MOD

QUESTION 2/2

ICTs for the environment, and assessment of human exposure to electromagnetic fields

1 Statement of the situation or problem

1.1 ICTs and climate change

The issue of climate change has emerged as a global concern and requires global collaboration by all concerned, in particular the developing countries[1] (which are the most vulnerable group of countries with respect to climate change). International initiatives in this domain are seeking to achieve sustainable development and identify ways and means in which information and communication technologies (lCTs) can help monitor climate change and reduce overall global greenhouse gas (GHG) emissions. The focus of this study Question is ''responsible consumption and production''.

ICTs have a direct and indirect effect on the environment. ICTs have their own footprint. At the same time, telecommunications/ICTs can help emerging economies overcome and thrive despite climate change and fluctuations, while helping the world mitigate climate change.

New technologies, systems and applications can monitor climate and reduce its adverse impact by utilizing technologies empowered by telecommunications/ICTs, e.g., big data. They can be pivotal in helping policy-makers and industry to tackle challenges with regard to environmental changes while formulating new policies and setting new standards of production towards reduction of emissions. Also, artificial intelligence can contribute to the collection of information through various methods and channels of data collection, by utilizing both human and historical experience to face extreme and unpredictable weather scenarios.

Study Group 5 of the ITU Telecommunication Standardization Sector (ITU-T) is the lead study group for the study of ICT environmental aspects of electromagnetic phenomena, environment and climate change, including methodologies and guidance to assess and to reduce environmental effects, such as recycling related to ICT facilities and equipment; and Study Group 7 (Science services) of the ITU Radiocommunication Sector (ITU-R) is the lead study group for studies related to the use of radio technologies, systems and applications, including satellite systems, for environment and climate-change monitoring and climate-change prediction.

In this respect, the outcomes of ITU-T and ITU-R resolutions and Recommendations, and in particular Resolution 73 (Rev. New Delhi, 2024) of the World Telecommunication Standardization Assembly (WTSA) and Resolution 673 (Rev. WRC-23) of the World Radiocommunication Conference, should serve as a basis for the study of this Question.

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[1] These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition.

1.2 Telecommunication/ICT waste material

The growth of telecommunications/ICTs, especially in developing countries, has been exponential in recent years. For instance, between 2002 and 2007, mobile-phone penetration in the Americas region grew from 19 to 70 terminals per 100 inhabitants. Globally, the share of mobile-phone subscriptions in developing countries increased by 20 percentage points, from 44 per cent to 64 per cent over the same period of time.

The growth of electrical and electronic equipment and their peripherals, as well as the continuous updating of technology, has generated a significant growth in telecommunication/ICT waste. It is estimated that between 20 and 50 million tonnes of telecommunication/ICT waste are generated every year worldwide. However, recycling and responsible disposal of telecommunication/ICT waste remain at low levels, making it difficult to even find figures on this issue at regional level.

According to the Global E-waste Monitor 2020, the world generated 53.6 million tonnes of e-waste in 2019, whilst global waste generation is predicted to reach 74 Mt by the year 2030, which is almost double the 2014 figures. This equates to an average of 7.3 kg per person.

Recycling and efficient disposal of telecommunication/ICT waste have not been handled properly, so it is proving a major challenge even to obtain correct figures for total ICT waste/e-waste present in the world.

The consequences of not carrying out proper recycling or disposal of e-waste constitute environmental problems of large magnitude and give rise to health issues, especially for developing countries.

The exponential growth of telecommunication/ICT terminals, the associated high turnover of terminals and advances in technology make it imperative to put forward actions in the immediate future to prevent the environmental catastrophe that would result in developing countries if we fail to produce an adequate regulatory framework and work towards policies that address this problem.

1.3 Human exposure to electromagnetic fields

With the advent of the wireless technologies, human exposure to electromagnetic fields (EMF) raised public concerns. The importance of developing strategies and guidance concerning human exposure to EMF has been well discussed. Over the previous study cycle, under study Question 7/2 Study Group 2 of the ITU Telecommunication Development Sector (ITU-D) has studied science-based policies, guidelines, national experiences and assessments of human exposure to radio-frequency EMF (RF-EMF). New versions of EMF standards have also been published during the study cycles and continue to be iterated with continued technological advancement and monitoring. Current ICNIRP and IEEE limits are largely harmonized, and the power density limits for whole-body exposure to continuous fields are identical above 30 MHz.

Due to the characteristics of multiple-input multiple-output (MIMO), beamforming and millimetre-wave technologies used in the new communication systems, some pioneer studies have been conducted to evaluate RF-EMF levels. Risk communication, including the benefit of new wireless technologies for people, in particular during the pandemic, is an important method to reduce unnecessary public concerns about RF-EMF exposure. WHO and ITU constantly help the exchange of knowledge between countries and regions on the current state of the science.

2 Question or issue for study

A number of issues will be addressed in this Question in the study period. The following steps will play a major role in order to study the Question:

1) In close collaboration with the respective BDT programme(s), identify the regional needs for relevant applications for developing countries.

2) Elaborate a method for study of the Question, in particular gathering evidence and information regarding current best practices on how ICTs can help reduce overall GHG emissions, including the ICT sector's own emissions and considering the progress by ITU-T and ITU-R in this regard.

3) Consider the role of Earth observation in climate change, as determined by the implementation of Resolution 673 (Rev. WRC-23), on the use of radiocommunication for Earth observation applications, in order to enhance the knowledge and understanding of developing countries in respect of the utilization and benefits of relevant applications in connection with climate change.

4) Develop best-practice guidelines for the implementation of relevant ITU-T Recommendations that are related to WTSA Resolution 73 (Rev. New Delhi, 2024), both for monitoring changes in the climate and reducing the impact of climate change using the action plan in WTSA Resolution 44 (Rev. New Delhi, 2024), in particular programmes 1, 2, 3 and 4 thereof.

5) Strategies to develop a responsible approach to, and comprehensive treatment of, telecommunication/ICT waste: policy and regulatory actions required in developing countries, in close collaboration with ITU-T Study Group 5 and Question 4/2.

6) The role of telecommunications/ICTs in monitoring and assessing global biodiversity objectives.

7) Collection of case studies, identification of lessons learned and best practices related to human exposure to electromagnetic fields.

8) Examine new wireless telecommunications/ICTs, best practices in EMF harmonization of standards and risk communication.

9) The role of new and emerging telecommunication/ICT services and technologies, such as using AI tools, in efficiently handling e-waste, contributing to climate action and in mitigating natural hazards like flash floods and large-scale fires (in collaboration with Question 3/1 and Question 5/2).

3 Expected output

The output will be a report or reports on the results of the work concluded for each step identified above, taking into account the specific needs of developing countries.

Other outputs could be the organization of workshops in relation with the relevant ITU-D programme and in consultation with the relevant ITU-T and ITU-R study groups.

4 Timing

The output will be generated on an annual basis. The output for the first year will be analysed and assessed in order to update the work for the next year, and so on. The final report is due by 2025.

5 Proposers/sponsors

ITU-D Study Group 2.

6 Sources of input

Contributions are expected from:

Member States, Sector Members and Associates, as well as inputs from:

1) Relevant BDT programmes, and particularly ICT initiatives successfully implemented for climate change and to address e-waste.

2) Regional needs as identified by workshops on the subject.

3) Regional and/or national action plans and/or national experiences in ICTs and climate change or e-waste.

4) Progress achieved by ITU-T and ITU-R study groups in this domain, in particular the results of the Joint Coordination Activity on ICTs and climate change (JCA-ICTCC).

5) Progress achieved by the United Nations Intergovernmental Panel on Climate Change (IPCC) and other similar initiatives.

7 Target audience

Target audience	Developed countries	Developing countries
Telecom policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Service providers/operators	Yes	Yes
Manufacturers	Yes	Yes

a) Target audience – Who specifically will use the output

The output of this study Question will be used by both developed and developing countries, and in particular the least developed countries (LDCs), small island developing states (SIDS), landlocked countries (LLDCs) and countries with economies in transition.

b) Proposed methods for implementation of the results

A set of guidelines and recommendations about strategies for a responsible and comprehensive approach to the treatment of waste related to telecommunications/ICTs: policy and regulatory actions required in developing countries and LDCs.

This guide could be implemented by the developing countries and LDCs, as well as operators and manufacturers, in establishing actions for responsible and integral treatment of waste related to telecommunications/ICTs.

8 Proposed methods of handling the Question or issue

Close coordination is essential with ITU-D programmes, and other relevant ITU-D study Questions, and with ITU-R and ITU-T study groups.

a) How?

1) Within a study group:

– Question (over a multi-year study period) ☑

2) Within regular BDT activity:

– Programmes ☑

– Projects ☑

– Expert consultants ☑

3) In other ways ☑

b) Why?

To ensure that the work and output of this study Question is not duplicated and that there is better collaboration among BDT, the other ITU Sectors, Sector Members and other United Nations agencies.

To elaborate the set of guidelines, it would be necessary to have the experience of different countries, operators and manufacturers, as well as different organizations concerned with the topic which could provide information.

9 Coordination and collaboration

– Regular ITU-D activities.

– Other study Questions or issues, in particular Questions 1/1, 2/2, 5/2 and 7/2, to address environment issues.

– Regional organizations, as appropriate.

– Work in progress in the other ITU Sectors.

10 BDT programme link

ITU-D priority ''Enabling policy and regulatory environment''.

11 Other relevant information

As may become apparent within the life of the Question.