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► Thematic Area 3: EIIP Recovery and Reconstruction Works – Implementation and Capacity-Building Arrangements

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▶ **Thematic Area 3: EIIP Recovery
and Reconstruction Works –
Implementation and Capacity-
Building Arrangements**



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EIIP Recovery and Reconstructions Works Implementation and Capacity Building Arrangements¹

Introduction

The need for an immediate and coordinated response during and immediately following crisis events is critical. The effective implementation of such a response requires not only the adoption of appropriate strategies and technical solutions but also the integration of inclusive social and environmental safeguards. Additionally, robust institutional frameworks and well-defined managerial arrangements must be in place to ensure that resources are mobilized efficiently, stakeholders are engaged, and recovery efforts are both rapid and sustainable. Only through a comprehensive and well-coordinated approach can the impact of crises be mitigated and the resilience of affected communities be strengthened in the long term.

This paper highlights the ILO's EIIP approach, focusing on inclusive, employment-driven strategies and local, resource-based methods to foster sustainable recovery, development, resilience, and capacity building.

The key themes are:

- 1. Local-resource based approaches and climate change adaptation in construction**
- 2. Inclusive approaches, environmental and social safeguards**
- 3. Institutional and management arrangements for effective procurement**
- 4. Capacity building and skills development in the construction sector**
- 5. Financing opportunities for climate change adaptation and green works**



¹ This Input Paper is prepared by Andreas Beusch for the ILO-Employment Intensive Investment Programme, January 2025.

1. Local Resource-Based Approaches and Climate-Change Adaptation in Construction

1.1 Utilising local resources

Utilising locally available resources in the construction and maintenance of public infrastructure is an approach that focuses on the use of materials, labour, and knowledge from the immediate environment. This approach has multiple benefits, including cost reduction, environmental sustainability, meaningful employment creation and community empowerment.

Productive, technically sound Local Resource-Based (LRB) approaches are designed to leverage local resources and skills in a way that generates long-term, sustainable outcomes, such as building local infrastructure, restoring livelihoods, and strengthening the community's capacity. These methods are technically sound and adapted to the local context, ensuring that recovery efforts are both relevant and durable. In addition to these technical and economic benefits, LRB approaches can foster inclusivity, provided that the active participation of local communities is prioritized. By engaging individuals, particularly women and marginalized groups, through meaningful roles in construction and recovery activities, LRB empowers these groups to contribute and benefit. However, for this empowerment to be realised, inclusion and equitable participation must be deliberately promoted and supported. Integrating gender-sensitive approaches ensures equitable access to opportunities, such as employment and training, while also recognising the social roles that women and men play in their communities. This approach also emphasizes the importance of adhering to labour standards, ensuring that workers are treated fairly, paid appropriately and provided with safe working conditions. Promoting decent work and fair wages is essential to ensuring that LRB not only contributes to economic recovery but also upholds social justice and rights. By aligning recovery efforts with international labour standards, LRB helps promote social cohesion, reduce inequalities and foster a sense of ownership and resilience. In this way, LRB not only strengthens the physical and economic fabric of communities but also contributes to social empowerment, inclusion, gender equity, and respect for labour rights.

In contrast, **Cash-for-Work (CfW) programmes**, while providing short-term employment, can be ineffective if they do not lead to lasting development or capacity building. They often fail to address the root causes of vulnerability or build resilience, as they are typically limited to temporary, low-skill labour without creating long-term benefits for the community.

The ambition to link humanitarian efforts to longer-term sustainable development and resilience, as seen in the **Humanitarian-Development-Peace Nexus (HDPN)**, aims to bridge the gap between immediate relief and long-term development. LRB approaches align with this ambition by not only providing immediate recovery solutions but also contributing to the long-term development of local capacity, infrastructure, and resilience. By integrating short-term humanitarian aid with longer-term recovery goals, LRB supports the kind of sustainable, community-driven development that is central to the HDPN, ensuring that recovery efforts are both impactful and enduring. This approach emphasizes the importance of cross-sectoral coordination, planning, and investment in both development and peacebuilding alongside humanitarian response."

There are various aspects, impacts and benefits of utilising an LRB approach:

- **Material sourcing and cost reduction:** Using locally sourced materials, such as stone, sand, soil, timber, or recycled materials, significantly reduces the costs associated with transporting and importing construction materials. Not only does this make the construction process more affordable, but it also supports local businesses and entrepreneurs who supply these materials. In addition, local materials are often better suited to the local environment, which can enhance the durability and functionality of the structures. For example, local stone might be more effective than concrete, asphalt or steel in certain settings, particularly where traditional building methods have been proven over time to withstand local environmental conditions (e.g. earthquakes, extreme heat, or humidity). By utilizing these materials, projects can achieve cost efficiency while enhancing resilience.

Furthermore, using locally available materials often reduces supply chain disruptions, which can be especially important in post-disaster recovery scenarios when access to materials can be limited or

costly. This approach also fosters greater local economic integration, as businesses and workers in the area benefit from a steady demand for local goods and services.

- **Environmental sustainability:** One of the most compelling reasons to adopt a LRB approach is its significant contribution to reducing the environmental impact of construction projects. By sourcing materials locally, the carbon footprint is drastically lowered, as transportation distances are minimised and the emissions associated with the movement of goods are reduced.

In addition, opting for renewable, locally available materials, such as timber, bamboo or earth-based options like adobe and rammed earth, not only reduces waste but also conserves precious natural resources. These materials are often biodegradable and have less lasting environmental impact once their useful life is over, unlike synthetic materials like plastic, steel, or cement, which persist in the environment for much longer.

Furthermore, local materials tend to be more naturally aligned with the surrounding ecosystem, helping to preserve the local environmental balance. For example, using indigenous plant species for thatching or natural stone for construction supports biodiversity, protects landscapes, and helps prevent environmental degradation.

- **Job creation and economic benefits:** Job creation is a direct and immediate benefit of adopting an LRB approach, as it relies on local labour to source, process, and apply materials in construction. This creates employment opportunities not only for skilled workers but also for unskilled labour, providing an essential economic boost to communities recovering from disaster or economic setbacks.

In addition to creating jobs, LRB approaches contribute to skills development. Contractors, labourers, and engineers gain valuable experience in working with traditional techniques and local materials, improving their skill sets and making them more competitive in the job market. This is particularly valuable for youth employment programmes and marginalized groups, including women, who may gain access to construction-related training and employment opportunities that are typically closed off in conventional construction sectors.

As workers acquire specialized skills, whether in traditional carpentry, masonry or sustainable building method, they become better equipped for future projects and can even establish small businesses that offer services such as house repairs, building and road maintenance furniture-making or other specialised work, e.g. producing gabion boxes, manufacturing cement products, roofing tiles, etc. This kind of skill-building not only supports individual empowerment but also strengthens the local economy by creating a skilled workforce ready for more complex and higher-paying jobs, which leads to sustained economic growth and prosperity within the community.

- **Community empowerment and ownership:** A key benefit of LRB is its potential to empower communities by involving them in the process of construction and recovery. When community members participate directly in the planning, building and maintaining of infrastructure, they gain a sense of ownership and pride over the projects. This feeling of ownership can translate into greater commitment to maintaining the structures, ensuring their long-term functionality and reducing the likelihood of neglect or disrepair.

Community-led projects also help bring people together, as individuals from different backgrounds work towards a shared goal, strengthening local connections and support networks. This sense of shared responsibility is crucial for recovery after a disaster, as communities that work together to rebuild are often stronger and better able to handle future challenges.

Community ownership helps to ensure that infrastructure meets the specific needs of the people it serves, rather than imposing top-down solutions that may not be culturally relevant or appropriate. This local involvement helps bridge the gap between community needs and external expertise, leading to more effective and context-specific outcomes.

- **Local knowledge, skills and cultural preservation:** One of the most valuable aspects of LRB approaches is the integration of local knowledge and indigenous construction skills into modern recovery efforts. Local craftspeople, carpenters and masons bring a wealth of experience and knowledge about building techniques that have been honed over generations, often tailored to the local climate and geography.

These traditional building techniques, such as the use of mud bricks, stone masonry or timber framing, often provide better thermal insulation, durability and resistance to local environmental hazards like floods or earthquakes. Incorporating this knowledge into contemporary projects helps to preserve cultural heritage while also enhancing the sustainability and resilience of new structures.

In addition to preserving traditional building techniques, LRB approaches can promote cultural continuity, as they reinforce the value of local skills and craftsmanship that are often at risk of being overshadowed by modern construction practices. This combination of traditional knowledge and modern efficiency can lead to innovative solutions that blend the best of both worlds, creating infrastructure that is culturally relevant, environmentally sustainable, and economically viable.

- **Building resilient infrastructure:** Resilience is one of the most critical outcomes of LRB approaches. Infrastructure built using local materials and techniques is often more resilient to the specific environmental risks of the area, such as floods, earthquakes, or extreme temperatures. By incorporating local knowledge of these risk, such as building homes on raised platforms in flood-prone areas or using earthquake-resistant construction method, communities can ensure that their infrastructure withstands the stresses imposed by both natural hazards and the impacts of climate change.

For example, in earthquake-prone regions, LRB techniques like building with flexible materials (e.g., bamboo or timber) or traditional stone masonry with lime mortar (which is more resistant to seismic shaking) can significantly improve a structure's ability to absorb and distribute seismic forces. Similarly, in flood-prone areas, traditional methods such as elevated wooden platforms or earth bunds can protect communities from floodwaters while also being more cost-effective and easier to maintain than conventional flood defences.

Long-term benefits include not only protection from immediate hazards but also a more adaptive and sustainable built environment that can evolve alongside changing environmental conditions, ensuring that recovery is not just a return to pre-disaster conditions, but a step forward toward greater resilience and sustainability.

The EIIP's main sectors of infrastructure works

- Rural roads
- Irrigation
- Flood control
- Erosion control
- Fishponds
- Water conservation and water harvesting
- Drinking water supply
- Health centers
- Primary schools
- Community centers
- Community forestry and horticulture
- Land development for agriculture
- Livestock shelters
- Rural sanitation
- Waste treating facilities
- Communal playgrounds

➔ Challenges

Challenges, such as **limited material availability, quality control issues, skills gaps, and the risk of resource depletion** need to be carefully managed. Balancing local knowledge with modern techniques, ensuring adequate training and resources, and promoting inclusive, sustainable practices are key to maximizing the benefits of this approach while minimizing the risks.

➔ Conclusion

The adoption of Local Resource-Based (LRB) approaches provides **multifaceted benefits that go beyond simply rebuilding infrastructure**. It creates local jobs, reduces costs, strengthens social cohesion, empowers marginalized groups, and promotes environmental sustainability. By drawing on local materials and knowledge, LRB approaches not only improve the immediate recovery process but also **build long-term community resilience**, making them a highly effective tool for sustainable development in disaster-affected areas.

CASE STUDY: Traditional Houses in Nias, Indonesia

Building resilient houses utilising local knowledge, skills, traditions and material

In response to the 2004 tsunami and the 2005 earthquake in Nias, Indonesia, a major reconstruction programme was launched to restore both public infrastructure and the island's traditional houses, known as *Omo Hada*. These vernacular homes, renowned for their earthquake resistance and constructed without nails, sustained only partial damage, while many of the modern, rigid buildings collapsed, resulting in hundreds of casualties. The restoration programme, led by the Museum Pusaka and supported by the Nias Heritage Foundation, the Multi-Donor Fund for Aceh and Nias, and technical assistance from the ILO, aimed to preserve the island's cultural heritage.

A key element of the restoration was the training of local carpenters in traditional building techniques. The programme involved a participatory process, where village leaders, the museum staff, and ILO experts collaborated to identify houses for restoration. Owners committed to providing materials and learning carpentry skills. Local carpenters, trained in traditional methods, were able to repair and rebuild homes, with the programme focusing on sustainable practices, such as tree planting for future wood supply.

By then 375 houses were restored, and many homeowners have gained skills in traditional carpentry, some even started small businesses in woodworking. The Museum Pusaka continues to offer carpentry courses to preserve these ancient skills and the cultural heritage of Nias.



Nias traditional houses have unique architectural features, including wooden construction, elevated pillars, large two-sided roofs, and slanted facades. These homes are specifically designed to withstand earthquakes and suit the local climate, with carefully chosen materials, a distinct measuring system, and specialized tools and rituals used in their construction.

The master carpenter of the Museum Pusaka assesses the repairs to be carried out together with the owner of the house and prepares a cooperation agreement. The house owner undertakes to provide the necessary wood and to undergo training in traditional house building and maintenance methods.



Suitable trees are selected, cut and sawn to the required dimensions and dried before use. The different structural parts of the houses require specific types of wood. New trees of the same species must be replanted



Traditional carpentry is an ancient craft that dates back hundreds of years. The training teaches homeowners and/or family members traditional carpentry skills, the associated rituals and helps to preserve the ancient culture of the Nias Island.



Conventional Construction Methods or Local Resource-Based (LRB) approach?

Choosing the best approach for post-disaster and post-conflict reconstruction projects

Labour resource-based methods are **highly effective in contexts where community involvement, economic recovery, and sustainability are essential**. They are particularly valuable for rebuilding infrastructure and fostering social cohesion in post-disaster, post-conflict, or refugee settings. These approaches **actively engage both refugees and host communities**, promoting integration and mitigating social tensions. By providing employment opportunities for both groups, labour-based methods **help rebuild social capital, enhance resilience, and empower local populations**. This approach not only supports long-term development and strengthens local capacity, but also ensures **recovery efforts are inclusive and sustainable**. It facilitates the integration of refugees into local economies and social structures, fostering a shared sense of ownership and contributing to lasting peace and cohesion within communities.



Conventional Construction:

Conventional methods are **effective for large-scale projects requiring technical expertise, speed, and precision, especially when critical infrastructure needs to be rebuilt quickly**. However, they often rely on external contractors, which can limit opportunities for local or refugee labour and may not address the social integration of displaced populations. **In post-conflict or refugee settings, conventional methods may miss the chance to engage both refugees and host communities** in the recovery process, potentially exacerbating social divides.

Hybrid Approach:

A hybrid approach **combines the speed and technical capacity of conventional construction with the community empowerment of labour-based methods**. This approach ensures that both refugees and host communities are included in reconstruction efforts, fostering social cohesion and economic recovery. Conventional methods can address technical aspects of reconstruction, while local labour can be engaged for less complex tasks, providing jobs and strengthening community ties.

1.2 Climate-resilient and job-creating design standards

1.2.1 Climate-resilient design standards

Climate-resilient design standards are essential for ensuring that infrastructure can withstand and adapt to the increasingly unpredictable and extreme effects of climate change. These standards integrate a variety of strategies aimed at reducing vulnerability to climate-related risks, ensuring that buildings, roads, and other infrastructure remain functional

Avoiding concrete where possible reduces CO2 emissions:

The CO2 emissions per cubic meter of structural concrete can vary depending on the specific mix design, the type of cement used and the inclusion of supplementary cementitious materials. On average, conventional concrete (using Ordinary Portland Cement) has a **CO2 footprint in the range of 200 to 400kg CO2 per cubic meter of standard concrete**.

The production of **1 ton of cement results in approximately 0.7 to 1 ton of CO2 emissions**.

and effective in the face of environmental challenges such as floods, heatwaves, storms, and rising sea levels. For example:

- **Durable, sustainable materials:** The use of locally sourced and climate-appropriate materials, such as weather-resistant building materials and renewable resources, minimizes environmental impact while ensuring that infrastructure remains functional over time, even under extreme conditions. Good examples are:
 - **Stone-paved roads and public spaces** offer notable advantages in terms of durability and weather resistance. Cobblestone pavements, in particular, are flexible and permeable, allowing rainwater to infiltrate the surface and evaporate, which creates a natural cooling effect during heat. Stone has been a trusted building material for centuries due to its resilience against heavy traffic, harsh weather, and natural elements like rain, wind, and extreme temperatures. Unlike asphalt or concrete, stone requires minimal maintenance and rarely needs replacing, making it a sustainable and low-impact choice for long-lasting infrastructure.
 - **Bio-engineering techniques** combine natural elements such as plants and earth with engineering methods, are used to stabilize slopes and prevent erosion, particularly in flood-prone or landslide-prone areas. This approach incorporates living vegetation like grasses, trees, and shrubs, which reduce soil erosion, manage stormwater, and increase ecological resilience. For example, willow stakes or coconut coir can be used to reinforce embankments and prevent the collapse of soil under heavy rain or flooding.
 - **Timber and Bamboo** in tropical or subtropical regions are climate-appropriate materials known for their strength, flexibility, and adaptability. These materials, when harvested sustainably, are renewable, lightweight, and resistant to extreme temperatures and humidity. They also have the added benefit of being biodegradable at the end of their lifecycle, reducing the long-term environmental impact of construction.
- **Water management systems:** Given the increasing frequency and intensity of floods and storms, effective water management systems are critical in climate-resilient infrastructure design. These systems help manage stormwater, reduce the risk of flooding, and prevent erosion, while ensuring that water resources are used efficiently.
 - **Advanced drainage systems:** Urban areas particularly vulnerable to heavy rainfall benefit from advanced drainage systems that can effectively handle large volumes of water. These systems may include stormwater drains, sump pumps, and retention ponds that collect and redirect water during storms. These systems help prevent flooding in built-up areas, reducing the damage to infrastructure and protecting lives and property.
 - **Flood barriers and protective embankments:** For communities located near rivers or coastlines, flood barriers or embankments are key to protecting infrastructure from rising waters. These barriers can be designed to withstand sea-level rise and storm surges, which are projected to intensify due to climate change. Seawalls, dikes, and embankment systems are all examples of infrastructure designed to protect urban and rural areas from coastal and riverine flooding.
 - **Permeable surfaces:** Permeable surfaces, such as porous asphalt, cobble-stone, or grass-crete (concrete blocks with gaps that allow grass to grow), enable rainwater to infiltrate into the ground instead of running off into storm drains. This reduces the risk of flooding and replenishes groundwater supplies, contributing to water conservation. These surfaces are often used in parking lots, walkways, and residential streets, where heavy rainfall can cause significant runoff and urban flooding.
 - **Rainwater harvesting:** In areas with water scarcity or seasonal drought, rainwater harvesting systems can be integrated into infrastructure to capture, store, and reuse rainwater for irrigation, non-potable purposes, or even potable water after proper filtration. This reduces dependence on municipal water systems and provides an alternative water source in times of need.
- **Energy-efficient solutions:** Integrating renewable energy technologies, such as solar panels, wind turbines, smart- and microgrids, and energy-efficient systems helps reduce the carbon footprint of infrastructure while improving its resilience to energy disruptions or shortages.

- **Adaptability to changing environmental conditions:** A key aspect of climate-resilient design is ensuring that infrastructure can adapt over time to changing environmental conditions, including shifts in climate patterns, resource availability, and societal needs. Adaptability involves not just building infrastructure that is resilient today, but ensuring that it can evolve as conditions change in the future.
 - **Flexible, modular design:** Incorporating modular design principles allows infrastructure to be easily adapted or expanded as needs evolve. For example, modular housing units or buildings can be reconfigured to accommodate changing populations or evolving environmental challenges, such as increased flooding or heatwaves.
 - **Green infrastructure:** Using green infrastructure elements like urban parks, wetlands, and tree canopies helps communities adapt to rising temperatures, improves air quality, and manages stormwater, while also providing social and health benefits. Green spaces can act as buffers to mitigate urban heat islands, reducing the need for energy-intensive cooling systems.

1.2.2 Job-creating design standards

Job-creating design standards that focus on climate resilience offer a multifaceted approach to improving both environmental performance and long-term economic sustainability. These standards not only ensure that infrastructure withstands the challenges posed by climate change but also create enduring employment opportunities across various sectors.

- **Job creation in construction and materials sourcing:** Climate-resilient infrastructure projects create significant local employment by prioritizing the use of locally sourced, climate-appropriate materials. This boosts jobs in harvesting, processing, and transporting materials, requiring specialized skills in sustainable extraction. These projects also generate roles in skilled labour, construction management, project coordination, and engineering, with local artisans trained in sustainable building techniques that blend traditional methods with modern goals. Additionally, the ongoing maintenance of these structures, which includes addressing wear and tear, erosion, and weathering, ensures long-term durability and preservation, providing steady employment during maintenance.

Comparing the Labour Content Example: Asphalt or Cobblestone?		
Aspect	Asphalt Paving (Paving Machine)	Cobblestone Paving
Machine/equipment use	High (paving machine, sprayer, rollers)	Low (mostly hand tools, plate vibrator)
Labour involvement	Low to medium (for preparation, support and finishing)	High (stone setting, joint filling and finishing)
Skill requirements	Low to medium (machine operators)	Skilled labour for stone cutting and setting
Labour intensity	Low to medium	High - extensive manual work
Equipment dependency	High	Low
Time per square meter	Shorter due to machine efficiency	Longer due to manual work
Approximate labour content per 1000 sqm pavement laying	20 worker-days Cleaning base, setting-out, spraying tack coat, assisting laying asphalt, finishing, cleaning equipment.	210 worker-days Preparing base, setting out, transporting stones, preparing sand-bedding layer, setting stone, filling joints, compacting, cleaning.
Sourcing pavement material	Bitumen often needs to be imported, and asphalt production requires specialised plants for mixing, processing and transport.	Suitable stone is often locally available and can be extracted and shaped manually. Natural stone offers exceptional durability, a long lifespan, and the added advantage of being easily reusable, making it a sustainable material choice.

- **Training and skill development:** Climate-resilient projects upskill workers through green technologies and sustainable practices, creating high-demand jobs in sectors like renewable energy and environmental conservation. These skills enable long-term careers in urban planning, disaster management, and eco-construction, fostering a workforce adaptable to the green economy.
- **Support for small and medium enterprises (SMEs):** Climate-resilient design standards boost local economies by prioritizing the use of locally sourced materials and contractors, providing small businesses with a reliable market and reducing reliance on external suppliers. SMEs that offer construction tools, maintenance services, and specialize in green technologies or sustainable practices can secure government contracts, expanding their reach and stimulating growth. The focus on local sourcing also strengthens the local economy by developing a green supply chain, reducing dependency on external markets, and fostering job creation. As SMEs grow to meet demand, they contribute to a more diversified and resilient economy.
- **Long-term employment in infrastructure maintenance:** Local sourcing in climate-resilient projects supports SMEs by creating markets for sustainable materials, tools, and services, while reducing dependency on external suppliers. This strengthens the green supply chain, fosters job creation, and drives SME growth, diversifying and stabilizing the economy. Skills gained in infrastructure maintenance, such as expertise in LRB techniques, and disaster resilience also enhance workers' employability across various sectors.
- **Regional resilience and economic growth:** These projects drive economic growth by creating jobs, supporting local industries, and mitigating climate-related disruptions. They attract investment, boost demand for local services, and enhance productivity, enabling regions to better withstand climate shocks.

➔ Challenges

While climate-resilient infrastructure design is crucial for mitigating the impacts of climate change, its successful implementation faces several challenges, including **securing resources for sustainable materials, overcoming technical barriers in water and energy management, and ensuring adaptability to future climate conditions**. Additionally, fostering **coordination among sectors, overcoming financial constraints, and addressing social resistance** are critical for general adoption.

Similarly, job-creating design standards, while offering substantial benefits, face their own set of challenges. These include a **lack of specialized skills, high initial costs, limited local capacity in some regions, and the potential for job insecurity** if ongoing investment or maintenance support is lacking. The success of these initiatives is also contingent on external factors such as government policies and the stability of global supply chains.

➔ Conclusion

Climate-resilient infrastructure design **integrates sustainable materials, water management, energy efficiency, and adaptability** to ensure that infrastructure not only survives but thrives in the face of climate change. By considering local conditions, leveraging renewable resources, and adopting flexible design strategies, communities can build infrastructure that is resilient to current risks and adaptable to future environmental changes. This approach is **crucial for reducing vulnerability, protecting lives, ensuring economic stability, and promoting sustainable development**.

In parallel, job-creating design standards for climate-resilient infrastructure offer a multifaceted strategy for both **environmental sustainability and long-term economic growth**. By prioritizing local materials and skilled labour, these standards **generate employment in sectors like construction, maintenance, and green technologies, while also fostering skill development and supporting small and medium enterprises (SMEs)**. As these projects evolve, they not only create sustained job opportunities but also contribute to regional economic stability by boosting local industries and reducing climate-related vulnerabilities. Ultimately, by integrating climate resilience with job creation, these design standards help build a more adaptable, prosperous future for communities, ensuring both environmental and economic sustainability in the face of climate change.

CASE STUDY: Roads and Employment Project, Lebanon

Optimising the labour content with enabling standards and design methods

In 2017, the Government of Lebanon secured a World Bank loan to *"(i) improve transport connectivity along select paved road sections, and (ii) create short-term job opportunities for both Lebanese and Syrian populations."* The project consisted of three main components: (i) road rehabilitation and maintenance, (ii) enhancement of road emergency response capacity, and (iii) capacity building and implementation support.

As part of the capacity-building component, the ILO provided training and information on standards and design methodologies aimed at creating employment opportunities.

Some examples of the relevant standards and design alternatives that were discussed and implemented include:

Instead of concrete retaining walls:

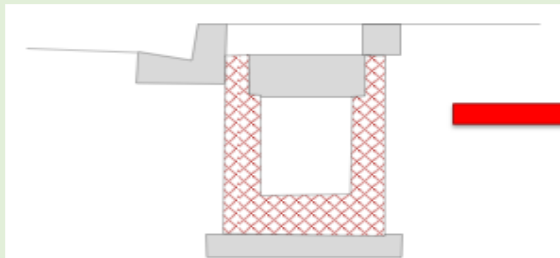


Masonry walls, cement bound or without

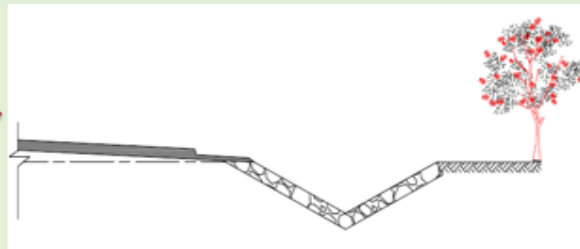


Gabion walls

Replacing "U" concrete side drains with masonry "V" drains

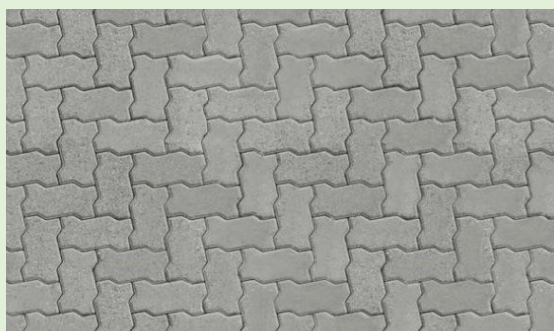


CDR Standard Type 1a

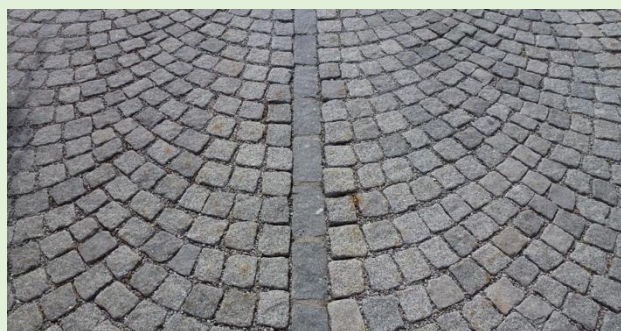


Cement masonry V-drain

Instead of asphalt pavements on parking spaces and bus stops:



Interlocking concrete paving blocks



Cobble-stones

CASE STUDY: Environmental Friendly Road Construction in Bhutan

The **Bhutan Rural Access Roads (BRAR) project**, which is supported by the Asian Development Bank (ADB), integrates bio-engineering techniques for road construction in rural and remote areas of Bhutan. This project focuses on using low-impact, environmentally sustainable methods, including bio-engineering for slope stabilisation and erosion control along rural roads.

Challenges and Opportunities:

- **Challenges:** The implementation of bio-engineering requires specialized knowledge and technical training for engineers and workers, which can sometimes be a constraint in rural areas. Additionally, the success of bio-engineering techniques depends on appropriate site conditions, and its effectiveness can vary depending on climate, soil type, and vegetation.
- **Opportunities:** Bio-engineering techniques offer significant long-term benefits for the environment, such as improved water retention, enhanced soil fertility, and biodiversity conservation. It aligns well with Bhutan's goal to remain carbon-neutral and maintain its "Gross National Happiness" (GNH) development philosophy, which emphasizes sustainable development and environmental protection.

By adopting bio-engineering for road construction, Bhutan is taking a proactive step toward building resilient, environmentally friendly infrastructure that can withstand climate-related challenges while maintaining ecological integrity. Some examples of bio-engineering technics:

Slope stabilisation (live staking)



Woody cuttings are planted in lines across the slope, typically following the contour, to form a barrier that traps material and reinforces the slope. Over time, a small terrace may develop. This technique serves to catch debris and stabilize the slope, with angled palisades offering drainage in certain areas. It is effective on sites up to 60°, particularly on steep landslide

debris slopes. However, it should be avoided on poorly drained materials or sites prone to small-scale slumping; in such cases, fascines may be more suitable.

Stone pitching

Stone pitching is used to armour slopes, providing a strong, well-drained surface that can withstand high water velocities. For a stronger, vegetation-enhanced version, see Section 4.14 on vegetated stone pitching. This technique is suitable for slopes up to 35°, particularly in areas with heavy seepage, flood risks, or where vegetation is hard to establish, such as urban settings. It is also effective on gully floors between check dams and for river scour protection.



Example of bio-engineering applications during construction and over time (Nepal)



2. Inclusive Approaches and Environmental and Social-Safeguards

2.1 Inclusive Employment Strategies

Inclusive strategies for community resilience and sustainable recovery in reconstruction works involve approaches that ensure the participation and benefit of all community members, including marginalised groups such as refugees, women, youth, elderly individuals, people with disabilities, and low-income families. By emphasizing inclusivity, these strategies help ensure that the voices of all affected populations are heard and their needs addressed, thereby contributing to a more resilient and equitable recovery.

2.1.2 Key concepts and strategies that include marginalised groups inclusive refugees

Concepts:

1. **Inclusive Strategies:** Approaches that actively involve diverse community members in decision-making and recovery efforts, eliminating barriers to participation. Inclusive strategies help to create spaces where everyone has an opportunity to contribute and benefit from recovery efforts
2. **Community Resilience:** The ability of a community to prepare for, respond to, and recover from adverse events while maintaining core functions and structures. Resilience is strengthened when all community members, are supported and integrated into the recovery process.
3. **Sustainable Recovery:** Rebuilding efforts that not only restore what was lost but also enhance long-term well-being, environmental sustainability, and social equity. It aims to build a foundation for future growth, ensuring that all community members, are able to thrive and contribute to the community's development.

Key Strategies

- **Participatory Planning:** Engaging all community members, in the planning stages of development and reconstruction is essential. This can be achieved through workshops, surveys, focus groups, and community meetings, ensuring that input is collected from diverse demographic groups. The goal is to ensure that the needs and aspirations of all community members are fully represented in the development and reconstruction process.
- **Capacity Building:** Providing training and resources to local organisations, community leaders and members enables them to take active roles in recovery efforts. This can include skills training in areas such as construction, project management, community organising, equality and inclusion. Empowering refugees and other marginalised groups foster meaningful participation in the recovery process and contributes to the long-term resilience of the community.
- **Equitable Resource Distribution:** Ensuring that development and recovery resources, such as funds, materials and services, are allocated fairly and equitably, with priority given to the most vulnerable populations. This helps prevent disparities in access to resources and ensures that everyone has an equal opportunity to benefit from development and reconstruction efforts.
- **Cultural Sensitivity:** Integrating local knowledge, traditions and practices into the development and reconstruction processes while being mindful of the needs and cultural backgrounds of the concerned communities. This approach fosters community ownership, strengthens cultural identity, and ensures that development and recovery efforts are inclusive and respectful of the diverse cultural and social contexts of all members, particularly refugees.
- **Multi-Stakeholder Partnerships:** Collaboration among government agencies, NGOs, community groups, and the private sector, including unions, can significantly enhance the effectiveness of recovery and development efforts. Partnerships bring together diverse expertise and resources to address complex challenges, ensuring that the needs of marginalized groups are adequately met and that all community members are actively involved in the recovery process.
- **Long-Term Planning:** Focusing on sustainable development goals (SDGs) that address underlying vulnerabilities, such as poverty, inequality, and displacement, ensures that development and recovery efforts promote the long-term well-being of both host and refugee populations. This

includes creating pathways for economic inclusion, access to education, healthcare and livelihood opportunities, thereby building resilience for future crises.

- **Monitoring and Feedback:** Establishing inclusive monitoring systems to track the effectiveness of development and recovery efforts and implement feedback mechanisms for all community members. Regularly gathering input from diverse groups throughout the development and development process ensures that efforts remain adaptable and responsive to the evolving needs of the communities.

Benefits of Inclusive Strategies

- **Enhanced Community Cohesion:** By ensuring that marginalized and vulnerable groups are included in the recovery and development process, inclusive strategies help foster a sense of ownership and trust among all community members. This strengthens social ties and creates a more cohesive and integrated community, where everyone works together towards common goals.
- **Improved Outcomes:** When diverse perspectives are incorporated into recovery efforts, the solutions are likely to be more effective and better meet the needs of the entire community. Inclusive planning ensures that no one is left behind and that the recovery process reflects the true needs of all people.
- **Greater Resilience:** Communities that embrace inclusive development are better equipped to withstand and recover from future challenges. When vulnerable and marginalized groups are integrated into the social, economic, and political fabric of the community, it enhances overall resilience and ensures that all members have the support and resources they need to recover from future shocks.
- **Social Equity:** By prioritising the inclusion of vulnerable and marginalized populations, inclusive strategies contribute to greater social equity, ensuring that all community members, regardless of their background or status, have equal access to opportunities and resources for recovery.

→ Challenges

While The challenges of using inclusive strategies and employment-focused approaches in reconstruction and development are complex and closely linked, requiring attention to both short-term and long-term needs. Inclusive strategies aim to involve marginalized groups, like refugees, women, youth, and people with disabilities, but often face **obstacles such as social exclusion, unequal access to resources, and lack of training**. These challenges show that recovery efforts need to go beyond just rebuilding infrastructure or distributing resources. They must also tackle the deeper social and economic inequalities that prevent everyone in the community from fully participating.

→ Conclusion

By implementing inclusive strategies, communities can build greater resilience and ensure that recovery and development efforts not only restore but also **improve the social, economic, and environmental landscapes of the affected areas**. It is essential to **engage refugees, marginalized groups, and local populations in every step** of the recovery and development process to ensure that it is inclusive, sustainable, and benefits everyone. This approach helps guarantee that communities are better prepared to face future challenges and create a more equitable and just society for all members, including those displaced by conflict or disaster.

CASE STUDY: Inclusive Approach in Jordan

The **ILO's Employment-Intensive Investment Programme (EIIP) in Jordan** has been active in Jordan since 2012, following the onset of the Syrian refugee crisis. The programme was introduced to address the dual challenges of unemployment and increased pressure on infrastructure and services in Jordan due to the large influx of refugees.

Initially, EIIP projects focused on creating job opportunities for both Jordanian host communities and Syrian refugees through labour-intensive public works. Over time, **the programme evolved to include more sustainable development goals, integrating inclusive employment practices, gender-sensitive approaches, and environmental safeguards** into its projects.

This timeline aligns with the broader global context, where EIIP initiatives were increasingly used as tools for promoting livelihoods in fragile and crisis-affected regions. In Jordan, these efforts have been tailored to strengthen local resilience and foster social cohesion.

How the ILO EIIP addresses **inclusion** and **environmental and social safeguards** in Jordan:

Inclusive Approaches

1. **Employment for Vulnerable Groups:** EIIP provides short-term, labour-intensive job opportunities targeting **Syrian refugees, Jordanian nationals**, and other vulnerable groups, with a focus on gender inclusion by encouraging women's participation in the workforce.
2. **Capacity Building:** Training programmes for local workers and communities help develop skills that improve long-term employability and promote community resilience.
3. **Gender Sensitivity:** The projects are designed to accommodate women by offering equal pay, safe working conditions, and support systems (e.g., childcare facilities or flexible working hours).
4. **Community Engagement:** Local communities are actively involved in planning and implementation to ensure that projects reflect their needs and priorities.



Environmental and Social Safeguards

1. **Environmental Protection:** EIIP projects emphasise sustainable natural resource management, such as water conservation, land rehabilitation, and waste management. For example, tree planting and soil conservation initiatives are common.
2. **Climate Adaptation:** Activities align with climate adaptation goals, focusing on enhancing the resilience of infrastructure to extreme weather events.
3. **Occupational Safety and Health (OSH):** Strict safety standards and training ensure safe working environments.
4. **Social Safeguards:** Projects comply with ILO standards for decent work, ensuring no exploitation, non-discrimination, and compliance with national labour laws.
5. **Conflict Sensitivity:** The EIIP approach fosters social cohesion by bringing together diverse groups (e.g., refugees and host communities) to collaborate on community-benefiting projects.



Through this integrated approach, EIIP not only creates immediate job opportunities but also addresses long-term social and environmental challenges, fostering inclusive and sustainable development in Jordan.

2.2 Inclusion and Enforcement of Environmental and Social Safeguards

In the construction sector, where projects can dramatically impact natural landscapes and local communities, environmental and social safeguards are essential for fostering sustainable and socially responsible practices. These safeguards are designed to protect ecosystems, uphold the rights and well-being of communities, and promote fair and safe working conditions for construction workers.

Major agencies, like the WB and ADB have established Environmental and Social Safeguard Frameworks (ESSF) that focus on managing environmental impacts and ensuring social inclusion, particularly in large-scale infrastructure or development projects. These frameworks generally emphasize environmental protection, stakeholder consultation, and mitigating adverse social impacts.

In contrast, the **ILO's mandate extends beyond environmental and social risks to include labour rights, decent work conditions, and the promotion of International Labour Standards (ILS)**. This focus on labour conditions sets the ILO apart, as its safeguards explicitly address the quality of work, workers' rights, and social dialogue, which may not be as prominent in the frameworks of other agencies. While the WB and ADB often concentrate on compliance with environmental regulations and social equity, the ILO emphasizes the protection of labour rights, the elimination of forced labour, child labour, and discrimination, and the promotion of fair wages and working conditions, all of which directly contribute to social sustainability and resilience.

Therefore, the ILO's safeguard approach can be viewed as more holistic, considering both the environmental and social dimensions alongside labour-specific issues, aligning with its broader mandate of promoting decent work and social justice. **This is an important distinction when considering the ILO's role in shaping sustainable development outcomes in projects where labour rights and working conditions are central concerns.**

2.2.1 Environmental safeguards in construction

Environmental safeguards are critical in the construction sector to minimize ecological damage and manage the industry's substantial environmental footprint. Construction activities—such as land clearing, material sourcing, and emissions from machinery, pose significant risks to the environment. Key safeguards include:

- **Environmental impact assessments (EIAs):** EIAs are essential tools in construction planning. They identify and evaluate potential environmental impacts of a project before work begins, considering aspects such as biodiversity loss, air and water pollution, noise levels, and waste generation. EIAs enable decision-makers to anticipate harmful outcomes and design mitigation measures, such as relocating projects away from sensitive habitats or implementing alternative construction methods to lessen environmental impacts.
- **Pollution controls:** The construction sector is a major contributor to pollution, including dust, emissions, and chemical runoff. Environmental safeguards mandate the use of pollution control measures, such as dust suppression techniques, equipment emission standards, and waste disposal protocols. These controls help maintain air and water quality standards, reduce health risks, and minimize the release of toxic substances into ecosystems.
- **Habitat protection:** Construction projects often require land clearing, which can lead to habitat destruction and biodiversity loss. Safeguards that protect natural habitats might include creating buffer zones around protected areas, relocating flora and fauna where feasible, and reforestation efforts post-construction. In some cases, developers are required to offset the ecological impact by creating or restoring habitats elsewhere, ensuring that projects do not result in a net loss of biodiversity.

2.2.2 Social safeguards in construction

Social safeguards are policies and practices that ensure construction projects respect the rights, cultures, and welfare of local communities. In a sector with high potential for displacement, social disruption, and

cultural loss, these safeguards ensure that construction activities contribute positively to local development without harming social structures or heritage. Key elements include:

- **Respect for local communities:** Construction projects often affect local populations, either through land acquisition or disruptions to daily life. Social safeguards require meaningful engagement with communities to address their concerns, receive their input, and involve them in decision-making processes. This helps prevent conflicts, ensures communities benefit from projects, and fosters a sense of ownership and trust.
- **Protection of cultural heritage:** Construction activities can endanger sites of cultural or historical significance. Safeguards protect cultural heritage by requiring assessments of cultural assets in project areas and establishing measures to avoid or mitigate harm. For example, a project near an archaeological site might have strict limitations on land use, or require careful excavation under expert supervision to preserve historical artifacts and structures.
- **Fair labour opportunities:** Social safeguards encourage projects to prioritize hiring locally and provide fair labour opportunities. This can include offering skill development programmes and jobs to local residents, fostering local economic growth, and ensuring that communities receive tangible benefits from projects in their area. By prioritizing fair and local labour practices, projects can create sustainable livelihoods and reduce social inequalities.

2.2.3 Decent work and occupational safety and health (OSH) in construction

Ensuring safe, fair, and equitable working conditions is a core aspect of the ILO's Decent Work Agenda and is essential for sustainable development. In the construction sector, where work often involves hazardous conditions and demanding physical labour, OSH measures are critical to protecting workers' well-being and upholding their fundamental rights. The following key standards and practices, aligned with the ILO's Decent Work principles, are vital for fostering decent work in the construction industry:

- **Fair Wages and Working Conditions:** Decent work standards, as advocated by the ILO, require that construction projects ensure fair wages, reasonable working hours, and access to benefits. By adhering to these standards, workers are guaranteed adequate compensation, improving their standard of living, reducing poverty, and ensuring their families' economic security. Fair wages and working conditions are fundamental to respecting workers' rights and upholding dignity at work.
- **Safe and Healthy Working Environments:** Construction is a high-risk sector, often exposing workers to hazards such as falls, machinery accidents, and harmful substances. Under the ILO's decent work framework, OSH safeguards are essential to protect workers from these dangers. Key practices include the mandatory use of personal protective equipment (PPE), regular machinery maintenance, and comprehensive safety inspections. These measures not only prevent accidents but also ensure a healthy working environment, aligning with the ILO's goal to promote workplace safety and prevent work-related injuries and illnesses.

Gender Equality and Disability Inclusion: The ILO's Decent Work Agenda emphasizes inclusivity, which includes promoting gender equality and disability inclusion in the workplace. In the construction sector, this means policies that actively encourage the participation of women and people with disabilities, addressing discriminatory hiring practices and ensuring workplace accommodations. Construction sites should be accessible to all, providing equal opportunities and safety measures for every worker, regardless of gender, physical ability, or background. This fosters an inclusive workplace culture where diverse workers can thrive. To strengthen this, it is crucial to explicitly address key areas of gender equality, such as the prevention of violence and harassment, ensuring equal pay for work of equal value and implementing measures to support workers with care responsibilities, e.g. flexible working hours and childcare facilities, enabling workers, particularly women, to balance work and family responsibilities more effectively. These concrete actions are vital in creating a truly equitable and supportive work environment where all workers, regardless of gender or background, can fully participate and prosper.

- **Strengthening OSH Practices for Worker Protection:** The ILO places a strong emphasis on the continuous improvement of OSH practices. OSH standards mandate rigorous safety training, risk assessments, and ongoing health monitoring to protect workers from both immediate and long-term health risks. Workers should receive comprehensive training on hazard recognition, emergency response, and safe work practices. Additionally, long-term health monitoring and support for rehabilitation are essential for workers who suffer injuries or illnesses on the job, reinforcing the ILO's commitment to promoting workers' health and rights throughout their careers.

In the construction sector, environmental and social safeguards are essential for promoting sustainable and socially responsible practices. While agencies like the World Bank and Asian Development Bank focus on environmental impact management and social inclusion, the **ILO takes a broader approach** by emphasizing labour rights alongside environmental and social issues. **The ILO's focus extends beyond environmental and social impacts to include the protection of labour rights, the elimination of forced and child labour, and the promotion of decent work standards, including fair wages, occupational safety, and gender and disability inclusion.** This comprehensive approach ensures that construction projects not only protect the environment and support communities but also uphold workers' rights, fostering long-term sustainability and social resilience.

→ Challenges

Inclusion and enforcement of environmental and social safeguards in complex construction environments is challenging, particularly when stakeholders have conflicting priorities.

- While **EIAs are critical tools** for assessing potential environmental risks, their effectiveness is often compromised by lack of data, incomplete assessments, or insufficient follow-up on mitigation measures.
- **Meaningful community participation** is often overlooked or insufficiently conducted. Projects may fail to adequately consult marginalized or vulnerable groups, leading to social disruption, displacement, or even cultural loss.
- **Safeguarding cultural heritage** in construction projects is often under-prioritized, especially when economic goals take precedence over social considerations.
- The construction industry continues to struggle with **gender and disability disparities**. Discriminatory hiring practices, lack of workplace accommodations, and unsafe working conditions for women and people with disabilities remain barriers.
- **Effective monitoring and enforcement** of environmental and social safeguards remain a critical challenge.
- For many agencies and local authorities, **limited resources and insufficient technical capacity** to implement and enforce safeguards present significant barriers.

→ Conclusion

By implementing in the construction sector environmental and social safeguards are essential for promoting sustainable and socially responsible practices. While agencies like the World Bank and Asian Development Bank focus on environmental impact management and social inclusion, the **ILO takes a broader approach by emphasizing labour rights** alongside environmental and social issues. **The ILO's focus includes the protection of labour rights, the elimination of forced and child labour, and the promotion of decent work standards, including fair wages, occupational safety, and gender equality and disability inclusion.** This comprehensive approach ensures that construction projects not only protect the environment and support communities but also uphold workers' rights, fostering long-term sustainability and social resilience.

3. Institutional and Management Arrangements for Effective Procurement

3.1 Institutional Capacity Building:

Effective procurement is crucial in the context of sustainable reconstruction projects, ensuring that resources are utilized efficiently, responsibly, and in alignment with long-term sustainability goals. A comprehensive approach involves strengthening institutional capacity, implementing effective management structures, and ensuring robust procurement strategies.

3.1.1 Importance of strengthening institutions

- **Core Functions:** Institutions responsible for managing and overseeing reconstruction and development programmes must have the capacity to plan, implement, and evaluate policies, manage resources, and engage stakeholders effectively. Strengthening these institutions ensures they can adapt to evolving challenges, foster community trust, and deliver results in line with sustainability goals.
- **Training and Resources:** Building institutional capacity involves ongoing training to enhance technical skills and provide the necessary resources. This includes workshops on project management, procurement processes, sustainability practices, and evaluating outcomes to inform future decisions.
- **Sustainability Focus:** Institutions should integrate sustainability into their operational frameworks, ensuring that environmental and social considerations guide all stages of the project, from planning through to post-implementation evaluation.

3.1.2 Frameworks for interagency cooperation and coordination

National Disaster Management Agencies (NDMAs) play a central role in coordinating disaster response and recovery, ensuring that relief efforts are efficient and aligned with national priorities. These agencies are typically responsible for disaster risk reduction strategies, early warning systems, relief coordination, and integrating recovery into long-term development plans.

Effective interagency frameworks must define the NDMAs' role in coordinating with local governments, humanitarian organizations, development agencies, and the private sector, ensuring clear authority, communication channels, and decision-making mechanisms. Additionally, NDMAs should be linked to key sectors like health, education, infrastructure, and social protection to ensure a holistic approach to recovery.

These frameworks often combine formal mechanisms, such as disaster response plans, and informal coordination platforms like interagency working groups. Alignment with international standards, such as the Sendai Framework for Disaster Risk Reduction, ensures consistency while fostering multi-stakeholder collaboration.

In summary, interagency cooperation frameworks must emphasize NDMAs' leadership in disaster recovery, define roles clearly, build on existing capacities, and ensure collaboration across sectors to achieve an effective, resilient, and sustainable recovery.

Examples

Bangladesh, Cyclone and Flood Response:

- **Cooperation Framework:** Bangladesh has developed an extensive framework for disaster management that involves multiple agencies, including the *Ministry of Disaster Management and Relief (MoDMR)*, the *National Disaster Response Coordination Centre (NDRCC)*, local government units, NGOs, and international agencies. The country's disaster management system is anchored in the *Disaster Management Act 2012*, which facilitates cooperation between various stakeholders.
- **Example:** After Cyclone Sidr (2007) and Cyclone Aila (2009), the government coordinated efforts through the *Disaster Management Bureau (DMB)*, with support from the United Nations, Red

Cross, and NGOs like BRAC. These efforts were supported by community-based approaches and capacity building to enhance local resilience.

- **Coordination Mechanism:** The *Humanitarian Coordination Task Force* (HCTF) coordinates efforts between humanitarian organizations, government agencies, and other stakeholders. This task force focuses on both short-term relief and long-term recovery, ensuring that recovery programs include disaster risk reduction (DRR) and resilience-building components.

Nepal, 2015 Earthquake Response:

- **Cooperation Framework:** In response to the devastating earthquake in April 2015, Nepal's National Emergency Operation Centre (NEOC) coordinated the government-led recovery efforts, working closely with the *National Disaster Risk Reduction and Management Authority* (NDRRMA).
- **Example:** The *Nepal Earthquake 2015 Recovery Framework* (NEFR) served as a central document, and was developed with input from key stakeholders, including the *UN Office for the Coordination of Humanitarian Affairs* (OCHA), the *World Bank*, and various international NGOs. This framework set out clear responsibilities for government ministries, development partners, and humanitarian organizations.
- **Coordination Mechanism:** The *Cluster Approach* under the UN, which focuses on sectors such as shelter, health, and education, was actively employed. The government, together with international partners, conducted joint assessments, including the *Post-Disaster Needs Assessment* (PDNA), to ensure that recovery efforts were aligned with Nepal's long-term development goals.

3.2 Effective Management Arrangements

3.2.1 Establishment of management structures

- **Clear Hierarchies and Roles:** Strong management requires well-defined organisational structures with clearly delineated roles and responsibilities. This enhances accountability, ensures streamlined decision-making, and provides a foundation for effective labour management. Clear hierarchies help establish robust systems for overseeing labour practices, ensuring fair treatment, appropriate task allocation, and compliance with labour standards. A well-organized structure also facilitates the integration of environmental and social safeguards, ensuring that these aspects are prioritised in decision-making and operational practices.
- **Project Management System (PMS):** Establishing PMSs dedicated to overseeing reconstruction and development programmes ensures focused coordination, tracking of progress, and adherence to procurement and sustainability standards. PMSs serve as the backbone of project planning, monitoring and evaluation, enabling structured implementation and ongoing adjustments to meet evolving needs. Effective labour management is integral to PMSs, ensuring worker safety, fair wages, skill development, and grievance mechanisms. Equally, PMSs must embed environmental and social safeguard mechanisms, such as minimizing ecological disruption, promoting resource efficiency and engaging communities to address social impacts proactively. This integrated approach strengthens stakeholder trust and contributes to sustainable outcomes.
- **Risk Management:** Implementing risk management frameworks during the planning phase helps identify potential challenges early, including risks related to labour disputes, unsafe working conditions or workforce shortages. Proactively addressing these risks ensures smooth implementation and compliance with labour laws and standards. Risk management must also include environmental and social safeguards, identifying potential environmental impacts (e.g., pollution, habitat loss) and social risks (e.g., displacement, inequity). Continuous monitoring ensures mitigation measures are effectively applied, protecting workers, communities, and ecosystems while preserving the project's integrity and reputation.

- **Stakeholder Engagement:** Actively involving stakeholders, such as local communities, government bodies, NGOs, and private sector partners, through advisory committees and regular consultations ensures a holistic and inclusive approach to project planning and execution. This engagement enables diverse perspectives to be considered, fostering innovative solutions and enhancing the project's social and environmental relevance. Transparent communication with stakeholders builds trust and credibility, which is particularly important in addressing concerns related to labour practices, environmental safeguards, and community impacts. Effective stakeholder engagement ensures that decision-making processes remain inclusive, transparent, and responsive to the needs of all parties, thereby enhancing project legitimacy and sustainability.
- **Data Management:** Effective management structures must prioritise robust data management systems to ensure transparency and accountability, particularly in labour management, community engagement, and safeguarding efforts. Transparent reporting on employment practices, wages, working conditions, environmental compliance, and social impacts builds trust among stakeholders. Accurate and accessible data supports compliance with labour standards, environmental regulations, and social safeguards, enabling responsive decision-making to address workforce, community, and ecological concerns. By fostering transparency, data management helps create an equitable, sustainable, and inclusive project environment that aligns with both human and environmental priorities.
- **Performance monitoring:** Establishing clear Performance Indicators (PIs) is essential for tracking and evaluating programme progress against defined objectives. This should cover critical areas such as timelines, budget adherence, labour productivity, environmental impact, and social outcomes. By setting measurable targets, project managers can identify areas needing improvement and implement corrective actions promptly. Regular evaluation against these PIs not only ensures projects stay on course but also helps measure their alignment with broader sustainability goals, such as reducing carbon footprints, promoting fair labour practices, and enhancing community well-being. The use of performance metrics fosters accountability, transparency, and continuous improvement throughout the project lifecycle.

Example: Data Management in India

The **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)** is an Indian social welfare programme enacted in 2005 aimed at enhancing rural livelihood security. It provides at least **100 days of guaranteed wage employment annually** to adult members of rural households willing to perform unskilled manual labour. The programme has a dual focus: i) generating employment and ii) creating durable assets such as roads, irrigation systems, and water conservation projects.

The **National Mobile Monitoring System (NMMS) App**, an official mobile application introduced under MGNREGA, enhances transparency and accountability in scheme implementation while serving as a digital bridge between field activities and administrative monitoring. The key features are:

1. Attendance Recording:

- The app records the real-time attendance of MGNREGA workers at work sites.
- Attendance is taken twice daily and includes geotagged photographs of workers to verify their presence.

2. Direct Monitoring:

- It enables real-time tracking of work progress, reducing delays and discrepancies.
- Worksite supervisors use the app to report daily updates, eliminating the need for manual records.

3. Payment Accuracy:

- By linking attendance directly to payment systems, the app ensures that wages are disbursed to verified workers without middlemen.

4. Reduction of Fraud:

- The app minimizes the risk of ghost workers and fake entries by relying on biometric and photographic evidence.

5. Transparency:

- All records are uploaded to the MGNREGA Management Information System (MIS), making data accessible to the public and officials for verification and social audits.

Challenges:

- **Digital Literacy and Connectivity:** Implementation may be hindered in areas with limited internet connectivity or where workers lack familiarity with smartphones.
- **Exclusion Risks:** Errors in attendance capture or technical issues can delay payments to genuine beneficiaries.



3.2.2 Procurement for Sustainable Recovery

Promoting Environmental Responsibility, Local Sourcing and Inclusivity

- **Definition:** Green procurement prioritises products and services that reduce negative environmental impacts including sustainable materials, energy-efficient technologies, and waste-reduction practices. By embedding these priorities into the procurement process, projects can deliver environmentally responsible outcomes.
- **Local sourcing:** Local sourcing not only supports the local economy but also minimizes the carbon footprint associated with transporting materials. By working with local suppliers and artisans, projects contribute to community development and reduce environmental costs.
- **Inclusivity²:** Green procurement policies should ensure that marginalized groups, such as women-owned businesses and local enterprises, have equal opportunities to participate in the procurement process. This inclusivity promotes economic equity and empowers communities.

Transparency, accountability and anti-corruption measures:

- **Open bidding processes:** Transparent procurement processes reduce the risk of corruption by ensuring fairness in supplier selection. Open bidding systems that are widely advertised allow for competitive pricing and prevent biased decisions.
- **Monitoring and reporting:** Regular audits and public reporting enhance accountability by ensuring transparency in procurement activities. Establishing whistleblower protections encourages reporting of irregularities, safeguarding the integrity of the process.
- **Conflict of interest policies:** Clear policies to address conflicts of interest among procurement decision-makers are critical. These include disclosure requirements and independent reviews to ensure ethical decision-making throughout the process.

Mechanisms for monitoring and evaluation:

- **Impact assessments:** Conducting regular sustainability impact assessments during and after project implementation ensures that procurement decisions align with environmental, social, and economic goals. These assessments help identify the long-term outcomes of procurement strategies and inform future planning efforts.
- **Feedback loops:** Establishing systems for continuous feedback from stakeholders, including suppliers, contractors and local communities, helps refine procurement practices and enhances decision-making for future projects.
- **Long-term tracking:** Tracking procurement outcomes over time allows for the identification of trends in sustainability practices, providing valuable insights for future projects. This data-driven approach ensures that sustainable procurement decisions are continuously improved based on past performance.

Institutional and management arrangements for effective procurement:

Effective institutional and management arrangements are critical not only for ensuring efficient resource allocation but also for aligning procurement processes with the broader objectives of sustainable development. Procurement strategies must support the integration of local resource-based (LRB) approaches across the project lifecycle, including planning, implementation, and evaluation stages.

- **Planning and preparation phase:** Procurement should prioritise locally sourced materials and services and include community consultations to ensure that local needs and resources are effectively incorporated into the project design.

To effectively implement the Local Resource-Based (LRB) approach, it is essential to introduce **appropriate contract documentation** that addresses key social, environmental, legal and work method considerations. Contract conditions should explicitly incorporate safeguards for social and

² ILO EIIP guide on gender-responsive procurement:

<https://www.ilo.org/publications/guide-gender-responsive-procurement-employment-intensive-investment>

environmental safeguards, compliance with relevant labour laws, gender equality and occupational safety and health standards. Additionally, the Bill of Materials and the specifications should be carefully aligned with the specific requirements of LRB work methods.

- **Implementation phase:** During implementation, procurement processes should ensure adherence to LRB approaches. This involves employing local labour, using traditional materials and utilising community-based procurement systems that support local suppliers and artisans.
- **Evaluation phase:** In the evaluation phase, it is essential to assess not only the financial and logistical outcomes of procurement but also the social and environmental impacts. Key indicators should include the extent to which local capacity was built, the effectiveness of local procurement practices and the sustainability of the project's long-term outcomes.

➔ Challenges

The successful implementation of green procurement policies and the integration of LRB approaches face significant challenges, ranging from financial constraints and compliance complexities to institutional capacity and inclusivity issues. Addressing these challenges requires comprehensive strategies that involve stakeholder engagement, robust monitoring systems, capacity building, and the political will to enforce sustainability standards. While these obstacles can be substantial, overcoming them is essential for ensuring that procurement processes not only achieve immediate project goals but also contribute to long-term sustainable development, community empowerment, and environmental protection.

➔ Conclusion

Procurement for sustainable recovery must **integrate environmental, social, and economic considerations throughout all stages of a project**. Green procurement policies, including local sourcing and inclusivity, are essential for reducing environmental impacts and fostering local economies. Transparency and accountability in procurement processes further ensure fairness and mitigate corruption. Mechanisms for monitoring and evaluation, such as impact assessments and feedback loops, enable ongoing refinement of procurement strategies to align with sustainability goals. Additionally, effective institutional and management arrangements are critical for integrating LRB approaches across the project lifecycle.

Example: Integrated LRB approach in Bangladesh

The **Local Government Engineering Department (LGED)** of Bangladesh is a prime example of successfully integrating **Local Resource-Based (LRB)** methodologies into infrastructure projects, particularly through its **Community-Driven Development (CDD)** approach. LGED's approach focuses on community involvement, local sourcing, and building local capacity across the project lifecycle, ensuring sustainable development and community empowerment.

LGED's model demonstrates how LRB methodologies can enhance project outcomes by fostering community participation, promoting sustainability, and building local capacity. This approach not only addresses immediate infrastructure needs but also strengthens communities, ensuring long-term development and resilience.

Key Features of LGED's Approach:

1. Community-Driven Development (CDD):

Local communities are involved in planning, decision-making, and prioritizing projects, ensuring that infrastructure projects meet local needs and fostering a sense of ownership.

2. Local Sourcing and Labor:

LGED prioritizes locally sourced materials and employs local labour, reducing environmental impact and supporting local businesses while creating jobs and building skills.

3. Community-Managed Procurement:

Local communities participate in procurement processes, empowering them to manage resources and contractors, improving transparency and reducing corruption.

4. Sustainability and Long-Term Benefits:

Projects use sustainable, locally available materials, ensuring durability and resilience. Community ownership promotes long-term maintenance and care of infrastructure.

5. Monitoring and Evaluation:

LGED integrates impact assessments and continuous feedback to measure social, economic, and environmental outcomes, refining future projects.



Outcomes:

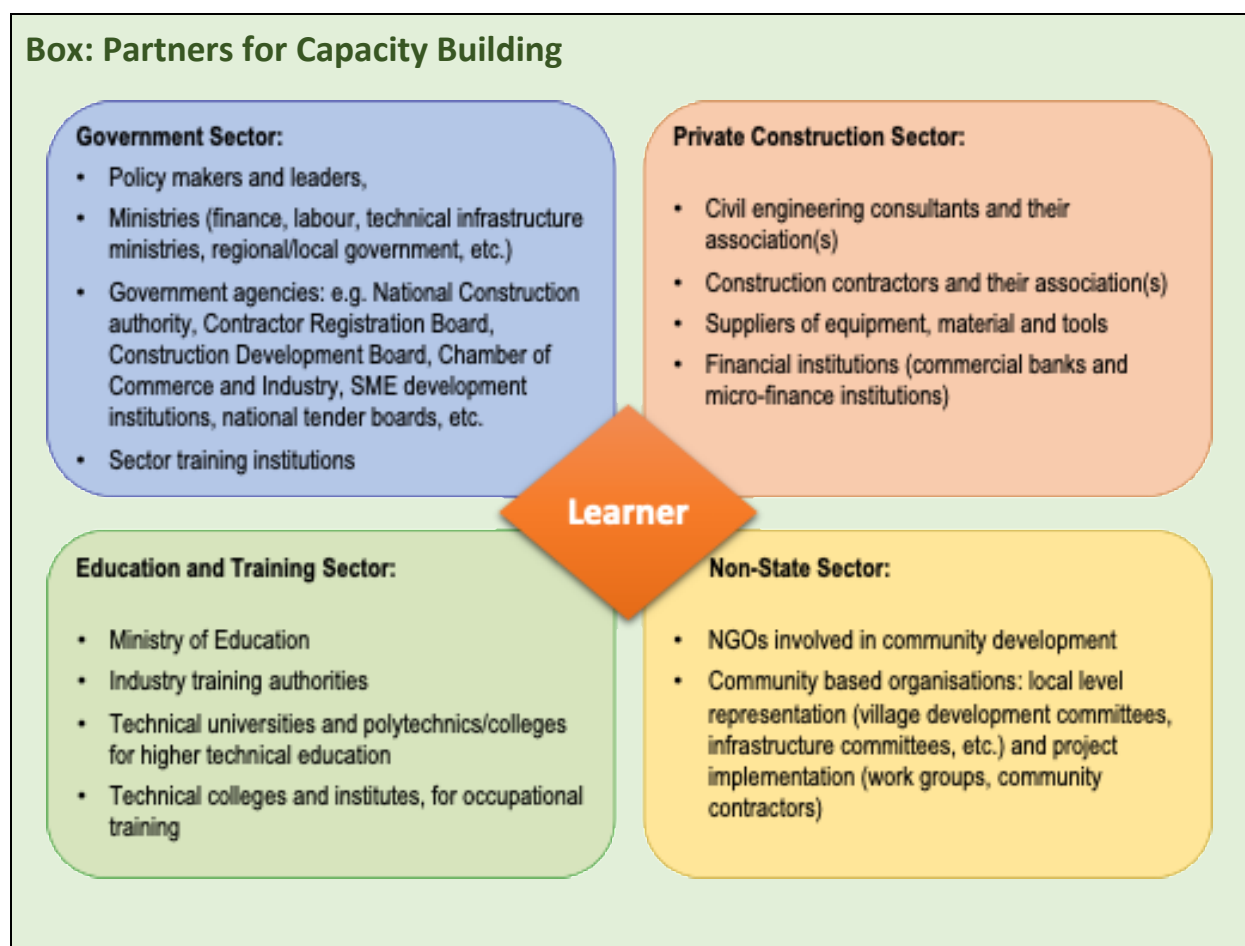
- **Improved Infrastructure Quality:** Projects are tailored to local conditions, resulting in more effective and sustainable infrastructure.
- **Enhanced Community Resilience:** Local capacity is built, increasing communities' ability to manage and maintain infrastructure.
- **Social Empowerment:** The CDD approach empowers marginalized groups, particularly women, by giving them a voice in development.

4. Capacity Building and Skills Development in the Construction Sector

4.1 Overview

The general nature, requirements and challenges for knowledge and skills development in the construction industry, particularly for the development of local contractors and consultants, are complex and multifaceted.

The importance of **involving and cooperating with relevant development support and regulatory institutions is most important**. Effective partnerships in training delivery are essential for ensuring recognition, ownership and sustainability. Typical partners are shown in the Box below.



In a functioning partnership there are different obligations and responsibilities:

- The **government** provides the enabling environment through relevant policies, strategies, and potentially financial support, such as funding for vocational training institutes.
- The **training or qualifications authority** provide occupational and/or qualification standards, registers qualifications, verifies/approves qualifications and recognises professional bodies (training providers) and professional individuals (trainers, instructors).
- **Employer's organisations**, such as contractor associations, can reach agreements with their members on how to develop human resources in the sector and how to finance such initiatives.
- **Trade unions / worker organisations** play an important role in negotiations with employers' organisations and the government to secure favourable conditions for training and worker protection.
- **Financial institutions**, such as banks, insurance companies, and micro-finance institutions, can provide financial support for establishing and running training facilities and programmes.

- **Suppliers** of equipment, tools, and building materials can offer applied training on the operation and use of their products, with training services included in supply contracts.
- **Non-governmental organisations** (NGOs) can be valuable partners, providing training through their own capacities and acting as intermediaries between the community and workers.

Example of Partnership Arrangements in Jordan

The high unemployment rate in Jordan, coupled with the significant influx of Syrian refugees, presents major challenges to the country. It is therefore crucial to create opportunities for both Syrian refugees and vulnerable Jordanians to secure decent livelihoods. The ILO's EIIP programme addresses this need by generating immediate employment through labour-intensive projects for both Syrian refugees (women and men) and host communities. These projects include the construction and maintenance of schools, support for local farmers (such as constructing water cisterns and terracing slopes), and the development and maintenance of agricultural feeder roads and other public facilities.

A training programme designed for engineers to apply LRB approaches has brought together the following partners:

- The **Jordan Engineers Association** with its training arm, the **Engineers Training Centre**, is the official provider and custodian of the *"Certified Competence Programme for Civil Engineers for Local Resource-Based Management"*.
- The **ILO** provides the necessary technical assistance through a dedicated support programme for managing all involved partners, developing the required managerial and technical capacities, developing and introducing the training programme, as well as backstopping and monitoring the implementation of the training programme.
- The **Ministry of Public Works and Housing** is the leading implementing agency of the programme and as such the originator of and main client for the training of engineers.
- The **Ministry of Agriculture and the Ministry of Local Government** together with **Municipalities** are further clients of the training programme.
- Registered **contractors** are the main beneficiaries of the training programme.
- The **German KfW** (Kreditanstalt für Wiederaufbau) together with the Government of Jordan finance the programme.
- The **World Bank** supported Municipal Services and Social Resilience Project (MSSRP) with TA from the ILO also utilises the LRB engineers' training programme for their capacity building programme.

4.2 Capacity Building for Public Officials and Engineering Consultants

4.2.1 Training requirements

Orientation and training are essential for both public officials and engineering consultants involved in the planning, design, and implementation of LRB infrastructure projects. The use of local materials, labour and skills require a customised approach that significantly differs from conventional infrastructure projects. Proper training equips both officials and consultants with the knowledge, skills and tools to manage the unique challenges and opportunities presented by LRB methods, ensuring that projects are executed efficiently, sustainably and in alignment with both community needs and industry standards. The main reasons for the need for comprehensive training are:

- **Decision-making:** LRB programmes involve balancing technical, social, environmental, and economic factors. Training helps planners and consultants assess these diverse needs and make informed, rational decisions that support both sustainability and economic viability. By integrating local knowledge and resource availability, decision-making is more relevant and adaptive to the community's context.

- **Stakeholder engagement:** LRB projects require collaboration with a wide range of local stakeholders, including communities, NGOs and local businesses. Training ensures that officials and consultants can manage competing interests, facilitate equitable participation and foster collaborative relationships that maximise social and economic benefits while minimizing conflicts.
- **Appropriate design:** Infrastructure projects utilising LRB methods must be carefully designed to align with local resources, climate conditions, employment generation needs, economic factors and environmental and social considerations. Training ensures that infrastructure is designed to meet local community needs leading to more sustainable and resilient projects.
- **Technical specifications:** To effectively plan, instruct, and control construction activities using LRB methods, these activities must be broken down into manageable work steps (items). This breakdown should be clearly reflected in the bills of quantities and the technical specifications. Training emphasizes the development of clear, concise specifications that prioritise locally sourced materials, sustainable construction techniques and the specific requirements of the LRB work methods, while ensuring compliance with quality and regulatory standards.
- **Contract preparation:** LRB contracts include specific conditions of contract that ensure decent working conditions, compliance with labour laws, and adherence to social and environmental safeguards, including occupational safety and health standards. They also account for the unique aspects of LRB work organisation and implementation methods, while considering the inherent limitations of SME contractors, e.g. packaging of contracts.
- **Costing for LRB works:** Accurate cost estimation for LRB projects presents a significant challenge, as realistic productivity norms are often lacking. This is especially true in contexts where labour productivity can vary widely due to a range of local factors. For instance, climatic conditions, the physical health and skill levels of workers, and the quality or availability of local materials and tools can all influence productivity rates. These variables can lead to fluctuations in the efficiency of both labour and materials, further complicating cost estimation. Therefore, effective training for planners and project managers is essential to develop more reliable productivity benchmarks, factoring in these diverse influences, and ensuring more accurate and adaptable cost planning for LRB projects.
- **Environmental sustainability and resource management:** LRB projects can have both environmental benefits and risks. Training equips project managers and consultants with the skills to assess and mitigate these impacts, focusing on sustainable resource use, waste reduction, and the promotion of long-term infrastructure sustainability.
- **Social safeguards and community impact:** LRB programmes aim to enhance livelihoods, reduce inequalities, and promote social inclusion by engaging local communities, creating employment opportunities, fostering skills development, and stimulating economic growth. At the same time, they address risks such as labour exploitation and displacement. To ensure this, social safeguard frameworks, implementation guidelines (e.g., checklists), and monitoring systems must be integrated throughout all project stages, from appraisal to the handover of the infrastructure.
- **Labour regulations and workers' rights:** LRB projects rely heavily on local labour forces, making it essential to ensure fair and ethical labour practices throughout the project lifecycle. Training equips officials and consultants with the knowledge and skills necessary to effectively plan and implement fair recruitment processes, uphold labour standards, address gender equality and social inclusion, and enforce safety regulations. Additionally, the training focuses on protecting workers' rights by fostering a culture of respect and accountability.
- **Project management and supervision:** The unique LRB work method demands an effective and responsive supervision process to ensure that work is executed in compliance with contract conditions, design specifications, and safety standards. Quality assurance throughout the entire work process is crucial to maintaining project quality and ensuring that standards are met at every stage of implementation.
- **Monitoring, evaluation and adaptation:** Effective monitoring and evaluation (M&E) systems are crucial for the success of LRB projects. Training equips officials and consultants with the skills to develop and implement robust M&E frameworks that track all key performance indicators, including

technical, social, economic, and environmental outcomes. This ensures that progress can be closely monitored, potential issues are identified early, and adjustments are made proactively to keep the project on track. By integrating flexibility into the M&E systems, training also helps ensure that the project remains responsive to changing conditions, such as fluctuations in local resources, community needs or unforeseen challenges, thereby enhancing the overall success and sustainability of the LRB initiative.

4.2.2 Training programmes for officials and consultants

Based on the identified training needs, it is clear that a **comprehensive and tailored training approach** is essential for the various groups of decision-makers and practitioners. This approach should address the specific fields of work and competencies required for each group. The information box on the following page provides an overview of the key training areas and their relevance to the different roles involved in LRB projects.

A **training programme** for decision-makers, planners, project managers, and consultants (and contractors, ref. 4.2.2 below) must be tailored to the specific environment in which they operate and designed to address actual competency gaps. To ensure high-quality, widely recognised training, thorough planning and preparation are essential, especially if the goal is to obtain official certification and recognition. The following approach is recommended:

- i) **Identifying the specific roles and functions** of individuals to be trained within the project.
- ii) **Developing detailed job profiles** that outline the competencies and additional skills required for working with the LRB approach.
- iii) **Analysis of training needs** through a combination of methods, including interviews, questionnaires, site visits, recognition of prior learning (RPL), and assessment of relevant work experience.
- iv) **Investigating and securing accreditation and certification** for the training programme within recognised national public and private sector education systems.
- v) **Identifying and securing certified training provider(s)** with qualified trainers to deliver the training programme. Additional "train-the-trainer" sessions may be required to familiarize trainers with LRB methods.
- vi) **Defining clear training objectives** and the competencies to be developed during the programme.
- vii) **Designing the learning programme**, detailing target participants, content coverage, assumed qualifications, certification requirements, performance standards, and assessment methods.
- viii) **Preparing the course/training curriculum**, including course title, target audience, training duration, entry requirements, certification details, course description, expected competencies, training methodology, subject matter with learning objectives, and assessment criteria for certification of competence.
- ix) **Preparing learning and teaching materials**, including the potential need for training of trainers to ensure consistent delivery of the programme.

Training by Scope of Work - Key Competencies and Skill Requirements

The scope of work varies depending on the level of involvement, project phases, and implementation arrangements, as illustrated in the graph below. LRB practitioners typically work in the following roles:

- **Planning Engineers and Managers** at ministry headquarters or local implementing agencies are responsible for project appraisal, planning, and monitoring of LRB projects.
- **Work Design and Supervision Engineers/Technicians** from line ministries, local governments, or implementing agencies **and/or Engineering Consultants** are tasked with detailed LRB project design, contract preparation and work supervision.
- **Contractors** including managing directors, engineers, technicians, and site supervisors, are responsible for the implementation of LBT contract work on-site.

Objective of an LRB competency building programme:

To strengthen the capacities of project managers, engineers, technicians, contractors, and their technical teams to effectively plan, implement, and supervise local resource-based (LRB) construction projects, ensuring sustainable practices, compliance with regulations, and the integration of local resources throughout the project lifecycle.

Typical training requirements by scope of work:

Project Phases	Implementation Arrangements	
	Managing Contracts (Client Staff / Consultants)	Executing Contract Works (Contractors)
Appraisal, Planning and Monitoring	Project Planning Engineers And Managers Appraise, plan and monitor LRB projects	
Design, Contract Preparation, Tendering and Contract Award	Work Design and Procurement Engineers/Technicians or Consultants Design LRB works; Prepare contracts; Estimate costs; Manage tender procedures; Programme works; Manage contract procedures	Contractors Managing Directors, Engineers and/or Technicians Comprehend LRB contracts; Apply tendering procedures; Calculate prices; Programme works; Prepare and submit bids; Manage the company's business
Supervision and Execution of Contract Works	Work Supervision Engineers and Technicians or Consultants Supervise LRB contracts; Manage contract procedures; Administrate contracts	Contractors Managing Directors, Engineers and/or Technicians Programme LRB works; Manage labour, materials, hand tools & equipment; Implement and control works; Manage contracts; Monitor and report performance. Contractors' Site Supervisors Plan and organise LRB operations on site; Organise and manage resources; Instruct/train and control labour force and site staff; Manage all site activities; Ensure quality and productivity; Record and report

➔ Conclusion

Effective training for public officials and consultants is essential for the successful implementation of Local Resource-Based (LRB) infrastructure projects. LRB projects require a customized training approach to address their unique challenges, ensuring that they are executed efficiently, sustainably, and in line with community needs.

The training programme should **focus on LRB-specific key areas**, including decision-making, stakeholder engagement, appropriate design, technical specifications, contract preparation with enabling conditions, costing, environmental and social sustainability, and labour standards and safety.

It should also be **customized to the specific roles** of each participant, with clear objectives and competencies.

By providing **recognised certification**, the programme ensures that officials and consultants are equipped to manage LRB projects effectively, promoting successful and sustainable outcomes. This recognition also adds credibility to the training, helping build confidence in the application of LRB methods.

4.3 Capacity Building for Contractors

4.3.1 Engaging locally-based contractors

Local contractors play a vital role in a country's economic and social development, contributing to infrastructure projects in much the same way as large contractors. They operate within the same regulatory frameworks and procurement procedures, while facing similar market challenges, including fluctuations in demand, government policy, contract management issues, marketing, access to finance, tender preparation, and staff training. However, for smaller contractors, these challenges are often more acute due to the limitations of the business environment and restricted access to resources, particularly financial capital.

Local contractors typically operate within specific geographic areas, bringing several key advantages. They are well-versed in local conditions, government structures, and the most suitable technologies and materials for the region. They also have established relationships with local clients, including governments and public agencies, and tend to employ local labour. These factors make them **particularly well-suited for implementing LRB methods**, as they are already deeply integrated into the local context and can leverage their knowledge and networks to support sustainable, community-driven projects.

Local contractors can range from micro-enterprises, often unclassified and owner-operated, to those with more limited skills and capacity, capable of handling smaller to medium-sized projects.

Barriers perceived by SME contractors that limit their ability to compete in the open market, as identified in an ILO EIIP survey conducted across multiple countries:

1. Bank finance difficult to obtain,
2. Bank interest rates are too high,
3. Long delays are experienced in receiving payments,
4. Insufficient or lack of work continuity,
5. Corruption and fraud,
6. Lack of equipment available for hire,
7. Tender procedures and contract award are too cumbersome and biased towards the use of equipment-intensive work methods.

4.3.2 Training requirements

Local small and medium-sized enterprise (SME) contractors often face **significant challenges in competing in an open construction market**. Many are not part of formal contractor classifications and are typically owner-operated businesses with limited resources. To effectively participate in LRB contracts, these contractors need targeted training and ongoing support to build their capacity and enhance their competitiveness.

In general, the **competencies required by contractors** for executing LRB projects include:

- Comprehending LRB contract documents and procedures for construction contracts
- Interpreting LRB work methods and integrating them to work programme and unit rates
- Establishing unit rates and carrying out pricing
- Preparing and submitting tenders including work programme
- Interpreting LRB contract designs, specifications and special conditions of contract
- Planning work operations for implementation
- Preparing and implementing quality control plan
- Managing all organisational and logistical issues for efficient contract implementation
- Managing all construction activities in accordance with contract conditions, specifications and quality assurance system
- Managing company staff and labour force in accordance with the conditions of contract and the law
- Organising staff and labour force on site
- Organising and implementing on-site skills training for labourers
- Managing safeguard measures (occupational safety and health, environmental protection, ensuring gender equality, ensuring labour laws and regulations)
- Ensuring correct and timely payment of labour
- Controlling productivity and quality of all work activities on site

- Preparing reports and contract administration
- Preparing claims and requests for variations of contract
- Organising and conducting site meetings
- Carrying out measurements of work, preparing payment certificates, arranging for payments and dealing with claims/variation orders
- Monitoring and controlling costs of completed work
- Dealing with client, official authorities, suppliers and other parties
- Managing the own business
- Ensuring project completion and project hand over

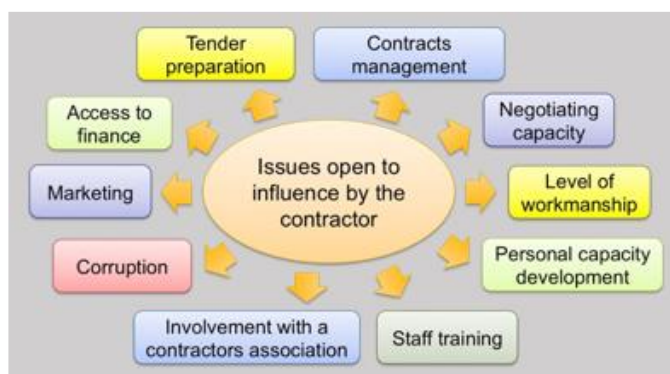
The success of LRB projects largely depends on the **competence of the contractor's site supervisory staff**. Their training is just as critical as that of the contractor, as **they play a central role in ensuring the effective execution of the work** on site. Typically, their key competencies include:

- Comprehending LBT contract documents and applying them for work implementation
- Interpreting LBT work methods and integrating them to site work
- Interpreting and applying LBT contract designs, specifications and special conditions of contract and applying to the work on site
- Managing labour-force on site; instructing, training and coaching, controlling
- Organising and managing tools, equipment and material on site
- Planning, allocating and supervising daily work activities in accordance with contract conditions, specifications and quality assurance system
- Introducing and controlling safeguard measures (occupational safety and health, inclusive participation, environmental protection, ensuring gender equality, labour laws and regulations)
- Controlling productivity and quality of all work activities on site
- Preparing site reports and keeping records
- Preparing reports and contract administration
- Participating in site meetings
- Participating in taking measurements of work and preparing payment certificates
- Dealing with client, official authorities, suppliers and other parties

However, **the scope of subjects and the depth of training required must be carefully determined through a comprehensive training needs analysis**, as outlined in Section 4.1.1. This analysis should be conducted in conjunction with the assessment and training programming for public officials and consultants to ensure full complementarity. By aligning contractor training with the needs of public sector stakeholders, we ensure that all training efforts are complementary and tailored to the project's specific requirements (refer to Box “Training by Scope of Works above”).

It is important to note that training for contractors alone does not resolve all capacity challenges. Performance issues unrelated to technical or managerial skills must also be addressed through broader project management measures, e.g. improved access to finance, enforcing conditions of contract, prompt payments, access to good quality hand tools and appropriate equipment, legal inadequacies, etc.

Addressing these factors is crucial for ensuring the overall success and sustainability of LRB projects.

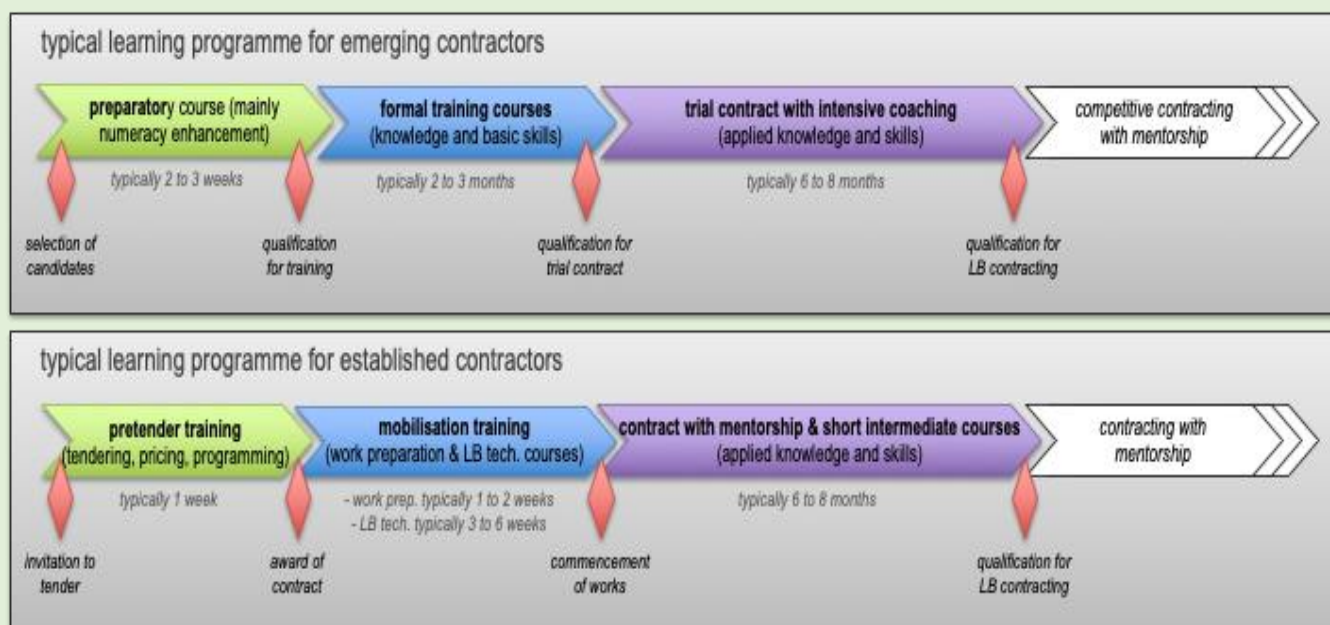


4.3.3 Training programmes for contractors

Training for contractors and their technical staff must be designed to ensure that the required competencies are acquired and effectively applied as quickly as possible. Whenever feasible, the training should be integrated into ongoing project work to reinforce learning and ensure practical application. Additionally, where possible, it should be linked to the training programmes for project officials and consultants to ensure full complementarity. A potential training scenario for contractor firms is illustrated in the following graph:

Example:

LRB Training Programme for Small-Scale Contractors in Aceh and Nias, Indonesia



➔ Conclusion

The development of local contractors through targeted capacity building is essential for the successful implementation of LRB projects, particularly in the context of small and medium-sized enterprises (SMEs). These contractors bring invaluable knowledge of local conditions and have the potential to play a critical role in sustainable infrastructure development.

However, their ability to participate effectively in LRB projects hinges on comprehensive training programmes that address both technical and managerial skills. These programmes must be tailored to local needs, integrated into existing educational frameworks, and supported by partnerships with established training providers.

4.4 Training Providers

The **most sustainable approach is to partner with existing training providers** and collaborate to enhance their capacity to deliver LRB-related training, rather than having the project provide training directly. By building on the strengths and infrastructure of established institutions, this approach ensures better integration into the local education system and long-term sustainability. It also leverages existing networks and expertise, minimizing the need to create new structures from scratch.

What needs to be explored is the existing landscape of national education and occupational training, including its capacity for innovation, research, and development. Key areas of focus include:

- **The availability and capacity** of technical and vocational education and training (TVET) institutions, sector-specific training centres, and higher learning institutions.
- **National and sectorial training policies**, strategies, and methodologies, with particular attention to adult education and human resource development. This includes assessing whether key actors in the construction industry have a clear strategy for human resource development.
- Identifying the **necessary steps to integrate these training** services into the established education system to ensure long-term sustainability and impact.

Through **targeted capacity-building support**, such as training of trainers, developing learning materials, and facilitating access to construction sites for practical training, these providers can be equipped with the resources, knowledge, and skills needed to deliver effective and relevant training that aligns with the evolving demands of LRB projects. This ensures both long-term sustainability and local ownership of the training process.

Different training arrangements for LRB are illustrated by the following examples:

Examples of integrated and sustainable LRB training programmes	
Timor Leste	The ILO EIIP technical assistance team developed and implemented effective methods for LRB rural road rehabilitation and maintenance. Over time, the project successfully integrated and institutionalised the technical training programme at the Don Bosco Training Centre and contract and business management training with IADE (National Business Development Institute), both of which have been accredited by INDMO (National Institute for Manpower Development) → <i>for more details refer to the box below on accredited training.</i>
Jordan	The successful implementation of the Employment Intensive Investment Programme for Jordanians and Syrian refugees was made possible through a comprehensive training programme for all stakeholders, including government planners, engineers, engineering consultants, contractors and site supervisory staff. The ILO supported the introduction of LRB technology, developed the training programme and provided mentorship throughout the implementation process. The orientation and training for LRB engineers and contractors was integrated into the standard curriculum of the Engineers Training Centre (ETC) of the Jordan Engineers Association. ETC accredited the training and is now the official provider of LRB courses, which are mandatory for engineers working on or overseeing LRB projects.
Iraq	In Iraq a skills certification programme for stone paving, adobe bricklaying and natural hydrated lime production was recently developed and integrated at Erbil Polytechnic University (EPU) with the support of the ILO. → <i>for more information see example box in Section 4.5 below.</i>
Madagascar	The ILO has supported the Government of Madagascar for several years in applying local LRB approaches in infrastructure projects. This support evolved when the government decided to mainstream employment-intensive methods into major infrastructure programmes. In 2000, a training centre was established to enhance capacity for LRB infrastructure works, serving both public and private sectors. The centre, managed as an autonomous non-profit institution with a board representing various stakeholders, offers training in road and building works, agricultural and environmental infrastructure, and material testing. It employs qualified trainers and provides accredited courses in LRB technology, employment conditions and occupational safety. The centre became financially self-sufficient by 2005. Its clients include government ministries, municipalities, international organizations and bilateral partners, as well as trainees from other African countries. It has trained a

	wide range of professionals, including engineers, technicians, local contractors, community workers, and NGOs.
Kenya	The Government of Kenya has been a pioneer in implementing Local Resource-Based (LRB) methods for the construction and maintenance of rural and minor roads. The Rural Access Roads Programme (RARP) began as early as 1977, and since then, over 20,000 km of roads have been constructed and maintained using LRB methods. As part of this large-scale, employment-intensive initiative, the internationally recognized and accredited Kisii Training Centre (KTC) was established in 1984. The centre offers nationally and internationally accredited LRB training programs for technical personnel in both the public and private construction sectors. In addition to KTC's specialized training programs, the LRB approach has been integrated into the standard civil engineering curriculum at Jomo Kenyatta University. Furthermore, LRB methods have been incorporated into the national curricula for ordinary and higher civil engineering courses at Polytechnics and Technical Colleges. Accredited craft courses for cobblestone chisellers and pavers have also been introduced to the village polytechnics.
South Africa	Witwatersrand University Johannesburg offers a postgraduate course in employment creation in the construction and maintenance of infrastructure. The Expanded Public Works Programme (EPWP) accredits all its LRB training under the National Qualification Framework (NQF). In collaboration with the South African Qualifications Authority and the National Department of Public Works accredited training in labour-intensive methods was developed with technical assistance from the ILO EIIP for various NQF levels (2, 4, 5, and 7) targeting Public Sector Client Bodies, Consultants, and Contractors. The NQF provides guidelines on the desired outcomes for curricula and learning programmes.

4.5 Training Recognition and Certification

Training in contracting development has been conducted in numerous countries. Many training programmes have yet to **secure official accreditation and recognition**, including qualification certificates for trainers as well as the training institutions. In some cases, successful efforts have been made to accredit learning programmes and integrating courses into existing qualification frameworks.

Local contractors proficient in LRB works technology can be effectively integrated into the existing registration and classification system for the construction industry, ensuring that their expertise is formally recognized and appropriately categorized. In some countries, a special category has been established specifically for competent LRB contractors.

When designing a training programme, a key objective should be to **integrate LRB topics into existing accredited curricula**, while making the most of qualified training providers already in place. LRB methods may need to be incorporated into their existing curricula, and trainers should be oriented to ensure effective delivery of these subjects.

Example: Accredited training for labour-based road construction in Timor Leste

The Enhancing Rural Access (ERA) project in Timor-Leste has since 2011 provided capacity development support to the domestic construction industry. The programme aims to develop local contractors to implement rural road works using labour-based methods.

The training courses for labour-based road rehabilitation and maintenance with the Don Bosco Training Centre and for contract and business management with IADE (National Business Development Institute) have been accredited with INDMO (accreditation authority). A recent evaluation identified the following lessons learned and good practice example:

For training to become fully effective and sustainable beyond a project's limited time frame, accreditation by a national education authority is paramount. The ERA project has managed to accredit labour-based road construction courses together with contract and business management courses with the Instituto Nacional de Desenvolvimento de Mão de Obra (INDMO).

These courses have been developed to a nationally accepted standard and also the capacity of the two training providers (Don Bosco and IADE) have been developed to be able to run the courses independently. Accreditation of TVET can be achieved through an integrated approach with 'embedded' experts and the commitment of the local training institutions and the national project partner (Secretariat of State for Support and Promotion of Private Sector) as well as INDMO who have been pursuing accreditation and adoption of the courses. The approach is in compliance with the ILO employment-intensive investment programme for creating an enabling environment for small- and medium-sized enterprises and is suitable for replication elsewhere.

➔ Challenges

The main challenges in implementing LRB training programmes include **ensuring that the training is tailored to local conditions, available resources, and capacities, while also securing formal accreditation and recognition in the industry.** Additionally, balancing multiple knowledge area, such as technical, social, environmental and economic considerations, can be challenging, as LRB projects require expertise across diverse disciplines.

Overcoming resistance to change is another significant challenge, as stakeholders may be reluctant to shift from conventional construction practices to the more integrated and locally focused LRB methods. Addressing resource constraints, including limited funding, training materials, and access to qualified trainers, can hinder the effectiveness of the programme. Additionally, adapting to evolving needs in the field, as LRB methods mature and new challenges emerge, requires continuous updates and flexibility in training content.

Another critical challenge is the issue of **recognition and certification.** Ensuring that the training programme is formally recognised by relevant authorities and provides participants with certification that is valued in the industry is vital for its success. This requires aligning training objectives with national and international education qualification frameworks and ensuring that certification is meaningful and carries weight with employers, contractors and government bodies.

Managing logistical complexities, such as organising training in remote or underserved areas and ensuring effective stakeholder engagement, especially with diverse local communities and businesses, adds further layers of complexity for a training programme. T

These challenges require **careful planning, coordination, and ongoing evaluation** to ensure the training meets both short-term objectives and long-term sustainability goals for LRB projects.

4.6 Integrated Skills Development and Employability

A large productive workforce is the characteristic of infrastructure works applying LRB approaches. It is important to acknowledge the temporary nature of construction works. This needs to be reflected in the terms of employment similar to other temporary jobs in construction and other sectors. **Nevertheless, there is scope for skills, career and livelihood development** if the appropriate regulatory measures are introduced. At the same time, it is important to acknowledge that effective maintenance of local infrastructure is a continuous process and can provide significant numbers of long-term employment opportunities for men and women.

The typical worker employed for construction or maintenance works using locally available resources is someone who has no or little income and lives close to the work site. These may be unemployed young people, local subsistence farmers, women (often single mothers) and other job seekers. In some places, such jobs are also offered to refugees who reside nearby. In most cases, these workers do not have special construction skills and often have quite different educational backgrounds.

How the workers are mobilised, recruited, organised, remunerated and protected are most important engagement issues. Persons employed in infrastructure works applying local resource-based methods need to be treated the same way as workers in any sector. All are in fact workers and labour regulations apply to them just as it does to all other workers. They should have:

- Opportunities for work that are productive and provide a fair income;
- Security in the workplace and social protection for families;
- Good prospects for **personal development** and social integration;
- Freedom to express their concerns, organize and participate in the decisions that affect their lives;
- Equality of opportunity and treatment for all women and men.

Opportunities for **skills development** are primarily **through public works programmes** with the main objective of infrastructure development and environmental works. Typical infrastructure works with affiliated skills and occupations are shown in the table on the following page.

Semi-skilled and skilled workers are required for a range of activities across three main categories: i) Construction, ii) Maintenance and Services, and iii) Supply. These activities demand specific knowledge and manual skills. However, workers with the necessary qualifications are often unavailable in the local labour market and, as a result, must be trained during the project's implementation.

Low-skilled workers are employed for various activities, such as soil excavation, cleaning, transporting materials over short distances, preparing materials and other tasks that do not require specialized skills and can be easily learned on the job.

A **skills requirement analysis**, tailored to the specific project context, can be conducted by addressing the following questions:

1. What are the skills and occupations required to implement the project?
2. Are labourers with the required skills available and can they be recruited?
3. Which of the identified occupations need to be trained during the implementation of the project?
4. How demanding is each of these skills sets that need to be trained?
5. What potential do these skills and occupations have for further employment or entrepreneurial development (matching skills with jobs)?
6. Are there possibilities to include skills other than those required for project implementation in the vocational skills development programme for the project?

Infrastructure work areas with affiliated occupations (skills that workers can acquire when working with EIIP projects)

Occupations:	A. CONSTRUCTION										B. MAINTENANCE & SERVICES					C. SUPPLY					
	Stone masonry (dry and wet)	Stone/block paving	Do-nou' technology (soil bag embankment installation)	Gabion installation and filling	Emulsion bitumen works	Erosion control - Bio-engineering works - Quarry rehabilitation	Plant production/rearing and planting	Light construction machine operation	Basic building skills (masonry, carpentry, roofing)	Surveyor (for LRB works)	Road maintenance (gravel and paved)	General building maintenance	Municipality services (cleaning, garbage clearing, etc.)	First aid and occupational health and safety management	Site clerk- site administration	Fabrication of construction stones (dressed stone, building blocks)	Preparation of construction aggregates (sand gravel)	Production of building construction materials (soil-bricks, tiles, etc.)	Production of concrete/cement ware (culverts, paving & building blocks)	Weaving of wire gabion boxes	Production and maintenance of simple tools
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6
EIIP areas of work:																					
Earth / gravel roads; construction or rehabilitation	✓		✓	✓		✓		✓	✓	✓				✓	✓	✓	✓		✓	✓	✓
Low volume sealed roads; construction or rehabilitation	✓	✓		✓	✓	✓		✓	✓	✓				✓	✓	✓	✓		✓	✓	✓
Trails; construction of trails and bridges	✓	✓		✓		✓		✓	✓	✓				✓	✓	✓	✓		✓	✓	✓
Road maintenance; earth, gravel and sealed	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓
Water and soil conservation	✓		✓	✓		✓			✓	✓				✓	✓		✓		✓	✓	✓
Flood protection; construction and maintenance	✓		✓	✓		✓		✓	✓	✓				✓	✓		✓		✓	✓	✓
Water harvesting and irrigation; construction and maintenance	✓					✓		✓	✓	✓				✓	✓	✓	✓		✓		✓
Water supply; construction and maintenance	✓							✓	✓	✓				✓	✓	✓	✓		✓		✓
Sanitation; construction and maintenance	✓							✓	✓	✓				✓	✓	✓	✓		✓		✓
Public facilities - construction; schools, clinics, markets	✓	✓		✓			✓		✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Municipality services - cleaning & mainten.; markets, streets, places, etc.		✓							✓	✓	✓		✓	✓	✓			✓			✓
Housing; construction and maintenance	✓							✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓
Forestry; nursery, planting, maintenance							✓							✓	✓						✓
Agriculture; erosion control, terracing, etc.	✓			✓		✓	✓	✓	✓					✓	✓	✓	✓		✓	✓	✓
Cultural heritage; preservation	✓	✓				✓	✓		✓		✓	✓	✓	✓		✓	✓	✓	✓		✓

Example: Rural Mason in India – A New Craft

Pradhan Mantri Awas Yojana (PMAY) is an initiative of the Indian Government to provide affordable housing for the urban and rural poor with the target of building 20 million affordable homes between 2016 and 2022.

The Ministry of Rural Development (MoRD) in 2016 identified a shortage of skilled artisans in the rural areas. MoRD decided then to train local masons in the specific work activities required for the provision of proper housing for the rural poor. These local masons would be engaged by the prospective house owners to construct their low-cost houses.

The Rural Mason trainees were provided with a 6-week course (360 hours), covering the technical subjects and skills required for building a 25 square-meters house.

UNDP assisted the MoRD in preparing National Occupational Standards for this training programme and the ILO developed appropriate training and reference material.

The national occupational standards developed for the rural mason is a shortened version of the complete standards for fully certified masons and adapted to the specific skills requirements related to this particular housing scheme.

Using a "build-while-learning" training approach, master trainers guided the construction of semi-customised rural houses from excavation of foundations to the completion of the roof. Many beneficiaries also opted for a standard, two-pit toilet to complete their homes.

Rural Mason

Brief Job Description (from Qualification Pack):

The job role performs routine rural construction works such as earth work for foundation, layout marking and construction of foundation, walls, brick/block masonry work, random rubble masonry works, IPS flooring, reinforcement and shuttering works, manual concreting works, fixing of door and window frames and shutters and installation of sanitary fittings and fixtures in toilets.



Rural masons are trained to excavate and lay foundations



to cut, bend and tie concrete reinforcement bars ...



building walls using bricks or stone/cement blocks



setting and installing window and door frames



erecting shuttering and concreting slabs ...



and carrying out all finishing works including plastering, flooring, painting and installing toilets with basic plumbing.

Results and observations

Initially the qualification pack (QP) for rural mason envisaged a training programme with 8 different National Occupational Standards (NOS) derived from the fully certified mason's QP. The identified NSQF level was set at level 4 and the minimum educational qualification was 'preferably 5th standard' and to have trainees with 3 years site experience in the same occupation. The course time to achieve the expected competencies was set at 360 hours of theoretical and practical training only (about two months).

However, on-going training courses showed that most trainees were in fact illiterates or semi-literates and had hardly any prior work experience of similar skills. The QP also envisaged a relatively high level of theoretical knowledge.

Recommendations were made to reduce the NOS, increase the practical training to about 90% and at least double the training time.

The training material was adapted to reflect the trainees' actual level of understanding:

- Five learning unit books as reference material for the trainers covering i) basic knowledge, ii) setting out construction works, iii) masonry works, iv) concrete works and v) toilet construction – fittings and fixtures
- Reference handbook for the learners and future rural masons consisting of important factual information, i.e. reference tables on resource requirements, masonry and concrete work standards, common construction measurement references, safety and health on site, plus all worksheets explaining the work methods for all major construction activities.
- 33 charts (A1 size) depicting all worksheets and 27 charts depicting general knowledge issues and "Dos and Don'ts" for use by the trainers when conducting training on site.
- Detailed session plans for the trainers.

Example: Skills Training on Employment Intensive Practices at the Cultural Heritage Conservation Works in Iraq



The ILO trained and certified 95 technicians and workers in various skills that contribute to the improvement of the cultural heritage sector. Among them, 63 workers received certification in conservation techniques for historical sites, including stone paving, adobe brick laying, and natural hydrated lime production. This **skills certification programme** was designed and implemented in collaboration with the Erbil Polytechnic University (EPU), with five nominated university trainers participating in the certification process. An ILO international expert provided training to the EPU trainers on the ILO's EIIP approaches, enabling them to develop customised training curricula for each skill and effectively deliver the training.

This certification programme **serves as a successful model** for the application and scaling of technical education in the cultural heritage sector. By offering a tailored and effective learning journey, it equips local Iraqis and displaced persons with unique, professional skills and certifications recognised by one of Iraq's leading technical universities.

The programme plays a pivotal role in **fostering self-reliance and resilience among both Syrian refugees and Iraqis**. It empowers participants with the skills necessary to rebuild their lives, contribute to host communities and prepare for a sustainable future. By focusing on cultural heritage conservation, the training enhances employability, promotes dignity and helps mitigate the challenges of displacement. Through skills development, refugees gain a renewed sense of purpose, which aids in their social and economic integration.



Marwan – Syrian Refugee: *“Thanks to this training programme, I have successfully acquired new skills and feel confident in starting my own business in the construction industry. This opportunity has opened doors for me and provided me with a newfound sense of hope for my future.”*

5. Financing Opportunities for Climate Change Adaptation and Green Works

5.1 Sources of Green Financing

Green financing refers to raising and managing funds to support projects and initiatives that promote environmental sustainability, reduce carbon footprints, and foster climate resilience. There are several key sources of green financing, each serving a unique role in driving climate-positive projects and sustainable development.

1. International Climate Funds

International climate funds are established by global organizations, coalitions, and partnerships to provide financial resources for climate mitigation and adaptation projects, particularly in developing countries.

2. Green Bonds are debt securities specifically earmarked for funding environmentally friendly projects, like renewable energy, energy efficiency, water management, and sustainable agriculture.

3. Public-Private Partnerships (PPPs) involve collaboration between governments and private sector entities to finance, build, and operate projects with environmental benefits, such as renewable energy plants, efficient transportation systems, or waste-to-energy projects.

- **Role of Government:** Governments often provide initial funding, policy support, tax incentives, or land access, which reduces the financial risk for private investors and incentivizes green investments.
- **Role of Private Sector:** The private sector brings expertise, capital, and innovation to scale projects effectively, making it possible to mobilize larger funds and implement green technologies more widely.

4. Grants and Subsidies are non-repayable funds provided by governments, non-profits, or international organizations to support green initiatives and research. They are particularly vital for early-stage projects, small businesses, and innovative technologies that may lack access to traditional financing.

5. Carbon Offset and CO2 Compensation Funds programmes allow companies or individuals to counterbalance their greenhouse gas emissions by investing in environmental projects that absorb or prevent an equivalent amount of CO2 emissions.

5.2 Incentives for Private Investment

Private sector investment is critical for financing climate-resilient and green infrastructure projects. Governments can create a conducive environment for such investment through a variety of policies and incentives, which can attract private capital and align business objectives with sustainability goals.

1. **Tax Incentives and Subsidies:** Governments can provide tax credits, deductions, or exemptions to companies investing in climate-resilient infrastructure and green technologies, such as renewable energy, sustainable materials, and energy efficiency. These financial incentives reduce the burden on private sector investments, encouraging greater allocation of resources toward green infrastructure.
2. **Green Bonds and Climate Bonds** can raise capital for environmentally sustainable projects like renewable energy and water management. They attract private investment by offering competitive returns while funding initiatives with long-term environmental and social benefits.
3. **Public-Private Partnerships (PPPs)** enable large-scale infrastructure projects by sharing financial risks between governments and private investors. Governments support these partnerships through subsidies, guarantees, or tax incentives, encouraging private investment in climate-resilient infrastructure.
4. **Loan Guarantees and Risk Mitigation Instruments:** Loan guarantees from governments or financial institutions reduce the financial risks of climate adaptation and green infrastructure projects, making them more attractive to private investors, especially in high-risk or vulnerable areas. This encourages private sector financing for climate-resilient infrastructure.
5. **Carbon Pricing and Emissions Trading Schemes:** Carbon pricing mechanisms, like carbon taxes or emissions trading, incentivize businesses to reduce emissions by linking carbon reduction to financial

savings. As carbon prices rise, the cost-effectiveness of low-carbon, climate-resilient infrastructure, such as energy-efficient buildings and renewable energy, improves.

6. **Performance-Based Incentives**, such as pay-for-performance schemes, encourage private investment by linking financial rewards to measurable environmental outcomes, like reduced emissions or improved energy efficiency. These incentives motivate companies to achieve environmental goals, stimulating further private sector investment in green infrastructure.
7. **Green Procurement Policies**: Governments can implement green procurement policies that prioritize environmentally sustainable goods and services. These policies drive demand for green infrastructure and technologies, encouraging private companies to invest in sustainable solutions to meet procurement standards. Green procurement also fosters a stable market for sustainable products, attracting further investment in the green economy.
8. **Support for Research and Development (R&D)**: Governments can offer grants, subsidies, or tax credits to encourage private sector investment in research and development of climate-resilient technologies. This support reduces financial risks, fosters innovation in sustainable infrastructure, and ensures the scalability and success of green technologies and climate adaptation solutions.

5.3 Financing Mechanisms for Climate Adaptation:

Innovative financing mechanisms are essential for funding climate adaptation projects, particularly in regions that are vulnerable to climate change impacts. These mechanisms not only mobilize private and public capital but also align financial returns with climate resilience objectives.

1. **Resilience Bonds** allow governments to raise capital for climate resilience projects, with payouts tied to achieving specific climate outcomes. Funds are used for projects like flood defences and infrastructure improvements designed to withstand extreme weather.
2. **Impact Investing** targets projects that generate positive environmental and social outcomes alongside financial returns. Investors fund initiatives like sustainable water management, flood protection, and renewable energy to promote climate adaptation in vulnerable areas.
3. **Blended Finance** combines concessional funding with private sector investment to de-risk climate adaptation projects. This approach encourages private investment in projects such as coastal protection and resilient infrastructure by reducing financial risks.
4. **Climate Adaptation Funds**, provided by governments or international organizations, offer grants or concessional loans to support projects that improve climate resilience. These funds support infrastructure, ecosystem restoration, and community-driven adaptation efforts.
5. **Pay-for-Performance Schemes** incentivise climate adaptation outcomes by tying payments to measurable results, such as reduced flood risk or improved water security. This model ensures cost-effective, high-impact solutions with accountability for outcomes.
6. **Insurance and Risk Financing**: Climate insurance products, such as catastrophe bonds, provide financial protection against climate risks. These mechanisms mitigate investment risks and encourage private sector investment in climate-resilient infrastructure by offering financial security.

5.4 Cost-Benefit Analysis:

A comprehensive cost-benefit analysis is essential to assess the long-term economic and environmental benefits of investing in low-carbon, resilient, and sustainable reconstruction projects. This analysis allows decision-makers to evaluate the full range of potential impacts and determine whether the benefits outweigh the costs.

1. **Economic Benefits of Low-Carbon Investments**: Investing in low-carbon, climate-resilient infrastructure generates economic returns by reducing energy costs, improving efficiency, and

preventing damage from extreme weather. Such projects also create jobs, stimulate local economies, and provide long-term economic stability.

2. **Environmental Benefits:** Low-carbon projects reduce greenhouse gas emissions, enhance biodiversity, and improve water and air quality. Sustainable initiatives, like green roofs or urban forests, help mitigate climate change effects, promote carbon sequestration, and enhance ecosystem services.
3. **Social and Community Benefits:** These projects reduce climate-related risks, improve community resilience, and provide access to services like clean energy and water. They can also create jobs, strengthen social cohesion, and improve public health by fostering better environmental conditions.
4. **Financial Returns and Investment Attractiveness:** Low-carbon, resilient infrastructure offers long-term financial returns, driven by reduced operational costs and increased asset value. These projects attract investors due to their alignment with the growing demand for sustainable investments and strong environmental, social, and governance (ESG) criteria.
5. **Risk Mitigation:** Climate-resilient infrastructure helps protect against risks like extreme weather, flooding, and droughts, reducing future repair costs and ensuring essential services. The cost of inaction is higher, as climate-related disasters can disrupt economies and communities.

➔ Challenges

The main challenges in financing climate-resilient and green infrastructure projects include **high upfront costs, risk and uncertainty and limited local capacity**. Many projects require substantial initial investment, which is often a barrier in regions with limited financial resources. Additionally, the **unpredictable nature of climate change** makes these projects risky, deterring private investment. A lack of local expertise further complicates implementation and maintenance.

Other challenges include **fragmented funding sources and inconsistent policies**, which can create inefficiencies and hinder effective project implementation. **Disjointed efforts among various stakeholders** often lead to duplicated efforts and missed opportunities, while unclear or conflicting policies undermine private sector confidence and investment.

Equity concerns, such as ensuring that vulnerable communities benefit from climate adaptation projects, and the lack of reliable data to assess outcomes, are also major barriers.

Overcoming these challenges requires a more coordinated, holistic approach, along with innovative financing mechanisms and stronger policy frameworks.

➔ Conclusion

Innovative financing mechanisms and policies are crucial for driving investment in low-carbon, climate-resilient infrastructure. By leveraging sources like international climate funds, green bonds, and public-private partnerships, governments can mobilise large-scale capital while addressing the needs of vulnerable regions. Additionally, instruments such as resilience bonds, impact investing, and blended finance de-risk climate adaptation projects, aligning financial returns with sustainability goals.

Cost-benefit analysis underscores the significant long-term economic, environmental, and social advantages of low-carbon projects, from reduced operational costs to improved community resilience.

Through the **integration of LRB approaches**, these financing models can be enhanced to ensure that local capacities are leveraged, fostering sustainable development and accelerating the global transition toward a low-carbon, climate-resilient future.

6. Key Conclusions and Recommendations

LRB approaches provide a comprehensive and holistic strategy for sustainable development by integrating environmental, social and economic considerations into infrastructure projects. By prioritising local resources, these approaches reduce dependency on external materials, lower costs, and increase community ownership of projects. This not only supports immediate recovery but also fosters long-term resilience, strengthening local capacities to manage and maintain infrastructure independently over time.

- **A key benefit of LRB approaches is job creation** through the use of locally available resources, providing sustainable employment and contributing to skills development. Tailored training programmes equip workers with the technical and managerial skills needed for infrastructure works, fostering both immediate project success and long-term economic sustainability.
- **Social inclusivity is a vital element of LRB approaches**, ensuring that marginalised groups, such as women, youth, refugees and people with disabilities benefit equitably from development. This fosters social cohesion, reduces inequalities and ensures that recovery efforts meet the needs of the entire community while promoting ownership and participation. Furthermore, inclusive approaches lead to more effective interventions and sustainable results, creating a strong business case for the inclusion of these groups in development efforts.
- **Comprehensive planning and preparation of LRB programmes** are critical for the successful implementation and long-term sustainability of the approach. This includes a thorough assessment of local resources, construction design alternatives, stakeholder engagement and their capacity for participation, as well as careful consideration of environmental, social, and economic factors. Effective planning ensures that the programme is aligned with the needs and capacities of the local community, while addressing potential challenges and risks. By establishing clear goals, timelines, and resource management strategies, the programme can be implemented efficiently, providing a foundation for sustained success and scalability.
- **Appropriate procurement and contract management** are equally crucial for enabling local contractors and communities to participate effectively in LRB projects. Consistent, efficient, and user-friendly procurement procedures are essential, especially in decentralized environments. In the initial stages, limited and simplified bidding methods have proven effective in supporting the development of emerging entrepreneurs. As these firms gain training and experience, they can gradually transition to competitive bidding in an open market.
- **The importance of capacity building is crucial. Well-designed orientation and training programmes are essential** for equipping all stakeholders, ranging from local communities and workers to engineers, contractors, and public officials, with the knowledge and skills needed to effectively manage and implement LRB programmes. Training must be tailored to local contexts, integrating technical, social, environmental, and economic factors. Beyond facilitating successful project planning and execution, such training empowers local communities to assume leadership roles in development, ensuring skills are retained locally and creating pathways to meaningful employment and long-term sustainable infrastructure.
- The successful implementation of LRB approaches, climate-resilient infrastructure and inclusive development faces **challenges such as resource constraints, capacity and skill gaps, financial barriers and social inequalities**. These issues can undermine the effectiveness and sustainability of projects, particularly in regions with limited resources and skilled labour. To address these challenges, a **comprehensive strategy is needed that integrates local knowledge with modern techniques, promotes stakeholder engagement, and focuses on capacity building through tailored training programmes**. Additionally, robust **planning, monitoring and enforcement systems** are essential to ensure sustainability and inclusivity.
- **Ultimately, LRB approaches help communities** build resilience by combining local resources, job creation, social inclusivity, targeted training and innovative financing to develop sustainable infrastructure that addresses both immediate needs and future challenges. This integrated approach

establishes a strong foundation for resilient development, enabling communities to adapt to climate change, strengthen local economies and promote long-term social equity.

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Contact details

International Labour Organization
Route des Morillons 4
CH-1211 Geneva 22
Switzerland

Tel: +41 22 799 6111

Email: ilo@ilo.org

Website: <https://www.ilo.org/topics-and-sector/employment-intensive-investment>

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