# CONTRACTORS, BUILDERS & HOMEBUILDERS

## Who is this pathway for?

This pathway targets general contractors, builders, construction firms, and homebuilders, as well as on-site managers, supervisors, and trade professionals directly responsible for construction execution. It also includes professional federations, trade unions, and vocational training organizations that represent or train the construction workforce. These actors transform design into reality, making them critical in ensuring that adaptation measures are effectively and safely implemented at scale across the built environment.

Contractors and builders are at the frontline of climate adaptation. They experience first-hand how heatwaves, flooding, and material degradation affect construction timelines, worker safety, and building quality. As climate risks intensify, traditional practices and schedules are becoming unsustainable.

Construction workers themselves are increasingly exposed to extreme heat, storms, and unsafe conditions, making adaptation not only an environmental priority but also an occupational safety issue. For builders, **adaptation starts with understanding local hazards** (soil instability, flood zones, fire-prone areas) and adjusting methods and materials accordingly. Yet many small and medium firms lack access to reliable risk data, guidance, or training. Moreover, compliance with evolving resilience codes and standards adds complexity to an already pressured market. This pathway provides direction on how contractors can build internal knowledge, integrate resilience measures into site management, and coordinate effectively with suppliers and designers to ensure that adaptation translates from plans into durable, safe, and affordable construction practices.

## Adaptation starts on-site where resilience meets reality.

Builders are aware of climate-related challenges but often lack the technical tools and training to adapt their practices. In the short term, they must strengthen knowledge on local risks and protect their workers on-site. In the medium term, adaptation must become embedded in procurement, subcontracting, and construction processes. By 2050, builders should be delivering resilient buildings as standard, with climate-adapted methods forming the norm across the construction industry.

# CONTRACTORS, BUILDERS & HOMEBUILDERS

## Short-Term Actions

| Actions | Resources & case studies | KPIs |
|---|---|---|
| Strengthen Site-Level Preparedness and Worker Safety Through Training | US OSHA's Heat Illness Prevention Program | Number of worksite safety protocols adapted to climate stressors (e.g., heatwave response plans, hydration and shade provisions) |
| Stay Updated on Evolving Codes and Standards | ICC Digital Codes Premium | Number of compliance checks or internal audits conducted per year |
| Coordinate with Subcontractors and Suppliers | *A Practical Guide to Climate-Resilient Buildings & Communities* (UNEP) | Number of joint training or coordination sessions with supply chain partners per quarter |

## Medium-Term Actions

| Actions | Resources & case studies | KPIs |
|---|---|---|
| Build with Integrity and Resilience Using Climate-Adapted Materials and Practices | Whole Building Design Guide on *Resilient Design* | Number of projects applying site-specific design features (e.g., floodproof foundations, ventilated façades) |
| Learn and Map Local Climate Risks & Offer Tailored Adaptation Checklists | World Bank Climate Change Knowledge Portal | Existence of adaptation checklists integrated into procurement and construction workflows |
| Communicate That Adaptation is Practical, Local, and Affordable | UNDRR *Resilient Cities Handbook* | % of client proposals or bids that include adaptation or resilience options |

## Long-Term Actions

| Actions | Resources & case studies | KPIs |
|---|---|---|
| Leverage Local Expertise and Knowledge in Construction Practices | ICOMOS Climate Change and Heritage Working Group | % of project workforce comprised of local skilled workers |
| Improve the Range of Tested Materials and Share Case Studies | ASTM *International Climate Standards* | Number of case studies published internally or shared with industry peers |
| Institutionalize Adaptation in Professional Training and Certification | Many Green Buildings Organisations offer training programs (US, Indonesia, etc.) | Number of apprenticeships or training programs integrating adaptation modules |

# Short-term actions

## Strengthen Site-Level Preparedness and Worker Safety Through Training

Action 1

**Goal:** Protect workers and ensure construction sites are resilient to climate-related disruptions.

**Description:** Contractors and builders must first safeguard their own workforce by adapting work practices to climate hazards. This includes creating emergency plans for heatwaves, storms, and floods, revising schedules to avoid peak heat hours, providing hydration and shade, and ensuring site-level safety protocols protect both workers and occupants. Worker safety is the foundation of resilience, as extreme conditions increasingly threaten health.

At the same time, builders and site managers should undergo basic training on region-specific climate risks, tailored to local geographies and building types. Sectoral training programs and local governments can provide hazard-specific modules (e.g., safe practices for construction in high rainfall vs. arid zones), while chambers of commerce and professional associations can distribute toolkits and briefings.

Resources

- U.S. Occupational Safety and Health Administration (OSHA)'s *Heat Illness Prevention Program* offers a comprehensive framework with specific protocols for construction sites including work-rest schedules, hydration requirements, acclimatization plans, and emergency response procedures. Adaptable to local conditions with specific temperature thresholds and shade requirements.
- OSHA offers other Heat Illness Prevention for Outdoor Work resources (posters, toolkits). Concrete employer-site guidance on heat waves, hydration, shade, schedule adjustment (english and other languages)
- International Labour Organization (ILO)'s *Ensuring safety and health at work in a changing climate* report offers a global overview of how climate change impacts worker safety (heat, storms, poor air quality) and provides guidance relevant for contractors adapting site-practices.
- This short article from Dutum Construction highlights how construction firms are modifying schedules, site-practices, hydration protocols and training to account for climate risks.
- Best Practice Guidance: United Nations Environment Programme (UNEP) *A Practical Guide to Climate-Resilient Buildings & Communities*. While broad, it includes content on construction site practices in developing contexts, good for Global South adaptation
- Lloyd's Register Foundation's *impact of climate change on safety at work* paper provides insight for construction, manufacturing, agricultural workers safety in the face of climate change

KPIs

**INPUT INDICATORS**
Measure the resources required to deliver

- % of employees and subcontractors trained in local climate risk awareness and emergency procedures
- Annual budget allocated to climate safety measures (as % of safety budget)

**LEADING INDICATORS**
Looks forward at future outcomes and events

- Number of worksite safety protocols adapted to climate stressors (e.g., heatwave response plans, hydration and shade provisions)
- Number of near-miss incidents related to climate hazards recorded and addressed

**LAGGING INDICATORS**
Looks back at whether the intended result was achieved

- Reduction in weather-related worksite incidents or absenteeism rates
- % of work sites with climate-specific emergency equipment (cooling stations, shade structures, hydration points)

# Stay Updated on Evolving Codes and Standards

Action 2

**Goal:** Ensure builders comply with climate-related regulations and adapt quickly to rising minimum standards.

**Description:** Contractors and homebuilders must actively track and integrate updates to building codes, zoning rules, and climate-related standards into their daily practices. Regulators should issue clear and proactive guidance, while industry associations can help by disseminating changes in simplified formats such as toolkits, briefings, or checklists. Staying aware of evolving requirements reduces compliance risks, improves quality of builds, and ensures resilience is consistently embedded in construction projects.

Resources

- ICC Digital Codes Premium is a subscription service providing real-time updates to International Building Codes with searchable database, comparison tools, and jurisdiction-specific amendments
- ASHRAE Climate Design Data Portal provides updated climate data for HVAC and building design
- This two-part resource offers (1) detailed *EU-level technical guidance* on integrating climate adaptation into building codes and standards, and (2) a *practical guide* showcasing best practices across Europe. It supports contractors and planners, especially those operating under or influenced by EU standards, in strengthening building resilience.

KPIs

**INPUT INDICATORS**
Measure the resources required to deliver

- Frequency of regulatory updates reviewed and disseminated internally
- Time lag between code publication and internal policy updates (days/weeks)

**LEADING INDICATORS**
Looks forward at future outcomes and events

- Number of compliance checks or internal audits conducted per year
- % of technical staff certified or tested on current climate-related codes

**LAGGING INDICATORS**
Looks back at whether the intended result was achieved

- % of projects completed in full compliance with updated adaptation or resilience codes
- Number of non-compliance incidents or code violations per 100 projects
- Cost of rework due to non-compliance with updated standards

# Coordinate with Subcontractors and Suppliers

Action 3

**Goal:** Ensure climate-resilient materials and practices are correctly selected and applied across construction projects.

**Description:** Builders should work closely with designers, manufacturers, subcontractors, and procurement managers to align expectations and practices around the use of resilient materials and practices. Manufacturers can provide evidence of performance and clear guidance on where and how their products should be used (e.g., floodproof foundations, fire-resistant façades), while procurement teams source verified, low-risk materials. Coordinating across the supply chain ensures correct application, reduces misuse, and accelerates the adoption of resilience practices on-site.

Resources

- Building Transparency EC3 Tool: Free database of Environmental Product Declarations (EPDs) allowing contractors to compare embodied carbon and climate performance of materials
- ASCE Infrastructure Resilience Division: Framework for evaluating supplier capabilities in climate-resilient construction
- Researchers at CPWR and Washington State University Vancouver developed the *Safety Climate Assessment Tool* (S-CAT, now integrated into SC-MIS) used in construction to assess maturity of safety culture (which can be extended to resilience practices). While not purely for climate-resilience, it helps measure how well you coordinate across trades and with subcontractors. Can help ensure resilient materials and practices are correctly applied.
- *A Practical Guide to Climate-Resilient Buildings & Communities* (UNEP) includes sections on building materials, contractors and supply coordination. Useful for contractors when coordinating with designers, manufacturers and suppliers in deploying resilient systems.

KPIs

**INPUT INDICATORS**
Measure the resources required to deliver

- % of subcontractors and suppliers required to meet adaptation or sustainability criteria
- Existence of standardized supplier/subcontractor climate criteria checklist

**LEADING INDICATORS**
Looks forward at future outcomes and events

- Number of supplier partnerships formalized for resilient and low-risk materials
- % of project materials sourced from pre-qualified resilient suppliers
- Number of joint training or coordination sessions with supply chain partners per quarter

**LAGGING INDICATORS**
Looks back at whether the intended result was achieved

- Reduction in material failure or warranty claims linked to environmental exposure
- Material performance ratings in post-occupancy evaluations

# Medium-term actions

## Build with Integrity and Resilience Using Climate-Adapted Materials and Practices

Action 1

**Goal:** Ensure that buildings are not only physically resilient to climate stressors (e.g., heat, flooding, wind, drought), but also built with integrity, care, and compliance using quality materials, respecting design intent, and upholding professional standards.

**Description:** This action calls for a dual commitment:
Technical resilience by applying validated, climate-adapted solutions such as elevated foundations, passive cooling systems, water-sensitive site design, and fire-resistant façades tailored to local hazard profiles and site-specific conditions.

- Professional integrity by adhering to a "code of conduct" that includes:
- Respecting design intent and approved plans (especially adaptation features)
- Complying with local codes, standards, and adaptation guidelines
- Using certified (good quality) materials suitable for future climate conditions
- Avoiding shortcuts that undermine long-term building performance
- Investing in ongoing training to ensure the workforce has the skills needed to execute resilient construction properly.

Resources

- EDGE provides a dedicated emerging markets certification system with climate resilience focus.
- The Whole Building Design Guide on *Resilient Design* is a comprehensive resource from the National Institute of Building Sciences.
- UNEP's *Practical Guide to Climate-resilient Buildings & Communities* specifically addresses how to use appropriate materials and design practices in different climate contexts (hot/arid, humid/coastal) including many self-built or resource-constrained buildings. Highly relevant for site-level integrity and resilience.
- The *EU's technical guidance on adapting buildings to climate change* is accompanied by a best practice guide. Together, they provide actionable methods for integrating adaptation into materials use, structural resilience, and building design.

KPIs

**INPUT INDICATORS**
Measure the resources required to deliver

- % of materials sourced from validated or certified resilience-tested suppliers

**LEADING INDICATORS**
Looks forward at future outcomes and events

- Number of projects applying site-specific design features (e.g., floodproof foundations, ventilated façades)

**LAGGING INDICATORS**
Looks back at whether the intended result was achieved

- Measured performance improvement in buildings (e.g., thermal comfort, flood resistance, durability)

# Learn and Map Local Climate Risks & Offer Tailored Adaptation Checklists

Action 2

**Goal:** Make adaptation site-specific by understanding the local hazards and integrating solutions accordingly.

**Description:** Builders should become literate in region-specific risks (e.g., wildfire-prone zones, unstable soils, flood basins) and collaborate with engineers and designers to co-produce risk-informed project plans. Checklists can help guide small- and medium-sized contractors on what to integrate at different project phases

Resources

- World Bank Climate Change Knowledge Portal provides global climate data and projections by location
- UNEP *Practical Guide to Climate Resilient Buildings* also includes checklists for new building projects in vulnerable settings.
- *Building Climate Resilience in Southeast Asia: Handbook* (BSR) contains tools, questionnaires and climate-risk mapping for Southeast Asia but with methodology transferable elsewhere.
- *How feasible is climate-resilient building design within the Global South?* (Energy and Buildings, 2025). This paper analysing design for adaptation in five Latin American cities highlights local hazard profiling, material and constructability constraints. Valuable for contractors mapping local risk.

KPIs

**INPUT INDICATORS**
Measure the resources required to deliver

- % of staff trained on region-specific climate risks
- Availability of standardized site-risk assessment tools and templates
- Number of partnerships with local authorities or experts to access updated hazard maps

**LEADING INDICATORS**
Looks forward at future outcomes and events

- % of new projects with completed local climate risk mapping prior to design approval
- Existence of adaptation checklists integrated into procurement and construction workflows

**LAGGING INDICATORS**
Looks back at whether the intended result was achieved

- Reduction in construction defects or maintenance costs linked to climate-related issues
- Client satisfaction or perceived value related to climate-adaptive features

# Communicate That Adaptation is Practical, Local, and Affordable

Action 3

**Goal:** Encourage buy-in from clients and the public by reframing adaptation as an enabler of comfort, cost-efficiency, and quality of life.

**Description:** Many clients are more motivated by comfort, energy savings, or value appreciation than climate risk itself. Builders should emphasize co-benefits, such as thermal comfort or reduced water bills, and present “climate-smart” solutions as value-adding and accessible rather than burdensome

Resources

- UNDRR Making Cities Resilient 2030 campaign offers a communication toolkit with tested messaging frameworks
- UNDRR *Resilient Cities Handbook*: Practical guidance for urban resilience initiatives
- UNEP *Practical Guide* (again useful) emphasises co-benefits (comfort, water efficiency, durability) making adaptation accessible.
- Though broad, *Global Sustainable Buildings Guide 2024* (Baker MacKenzie) includes market incentives across jurisdictions (comfort, value, regulation) that can help contractors articulate the business case of resilience to clients.
- *Climate Resilient Construction and Building Materials* (Cambridge Scholars Publishing, 2025) provides material-specific evidence on resilience under climate stressors. Helpful for contractors to show clients that adaptation is not high-cost luxury but a reliable investment.

KPIs

**INPUT INDICATORS**
Measure the resources required to deliver

- Existence of communication materials linking adaptation measures to comfort, cost savings, or asset value
- Number of staff trained in communicating co-benefits of resilient construction
- Number of communication tools/ materials developed (brochures, videos, calculators)

**LEADING INDICATORS**
Looks forward at future outcomes and events

- % of client proposals or bids that include adaptation or resilience options
- Frequency of client engagement sessions or workshops on local climate-smart solutions
- Client awareness and understanding scores (pre and post engagement surveys)
- conversion rate: clients offered resilience options to clients selecting resilience options

**LAGGING INDICATORS**
Looks back at whether the intended result was achieved

- Share of clients choosing resilient design options when offered
- Market share growth or customer retention linked to adaptation-focused offerings
- Average project value uplift or increase when resilience features are added
- Number of client referrals specifically mentioning resilience expertise

# Long-term actions

Action 1

## Leverage Local Expertise and Knowledge in Construction Practices

**Goal:** Integrate local insights to enhance the cultural, technical, and environmental relevance of resilience strategies.

**Description:** Builders and contractors should actively engage local tradespeople and builders in the design and construction process, drawing on their practical expertise with regional conditions, traditional methods, and climate-appropriate materials. Over the long term, this collaboration can create a two-way knowledge exchange where modern resilient techniques are combined with time-tested local practices, resulting in solutions that are both innovative and rooted in community realities. By formalizing the role of local expertise in construction projects through advisory groups, participatory workshops, or co-developed design approaches, builders can ensure adaptation strategies are locally feasible, culturally relevant, and widely accepted.

Resources

- UNESCO World Heritage Centre's Climate Change provides documentation of traditional climate-adapted building practices
- ICOMOS Climate Change and Heritage Working Group outputs specific guidance for adaptation and methodologies for documenting traditional techniques
- UNDP case studies of locally led adaptation solutions.
- *Local solutions for green buildings and construction* (GlobalABC) focuses on the value of local trades, materials and context-specific building solutions. Good for contractors to engage local expertise in resilient building practices.
- *Traditional Architecture: A Natural Disaster Resilient Alternative* (Advances in Engineering Management, Innovation, and Sustainability, 2021) highlights what can be learnt from traditional construction and details the applicability of traditional construction methods.
- *Resilience of vernacular and modernising dwellings in three climatic zones to climate change* (Scientific Reports, 2021) investigates the impact of climate change on indoor thermal comfort in rural dwellings, adopting vernacular and modern materials.

KPIs

**INPUT INDICATORS**
Measure the resources required to deliver

- % of projects developed with participation from local builders or regional craftspeople
- Number of documented traditional/local techniques in project specifications

**LEADING INDICATORS**
Looks forward at future outcomes and events

- Number of community or regional partnerships established to co-develop adaptive building solutions
- % of project workforce comprised of local skilled workers
- Knowledge exchange events organized with local building communities

**LAGGING INDICATORS**
Looks back at whether the intended result was achieved

- Improvement in project performance or cost efficiency due to locally informed practices
- Comparative cost analysis: projects with vs. without local expertise integration
- Community acceptance ratings for completed projects

Action 2

# Improve the Range of Tested Materials and Share Case Studies

**Goal:** Accelerate validation and mainstream use of climate-resilient construction methods.

**Description:** Builders should take an active role in piloting innovative or underused materials and systems that show promise for adaptation, such as flood-resilient façades, passive cooling features, or modular retrofits. By testing these solutions directly on projects and documenting outcomes in case studies, builders can generate much-needed performance data and reduce uncertainty in the market. Publishing these case studies through professional associations, training programs, or industry networks helps normalize resilient practices, gives peers confidence to adopt them, and creates pressure for regulators to include them in official codes and standards.

Resources

- ASTM International Climate Standards for evaluating material climate performance.
- *How to build climate resilience into the construction industry* is a broad overview of resilience in construction globally, including the imperative of pooling case-studies and material and technology innovation from the World Economic Forum.

KPIs

**INPUT INDICATORS**
Measure the resources required to deliver

- Number of pilot projects initiated to test adaptive materials or systems

**LEADING INDICATORS**
Looks forward at future outcomes and events

- Number of case studies published internally or shared with industry peers
- Time from pilot initiation to mainstream adoption decision

**LAGGING INDICATORS**
Looks back at whether the intended result was achieved

- % of validated techniques scaled or adopted in mainstream construction processes
- Peer adoption rate: number of competitors/peers adopting tested solutions

# Institutionalize Adaptation in Professional Training and Certification



**Goal:** Mainstream climate resilience across the construction workforce through mandatory education and licensing requirements.

**Description:** Over the long term, climate literacy and passive design principles should be fully integrated into all professional training pathways, from apprenticeships to advanced certifications. This includes embedding hazard-specific construction methods, resilient material use, and site safety under extreme conditions into continuing education programs, licensing exams, and mandatory recertification. Every builder and contractor entering the field must have the knowledge and skills to adapt construction practices to evolving climate risks. This shift transforms resilience from a niche or optional skillset into a core requirement of professional competency, raising industry standards and embedding adaptation into the DNA of construction practice.



- Many Green Buildings Organisations offer training programs (US, Indonesia, etc.) to draw from, and expand to focus on adaptation needs for contractors and builders.
- *Resilience in the built environment: Key characteristics for solutions* (Sustainable Cities and Society, 2022) analyses resilience characteristics in built environment. Helps define competencies for training and certification of builders and contractors.



**INPUT INDICATORS**
Measure the resources required to deliver

- % of workforce enrolled in resilience-related certification or continuing education programs

**LEADING INDICATORS**
Looks forward at future outcomes and events

- Number of apprenticeships or training programs integrating adaptation modules

**LAGGING INDICATORS**
Looks back at whether the intended result was achieved

- Increase in projects recognized or awarded for resilience excellence