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Building Resilient Local Infrastructure in Nepal

LISP's GEDSI and Climate Resilience Approach

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Nepal faces rising climate hazards and persistent social inequalities that leave many communities at heightened risk. As floods, landslides, and shifting rainfall patterns increasingly threaten local infrastructure, the need for systems that are both resilient and inclusive is ever more urgent.

The Foreign, Commonwealth and Development Office (FCDO) funded Local Infrastructure Support Programme (LISP) is responding to this challenge by working directly with 50 local governments in Karnali and Lumbini Provinces in Nepal to embed Gender Equality, Disability, and Social Inclusion (GEDSI) and climate resilience principles into every stage of the infrastructure cycle – planning, design, procurement, construction, and operation and maintenance.

LISP is a partnership programme between the UK Government and Government of Nepal with joint financing agreement. DT Global, in partnership with CARE Nepal, currently supports local governments to implement the programme. The local governments deliver inclusive and climate resilient infrastructures that ensure more equitable access and sustainability for communities through participatory planning, climate risk assessments, and resilient engineering design through LISP.

Cover page and below: Women play a leading role in constructing climate-resilient irrigation infrastructure, gaining technical skills and creating income opportunities while improving water access, strengthening agricultural productivity, and building more resilient communities.



Introduction

Nepal is a culturally diverse and geographically complex country that faces persistent infrastructure development challenges driven by climate vulnerabilities and socio-economic disparities. The country experiences a dominant summer monsoon from June to September that delivers most of its annual rainfall, while winters remain dry and cool. Although average annual rainfall is approximately 1,570 mm, precipitation varies significantly across regions. Rising temperatures, shifting rainfall patterns, and more intense rainfall events have increased the frequency and severity of floods, landslides, droughts, and glacial lake outburst floods. These trends place Nepal among the world's most climate-vulnerable countries, highlighting the need for infrastructure that can withstand future climate risks while supporting long-term community resilience (*DHM 2023; Singh et al, 2025*).

Local governments play a central role in delivering essential services and infrastructure that support and sustain communities. As climate risks intensify and social inequalities persist, infrastructure investments must be designed to be both climate resilient and socially inclusive. Reflecting this priority, the Government of Nepal is embedding GEDSI and climate resilience across all three tiers of government – Federal, Provincial, and Local – through gender-responsive planning, climate-informed budgeting, and inclusive design in all new infrastructure projects. National policies, including Nepal's Nationally Determined Contribution 3.0 (2025) and the Asian Development Bank Country Climate Plan (2025-2029), further reinforce commitments to strengthen adaptation, reduce climate vulnerability, protect ecosystems, and improve the resilience of public infrastructure.

LISP supports local governments to translate these national priorities into practice. The programme integrates GEDSI and climate resilience throughout the infrastructure planning and design process, ensuring that investments respond to both current community needs and future climate risks. During feasibility studies, LISP incorporates climate and environmental risk assessments, community perceptions of hazards, social mapping, and inclusive consultation processes to identify vulnerabilities and inform infrastructure design. At the same time, the programme strengthens local government capacity to plan, implement, and manage infrastructure that remains resilient, equitable, and sustainable over time.

Integrating climate resilience with GEDSI strengthens the long-term effectiveness of local infrastructure. Climate-resilient designs reduce vulnerability to hazards and extend the lifespan of infrastructure, while inclusive planning helps ensure that women, persons with disabilities, and marginalised groups can safely access and benefit from essential services during both normal conditions and times of crisis. This integrated approach enables local governments to deliver infrastructure that is more equitable, adaptive, and sustainable for the communities they serve.



For the first time, women in Siyala, Dullu Municipality, actively participated in a community consultation for the Bahunpali–Amen Piru Road Upgrading Project, helping ensure local infrastructure planning reflects the needs and perspectives of the entire community.

LISP's GEDSI and Climate Resilience Approach

Recognising that climate change disproportionately affects women, persons with disabilities, and other vulnerable groups, LISP integrates GEDSI and climate resilience across the entire infrastructure cycle, from planning to operations and maintenance. This approach ensures that infrastructure development is technically feasible, inclusive, equitable, and sustainable. To promote consistency and long-term sustainability, LISP supported local governments to formally endorse Seven Improved Modality Guidelines¹, which embed GEDSI, environmental safeguarding, Occupational Health and Safety and other considerations into the Government of Nepal's seven step planning process² and the full infrastructure project cycle across their wider infrastructure portfolio.

LISP developed the *Integrated Infrastructure Design Approach* to strengthen local infrastructure governance in local governments, which consists of five structured, sequential design steps, from the pre-design stage to detailed project report finalisation. Each step defines expected outputs and includes practical checklists, tools, and guidance. The *Approach* enables field-level applicability, participatory planning, and integration of cross-cutting priorities such as GEDSI,

¹ Seven Improved Modality Guidelines: Seven Guidelines for Strengthening Infrastructure Governance of Local Governments

² Seven Steps Planning Process: Annual Planning and Budget Steps recommended by National Planning Commission for Local Governments

climate resilience and disaster risk reduction, environmental and social risks screening process, and occupational health and safety.

LISP promotes community consultation and engagement at every stage of the infrastructure cycle, including settlement-level planning, design consultations, local green job creation during construction, and community-led operation and maintenance after completion. Its participatory approach helps to ensure project selection reflects the needs of women and marginalised communities. Inclusive design features such as ramps, handrails, gender-friendly toilets, and accessible waiting areas are incorporated into engineering design and construction to enhance accessibility. Universal design elements like road safety signage enhance usability and climate-sensitive interventions including slope stabilisation and water source protection help to reduce infrastructure vulnerability and safeguard ecosystems.

During the feasibility phase, design inputs are gathered through community consultations which identify different accessibility needs of different gender and social groups, including marginalised populations. Historically, access, power, and political or social interests influenced project selection. To guide inclusive planning, the Government of Nepal issued the *Local Level Inclusive Planning Guideline, 2078*, which local governments are actively implementing and institutionalising through their planning processes. This includes inclusive participation at the settlement level – meaning mixed and targeted community meetings that actively engage women, marginalised groups, and representatives from community organisations and civil society networks to identify their diverse needs.

The GEDSI Lens

Infrastructure is transformative when it benefits everyone, especially women, persons with disability, and marginalised communities, who are often excluded from planning and decision-making in different stages of the infrastructure cycle. Roads, bridges, Water, Sanitation and Hygiene (WASH) systems, and irrigation systems, are vital assets that connect communities and provide essential services. Equitable access and inclusive design are critical to ensuring all users benefit.

Through LISP, local governments select GEDSI-responsive infrastructure based on local needs, particularly in remote and marginalised communities. This integrated approach guides local governments to identify and prioritise projects through local-level planning, bringing decision-making closer to communities – a core strategy in Government of Nepal's Seven Step Planning Process. Local governments prioritise infrastructure in settlements with limited access to basic services, defined as more than one hour's walking distance to health facilities, administrative services, other essential services, and where over 50 percent of beneficiaries are from marginalised groups.

In Kagkot Settlement, Chharka Tangson Rural Municipality (Dolpa District, Karnali Province), the Lungu river divides 62 households. One side of the river houses the market and residential area, while the other side contains essential facilities such as a health post, police post, and a branch of National Commercial Bank, Ltd. Crossing the river during the rainy season was dangerous, as residents relied on a temporary wooden log positioned only slightly above the water level, often preventing safe access to these services and making it difficult for children to attend school. In 2025, through LISP co-financing, the municipality built a disability-friendly truss bridge with railings, a ramp, and a resting point, improving year-round access to essential services for

people with disabilities, aged population, school going children, pregnant women, and the entire community.

During feasibility studies, local governments conduct community consultations to capture diverse needs including accessibility, safety, and mobility patterns, and reflects identified needs in engineering designs. These efforts result in making infrastructure usable for everyone. Local government engineers are supported to integrate GEDSI responsive features into infrastructure designs and detailed project reports, with the associated costs for these features included in estimates. LOCAL governments can then monitor construction against these designs to ensure safe, high-quality, and GEDSI compliant construction. Site inspection reports track progress, identify gaps, and recommend corrective actions resulting in more inclusive and accessible infrastructure.

CR and DRR Integration

Through LISP, local governments manage the impacts of climate-related hazards and impacts such as:

- **Infrastructure damage:** Increased incidents of flooding, landslides, and extreme climate events can destroy local infrastructures (e.g., roads, bridges, WASH systems, irrigation systems, renewable energy, public and private buildings/properties).
- **Service disruption:** Damage to infrastructure interrupts essential services such as water supply, sanitation, health facilities, and transportation, directly affecting public health and livelihoods.
- **Economic loss:** Infrastructure damage can require costly maintenance, rehabilitation, and re-construction.
- **Reduced resilience:** Communities become more vulnerable during a disaster, particularly marginalised and disadvantaged groups with limited capacity to recover.

Participants in the Data, Evaluation, and Learning field study visit a LISP co-financed irrigation canal.



When local governments build adaptive and sustainable infrastructure, it reduces long-term maintenance costs, safeguards community access, conserves natural resources, and strengthens infrastructure resilience, which ultimately enhances communities' resilience. Every investment in climate resilient infrastructure design and construction generates greater social, economic, and environmental returns over time. LISP develops and secures approval of an operation and maintenance fund procedure that allocates budget for the maintenance of small-scale projects. This solution has proven effective for project sustainability and proper use of allocated budget.

LISP also encourages the selection of infrastructure projects that address climate impacts, such as the slab culvert used in Bheriganga Municipality in Surkhet, Karnali province, and encourages inclusion of climate resilience design elements in all infrastructure projects. In the past, communities in Bheriganga and Kalimati Municipality in Salyan district, Karnali struggled every monsoon. Floods damaged farmland and homes, leaving families feeling unsafe and unable to protect their livestock. The local governments realised they needed a stronger and more climate resilient solution. Needs assessments led to the construction of a slab culvert that can safely guide monsoon water and keep the road usable throughout the year. LISP improved the design of the road by adding climate resilient and disaster risk reduction features including the construction of gabion walls, wing walls, side drains, and proper cross drainage structures, adopting nature-based solutions. Implementing the project through a user committee created employment opportunities for local women and marginalised groups, which contributed to income generation, while ensuring decent working conditions and worker safety during construction, and enhancing the capacity of the user committee members in construction management, safety, and quality control.

With the completion of the slab culvert in 2025, the Bheriganga local government has shared that its communities now enjoy reliable, year-round mobility with less transport disruptions, safer access to schools, markets, health services, municipal, and banking services, and people are better able to protect their property and livestock during the rainy season. Bheriganga local government's utilisation of the LISP approach shifted it away from temporary repairs to a long-lasting and climate resilient structure that serves everyone more reliably.

LISP integrates climate risk assessments into project feasibility studies, design, and costing. The programme also promotes nature-based solutions, including bio-engineering techniques that use locally available resources, and embeds climate resilience features through continuous monitoring of project delivery against agreed plans and designs. To support the long-term sustainability of infrastructure assets, LISP strengthens monitoring, operation, and maintenance systems, creates green jobs for local communities, and provides policies, guidelines and standards to local and provincial governments to help institutionalise these approaches.

Local governments are utilising LISP to build their understanding of how assets can be planned, designed, procured, constructed, and maintained for longevity, leading to increased local government capacity to implement climate resilience features and strengthening the adaptive capacity of the local community.

In Dadudwa Khola, Kholapur (Banke District, Lumbini Province), The local government implemented riverbank protection works to prevent erosion caused by flash floods (see photo below) through LISP co-financing. The intervention protected nearby settlements, benefiting an



Clockwise from left: Daduwa Khola Riverbank Protection Work; Sumdo-Cheпка-Rigmo foot trail; Riverbank Protection and Trail Improvement Work, Dolpa

estimated 200 residents and creating employment for four skilled and six unskilled workers, 16 working days for each.

Similarly, Shey-Phoksundo Rural Municipality implemented riverbank protection and bio-engineering techniques along the Sumdo–Cheпка–Rigmo foot trail (Dolpa, Karnali Province). This critical tourism route to Shey-Phoksundo Lake was previously hazardous for trekkers and mule transport, with past incidents causing both human and animal losses. The local government and LISP intervention improves accessibility and safety, reduces risks, and supports local tourism (see two photos above, right).

Strengthening Systems and Measuring Success

Local governments in Nepal face the challenge of delivering sustainable infrastructure that is inclusive and climate resilient and meets community needs despite constrained budgets. Historically, planning processes lacked meaningful participation from women, persons with disabilities, and marginalised groups, while risks such as floods and erosions threatened infrastructure sustainability and peoples' livelihoods.

By strengthening local governance systems, local governments institutionalise improved modalities such as forming and mobilising inclusive user committees, implementing environmental safeguards, and establishing grievance handling procedures through LISP. These measures build inclusivity and accountability as integral parts of the local governance framework.

By following LISP's approach, local governments are combining inclusivity with resilience to deliver infrastructure that not only connects places but also safeguards people, thus creating assets that strengthen community resilience under changing climate conditions. Local governments like Khajura in Lumbini and Dullu in Karnali are adapting LISP's approach in projects beyond LISP's co-financing, such as detailed project report preparation for small scale projects, community consultations during planning and feasibility study stages, and embedding lab material testing, personal protective equipment, and worker's insurance during construction in the bills of quantities.

LISP addresses these gaps by strengthening local governance systems and institutionalising inclusive practices including grievance handling mechanisms and ensuring labour insurance and personal protective equipment provisions for workers through procurement. System strengthening includes capacity building of local governments across all stages of infrastructure project cycle, including the seven-step planning process to empower them to fully integrate climate resilience, disaster risk reduction, and environmental and social risk screening.

Conclusion: Building for the Future

From rural roads and bridges to WASH systems, small irrigation, renewable energy, and solid waste management, by embedding GEDSI, climate resilience, disaster risk reduction, environmental and social risk screening, and engineering standards into every stage, the LISP approach ensures that infrastructure is technically sound, equitable, resilient, and sustainable.

The process begins with inclusive and resilient annual planning, which is the entry point for the infrastructure cycle. Through settlement-level consultations, local governments in partnership with LISP identify projects that reflect community priorities and address the needs of women, persons with disabilities, and marginalised groups.

Feasibility studies incorporate climate risk assessments, and findings are integrated into engineering designs and cost estimates. Features such as ramps, resting places, canal crossings, and covered drainage improve accessibility, while universal design elements, like road safety signage, enhance usability. Climate-sensitive interventions such as drains and drainage structures, river training works, promotion of nature-based solutions through bioengineering, slope stabilisation, and water source protection works, reduce vulnerability of communities to climate change impacts and safeguard ecosystems.

The impact is evident. Projects such as the Kagkot disability-friendly truss bridge, and the Bheriganga slab culvert illustrate how integrating GEDSI and climate resilience creates infrastructure that is safer, stronger, and more equitable; connecting communities, protecting lives, and fostering economic opportunities.

As Nepal faces increasing climate risks and persistent social inequalities, building adaptive and inclusive infrastructure is essential. LISP demonstrates that when planning prioritises community participation, inclusion, and resilience, investments last longer, ownership grows, and no one is left behind.

References

1. Department of Hydrology and Metrology (DHM) – Nepal Climate Summary 2023
2. Resham Jung Singh, Nurazim Ibrahim, Vishnu Prasad Pandey; Climate change impacts on water, sanitation, and hygiene (WASH) systems in Nepal: users' perception of community-managed WASH systems. *Journal of Water, Sanitation and Hygiene for Development* 1 October 2025; 15 (10): 866–880. doi: <https://doi.org/10.2166/washdev.2025.138>

New foot trails built through LISP are making daily journeys safer and easier in Musikot Municipality, Gulmi, helping children reach school, farmers access their fields, and communities stay connected.



