

## **Question 12/5 – Adaptation to climate change through sustainable and resilient digital technologies**

(Continuation of Question 12/5)

### **1 Motivation**

Digital technologies can be effective in enabling countries and cities to better adapt to climate change. Adaptation involves taking action to tolerate the effects of climate change on a local, country, regional and international level. Examples include remote sensing for monitoring of natural disasters such as earthquakes and tidal waves, and improved communications to help deal with natural disasters more effectively.

Digital technologies, and satellite and surface-based remote sensors in particular, are already the main tools for environmental observation, climate monitoring and provide data for climate change prediction on a global basis. The modern disaster prediction, detection and early warning systems based on the use of digital technologies are essential for saving lives and should be provided where needed including developing countries.

ICTs can also play a crucial role in supporting cities to adapt to the effects of climate change. Remote sensing and geographic information systems make vital climate and disaster information available for early warning systems to deliver alerts to communities that are at risks in a timely manner. ICT devices grant rural citizen access to the latest climate information that allows them to take pre-emptive measures before any natural hazard strikes. This is particularly crucial to coastal cities that are particularly vulnerable to raising sea-level. Urban drought, desertification and extreme heat are also increasingly pushing rural citizens to live under water-stress conditions.

The effects of climate change often disproportionately impact rural areas and communities. These areas often lack the social and economic resources to enhance climate resiliency.

This leads to a series of challenges that are barring rural communities from taking advantage of digital technologies in adapting to the effects of climate change. While half of the world population is now connected to the internet, the other half remains offline<sup>1</sup>. Many inhabitants of rural areas cannot afford the Internet and are being left behind as the digital revolution continues to advance. Without access to mobile phones, the Internet, or other basic ICT devices, rural citizens would not be able to anticipate upcoming climate disasters and take adaptive measures accordingly.

This Question would improve the efficiency of power and cooling systems in ICT networks, support the development of energy efficiency ICT architectures such as up to 400 VDC power feeding systems, add energy saving features to ICTs equipment and applications, improve air flow controlling technology, cooling technology and renewable energy systems and more. All these features can improve energy efficiency and reduce carbon emissions of digital technologies.

In addition, the lack of adequate broadband infrastructure is also limiting the adoption of ICTs in rural areas. Low-cost, portable and energy efficient powering units and broadband infrastructures can accelerate the adoption of ICTs and thereby enhancing their adaptation measures.

Question 12/5 aims to develop Recommendations, Supplements and/or Technical Reports that support the deployment of digital technologies in accelerating climate adaptation actions. Particular emphasis has been placed on expanding the capacity of rural communities and areas to build and maintain climate resilient ICT infrastructures.

Additionally, to be effective in this role, the telecommunications infrastructure and associated ICT must be resilient to the effects of climate change. The ICT sector itself must therefore be taken into consideration when considering adaptation to climate change.

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<sup>1</sup> <https://news.itu.int/itu-statistics-leaving-no-one-offline/>

The ICT sector can help adapt to the adverse impacts of climate change with, for instance, but not limited to, early warning systems, smart agriculture applications, micro smart grids, building optimization.

Question 12/5 covers the actions to be undertaken by the ICT sector to anticipate and adapt itself to these adverse effects (i.e., resilient ICTs to floods, high temperature etc.).

Digital technologies provide an exceptional opportunity to improve the creation, management, exchange and application of relevant climate change information and knowledge on ICT-based climate change adaptation measures.

This Question is in line with the following Sustainable Development Goals: SDG 7 "Ensure access to affordable, reliable, sustainable and modern energy for all"; SDG 9 "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation"; SDG 11 "Make cities and human settlement inclusive, safe, resilient and sustainable" and SDG 13 "Take urgent action to combat climate change and its impact".

The following Recommendations and Supplements, in force at the time of approval of this Question, fall under its responsibility:

- ITU-T L.2, L.4, L.20, L.21, L.22, L.23, L.32, L.33, L.1200, L.1201, L.1202, L.1203, L.1204, L.1205, L.1206, L.1207, L.1210, L.1220, L.1221, L.1222, L.1325, L.1700, L.1500, L.1501, L.1502, L.1503, L.1504, L.1505, L.1506, L.1507;
- L-series Supplements 14, 15, 22, 23, 24, 25, 29, 30, 31.

## **2 Questions**

Study items to be considered include, but are not limited to:

- What are the most efficient and resilient solutions related to ICT sector infrastructures and facilities, including ICT equipment, power systems, cooling systems and management systems?
- What are the technological, social, and economic challenges that rural areas, cities, and communities are facing when it comes to climate change adaptation?
- How can digital technologies support these communities in adapting to the effects of climate change?
- How do we best harness the potential of ICTs in adapting to the effects of climate change in rural areas, cities, and communities?
- Which ICT infrastructures are key for adapting to climate change in rural areas, cities, and communities?
- How to increase broadband coverage while providing low-cost and efficient ICT equipment and infrastructures in those areas?
- How do we ensure that the current adaptation actions are sufficient to deal with all climate variables in the long-term? How can ICTs improve current adaptation actions?
- How to adapt the agriculture sector to climate change? What role do ICTs play in this regard? Can we make the agriculture sector climate-proof?
- Explore how ICTs can be used to adapt to the effects of climate change and biodiversity loss related to a variety of sectors: e.g., energy, agriculture, housing, fisheries, health, water, etc.;
- Identify best practices related to climate change adaptation for different types of areas (e.g., energy, agriculture, housing, fisheries, health, water, etc.);
- Explore how to help developed and developing countries to use digital technologies to establish climate monitoring networks, to enable rapid data gathering for emergency

response, to prioritize decision-making, to facilitate logistics and disaster early warning systems by sharing knowledge and data through crowd sourcing, customization of information, etc.;

- Examine how to use ICTs for monitoring the displacement and settlement of populations in different areas such as like coastal zones, marine ecosystems, urban and rural areas;
- Most efficient solutions related to ICT sector infrastructures and facilities, including ICT equipment, power systems, cooling systems and management systems related to low-cost solutions;
- Specifications of configuration and installation of power feeding systems in DC or hybrid AC and DC, including cable distribution methods, basic concepts (or architectures) of the power supply network related to low-cost solutions;
- Improve and complement safety criteria and requirements for service personnel and equipment;
- Define efficient architectures and facility solutions for digital technologies (e.g., AI, IoT, 5G/IMT-2020) network implementation taking into consideration the efficient use of energy and resources related to low-cost solutions.

### **3 Tasks**

Tasks include, but are not limited to:

- Develop Recommendations, Supplements and/or Technical Reports that contain requirements and technical specifications on low-cost, portable, and efficient ICT infrastructure that can be deployed in rural areas and communities;
- Develop Recommendations, Supplements and/or Technical Reports that examine the long-term impacts of climate change in rural areas, cities, and communities;
- Establish related metrics/KPIs, measurement methods and reference values of energy efficiency requirements and evaluations for new solutions along with low-cost low impact solutions;
- Develop Recommendations, Supplements and/or Technical Reports on climate change adaptation of the ICT Sector by enhancing infrastructure/facilities resilience to climate related hazards;
- Develop Recommendations, Supplements and/or Technical Reports to provide guidance for resiliency of telecommunication services in response to both natural and man-made disasters;
- Develop Recommendations Supplements and/or Technical Reports on control/monitoring/management of power cooling, facilities infrastructure management and remote power metering of digital technologies equipment related to low-cost solutions;
- Develop Recommendations Supplements and/or Technical Reports on new energy saving solutions and low carbon emission solutions, including key parameter requirements of digital technologies equipment, network and realization including Data Centres for low-cost solutions;
- Maintenance and revision of existing Recommendations and Supplements.

An up-to-date status of work under this Question is contained in the ITU-T SG5 work programme ([https://www.itu.int/ITU-T/workprog/wp\\_search.aspx?sp=17&q=12/5](https://www.itu.int/ITU-T/workprog/wp_search.aspx?sp=17&q=12/5)).

### **4 Relationships**

#### **WSIS Action Lines:**

- C2, C7

**Sustainable Development Goals:**

- 7, 11, 13

**Recommendations:**

- ITU-T K-series
- ITU-T L-series

**Questions:**

- Q1/5, Q2/5, Q3/5, Q4/5, Q6/5, Q7/5, Q9/5, Q11/5, Q13/5

**Study Groups:**

- ITU-T SGs
- ITU-D SGs
- ITU-R SGs

**Other bodies:**

- ATIS
- CCSA
- ETSI EE
- ECMA
- GSMA
- 3GPP
- CCSA
- IEC
- IETF
- ISO
- CIAJ
- GISFI
- 3GPP
- TSDSI
- IEEE