership of the facility, and strengthens community-facility relationships.
- **Green Roofs / Walls:** Where space on the ground is limited, explore green roofs or vertical wall gardens. These provide insulation, reduce heat load, and improve air quality even with minimal ground space.

Recommendations for Replication

- **Dust-prone and arid settings:** Drip or subsurface irrigation, rather than sprinkler or flood irrigation, should be the default for therapeutic gardens and shade trees in arid settings, minimizing evaporative loss and aligning with smart-irrigation models like those in Egypt. Shade provision is also a higher-priority design driver: outdoor waiting areas without canopy or structural shade in 40°C+ ambient conditions pose a direct heat-safety risk. Multi-purpose, low-water species should be prioritized over high-water ornamental planting to meet both shade and food-security goals within realistic water budgets. Drip/subsurface irrigation and structural or tree shade over outdoor waiting areas should therefore be a non-negotiable line item in arid facility upgrade proposals.



Bangladesh, 2025.

Humid, tropical, and flood-prone settings: Raised or well-drained planting beds are the priority design measure, preventing waterlogging and mosquito-breeding standing water around therapeutic gardens. Canopy shade remains valuable for heat comfort but is a secondary priority to drainage in these settings.

Coastal settings: Salt-tolerant, wind-firm species should anchor garden design, and dense perimeter planting can double as a windbreak, reducing cyclone debris risk to the building.

Cold and high-altitude settings: Cold-hardy perennial species should be prioritized, and where outdoor growing seasons are short, a simple greenhouse, cold frame, or indoor planting area can extend the therapeutic and food-production benefits year-round.

All settings:

- Include a green space design plan in all facility upgrade proposals, even for urban or space-constrained facilities. Explore vertical, rooftop, and courtyard options.
- Prioritize shade tree planting over outdoor waiting areas as a first-step, low-cost heat mitigation measure.
- Use multi-purpose, indigenous species that provide shade, food, and ecological benefits simultaneously.
- Document all plantings in the facility environmental register, contributing to both operational management and carbon sequestration tracking.

G. Community Engagement in Climate Actions

Why This Matters

A health facility cannot be climate-resilient in isolation. Its catchment community is both its client source and most important partner in emergency preparedness and response. When a cyclone is approaching, when floodwaters are rising, or when a heatwave is killing the most vulnerable, the community network, community health workers, local leaders, women's groups, and religious institutions, is the fastest and most effective mechanism for warning, mobilizing, and protecting people.

Community engagement also extends the impact of green clinic activities beyond the facility walls.

Environmental awareness delivered during antenatal care visits reach hundreds of women and families each month. Tree planting programs with community participation build shared ownership of environmental outcomes. Early warning systems linked to community health workers can protect the most vulnerable people, such as newborns, heavily pregnant people, and the elderly or isolated, before a climate emergency becomes a medical emergency.

Pathfinder's approach positions health facilities as anchor institutions for community climate resilience, not just places people visit when they are sick. Facilities are active hubs for health literacy, environmental stewardship, and collective preparedness.

Pathfinder's Field Experience

Tanzania Engaging community Leaders for Community Change and creating model household

The Boma Imara project treats men, community leaders, and other influential groups not as secondary audiences but as active drivers of health and environmental outcomes, engaging them directly rather than relying on messaging aimed only at women. The strategy brings men into climate action and SRHR decision-making, building shared responsibility within the family rather than leaving it to women alone. This happens through five connected entry points: health facilities, community outreach, Model Boma / Model Households, Community Conservation Microfinance Groups, and Climate Resilience School Clubs. Community and traditional leaders reinforce this shift from the top down. As visible champions, they help normalize positive behaviors, drive uptake of health services, and push back against harmful practices, giving new norms the social weight to stick.

Engagement translates into concrete, visible change by creating "Climate Resilient Model Household" a households build handwashing stations (tippy taps), adopt energy-saving stoves, upgrade latrines, and apply climate-smart agriculture practices. Alongside these physical changes, the project reinforces positive attitudes toward sexual and reproductive health and rights, climate actions and works to keep both boys and girls in school. Community health workers and community champions carry this work forward. Trained and supported with stipends, they conduct regular household and village visits, promoting latrine and bath-shelter use, long-lasting insecticidal mosquito nets, and climate-smart agriculture and food security practices, turning one-time engagement into a sustained, community-owned habit.

International Minimum Standards

Domain	Minimum Standard	Verification
Community Early Warning	Clinic must have a documented mechanism for pushing climate alerts to CHWs and community leaders. Community alert systems are required as part of facility emergency plans as per the WHO Health Emergency Preparedness protocols.	Alert protocol documentation; CHW contact register.
CHW Deployment Protocols	Protocols for mobilizing CHWs to high-risk households during climate emergencies. CHW integration in climate emergency response is recommended.es.	CHW deployment log; household risk register.
Health Education Integration	Climate-health education is integrated into all routine clinical contacts (ANC, immunization, FP, well-child visits).	Education session records; IEC materials audit.
Community Participation	Community participation in health facility programming is the best practice. Community members, especially women and youth, engage in clinic environmental activities (tree planting, awareness campaigns).	Participation records; community meeting minutes.
Feedback Mechanisms	WHO Person-Centred Care: Client and community voice in service quality monitoring. Formal mechanism for community members to provide feedback on climate-related service disruptions.	Feedback register; satisfaction survey records.

Key Community Engagement Activities

- **Multi-Channel Alert Dissemination:** When a meteorological event (heatwave, flood, storm) is detected, the clinic pushes automated alerts to all registered community health workers, local leaders, and women's group representatives. Alerts specify hazard, timing, and protective actions. Communication channels should include SMS, radio, megaphones, and community notice boards to reach the most people, especially in rural and high-risk communities.

- **Targeted Household Visits:** Community health workers are mobilized to visit high-risk households first: households with registered newborns, pregnant women, isolated and elderly individuals, and households with known disabilities. Visits verify that these families have access to basic protective assets (water purification tablets, home hydration resources, emergency contact numbers) and provide on-the-spot guidance.

- **Climate-Health Education at Clinical Contacts:** Clinical encounters are an underused opportunity for climate-related health education. A midwife conducting antenatal care visits can explain the signs of heat stress in pregnancy in two minutes. An immunization nurse can explain how to protect children during a heatwave. These interactions, multiplied across thousands of client contacts per year, create significant community health literacy.

- **Community Tree Planting and Environmental Days:** Facilities organize seasonal tree-planting events with community participation, schools, women's groups, and youth associations. These events build community ownership of the facility's green space, extend environmental benefits into the community, and create opportunities for health education in a festive, non-clinical setting.

- **Women's Economic Empowerment:** Green clinic activities can be linked to women's economic empowerment, green handicrafts, sustainable agriculture, and tree nursery management. These activities provide income while building environmental knowledge and agency.

Replication Requirements and Key Entry Points

- **Dust-prone and arid settings:** Early-warning messages should cover both heatwave and dust-storm alerts, in addition to flood and storm warnings, using the same multi-channel approach of SMS, radio, megaphones, and notice boards described. In pastoralist or seasonally mobile communities often living in arid settings, community health worker household risk registers should account for seasonal population movement since fixed household lists can quickly become outdated. Heat and dust-storm hazard types should accordingly be added to the minimum three climate hazard types that every facility's alert-to-action protocol cover in arid contexts.

- **Humid, flood-prone, and monsoon settings:** Early-warning messages should prioritize flood and heavy-rainfall alerts, and community health worker household risk registers should flag households in low-lying or flood-prone areas for early evacuation support, using the same multi-channel approach.

- **Coastal and cyclone-prone settings:** Alerts should cover cyclone/storm-surge warnings with clear evacuation instructions, coordinated with local disaster-management committees.

- **Cold and high-altitude settings:** Cold-wave and snow-access alerts should be added where relevant, and community health worker risk registers should flag households with limited heating access or road isolation risk during winter months.

General Requirements:

- Tailor the minimum three hazard types covered by each facility's alert-to-action protocol to the locally dominant hazards rather than a fixed list.
- Update community health worker household risk registers to reflect the relevant seasonal or geographic vulnerability.
- Connect every facility to the national meteorological service's early warning system.
- Register and maintain a current list of high-risk households in every community health worker's catchment area.
- Train all community health workers on climate-related health risks, emergency response protocols, and the facility's emergency plan annually, at a minimum.
- Integrate climate-related health messaging into all routine clinical contact types.
- Design community engagement activities to prioritize the participation of women and youth.



Bangladesh, 2025.

H. Inclusivity & Gender Responsiveness

Why This Matters

Climate change does not affect everyone equally. Women, adolescents, youth, people with disabilities, elderly, displaced persons, and those living in poverty face higher climate-related health risks and more barriers to accessing care during climate events. A green clinic that improves infrastructure and service quality but does not address these disparities will fail to reach the people who need it most. The WHO emphasizes that gender-responsive health systems are essential to ensure equitable access to services, particularly for SRH. (21–23) Adolescents and youth face specific barriers, including stigma, lack of confidentiality, and restrictive facility policies that prevent them from seeking care. People with disabilities are disproportionately affected by climate events and by facility infrastructure that was not designed with their needs in mind. Inclusivity in green clinics means more than physical accessibility – though ramps, accessible toilets, and clear pathways matter enormously – it means designing services, communication, and community engagement to actively reach and include groups who are systematically excluded and involving them in those decisions. It also means training staff to provide respectful, non-judgmental care to all clients.

Pathfinder's Field Experience

Pathfinder's Women-Led Climate Resilience program strengthened health systems, enhanced women's and young people's leadership, and improved community resilience to climate change. The program worked alongside women and girls in low-resource communities to develop the tools, knowledge, networks, and resources they need to ensure reliable access to quality health care, build foundations for economic growth, and strengthen their communities and health systems so they are resilient to future shocks. The Takeda funded project Support community champions, host gender-transformative trainings, and engage local community-based organizations to combat harmful social norms, including gender-based violence.

To strengthen climate resilience at the health facility level, the Boma Imara project improved accessibility of green clinics for vulnerable groups, including people with disabilities. This community-clinic connectivity reinforces gender transformative behavior change and promotes women's leadership in local adaptation planning.



Ethiopia, 2021.

Pathfinder's Egypt climate-health work is not only about solar panels and greener operations; it also uses women's leadership as part of the design. The project works through women "Ambassadors of Change," supports women's financial autonomy, and links clinic greening with community engagement, which makes the model more inclusive in practice by giving women a visible role in shaping health and environmental decisions.

International Minimum Standards

Domain	Minimum Standard	Verification
Accessibility	According to CRPD Article 9 and WHO WASH FIT, physical access is required for persons with disabilities. Ramps at all facility entrances; accessible toilets (grab bars, accessible sinks, non-slip flooring, turning radius); clear signage. Basic sign language and printed material must be prepared for other types of disabilities.	Disability access audit checklist
Adolescent-Friendly Services	At least one provider trained in adolescent-friendly health services; dedicated space and confidentiality for adolescent consultations.	Training records; Service area observation
Maternity Privacy	Visual and auditory privacy in all maternity service areas (delivery, antenatal, and postnatal rooms).	Privacy observation checklist
Gender-Sensitive Climate Assessment	Gender-disaggregated and sensitive assessment of climate-related health service impacts and barriers. [29]	Data systems audit; Reporting format review
Staff Sensitivity Training	WHO Quality of Care Framework: All staff are trained in non-discriminatory, dignified, and respectful care, as well as the specific needs of marginalized groups.	Training records; Client satisfaction data



Ethiopia, 2021.

Dimensions of Inclusive Green Clinic Design

- **Accessibility:** Physical barriers are often the most obvious exclusion mechanism. A facility with steps at the entrance, no handrails, narrow doorways, and standard-height toilet fixtures effectively excludes wheelchair users, pregnant women, clients with orthopedic conditions, and elderly individuals. Every facility upgrade should include a disability access audit using a standardized checklist, with retrofits prioritized for entry points, toilets, and consultation rooms.

- **Adolescent and Youth Inclusivity:** Adolescents and youth will not seek SRH services at a facility where they feel judged, exposed, or unwelcome. Green clinic programming should ensure that facilities provide: a dedicated consultation space with door-closing privacy; a trained provider available during at least some clinic hours; clear, visible messaging that adolescents and youth are welcome; and confidentiality assurances that are understood by young clients.

- **Gender Responsiveness in Climate Programming:** Women often bear disproportionate burdens during climate events, fetching water from farther sources during drought, being responsible for food security during flooding, and facing increased risk of GBV in displacement settings. This reality is reflected in Tool 2 (see Annexes), which includes indicators on GBV protection protocols, solar-powered private consultation space, and trained providers for GBV and adolescent SRH services during climate-induced displacement. Green clinic programming should collect gender-disaggregated data on climate-related health impacts and service disruptions and should design community engagement activities that specifically engage women as leaders and participants, not just as recipients. The WHO's technical report on mainstreaming gender in climate change health programs provides practical guidance across all phases of the project cycle.[30]

Inclusivity Assessment Framework

Dimension	What to Check	Minimum Action
Physical Access	Entrances, corridors, toilets, consultation rooms.	Ramp at main entrance; one accessible toilet per gender.
Adolescent Services	Privacy, provider training, messaging, confidentiality.	Private consultation room; training for 1+ provider.
Maternity Dignity	Delivery room privacy, presence of a companion, and respectful care.	Curtained or private delivery bay; companion of choice allowed.
Disability Access	Wheelchair access, visual/hearing impairment support.	Ramp + accessible toilet + visual information materials.
Language & Literacy	Materials, signage, and verbal communication in local languages and at appropriate literacy levels.	Key materials in the local language; staff trained in plain-language communication.
Women's Safety	Privacy in waiting and service area, security lighting, safe pathways.	Security lighting: covered pathway from gate to entrance, private waiting area.

Recommendations for Replication

Dust-prone and arid settings: Pregnant women, infants, and elderly clients face disproportionate heat-related health risks in sustained high-ambient settings. Facility waiting areas and transport waiting points should provide shade and hydration access as a baseline accessibility measure. In arid contexts hosting displaced populations, solar-powered private consultation space for GBV response and adolescent SRH services (see Annexes, Tool 2) should be a priority retrofit given the added vulnerability of displaced women and girls. A heat-safety check covering shade and water access at waiting points should be included in every disability/inclusion access audit conducted in arid facilities.

Humid, flood-prone, and monsoon settings: Accessibility audits should also verify that ramps, pathways, and accessible toilets remain usable and non-slip during and after heavy rainfall, and that evacuation routes for people with disabilities are passable during flooding.

Coastal and cyclone-prone settings: Evacuation and shelter plans should explicitly address the needs of people with disabilities, pregnant women, and elderly clients, consistent with Tool 2 indicators on GBV protection and safe space provision during climate-induced displacement (see Annexes).

Cold and high-altitude settings: Waiting areas and transport waiting points should provide shelter from cold and precipitation as a baseline accessibility measure, paralleling the shade and hydration standard used in hot, arid settings.



Niger, 2026.

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Bangladesh, 2025.

Facility Certification and Assessment

This chapter defines the specific, verifiable thresholds a supported facility must meet across all Core Components to be formally designated a 'Green and Climate-Resilient' facility. It operationalizes Core Components 1–8 into measurable criteria and does not introduce new technical content beyond what those components already cover. These standards are the minimum acceptable baseline. Facilities can always aim higher, but meeting these standards means a facility provides safe, resilient, and inclusive care aligned with international requirements. Standards are drawn from the WHO, UNFPA, IFC, LEED Healthcare, CRPD, and Pathfinder's experience. They are designed to be measurable, achievable in low- and middle-income country settings, and meaningful for service quality.

Green Facility Certification Standards

Domain	Minimum Standard	Verification
Energy	All life-critical departments (maternity, theatre, laboratory) have ≥8 hours battery backup independent of the national grid. LED lighting in all clinical areas.	Load analysis report; System commissioning certificate; LED inventory
Water & WASH	Daily water availability confirmed; treatment protocol documented; bacteriological testing ≥2x/year; ≥1 CRPD-compliant toilet per gender	WASH FIT assessment; Water quality lab report
Health care Waste Management	Three-stream waste segregation with color-coded bins at every care point; incinerator temperature logs maintained; paved access to disposal area ≥1.2m wide	HCWM audit; Incinerator maintenance register; Site inspection
Environment	≥5% compound as planted green space; ≥70% tree survival at 24 months; tree inventory register maintained	Site area measurement; Tree inventory register and survival count
Inclusive SRH	Ramps and accessible entrances; disability-accessible toilet; disability friendly IEC/BCC materials; visual privacy in all maternity areas; ≥1 AFHS-trained provider on staff	Disability access audit; Training records; Privacy observation checklist

Domain	Minimum Standard	Verification
Emergency Preparedness	Written, current emergency plan; simulation drill ≥1x/ year; staff refresher training ≥annually; emergency commodity and supply availability; facility connected to early warning system.	Plan document; Drill records; Training log; EWS connection confirmation
Staff Training	100% of staff involved in waste, energy, and water systems trained at induction; annual refresher completed	Training records; Attendance registers; Competency assessments
Community Engagement	Documented community health worker alert protocol; community health worker household risk register maintained; climate-health education integrated into ≥3 clinical contact types.	Protocol document; Community health worker records; Education session logs

Climate-Hazard Supplements

In addition to the core Green Facility Certification Standards above, supplementary parameters tailored to the locally dominant climate hazard should be added to the facility assessment checklist. These supplements each draw on multiple domains at once, which is a further reason they are consolidated here rather than distributed across individual Core Component sections.

In dust-prone and arid settings:

- Energy/solar components should be specified and rated for high-ambient, high-dust operation with a documented panel-cleaning schedule in place.
- For WASH, storage sizing should include a documented evaporation margin with groundwater or municipal salinity (TDS) tested and treatment matched accordingly.
- Indigenous or drought-tolerant species should comprise most new plantings with drip or subsurface irrigation.
- For emergency preparedness, the written plan should include a dust-storm protocol in addition to heat, flood, and storm scenarios.

In humid, flood-prone, and monsoon settings:

- Energy, battery, and inverter enclosures should be sited above documented flood levels and rated for high humidity/condensation exposure.
- For WASH, storage and treatment infrastructure should be sited or sealed above flood level with rainy-season chlorination/UV verification frequency increased.
- Flood- and waterlogging-tolerant species should be prioritized, with raised or well-drained planting beds.
- For emergency preparedness, the written plan should include a flood and waterborne-disease protocol in addition to heat and storm scenarios.

In coastal and cyclone-prone settings:

- Energy/solar mounting and enclosures should be wind-rated and corrosion-resistant to salt air.
- For WASH, sources should be tested for saline intrusion with desalination treatment budgeted as needed.
- Salt-tolerant and wind-firm species should anchor green-space and windbreak planting.
- For emergency preparedness, the written plan should include a cyclone/storm-surge evacuation protocol in addition to heat, flood, and dust-storm scenarios.

In cold and high-altitude settings:

- Energy/battery storage should be insulated/heated and solar arrays sized for the lowest-irradiance season.
- For WASH, exposed pipework and storage should be insulated or buried below the frost line.
- Frost-hardy native species should be prioritized with planting timed outside the frost season.
- For emergency preparedness, the written plan should include a cold-wave/snow-access protocol in addition to heat, flood, and storm scenarios.

Assessing Facilities

Pathfinder's facility assessment tools (see Annexes, Tool 2) provide standardized checklists and scoring frameworks for each of these domains. Teams should conduct a baseline assessment before starting any green clinic upgrade work, and a follow-up assessment after completion. Assessments should be repeated annually at minimum to track progress. Facilities that do not yet meet minimum standards in one or more domains should have a documented improvement plan with timelines and responsible parties. Not meeting the standard immediately is acceptable; however, facilities that persistently fail to meet standards despite adequate resources and support should be escalated to the next managerial level in the health system.

Scoring

Score	Meaning	Required Action
80–100% across all domains	Highly climate-ready: Green Facility designation eligible.	Maintain systems; document for replication; pursue carbon credit registration.
50–79% in one or more domains	Moderate gaps: action plan required within 6 months.	Develop a domain-specific improvement plan; assign responsible staff; schedule follow-up assessment
Below 50% in any domain	Critical gaps: immediate action required.	Escalate to project lead; convene emergency planning meeting; mobilize emergency resources.

07 Developing Green Clinics Programming



Bangladesh, 2025.

This section offers a practical, step-by-step guide to designing and implementing green clinic programming. It is intended for program managers and project teams who are planning green clinic activities. Each step includes key questions, guidance, and examples linked to the nine core components described above.

Effective green clinic programming always starts with context, understanding the specific climate risks in your operating environment, how those risks affect health and health services, and what interventions will be most effective, feasible, and sustainable. This section walks you through that process systematically.

Step 1: Assess the Climate Risks

Key Question: What climate hazards pose the biggest threat to health, to this health facility, and to health service delivery in this region?

Before you can design interventions, you need to understand what you are protecting against. 'Climate change' is too broad a concept to design around; you need to identify specific, locally relevant climate hazards. This matters because an intervention that addresses flooding in coastal Bangladesh may be entirely different from what is needed for drought in northern Ethiopia, even though both are responses to climate change. When available, start with a country's Nationally Determined Contributions (NDCs), National Adaptation Plan or Health National Adaptation Plan to understand national climate and health priorities, and review regional climate data from meteorological services. Talk to facility managers, district health officers, community leaders, and community health workers. They often have the most practical, ground-level understanding of how climate affects the community.

Climate Hazard Inventory

Hazard	Description & Potential Impact
Extreme Heat	Temperatures significantly above seasonal norms, sustained for days or weeks. Affects staff performance, client safety, cold chains, and pharmaceutical storage.
Drought / Water Scarcity	An extended period of reduced rainfall causes water source failure, reduces water quality, and increases agricultural losses which affect nutrition and health-seeking ability.
Flooding	River, pluvial (rainfall), or coastal flooding damages infrastructure, contaminating water, disrupting road access, and displacing populations.
Extreme Weather / Storms	High winds, cyclones, and heavy rainfall cause structural damage, power outages, and supply chain disruptions.
Desertification / Dust Storms	Progressive land degradation causes dust events that damage respiratory health and contaminate water and food supplies.
Vector-Borne Disease Shifts	Climate change is altering the range and season of mosquitoes, ticks, and other disease vectors, shifting malaria, dengue, and other disease patterns.

Note: *Climate hazards are natural weather-related events made more severe by greenhouse gas emissions.*

Vulnerability Matrix

For each identified hazard, assess: 1) its probability in your setting; 2) its potential impact on facility services; and 3) which facility components are most vulnerable (see Annexes, Tool 1).

Example: Extreme Heat	• Probability: HIGH in Egypt, parts of Ethiopia, and Pakistan • Impact: MEDIUM-HIGH; reduces staff performance, threatens cold chain integrity, endangers clients • Vulnerable components: vaccine refrigerator, pharmacy storage, maternity ward, staff health • Existing mitigation: None documented
Example: Seasonal Flooding	• Probability: HIGH in coastal Bangladesh, seasonal in Tanzania • Impact: HIGH; damages electrical infrastructure, contaminates water supply, blocks road access, displaces clients • Vulnerable components: Ground-floor equipment, electrical panels, water well, waste storage, road access • Existing mitigation: Some sandbag deployment; no formal plan

Step 2: Identify the Local Impacts on Health and Health Systems

Key Question: For each identified hazard, what impact does it have on health, on this health facility, and on health service delivery? Why does it matter? Are there local practices, resource gaps, cultural norms, or social/systemic structures that influence these impacts?

Each climate hazard creates a cascade of health and health system impacts. The same hazard can have different impacts depending on local context, the quality of infrastructure, the vulnerability of the population, existing health system capacity, and social and cultural factors. You need to understand these specifically for your context.

Think broadly: direct health effects (heat stroke, flood-related infections), secondary effects (displacement, food insecurity, mental health), changes in service demand (more clients during an epidemic, fewer clients when roads are flooded), facility-specific risks (power failure, water contamination, building damage), and staff impacts (absenteeism, reduced performance, mental health).

Also, think about who is most affected. Climate impacts are not equal. Women, young children, elderly individuals, people with disabilities, and people in poverty are typically at higher risk and face more barriers to accessing care during climate events. This is where inclusivity intersects with your climate risk assessment.

Step 3: Explore Possibilities for Responsive Actions

Key Question: For each identified impact, what activities could reduce the risk of experiencing that impact, or reduce adverse effects if it occurs?

With a clear picture of hazards and their impacts, you can now brainstorm potential interventions. Each of the nine core components addresses specific climate risks and impacts. The table provides examples of how specific impacts map to different interventions.

Climate Hazard	Impact on Facility/Services	Potential Intervention	Relevant Component
Extreme Heat	Elevated ambient temperature in the maternity ward	Plant indigenous shade trees over south-facing walls; paint the roof white; install ceiling fans	Biodiversity & Green Spaces
Extreme Heat	Power outages during heatwaves	Install solar PV with battery backup for life-critical loads	Energy Systems
Extreme Heat	Staff unprepared; no action plan	Develop a heat preparedness plan; connect to the early warning system; provide staff training	Human Resources & Preparedness
Extreme Heat	Vaccine cold chain at risk	Install Solar Direct Drive refrigeration; implement temperature monitoring	Energy Systems
Drought	Water supply interruption	Install a rainwater harvesting system; establish a 90-day minimum storage	WASH
Drought	Hand hygiene failures	Install point-of-use water filtration; low-flow handwashing fixtures	WASH
Flooding	Waste storage breached; contamination	Elevate waste storage above flood level; seal waste containers	HCWM
Flooding	Road access blocked; delayed referrals	Community early warning and community health worker mobilization; pre-delivery for high-risk women before flood events	Community Engagement
Any Hazard	Vulnerable clients not reached	Community health worker household risk registers; targeted outreach for high-risk groups	Community Engagement & Inclusivity

Note: *This is not an exhaustive list. The greater your specificity in describing the climate hazards and their impacts, the more targeted and effective your interventions will be. Include both facility-based and community-based options as appropriate.*

Step 4: Select Priority Activities

Key Question: Which activities should be implemented? Which are most feasible, effective, and impactful? How can activities be organized to maximize efficiency?

You will rarely have the resources to implement everything at once. Prioritization is a critical programming skill. Use the following criteria to select activities:

Severity of risk addressed	Prioritize activities that address the most severe or immediate threats to client safety, service continuity, or staff health. A maternity ward without backup power during a climate event is a life-threatening risk, this takes priority over planting ornamental trees.
Feasibility and readiness	Choose activities where the technical capacity, local supply chains, government permissions, and community readiness are in place. A perfectly designed solar power system is useless if there are no local technicians to maintain it.
Cost-effectiveness	Consider which activities deliver the greatest impact per dollar invested. Solar power systems have high upfront costs but generate long-term savings. Tree planting is low-cost with high co-benefits.
Alignment with national priorities	Align with the country's national health, adaptation, and health quality standards. Activities that support national priorities are more likely to be sustained after the project ends.
Equity and inclusion	Prioritize activities that specifically benefit the most vulnerable groups, not just those that improve average outcomes.
Evidence of effectiveness	Where available, draw on evidence from similar contexts.

Activities can often be bundled for efficiency. A comprehensive climate preparedness plan is more effective than separate heat, flood, and storm plans. Climate-related health training that covers multiple hazards is more efficient than individual training. Community engagement activities can simultaneously support early warning, environmental awareness, and health literacy. Coordinate with local partners, district health officers, government facility managers, community leaders, and non-governmental organization partners to ensure that priorities reflect community needs and avoid duplication.



Bangladesh, 2025.

Step 5: Strengthen Activities & Develop Measures of Success

Key Question: What activities and frameworks will support implementation? How will we know we have been successful?

The best-designed intervention can fail without the right supporting structures. Before implementation, ensure that foundational activities are in place, facility assessments, staff training plans, community engagement strategies, government partnership protocols, and data collection systems.

Supporting Activities

Baseline Facility Assessments	Use the Climate Vulnerability Assessment, Health Facility Readiness Assessment, and Climate-Resilient Design Checklist (see Annexes) before any investment. These establish what exists, what is needed, and what must be prioritized. Repeat at regular intervals to track progress.
Advocacy and Policy Engagement	Advocate from the start for the integration of green clinic standards into regional and national policy, planning, and budgeting. Government buy-in is essential for long-term sustainability. Present data early and regularly to district and national health authorities.
Community Engagement Planning	Facility-based improvements must be accompanied by community engagement and connections to early warning systems, health worker training, and awareness programming. These activities reinforce and extend the impact of facility investments.
Inclusion and Equity Integration	Review every planned activity through an inclusion lens: Will this activity benefit the most vulnerable groups? Are there adaptations needed for women, youth, people with disabilities, or other marginalized groups?
Technology and Digital Tools	Consider digital tools where appropriate: SMS-based early warning systems, digital data collection for facility assessments, and solar system monitoring apps. These can significantly improve program efficiency and data quality.
Financial Sustainability Planning	From the start, plan for how the green clinic infrastructure will be maintained. Net metering revenue, government budget allocations, and community contributions are all potential sustainability mechanisms. Document cost savings data to support future climate finance applications.

Step 6: Measuring Success

Monitoring and evaluation for green clinics should track outcomes across all components. The table provides example indicators aligned with each of the nine components ***that could be integrated into the project's Monitoring, Evaluation, & Learning (MEL) plan.***

Component	Output Indicator	Outcome Indicator	Data Source
Energy	# of facilities with solar power systems installed; % of life-critical departments with backup power	% reduction in power outages affecting clinical services; % reduction in energy costs	Commissioning reports; Energy logs
WASH	# of facilities with documented water treatment protocols; # with CRPD-compliant toilets.	% of time water available on-site; water quality test pass rate	WASH FIT; Water quality lab reports
HCWM	% of care points with three-stream waste segregation; % of incinerators with temperature logs.	% reduction in HCWM-related incidents; HCWM audit score improvement	HCWM audits; Incident logs
Environment	# of trees planted; % compound as green space.	Tree survival rate at 24 months; Measured temperature reduction in outdoor waiting area.	Tree inventory; Temperature monitoring
Human Resources & Preparedness	% of staff trained in green operations; % of facilities with current emergency plans	Score on emergency drill assessment; Staff competency assessment results.	Training records; Drill reports
Community	% of community health workers trained in climate-related health response; # of high-risk households with risk plans	# of climate alerts successfully transmitted; % of high-risk households reached during climate events	CHW logs; Community records
Inclusivity	% of facilities with accessible entrances and toilets; % of providers trained in adolescent-friendly services; Availability of disability-friendly materials	% increase in service uptake by people with disabilities and adolescents; Client satisfaction scores	Access audits; Service statistics; Satisfaction surveys
Certification	% of facilities meeting minimum certification standards across all domains	% of facilities achieving Green Facility designation	Certification assessment scores

Note: *Start collecting data before implementation (baseline) and at regular intervals during and after. Data that cannot be compared to a baseline has limited value for demonstrating impact.*



Tanzania, 2026.

08



Niger, 2026.

Conclusion

A green clinic is not a collection of separate interventions; it is an integrated system in which energy, water, waste management, environmental design, human resources, and community engagement work together to support safe and resilient care. Investments in one area must be matched by the systems needed to sustain them. For example, solar power requires maintenance capacity, waste segregation requires appropriate WASH systems, and green spaces require sustainable water management. This guide provides a framework for designing green clinics that respond to local climate risks while strengthening the quality and continuity of health services.

This guide reflects Pathfinder's experience to date and should be considered an evolving resource rather than a fixed standard. Country programs should adapt the recommendations to local contexts, test approaches, document lessons, and use evidence from implementation to strengthen future iterations. Green clinic investments should be planned, budgeted, and monitored as part of core health service delivery—not as an additional activity separate from clinical priorities.

Climate change is already affecting the environment in which health facilities operate. For women, newborns, children, and adolescents who rely on RMNCAH services, disruptions caused by floods, heatwaves, storms, and other hazards can have serious consequences. Investing in climate-resilient infrastructure, prepared staff, and stronger facility systems before crises occur helps protect services, reduce recovery costs, and build more resilient health systems.

Teams should use the tools in this guide, including the Climate Vulnerability Assessment, Health Facility Readiness Tool, and component-specific Replication Requirements, to identify priorities, guide investments, and support progress toward Green Facility designation. Where possible, green clinic standards should be integrated into government systems, accreditation processes, and routine budgets.[31]

09



Niger, 2026.

Annexes

The following tools are designed to be used sequentially. Together, they cover the full journey from initial risk assessment to physical and operational planning for a climate-resilient facility.

Tool	Purpose	When to Use
Tool 1: Climate Vulnerability Assessment	Identifies which climate hazards matter most in your context and which facility components are most vulnerable.	Before design or investment decision. Repeat every 2 years or after a significant climate event.
Tool 2: Health Facility Readiness Assessment	Measures current operational capacity across clinical care, infrastructure, supply chain, staff safety, and waste management.	At baseline, before intervention. Repeat annually to track progress.
Tool 3: Climate-Resilient Design Checklist	Guides physical and systemic upgrades for new builds or retrofits, covering site selection, building design, utilities, waste, and operations.	During the planning of new construction or major facility upgrades.

Tool 1: Template for Climate Vulnerability Assessment

Facility Name	
Date	
Assessor(s)	
Climate Zone	(e.g., arid, tropical, temperate, monsoon)

Step 1: Identify Relevant Climate Hazards

- Select all hazards relevant to your context and rank by likelihood:
- Extreme heat (>40°C)
- Flooding (river / pluvial/coastal)
- Storm / high wind/cyclone
- Drought/water scarcity
- Wildfire/smoke
- Sea level rise/saltwater intrusion
- Landslide/erosion
- Cold wave/ice storm
- Other:

Step 2: Vulnerability Matrix

Hazard	Probability (L/M/H)	Impact on Services (L/M/H)	Vulnerable Components	Existing Mitigation	Risk Score (P x I)
Extreme Heat			☐ Power supply ☐ Cold chain ☐ HVAC ☐ Pharmacy ☐ Staff health		
Flooding			☐ Ground-floor equipment ☐ Water well ☐ Waste storage ☐ Electrical panels ☐ Access road		
Storm			☐ Roof ☐ Windows ☐ Solar panels ☐ Antenna ☐ Ambulance		
Drought			☐ Toilets ☐ Hand hygiene ☐ Sterilization ☐ Gardening/ kitchen		
Wildfire/ Smoke			☐ Air intakes ☐ Staff housing ☐ Evacuation route		
Other					

Step 3: Critical Function Dependency Analysis

Critical Service	Time Until Unsafe Without This Function	Most Vulnerable Utility (power/water/cooling/ access)	Backup Available? (Yes / No / Partial)
Emergency Care			
Vaccine Storage			
Surgery / Delivery			
Lab Diagnostics			
Pharmacy			

Step 4: Adaptation Prioritization

Priority Action	Targeted Hazard	Timeline	Responsible Role	Estimated Cost (Low/Med/High)
e.g., Elevate the backup generator above the flood level	Flooding	3 months	Facility manager	Medium

Tool 2: Health Facility Readiness Assessment Tool

Facility Type	☐ Primary Clinic ☐ Health Centre ☐ District Hospital ☐ Other:
Date	
Assessor(s)	
Scoring Guide	2 = Fully ready / in place and functional | 1 = Partially ready / gaps exist | 0 = Not ready / absent or non-functional

Indicator	Score	Evidence
Module A: Climate-Aware Clinical Readiness		
A1. Protocols for heat-related illness (cooling, hydration, electrolyte monitoring)		
A2. Protocol for respiratory emergencies during wildfire smoke or dust storms		
A3. Protocol for waterborne / flood-related infections (leptospirosis, diarrhea)		
A4. Staff trained in climate-sensitive disease surveillance (malaria timing shifts)		
A5. Early warning system links with the local meteorological or health alert service		
Module B: Infrastructure & Utility Readiness		
B1. Backup power runs essential devices (ventilator, fridge, lights) for 72 hours		
B2. Minimum 3 days of potable water stored on-site OR redundant supply confirmed		
B3. Pharmacy and supply storage protected from extreme heat; temperature log available		
B4. Building structure and drainage checked for storm/flood resilience within the last 12 months		
B5. Communication system functions during power/cellular outage (radio, satellite)		
Module C: Supply Chain & Logistics Readiness		
C1. Buffer stock of essential medicines (at least 2 weeks beyond normal cycle)		
C2. Cold chain has temperature alarms and passive cooling (ice packs, solar fridge)		
C3. Agreements with local transport for emergency resupply during road closures		
C4. Personal protective equipment (PPE) for extreme weather (heat-reflective, waterproof)		
C5. Emergency trafficability confirmed: evacuation/emergency logistics route integrity assessed**,** and ambulances verified able to safely access the facility from surrounding main roads during heavy rainfall, flash floods, cyclones, snow/ice, or other extreme weather events (key indicator in flash-flood-prone /arid contexts, monsoon/coastal flood-prone settings, and cold or high-altitude settings with seasonal road closures).		
Module D: Staff & Patient Safety Readiness		
D1. Staff have access to shade, rest breaks, and hydration during heatwaves		
D2. Evacuation plan for climate emergencies (fire, flood, storm) practiced in the past year		

D3. Designated a safe area for patients with climate-sensitive conditions		
D4. Mental health support available for staff and patients after climate events		
D5. Facility has documented protection protocols and at least one trained provider ready to manage gender-based violence (GBV) response during climate-induced displacement events.		
D6. Solar-powered private consultation space available for confidential GBV response and adolescent sexual and reproductive health and rights (SRHR) services, including during power outages linked to climate-induced displacement.		
Module E: Environmental & Waste Readiness		
E1. Waste is not incinerated near patient areas; alternative treatment is available if roads are blocked		
E2. Waste storage area flood-proof (elevated, sealed containers)		
E3. No open drainage or stagnant water around the facility (vector control confirmed)		
Module F: Crisis Communication & Data Continuity		
F1. Redundant, off-grid communication tools (e.g., satellite phone, two-way radio) are available and periodically tested to maintain telemedicine consultations and EHR/ data continuity if the primary electrical grid and cellular towers fail simultaneously during a climate emergency.		

Scoring Summary

Module	Maximum Score	Actual Score	% Readiness
A: Clinical Readiness (max 10)			
B: Infrastructure (max 10)			
C: Supply Chain (max 8)			
D: Staff / Patient Safety (max 8)			
E: Waste / Environment (max 6)			
TOTAL			

Readiness Level

☐ 80–100%: Highly climate-ready. Pursue Green Facility designation.

☐ 50–79%: Moderate gaps. Develop an improvement plan within 6 months.

☐ Below 50%: Critical gaps. Escalate to the country director. Immediate action required.

Tool 3: Checklist for Climate-Resilient Health care Facility Design and Operation

Instructions: Rate each item as: ✓ Fully in place | ⚠ Partially/in progress | ✗ Not addressed | N/A

Measure	Status
A. Site Selection & Surroundings	
A1. Located outside known floodplain, landslide zone, or coastal inundation risk area (or elevated/ protected if unavoidable).	
A2. Access roads have at least two routes to avoid isolation during extreme weather.	
A3. No reliance on a single utility corridor (power, water, data) vulnerable to storms or heat.	
A4. Natural drainage and permeable surfaces are maintained to reduce local flooding.	
A5. In flash-flood-prone arid/semi-arid settings as well as in monsoon, coastal, and other flood-prone settings, the site audit includes localized defensive structures against flooding (flash or seasonal), identified accumulation hotspots in and around the facility premises, and defined safe runoff discharge pathways.	
B. Building Envelope & Passive Design	
B1. Roof and walls have high solar reflectance (cool roof) or a green roof to reduce heat gain.	
B2. Windows are shaded (external louvers, overhangs) and operable for natural ventilation.	
B3. The building envelope is airtight and insulated to maintain interior temperatures without excessive HVAC.	
B4. Critical areas (pharmacy, records, server room) have additional thermal and moisture protection.	
C. Energy Systems & Backup	
C1. On-site renewable energy (solar PV or other) sized for essential loads during grid failure.	
C2. Battery storage or other backup for night / extended outages (minimum 8 hours for life-critical loads).	
C3. Automatic transfer switch for backup generator (with fuel for 7+ days).	
C4. Energy-efficient lighting, HVAC, and medical equipment (Energy Star or equivalent) throughout.	
C5. Electrical load-mapping matrix in place isolating critical loads (hybrid solar/battery backup run-hours for vaccine refrigerators and pharmacy cooling) from non-critical, high-draw loads (e.g., autoclaves/heavy sterilization equipment), particularly critical in high-solar-load, arid/semi-arid settings, and equally important wherever battery capacity is constrained, including flood-, humidity-, or cold-affected installations.	
D. Water & Sanitation Resilience	
D1. On-site water storage for at least 3 days of operational needs.	
D2. Redundant water source (well, rainwater harvesting, or second utility feed).	
D3. Low-water or waterless fixtures were clinically appropriate.	
D4. On-site wastewater treatment or secure containment to avoid contamination during floods.	

D5. Frequency and duration of water supply interruptions are logged and tracked over time (beyond a one-time source-availability assessment), relevant where municipal water grid volatility is a persistent challenge, as in rural arid areas, as well as in flood-affected settings where sources are periodically contaminated or cut off, and in cold settings where freezing disrupts supply.	
D6. Benchmark established for routine, periodic (e.g., quarterly) biological and chemical water quality testing, rather than a single baseline assessment, to account for seasonal fluctuations in water quality.	
E. Climate-Adapted Waste Management	
E1. Sharps and infectious waste storage is elevated above projected flood levels.	
E2. Waste storage area ventilated and heat-resistant to avoid pathogen growth.	
E3. No incineration without emission controls; plan for alternative treatment if roads are closed.	
F. Operational & Emergency Preparedness	
F1. Climate risk drills (heatwave, flood, storm) are conducted annually with all staff.	
F2. Patient triage protocols for climate-exacerbated conditions (heat stroke, respiratory, vector-borne)	
F3. Communication system with backup (satellite phone or radio) for extreme events.	
F4. Cold chain storage with temperature monitoring and backup power confirmed.	
F5. Regular inspection of drainage, roof anchors, and tree risk is completed and documented.	



Bangladesh, 2019

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