switchasia

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Sustainable Consumption and Production in Buildings
Actions for Scale-up

Ideas and examples along the construction value chain

CONTEXT

The EU SWITCH-Asia Policy Support Component implemented a technical advisory (TA) project "Strengthening SCP in the building sector" between October 2023 and January 2024. This project produced comprehensive snapshots based on rapid appraisals of the building sector in Bangladesh, Mongolia, Nepal, Pakistan, and Uzbekistan. Each appraisal involved mapping domestic stakeholders, identifying sustainable consumption and production (SCP) practices, assessing opportunities and challenges, and developing targeted solutions with practical examples to address the challenges.

Through a systematic mapping of key challenges, opportunities, and strategic priorities for each country along the building sector value chain, the project's issue matrix ensured a focused approach to identifying the most impactful areas for sustainable transformation. Additionally, the capacities and capabilities of national contractors and material suppliers were assessed.

The appraisals identified key issues across the entire value chain of the building sector ranging from design and planning to materials and construction, utilization, and eventual demolition. The analysis highlighted specific touchpoints where national practices can influence sustainability outcomes. Based on these insights, actionable and country-specific solutions were developed to address unique challenges and capitalize on emerging opportunities within the sector.

This report synthesizes the findings from five country snapshots, namely: Bangladesh, Mongolia, Nepal, Pakistan, and Uzbekistan. While these countries, and the broader Asia-Pacific region, exhibit significant economic, geographic, and political diversity, they share common trends in economic growth, urbanization, and corresponding imperatives for the building sector. This report consolidates these shared trends and presents cohesive solutions to enhance the SCP profile of the building sector across the region.

INTRODUCTION

Countries across the Asia-Pacific region are undergoing a rapid population shift from rural to urban areas, placing significant strain on existing urban infrastructure. Many urban centres face challenges as their facilities are stretched beyond capacity, unable to meet the growing demands of an expanding population. Simultaneously, the industrialization of these economies over the past few decades has driven substantial investments in industrial infrastructure and core facilities, including highways and ports.

This surge in infrastructure development has significantly contributed to GDP growth and increased the construction sector's share in national economies. Additionally, it has delivered notable social benefits, enhancing productivity and economic efficiency. However, these gains have often come at considerable environmental and social costs, largely due to insufficient or inadequate regulations and standards. Such externalized costs have created long-term challenges, undermining sustainable economic growth and development.

As a result, many countries in the region face issues such as poorly planned infrastructure, substandard construction quality, and increased vulnerability to extreme weather events. These inadequacies lead to inefficiencies in the built environment and create stranded assets, imposing financial burdens on local and national economies.

Recognizing these challenges, local stakeholders are actively working to address infrastructure-related shortcomings. Many Asia-Pacific countries have made strides in enhancing regulations to mitigate the environmental impact of built infrastructure, including improvements in building codes and standards. Most countries have adopted national building codes designed to ensure safety, sustainability, and structural integrity, supported by quality control institutions and certification bodies to enforce compliance. In some instances, efforts are underway to align national standards with international benchmarks.

To facilitate the implementation of these regulations, governments have introduced various measures. These include establishing material testing and certification institutions, fostering partnerships with domestic and international technical organizations, prioritizing sustainable practices in public procurement, and integrating environmental conditions into trade and investment agreements. Additionally, governments incentivize the private sector to adopt eco-friendly materials and designs while creating opportunities for workforce skill enhancement in the construction industry. The extent and maturity of these initiatives vary across countries in the region.

The use of locally available traditional materials like stone, wood, bamboo, and clay alongside modern materials such as cement, concrete, steel, and advanced composites presents an opportunity to improve sustainability and resilience. When carefully sourced, traditional materials can significantly enhance the environmental performance of buildings.

Facility management and building maintenance practices also vary significantly, influenced by factors such as building type, ownership structure, and available resources. Urban areas are more likely to adopt professional facility management services. However, regulatory frameworks often focus narrowly on safety and energy efficiency, with enforcement remaining inconsistent.

Demolition practices frequently rely on informal, ad hoc approaches, leading to varying levels of safety and efficiency. The informal sector often dominates material recovery activities, while building codes and municipal guidelines primarily govern demolition processes. Environmental

regulations typically address waste disposal and air quality control but lack comprehensive coverage of demolition practices.

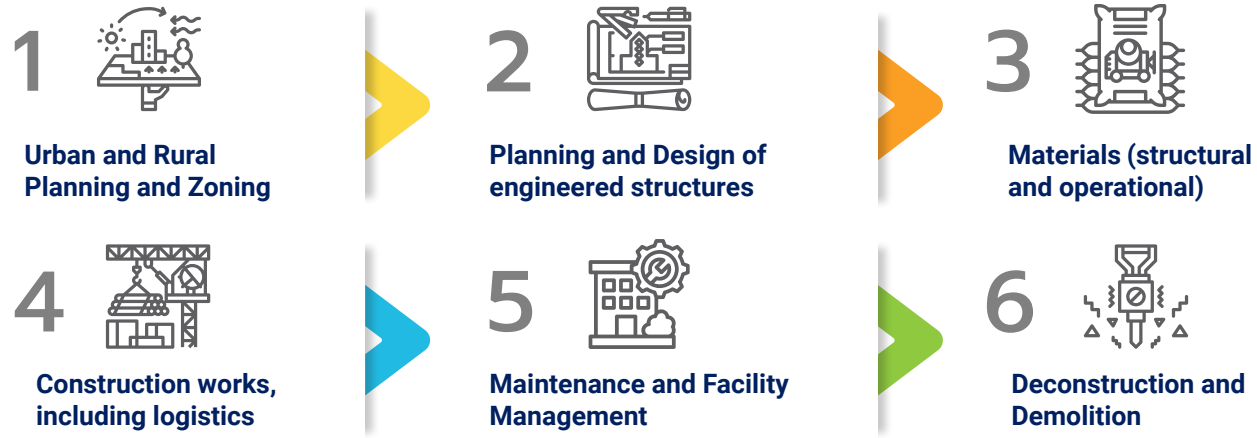
Several structural challenges hinder progress, including:

1. **Skilled labour shortages:** The shortage of qualified professionals extends across on-site workers, architects, engineers, and project managers. Educational and vocational training institutions are struggling to meet industry demands.
2. **Regulatory complexity and enforcement:** Bureaucratic inefficiencies, from site acquisition to permitting and inspections, often delay construction projects. Weak and inconsistent enforcement further exacerbates these issues.
3. **Material cost fluctuations:** The construction sector is highly vulnerable to price volatility for essential materials, driven by global market trends, local supply-demand dynamics, and tax policies. Tax regimes often fail to differentiate between primary and secondary raw materials, making recycled options financially unattractive.

Other persistent challenges include insufficient regulations and standards for materials and construction, limited awareness across the value chain (including public authorities and consumers), natural disasters impacting timelines and costs, and restricted access to specialized equipment and expertise.

ACTIONS FOR SCALING-UP

The value chain of the building sector comprises six key stages, spanning from initial planning and zoning to deconstruction and demolition. These stages, in sequence, are:



Key stakeholders in this value chain include governments and local authorities, regulatory and standard-setting bodies, sector associations, and a broad spectrum of private sector participants such as designers, architects, builders, and recyclers.

Actions relevant to these stakeholders are categorized into the following areas:

- **Regulations, Guidelines, and Standards:** Establishing robust frameworks to guide sector practices.
- **Skills and Capacity Building:** Enhancing the capabilities of professionals and workers through targeted training and education.
- **Implementation:** Ensuring effective application and adherence to established rules and best practices.
- **Partnerships and Collaborations:** Fostering cooperation among public and private entities to drive innovation and efficiency.
- **Research:** Conducting studies to advance sustainable and resilient building practices.

Specific examples of activities under these categories are provided to illustrate actionable steps for stakeholders based on the findings from the five country snapshots.

1. Urban and Rural Planning and Zoning (why, what, and where)

CATEGORY	ACTION	EXAMPLE
Regulations	• Integrate Sustainable Consumption and Production (SCP) principles in urban planning and zoning laws. • Harmonize national policies (environmental laws, Nationally Determined Contributions or NDC) that integrate SCP principles in buildings. • Plan sustainable redevelopment of old parts of cities, focusing on preserving heritage while enhancing energy efficiency.	• Renewable energy installations, particularly solar energy, on residential and commercial buildings.
Guidelines and Standards	• Develop urban planning guidelines that consider extreme temperature fluctuations, aiming to minimize energy use for heating and cooling. • Develop or revise building codes to mandate energy efficiency standards for new constructions and major renovations.	• Design a pilot project for a passive solar housing complex that utilizes thermal mass and orientation to reduce heating needs, such as in extreme cold conditions in parts of Pakistan, Uzbekistan, Mongolia and Nepal. • EU's Energy Performance of Buildings Directive could be a useful reference.
Implementation	• Develop local climate adaptation measures that can be incorporated into building designs and urban planning.	• Introduce bio-swales and rain gardens in urban planning to reduce surface runoff and lower flood risks as is done in Pakistan.

2. Planning and Design of Engineered Structures

CLASSIFICATION	ACTION	EXAMPLE
Guidelines and Standards	• Update or create national Green Building codes and / or labels that certify buildings designed with sustainable materials, energy efficiency, and resilience to natural calamities such as floods, and earthquakes. • Develop guidelines for flood-resilient building designs that can withstand monsoon seasons and mitigate the impacts of flooding. • Create design standards for buildings that provide thermal comfort in hot climate while minimizing energy use for air conditioning. • Set higher insulation standards for new constructions to withstand extreme winter temperatures, reducing the need for fossil-fuel-based heating. • Create guidelines for the assessment of buildings' environmental impact over their entire lifecycle, encouraging the use of materials that are recyclable and have lower embodied carbon.	• Design elevated foundations for homes in flood-prone areas as has been done in Bangladesh. But incorporate local materials and techniques that are cost-effective and sustainable. • Consider high thermal mass buildings with natural ventilation systems that keep indoor spaces cool. • Design projects for a passive solar housing complex that utilizes thermal mass and orientation to reduce heating needs. • Promote lifecycle assessments for buildings and infrastructure to encourage circular economy approaches in the construction sector.

CLASSIFICATION	ACTION	EXAMPLE
Skills and capacity building	• Conduct training programs for local builders, architects, and engineers on sustainable construction practices, especially those that increase resilience to climate impacts. • Organize workshops in collaboration with local universities to train professionals in the design and construction of flood-resilient buildings.	
Implementation	• Design projects that combine the traditional craftsmanship with modern structural engineering for sustainable, culturally-rich urban development. • Plan and construct multi-purpose buildings that can serve as community centres and double as emergency shelters during disasters.	• Create projects that adapt the thermal-regulating properties of traditional housing into modern, eco-friendly building insulation materials. For example, Ger in Mongolia and Kupol domes in Uzbekistan. • Design schools and community centres that have elevated areas for refuge during floods as is found in isolated rural areas of Bangladesh. • Implement rainwater harvesting systems in building designs to reduce pressure on groundwater sources and provide clean water during waterlogging.
Partnerships / collaborations	• Engage with local communities to co-create solutions that are socially accepted and environmentally beneficial.	• Create community-driven projects that apply SCP principles to the renovation of local community centres, incorporating traditional designs and modern energy efficiency.
Research	• Develop local climate adaptation measures that can be incorporated into building designs and urban planning. • Document and integrate traditional architectural wisdom that naturally embodies sustainable practices into modern building designs.	

3. Materials (structural and operational)

CLASSIFICATION	ACTION	EXAMPLE
Regulations	• Develop strategies for waste reduction and management in the construction sector, emphasizing recycling and reuse of materials. • Provide tax breaks and / or other fiscal incentives for companies to use locally-sourced, sustainably-produced materials in construction projects. • Introduce circular economy concepts in the construction sector, emphasizing reuse and recycling of materials. • Encourage the use of materials with lower embodied carbon by promoting lifecycle assessment tools for construction projects.	• Fund and set-up construction waste recycling facilities that process materials for reuse in new building projects. • Establish national / sub-national platforms for the exchange of reclaimed construction materials. • Create pilot programs for deconstruction and material recovery aiming to repurpose materials from old buildings. • Facilitate the use of local materials and other traditional water management systems in new constructions to promote cultural heritage and sustainable water usage. • Partner with local manufacturers to develop a database of locally sourced, low-carbon building materials.

CLASSIFICATION	ACTION	EXAMPLE
Standards	• Develop national standards for sustainable building materials and integrate it with retrofitting standards for risks related to natural calamities such as earthquakes and floods. • Develop standards and building codes that integrate SCP principles, particularly those related to energy efficiency, material circularity, and low-carbon technologies. • Support the development and implementation of sustainability standards, testing protocols, and certification systems for buildings materials.	• Create a standard for the use of locally-sourced, low-energy-intensive building materials. • Set up a local testing and certification process for construction materials and practices that meet SCP standards. • Establish a certification scheme for sustainably sourced materials, such as locally manufactured low-carbon bricks, that have a low environmental footprint and are suitable for local climate.
Skills and capacity building	• Develop and conduct training programs for architects, engineers, construction workers, and other stakeholders on sustainable materials and practices. • Collaborate with local universities and technical institutes to develop a certification program for sustainably sourced local construction materials.	• Design workshops focusing on training constructors in building earthquake-resistant homes using bamboo and other sustainable materials that are readily available locally. • Conduct workshops on building with cotton insulation, a by-product of the cotton industry, for improved energy efficiency.
Monitoring	• Create monitoring, review, verification and reporting systems and processes on material-use efficiency, material recycling, and related indicators.	• Create an annual sustainability report for the construction sector that includes metrics on CO_2 emissions reduction and material recycling rates, feeding also into Nationally Determined Contributions on climate change.
Implementation	• Promote the use and development of affordable, locally sourced, and eco-friendly building materials that are suitable for the local climate and conditions. • Introduce modular, portable, and low-impact construction materials that can be easily assembled, disassembled, and transported. • Develop sustainable rural housing models that are affordable, culturally appropriate, and use local, eco-friendly materials.	• Implement projects to enhance the seismic resilience of old apartment blocks and other buildings using sustainable materials and technologies. • Support sustainable reconstruction of heritage sites using traditional techniques and materials, while subtly integrating modern energy-efficient technologies. • Pilot projects for rural homes using compressed stabilized earth blocks (CSEB) that provide excellent insulation and are made from local soil as is done in Bangladesh. • Support the development of bamboo-based construction materials as used in Bangladesh, which are sustainable and have a high strength-to-weight ratio suitable for seismic and flood resilience.
Partnerships / collaborations	• Organize meetings, workshops, and conferences where national builders can learn from EU experts about advances in sustainable building materials and techniques.	

CLASSIFICATION	ACTION	EXAMPLE
Research	• Analyse the use of local construction materials and their environmental impact. • Research and promote the use of disaster-proof building materials that are locally available and can reduce the damage caused by natural disasters such as floods and earthquakes.	• Study the impact of sourcing local bamboo for construction, considering its sustainability and carbon sequestration benefits. • Set up a collaborative research program with local universities to develop insulation materials adapted to extreme local climate. • Study and promote the use of indigenous plants for building materials and natural insulation, adapting this knowledge to modern construction where feasible. • Assess the traditional building materials and techniques and evaluate their environmental impact, proposing SCP-compliant alternatives.

4. Construction works, including logistics

Assessment for this stage of the value chain is rather challenging particularly for logistics of building materials. There are obvious opportunities to reduce and manage material waste especially in the construction phase. That said, findings from five country snapshots - Bangladesh, Mongolia, Nepal, Pakistan and Uzbekistan - were limited and warrants more efforts to make specific recommendations.

5. Maintenance and Facility Management

CLASSIFICATION	ACTION	EXAMPLE
Guidelines and Standards	• Develop and promote maintenance protocols that align with SCP objectives to extend the lifespan of buildings and reduce their environmental impact.	• Establish a set of green maintenance standards for public buildings that includes regular energy audits and the retrofitting of energy-saving appliances.
Skills and capacity building	• Conduct trainings for facility managers on green maintenance practices, including the use of energy management systems and non-toxic cleaning products.	
Implementation	• Advocate for the implementation of smart building technologies to optimize energy use in existing and new buildings. • Implement strategies for optimizing energy and resource use in existing buildings through improved facility management and maintenance.	• Introduce a pilot project for a Building Management System in a public building to monitor and regulate energy consumption • Implement Building Management Systems in commercial buildings for efficient energy and water use, adapted to local climatic conditions and technological capabilities. • Introduce a pilot program for retrofitting public buildings with smart building management systems to reduce energy consumption.
Monitoring	• Create a monitoring, verifying and disclosure system on various in-use parameters, such as energy, water, housekeeping materials.	
Partnerships / collaborations	• Collaborate with relevant authorities to develop and implement national standards for sustainable construction and maintenance	

6. Deconstruction and Demolition

CLASSIFICATION	ACTION	EXAMPLE
Regulations	• Promote practices such as reuse and recycling of construction materials and the use of renewable resources. • Frame requirements and guidelines to implement circular economy concepts within the construction sector, focusing on material reuse and waste minimization.	• Establish pilot programs for deconstruction and material recovery, aiming to repurpose materials from old buildings. • Introduce programs for repurposing construction debris from demolition sites as aggregates for new building projects.
Partnerships / collaborations	• Partner with city authorities to repurpose construction and demolition waste for new building projects.	