**“Ensuring meaningful connectivity to the Internet for landlocked developing**

**countries (LLDCs)”**

1. What strategies can be adopted to ensure meaningful connectivity to the Internet for LLDCs?

LLDCs face distinct structural and geographical disadvantages in accessing global internet infrastructure. Without direct access to submarine cables and relying heavily on transit through neighboring countries, LLDCs also suffer from higher bandwidth costs, limited international gateway diversity, and slower deployment of broadband infrastructure. These challenges, compounded by rugged terrains, low population density in remote areas, and weaker digital ecosystems, have created significant digital divides. In an era where internet is fundamental for governance, delivering public goods, innovation and economic resilience; ensuring meaningful connectivity; reliable, affordable, secure, and empowering access is critical for LLDCs to fully participate in the global digital economy and achieve the Sustainable Development Goals (SDGs).

Nepal recommends the following five core principles:

1. **Regional Transit Connectivity Agreements:** Promote multilateral digital transit cooperation between LLDCs and neighboring transit countries; enabling fair, regulated, and uninterrupted cross-border bandwidth access.
2. **Public- Private Partnerships (PPP):** Attract investment in digital infrastructure such as high-altitude data centers, fiber optic corridors, rural towers, and satellite gateways, particularly in underserved remote and mountainous areas.
3. **Affordability-focused Interventions:** Introduce zero-rating for essential digital services, tax waivers for telecommunication infrastructure in remote zones, and incentivize local ISPs through subsidies or shared infrastructure access.
4. **Digital Public Infrastructure (DPI):** Develop open, interoperable digital layers including digital identity (e.g., Nagarik App), payments with platforms to enable scalable internet use across sectors.
5. **Innovation and Capacity Development:** Promote LLDC-specific digital innovation hubs, open-source tools, and regional AI collaborations to reduce dependency on expensive proprietary infrastructure.
6. What unique challenges do LLDCs face in attaining meaningful connectivity to the Internet, and what specific policies and measures can be taken?

LLDCs face complex web of challenges in their pursuit of meaningful internet connectivity- challenges rooted in geography, infrastructure deficits, economic constraints, and policy limitations. Lacking direct access to submarine cables and seaports, LLDCs are compelled to rely on neighboring transit countries for international bandwidth, often at high costs and under asymmetrical terms. This dependency creates vulnerabilities, increases latency, and restricts competition in the digital market.

In addition to high transit fees, LLDCs often struggle with underdeveloped domestic infrastructure, limited investment in last-mile connectivity, and low digital literacy rates in rural and remote areas. Issues such as natural terrain barriers further hinder progress. Moreover, the absence of economies of scale in small and dispersed market makes broadband rollout commercially unviable in many LLDCs. Without targeted and coordinated interventions, these challenges continue to exacerbate digital exclusion, limiting the transformative potential of ICT for inclusive development.

The unique challenges LLDCs face in attaining meaningful connectivity to the internet, and specific policies and measures that can be taken are:

1. Affordability:
   * Challenges: High per capita cost of international bandwidth, reliance on a limited number of cross-border routes.
   * Solutions: Regional bandwidth cost-regulation frameworks. Special concessional financing from international agencies. Government-led subsidy mechanisms for local ISPs.

Affordability remains one of the most pressing barriers. High infrastructure cost, limited access to international fiber routes, and heavy dependence on neighboring transit countries make broadband significantly more expensive in LLDCs than in other countries. Limited economies of scale and low household incomes remains pertinent challenges. To address these problems, LLDCs should implement policies such as regional cost regulation frameworks, targeted subsidies through universal service funds, and public-private partnerships (PPPs) to attract investment and distribute risks. Removing tariffs on ICT equipment and encouraging affordable device production are also crucial steps. Additionally, efficient spectrum management and clear regulatory frameworks can foster a competitive and innovative ICT environment.

1. Quality of Bandwidth or Communications:
   * Challenges: Packet loss, limited redundancy, and single-point failures due to lack of redundant and diversified routes.
   * Solutions: Promote multi-route international connectivity through neighboring countries. Encourage Internet Exchange Points (IXPs) to reduce latency and enhance internal-traffic exchange.

Bandwidth quality and communications reliability are also serious concerns. Many LLDCs suffer from packet loss, low redundancy, and frequent service interruptions due to their dependence on single, fragile connectivity routes. To enhance network quality, LLDCs should pursue diversified international connections via multiple neighboring countries, invest in regional and domestic Internet Exchange Points (IXPs), and establish minimum quality-of-service standards.

1. Investment:
   * Challenges: Low ROI in remote geographies, insufficient private sector interest.
   * Solutions: Government-backed digital infrastructure bonds. Infrastructure tax holidays and risk-sharing through PPPs. Setup of Digital Investment Facilitation Units (DIFUs) to attract FDI in ICT.

On Investment front, low returns in remote areas discourage private sector participation. To counter this, LLDCs can introduce tax holidays, risk-sharing mechanisms, and create Digital Infrastructure Investment Facilitation Units (DIFUs) to streamline investment process and attract FDI in broadband and data center infrastructure.

1. Infrastructure:
   * Challenges: Rugged terrain, vulnerability to natural disasters (e.g., landslides, floods).
   * Solutions: Leverage satellite technology, microwave towers, and mesh network. Promote infrastructure sharing mechanism i.e., shared passive infrastructure (towers, ducts) among telcos. Invest in disaster-resilient designs for fiber and towers.
2. Enabling Environment:
   * Challenges: Fragmented digital policy, slow licensing, and lack of inter-agency coordination.
   * Solutions: Need of Integrated Digital Policy and IT/ICT Policy by combining the relevant policies withing common Umbrella Act which will harmonize policies under a Digital Transformation Policy and Act. Create Unified Digital Governance Units for better implementation. Foster cyber policy coherence among LLDCs and transit countries. i.e., Creating an enabling environment is critical for scaling digital development. Government must establish unified digital governance bodies. Regionally aligned cyber policies and cooperative regulatory frameworks will also enhance connectivity and trust across border.
3. Security and Resilience:
   * Challenges: Cyber security threats, low preparedness, lack of localized CERT teams.
   * Solutions: Establish regional Cybersecurity Emergency Response Teams (CERTs). Promote data localization and regional security alliances. Develop AI-driven early warning systems for infrastructure attacks i.e., Security and resilience in cyberspace are increasingly important as digital dependence grows. LLDCs often lack strong cyber security institutions and localized response capabilities. Establishing national and regional CERT, fostering international cooperation, and adopting AI-powered early warning systems can significantly strengthen cyber resilience.

The ITU reports that LLDCs still face higher-than-average broadband prices, pronounced urban-rural and gender digital divides, and lower broadband penetration rates- averaging only 5 fixed-broadband and 59 mobile-broadband subscriptions per 100 people, compared to global averages of 20 and 95, respectively. These figures underscore the need for targeted interventions. Bridging these gaps requires not only infrastructure and policy reform but also context-specific approaches that consider each LLDC’s income levels, geography, and digital maturity.

In conclusion, addressing the unique challenges of LLDCs demands a mix of technical, financial and institutional measures. With the right support, including international cooperation and tailored national policies, meaningful connectivity can become a reality for millions living in these landlocked regions unlocking opportunities for inclusive growth and digital transformation.

1. What can ITU Membership, governments and other stakeholders, including those from transit countries, do to ensure meaningful connectivity to the Internet for LLDCs?

The Government of Nepal proposes the following collaborative actions:

* Adopt a global LLDC Connectivity Plan: A voluntary ITU-led framework where transit countries agree to enable fair access to cross-border fiber and submarine landing stations under non-discriminatory terms.
* Establish a dedicated ITU LLDC Fund for targeted investment in fiber backbone expansion, community networks, and capacity building in LLDCs.
* Foster regional data corridors- link LLDCs with neighboring countries via cross-border digital corridors (e.g., Nepal-India-Bangladesh Fiber Corridor) supported by multinational organizations.
* Support LLDC-specific data dashboards to monitor digital equity, affordability, and network performance indicators.
* Incentivize Transit Countries- offer technical and financial support to transit countries that facilitate LLDC connectivity under regional cooperation agreements.

LLDCs require targeted, coordinated, and well-financed interventions that go beyond generic digital development strategies. The path forward must emphasize regional digital cooperation, strategic public-private partnerships, innovation in infrastructure development, and capacity building, supported by global institutions like the ITU. A digitally inclusive future for LLDCs is not only possible but imperative for ensuring that no nation or population is left behind in the global digital revolution.