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|  | **Document TDAG-WG-futureSGQ/48-E** |
|  | **9 May 2025** |
|  | **English only** |
| Vice-Chair, ITU-D Study Group 2 |
| Updated views on future of ITU-D Study Group 2 Questions |
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| **Summary:**This document provides updated views on new and revised study items for the ITU-D Study Group 2 Questions, as shared by each of the Management Teams of the Questions concerned and consolidated by the Coordinator on the referred study group for the discussion of the future of Questions. The result of the consolidation is brought as an input for the work of the TDAG Working Group on the future of Study Group Questions (TDAG-WG-futureSGQ).**Action required:**Participants are invited to use this document as an input for the discussions of the TDAG Working Group on the future of Study Group Questions (TDAG-WG-futureSGQ).**References:**WTDC Resolution 2 (Rev. Kigali, 2022) |

# Introduction

ITU-D Study Group 2 held its latest meeting from 5 to 9 May 2025, where possible items for the future study Questions were discussed.

Some rapporteurs and co-rapporteurs of the Questions sent their updated inputs to the SG2 Coordinator, while others need to consider it further. Some ideas were extracted from the documents presented by the rapporteurs and co-rapporteurs of the Study Group Questions at the final meeting of the ITU-D Study Group 2 held from 5 to 9 May 2025 (Documents [2/378](https://www.itu.int/md/D22-SG02-C-0378), [2/REP/26](https://www.itu.int/md/D22-SG02-R-0026/), [2/379](https://www.itu.int/md/D22-SG02-C-0379), [2/REP/27](https://www.itu.int/md/D22-SG02-R-0026/), [2/380](https://www.itu.int/md/D22-SG02-C-0380), [2/REP/28](https://www.itu.int/md/D22-SG02-R-0026/), [2/381](https://www.itu.int/md/D22-SG02-C-0381) (Rev.1), [2/REP/29](https://www.itu.int/md/D22-SG02-R-0026/), [2/382](https://www.itu.int/md/D22-SG02-C-0382), [2/REP/30](https://www.itu.int/md/D22-SG02-R-0026/), [2/383](https://www.itu.int/md/D22-SG02-C-0383), [2/REP/31](https://www.itu.int/md/D22-SG02-R-0026/), [2/384](https://www.itu.int/md/D22-SG02-C-0384), [2/REP/32](https://www.itu.int/md/D22-SG02-R-0026/)). The consolidated updated inputs are provided in this contribution with change tracks. The revised ToRs can be found in the Annex section.

# Initial ideas on new and revised items of study for ITU-D Study Group 2 Questions

**ITU-D Question 1/2 (Smart sustainable cities and communities)**

The following topics were raised by Question 1/2 as important areas of study that require further study in the next period. These are:

1. Developing mechanisms and tools for evaluating smart cities and communities.
2. Economic models for the harmonious development of smart cities and communities
3. Best practices and guidelines for an appropriate legal framework in building smart cities and choosing/providing smart services and applications.

**ITU-D Question 2/2 (Enabling technologies for e-services and applications, including e-health and e-education)**

* Addition of “Impact of AI technologies in support of e-services and applications to enable an efficient telecommunication/ICT ecosystem”.
* Addition of “the United Nations accepted “Global Digital Compact”, and one of its actions is to connect all schools and hospitals to the Internet, building on the GIGA initiative of the ITU and UNICEF, and to enhance the telemedicine services and capabilities.”

**ITU-D Question 3/2 (Securing information and communication networks: Best practices for developing a culture of cybersecurity)**

The following topics were raised by Q3/2 as possible items for study during the next period:

Discuss approaches and share experiences on how to promote cybersecurity and cyber resilience for the telecommunications/ICTs sector, including:

1. Cybersecurity public policies and regulations that applies to the telecommunications/ICTs sector, including obligations and assurance practices.
2. Specific measures, initiatives and projects to improve the cybersecurity and cyber resilience of small and medium telecommunications service providers.
3. How ITU membership is addressing the cybersecurity challenges and opportunities of the new and emerging telecommunications/ICT technologies and services in the sector.

**ITU-D Question 4/2 (Telecommunication/ICT equipment: Conformance and interoperability, combating counterfeiting and theft of mobile devices)**

1. Conformance and Interoperability
	* Strengthening testing mechanisms to ensure that ICTs equipment conforms to international and regional standards and developing mechanisms to meet these standards.
	* Promoting interoperability of systems and equipment to improve global connectivity and facilitate the adoption of ICTs in different contexts.
	* Establishment of collaborative platforms to share best practices and testing methodologies.
2. Fight against counterfeit equipment
	* Establishment of centralized databases for identifying and tracking genuine equipment, and adoption of technological, legal, and institutional strategies to identify, mitigate, and deter counterfeit ICTs equipment.
	* Educating stakeholders (manufacturers, distributors, and consumers) on the risks and dangers associated with counterfeit equipment.
	* Development of technological solutions for the authentication of equipment (QR codes, microchips, etc.).
3. Combating mobile device theft
	* Increased international collaboration to track and block stolen devices through IMEI databases, and the development of legal and technical frameworks to reduce mobile device theft.
	* Establishment of harmonized legal frameworks for the criminalization of the resale of stolen equipment and strengthening international cooperation and traceability mechanisms to deter the resale.
	* Educating the general public on the use of anti-theft services (remote locking, traceability).

**ITU-D Question 5/2 (Adoption of telecommunications/ICTs and improving digital skills)**

This is a new study Question. All parts of the ToR need future studies as they have not been fully explored in this study cycle.

**ITU-D Question 6/2 (ICTs for the environment)**

Addition of:

* The role of ICTs and cutting-edge intelligent technologies like AI in reducing climate change-related disasters like flash floods and large-scale fires (in collaboration with Q3/1).
* The role of ICTs in monitoring and protecting Biodiversity worldwide and, in particular, in Biodiversity hotspots where the variety and richness of ecosystems is particularly high.

**ITU-D Question 7/2 (Strategies and policies concerning human exposure to electromagnetic fields)**

The following new topics are proposed at this stage:

1. 5G EMF
2. EMF in low-altitude airspace and drone
3. AI in EMF evaluation
4. EMF in smart wearable devices

**Annex 1: Proposed new terms of reference for ITU-D SG2 Questions**

**MOD**

**QUESTION 1/2 Smart sustainable cities and communities**

1. **Statement of the situation or problem**

All areas of society – culture, education, health, transport, trade and tourism – will depend for their development on the advances made through information and commu­nication technology (ICT) systems and services in their activities. ICTs can play a key role in the protection of property and persons; smart management of motor vehicle traffic; saving electrical energy; measuring the effects of environmental pollution; improving agricultural yield; increasing efficiency in global travel and tourism; management of health care and education; management and control of drinking-water supplies; and solving the problems facing cities and rural areas. This is the smart society. Similarly, as highlighted by the World Summit on the Information Society (WSIS), ICT applications can support sustainable development in public administration, business, education and training, health, the environment, agriculture and science within the framework of national cyberstrategies.

The United Nations 2030 Agenda for Sustainable Development recognizes the enor­mous possibilities offered by ICTs and calls for significant increase in access to such technologies, which have a decisive contribution to make in support of implementation of all the United Nations Sustainable Development Goals (SDGs). ITU therefore deems it a priority to support its membership in achieving the SDGs, in close collaboration with other associates.

Delivering the promise of the smart society relies on three technological pillars – con­nectivity, smart devices/terminals and software – as well as on sustainable development principles.

Connectivity or the underlying infrastructure encompasses both traditional and emerg­ing networks and new technologies. It is a key enabler upon which all smart services could be provided. Examples include machine-to-machine (M2M) communication, the Internet of Things (IoT), and resulting applications and services such as e‑government, traffic management and road safety.

It is estimated that at present over 50 per cent of IoT activity is focused on manufactur­ing, transport, smart cities and user applications, but that in the future all industries will be able to benefit from IoT initiatives, highlighting and enabling new business models and workflow processes.

Smart devices/terminals are the things and edge components that are connected via the enabling infrastructure and connectivity layer to exchange data between the field and the city operation centre. Cars, traffic lights and cameras, water pumps, electricity grids, home appliances, street lights and health monitors are all examples of things that need to become smart so as to deliver significant advancements towards the achieve­ment of sustainability and economic and social goals. This is especially important in developing countries[[1]](#footnote-2).

Then the role of software development becomes essential to exploit and capitalize on the first two pillars (connectivity and terminals), such that all three pillars can function together to support new services that would never have been possible before. Software includes both the city platform which interfaces with all terminals seamlessly as well as the service-specific functions that are tailored to perform each vertical application or service in the city.

It will be possible for the work carried out under this study Question to be founded on Resolutions 139 (Rev. Dubai, 2018), on the use of telecommunications/ICTs to bridge the digital divide and build an inclusive information society, and 197 (Rev. Dubai, 2018), on facilitating IoT to prepare for a globally connected world, of the Plenipotentiary Conference; Resolutions 44 (Rev. Geneva, 2022), on bridging the standardization gap between developing and developed countries, and 98 (Rev. Geneva, 2022), on enhanc­ing the standardization of IoT and smart cities and communities for global development of the World Telecommunication Standardization Assembly; and Resolution ITU-R 66-1 (Rev. Sharm el-Sheikh, 2019) of the Radiocommunication Assembly, on studies related to wireless systems and applications for the development of IoT.

1. **Question or issue for study**

Based on the statement of the situation set out in § 1 above, the issue of study will revolve around the three main pillars in addition to other complementary components, as follows:

1. Consideration of smart sustainable cities and communities (SSCCs) to enlarge the scope of study and include smart villages and any form of communities.
2. Raising awareness and sharing experiences on improving connectivity and underlying infrastructure to support the smart society and potential smart services, including smart grids, public administration, transport, business, education and training, health, the environment, agriculture, tourism and science.
3. Examination of best practices for fostering and enabling deployment and use of smart devices/terminals used for providing smart services in the city/society.
4. Survey of methods and examples of how software and platforms, both open-source and/or proprietary, enable connectivity of smart devices/terminals and integration of data for supporting smart services, cities and communities.
5. Studying policies and business models that ensure the involvement of different stakeholders and yield sustainable for the harmonious development of smart cities and communities.
6. Discuss and share reference data management architectures that would promote and enable development of smart cities and communities.
7. Defining performance benchmarks and developing assessment mechanisms for smartness in terms of quality-of-life, technical aspects and policy mechanisms.
8. Sharing of experiences and best practices and developing an appropriate legal framework for building smart cities and choosing/providing smart services and applications.
9. Promotion of capacity building and the acquisition of knowledge on ICTs for adoption of the skills required for development of a smart society.
10. Encouraging city planners and city officials to participate in the study and share their experiences.

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**QUESTION 2/2 Enabling technologies for e-services and applications, including e-health and e‑education**

1. **Statement of the situation or problem**

In order to continue to contribute to and promote attainment of the United Nations Sustainable Development Goals (SDGs) set in September 2015 and objectives set by the Geneva Plan of Action of the World Summit on the Information Society (WSIS) in the era of digital transformation, it is necessary to address the challenge of digital infrastructure development to make available consequent benefit in developing countries.

The offerings of e-services, m-services and over-the-top (OTT) applications present new opportunities for economic development, particularly in developing countries. Enabling technologies such as cloud computing offer ubiquitous, convenient and on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service-provider interaction.

Increased broadband networks also lead to the development and deployment of new services and applications, such as mobile money transfer, m-banking, m-commerce and e-commerce. More importantly, in developing countries, especially in remote areas, there are few health professionals, and the United Nations goal of "minimum health care for all'' will not be achieved by 2030 without the use of e-health technology. The coronavirus disease (COVID-19) pandemic has made it more difficult to meet people in person, and the relationship between patients and medical doctors, pregnant women and midwives, and older persons and visiting nurses has begun to change in many ways in the medical field. In addition, students at schools or universities in both urban and remote areas were not able to meet their instructors in person during the pandemic and demand increased sharply on different educational platforms and applications. Such a trend is expected to continue and even increase as it proves effective. OTT applications have connected communities, families, businesses, clients and partners all around the world to stay informed, socialize, practice sport or yoga and be entertained. M‑services were at the core of the pandemic response, and will continue to be essential in the years to come.

In 2024, the United Nations accepted Global Digital Compact, and one of the actions is to map and connect all schools and hospitals to the Internet, building on the Giga initiative of the ITU and UNICEF, and enhance telemedicine services and capabilities.

1. **Question or issue for study**

The scope of activities is:

1. Introduce best-practice models for e-services in developing countries, including e-health and e-education.
	1. Ways to promote an enabling environment among ICT stakeholders for the development and deployment of e-services and m-services.
	2. Study of new e-health technologies, including combating pandemics.
	3. Sharing e-health standardization with developing countries.
2. Methods of development and deployment of cross-cutting m-services related to e‑commerce, e-finance and e-governance, including money transfer, m-banking and m-commerce.
3. Regulatory frameworks for the provision of OTTs.
4. National case studies and experiences regarding legal frameworks and partnerships seeking to facilitate the development and deployment of e-services, m-services and OTTs.
5. Impact of OTTs on end-user demand for the Internet
6. Impact of AI technologies in support of e-services and applications to enable an efficient telecommunication/ICT ecosystem.
7. Strategies and policies to foster the emergence of a cloud-computing ecosystem in developing countries, taking into consideration relevant standards recognized or under study in the other two ITU Sectors.
8. Advanced knowledge support to BDT's e-application projects in cooperation with WHO or other UN bodies.

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**QUESTION 3/2 Securing information and communication networks:
Best practices for developing a culture of cybersecurity in the telecommunications/ICTs sector**

1. **Statement of the situation or problem**

The use of telecommunications and information and communication technologies (ICTs) has been invaluable in fostering development and social and economic growth globally. However, despite all the benefits and uses these technologies offer, there are risks and threats to security.

From personal finances to business operations, from national critical infrastructure and essential services to private ones, all transactions are increasingly managed through information and communication networks, making them more vulnerable to some form of attack.

In order to build trust in the use and application of telecommunications/ICTs for applications and content of all kinds, especially those having a major positive impact in economic and social areas where all players exert an effect on the protection of personal data, network security and the actual network user, close collaboration is required between national authorities, foreign authorities, industry, academia and users.

Based on the foregoing, securing information and communication networks and developing a culture of cybersecurity have become key in today's world for a number of reasons, including:

a) the explosive growth in the deployment and use of ICT;

b) cybersecurity remains a matter of concern of all, and there is thus a need to assist countries, in particular developing countries[[2]](#footnote-3), to protect their telecommunication/ICT networks against cyberattacks and threats;

c) the need to endeavour to ensure the security of these globally interconnected infrastructures if the potential of the information society is to be achieved;

d) the growing recognition, at the national, regional and international levels, of the need to develop and promote best practices, standards, technical guidelines and procedures to reduce vulnerabilities of and threats to ICT networks;

e) the need for national action and regional and international cooperation to build a global culture of cybersecurity that includes national coordination, appropriate national legal infrastructures, watch, warning and recovery capabilities, government/industry partnerships and outreach to civil society and consumers;

f) the requirement for a multistakeholder approach to effectively make use of the variety of tools available to build confidence in the use of ICT networks;

g) United Nations General Assembly (UNGA) Resolution 57/239, on creation of a global culture of cybersecurity, invites Member States "to develop throughout their societies a culture of cybersecurity in the application and use of information technology";

h) UNGA Resolutions 68/167, 69/166 and 71/199, on the right to privacy in the digital age, affirm, *inter alia*, "that the same rights that people have offline must also be protected online, including the right to privacy";

i) best practices in cybersecurity must protect and respect the rights of privacy and freedom of expression as set forth in the relevant parts of the Universal Declaration of Human Rights, the Geneva Declaration of Principles adopted by the World Summit on the Information Society (WSIS) and other relevant international human rights instruments;

j) the WSIS Geneva Declaration of Principles indicates that "A global culture of cybersecurity needs to be promoted, developed and implemented in cooperation with all stakeholders and international expert bodies", the Geneva Plan of Action encourages sharing best practices and taking appropriate action on spam at national and international levels, and the Tunis Agenda for the Information Society reaffirms the necessity for a global culture of cybersecurity, particularly under Action Line C5 (Building confidence and security in the use of ICTs);

k) ITU was requested by WSIS (Tunis, 2005), in its agenda for implementation and follow-up, to be the lead facilitator/moderator for Action Line C5 (Building confidence and security in the use of ICTs), and relevant resolutions have been adopted by the Plenipotentiary Conference, the World Telecommunication Standardization Assembly (WTSA) and the World Telecommunication Development Conference (WTDC);

l) UNGA Resolution 70/125 adopted the outcome document of the high-level meeting of the General Assembly on the overall review of the implementation of the WSIS outcomes;

m) the WSIS+10 statement on the implementation of WSIS outcomes, and the WSIS+10 vision for WSIS beyond 2015, adopted at the ITU‑coordinated WSIS+10 high-level event (Geneva, 2014) and endorsed by the Plenipotentiary Conference (Busan, 2014), which were submitted as an input into the UNGA's overall review on the implementation of WSIS outcomes;

n) WTDC Resolution 45 (Rev. Kigali, 2022) supports the enhancement of cybersecurity among interested Member States;

o) Resolution 130 (Rev. Bucharest, 2022) of the Plenipotentiary Conference resolves to continue promoting common understanding among governments and other stakeholders of building confidence and security in the use of ICTs at the national, regional and international level;

p) WTSA Resolution 50 (Rev. New Delhi, 2024) highlights the need to harden and defend information and telecommunication systems from cyberthreats and cyberattacks, and continue to promote cooperation among appropriate international and regional organizations in order to enhance exchange of technical information in the field of information and telecommunication network security;

r) there have been various efforts to facilitate the improvement of network security, including the work of Member States and Sector Members in standards-setting activities in the ITU Telecommunication Standardization Sector (ITU‑T) and in the development of best-practice reports in ITU‑D; by the ITU secretariat in the Global Cybersecurity Agenda (GCA); and by ITU‑D in its capacity-building activities under the relevant programme; and, in certain cases, by experts across the globe;

s) governments, service providers and end users, particularly in least developed countries (LDCs), face unique challenges in developing security policies and approaches appropriate to their circumstances;

t) reports detailing the various resources, strategies and tools available to build confidence in the use of ICT networks and the role of international cooperation in this regard are beneficial for all stakeholders;

u) spam and malware continue to be a serious concern, although evolving and emerging threats must also be studied;

v) the need for simplified test procedures at basic level for security testing of telecommunication networks to promote a security culture.

1. **Question or issues for study**

Discuss approaches and share experiences on how to promote cybersecurity and cyber resilience for the telecommunications/ICTs sector, including:

1. Cybersecurity public policies and regulations that applies to the telecommunications/ICTs sector, including obligations and assurance practices.
2. Specific measures, initiatives and projects to improve the cybersecurity and cyber resilience of small and medium telecommunications service providers.
3. How ITU Membership is addressing the cybersecurity challenges and opportunities of the new and emerging telecommunications/ICT technologies and services in the sector.

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**QUESTION 5/2 Adoption of telecommunications/ICTs and improving digital skills**

1. **Statement of the situation or problem**

Broadband technologies are fundamentally transforming the way we live. Broadband infrastructure, applications and services offer important opportunities to boost economic growth, enhance communications, improve energy efficiency, safeguard the planet and improve people's lives. Broadband access and adoption have a significant impact on the world economy and are important to bridging the digital divide.

According to the ITU 2021 edition of Facts and Figures, an estimated 2.9 billion people – or 37 per cent of the world’s population – remain offline. In developed countries, 90 per cent of the population is online compared to 57 per cent in developing countries[[3]](#footnote-4) and 27 per cent in least developed countries (LDCs). Of the 37 per cent of people who are offline, 5 per cent cannot connect even if they wanted to due to a lack of network coverage (“coverage gap”), while 32 per cent remain offline for other reasons (“usage gap”).

Since the onset of the coronavirus disease (COVID-19) pandemic, Internet connectivity has played a vital role in allowing individuals to continue to participate in everyday social, political and economic activities as millions of people turned to remote work, distance learning, e-commerce and Internet-enabled telehealth services. Almost 70 per cent of the workforce in some countries shifted to remote work, and 94 per cent of the world's student population was affected by school closures. Unfortunately, of those affected, at least 31 per cent of school-age children are still unable to access online educational content.

Disparities are found across countries. With respect to gender, globally, only 48 per cent of women use the Internet compared to 55 per cent of men. In developing countries, women are almost 10 per cent less likely to use the Internet than men, compared to only 2 per cent less than men in developed countries. The gender gap further widens in LDCs (15 per cent women to 28 per cent men) and in LLDCs (21 per cent women to 33 per cent men). Broadband adoption directly contributes to the likelihood that a community will participate in and benefit from the digital economy.

In indigenous communities, the digital divide plays an even larger role in widening the economic, educational and social divides. Due to the sparse population in rural and remote areas where many indigenous people live combined with the challenges of broadband mapping and data collection, available information sources often provide incomplete data for Internet access and adoption. Methods to increase adoption in these areas will optimally focus on factors at the household and personal level to include price, availability of computers or other devices, content provided in local languages and digital skills.

Global stakeholders have become increasingly focused on alleviating disparities in broadband adoption by investing in approaches that address the affordability of devices and services and emphasize the importance of digital skills and digital literacy to effec­tively participate in the global economy. In a survey conducted by ITU, less than 40 per cent of the population in 40 per cent of countries surveyed had basic ICT skills, while, similarly, less than 40 per cent of the population in over 70 per cent of countries had standard ICT skills, and in over 95 per cent of countries less than 15 per cent of the population had advanced ICT skills.

There must be a significant uptake in broadband services and technologies for a com­munity to participate fully in the digital economy. As stakeholders around the world work to deploy broadband networks, it is also important to develop and execute strat­egies that enable their citizens to adopt and effectively use broadband technologies, services and devices, supported by adequate digital skills. Increasingly, stakeholders use local languages and iconography to increase computer and overall literacy. Optimally, all strategies for adoption will be studied in the context of the social, economic and cultural factors faced by individuals in urban, rural and remote areas in both developed and developing countries.

1. **Question or issue for study**
2. Analysis of adoption opportunities, challenges and disparities for telecommunications/ICTs, including broadband.
3. Trends in telecommunication/ICT adoption globally, including in urban, rural, remote and other areas.
4. Trends in Internet traffic and the impact on demand for high-speed broadband, including during pandemics and disasters.
5. Trends in digital skills development and training programmes.
6. Methods to promote and encourage digital literacy, training and skills development across all levels of the global socio-economic landscape to close the digital skills gap.
7. Approaches to strengthen digital-skills training for the adoption of e-services, including e‑agriculture, e-commerce, e-education and e-health.
8. Ways to encourage the adoption of telecommunications/ICT services and devices among school-aged children and youth and to teach them basic, intermediate and advanced digital skills so that they can safely participate fully in the information society.
9. Ways to encourage widespread adoption of new and emerging telecommunication/ICT services and technologies to increase fast and reliable connectivity for all, including women and individuals in developing and least developed countries (LDCs), landlocked developing countries (LLDCs), and small island developing states (SIDS).
10. Strategies and policies to improve the affordability of Internet-enabled devices, including handsets and data services to meet the growing demand for affordable Internet services and devices (in collaboration with Question 4/1).
11. The influence of cultural, social and other factors in producing unique and often creative methods of encouraging the adoption of e-services by residents of developing countries, including relevant content in local languages.

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**QUESTION 6/2 ICTs for the environment**

1. **Statement of the situation or problem**
	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[[4]](#footnote-5) (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 through e.g. satellite images, drones, IA etc 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 direct footprint, which shall be reduced in order to meet the objectives of the Paris Agreement. At the same time, ICT 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 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 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. Geneva, 2022) of the World Telecommunication Standardization Assembly (WTSA) and Resolution 673 (Rev. WRC‑12) of the World Radiocommunication Conference, should serve as a basis for the study of this Question.

* 1. **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. **ICTs and Biodiversity**

The United Nations COP 15 on Biodiversity, organised by the UN Convention on Biological Diversity, defined in 2022 a roadmap for beyond 2030 relatively to biodiversity. This COP gave birth to an engaging global agreement focused on several global goals by 2050 and built around 23 targets by 2030: this is the adoption of the Kunming-Montreal Global Biodiversity Framework by 196 nations. This agreement includes protection of 30% of the land and 30% of the seas by 2030 and the deployment of nature-based solutions to fight climate change.

During COP 15, the following foundational objective has been set: To halt and reverse biodiversity loss by 2030. This objective implies the need to be able to assess impact on biodiversity of human activities, including the impact from organizations.

Unlike many other products and services, Information and Communication Technology (ICT) distinguishes itself by its double-edged nature. Though the ICT sector is not one of the main sectors impacting biodiversity, it does have an impact through e.g. raw material extraction, increased production, contaminating disposal of end-of-life ICT equipment, land occupation and indirectly through greenhouse gas emissions generated.

However, at the same time, ICTs and digital technologies such as IoT, artificial intelligence, drones and satellite imagery can help monitor biodiversity and facilitate its protection and restoration through remote sensor networks, data gathering and management to promote the conservation of biodiversity.

1. **Question or issue for study**

There are a variety of issues that members will address under this study Question in the next four years. It is expected that the following steps for the study will play a major role in the future in order to meet the objective of 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 methodology for the implementation 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 own emissions and taking into consideration progress achieved 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‑12), 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 Recommendations adopted by ITU‑T as a result of the implementation of Resolution 73 (Rev. Geneva, 2022), both for monitoring changes in the climate and reducing the impact of climate change using the action plan in WTSA Resolution 44 (Rev. Geneva, 2022), 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.
6. Consider the role of ICTs towards a greener world post-COVID-19.
7. The role of ICTs and cutting-edge intelligent technologies like AI in reducing climate change-related disasters like flash floods and large-scale fires. (in collaboration with Q3/1).
8. The role of ICTs in monitoring and protecting Biodiversity worldwide and, in particular, in Biodiversity hotspots where the variety and richness of ecosystems is particularly high

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**QUESTION 7/2 Strategies and policies concerning human exposure to electromagnetic fields**

1. **Statement of the situation or problem**

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 study cycle from 2018 to 2021, 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: in March 2020, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) published an update to the ICNIRP (1998) Guidelines. The Institute of Electrical and Electronics Engineers (IEEE) also published the updated C95.1-2019 in October 2019. The 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.

1. **Question or issue for study**

The study Question will encompass workshops featuring subject-matter experts, administrations and Sector Members who can share expertise and experiences related to the topic; collection of case studies and input contributions related to the topic; and interactive discussions to allow the Question to compare experiences and identify lessons learned and best practices. Additionally, throughout the study cycle, the Question will continue to examine new wireless technologies, best practices in EMF management, harmonization of standards and risk communication, with priority focus on:

* Responding to EMF miscommunication
* Exposure in new EMF scenarios
* Examining the implementation of exposure limits via a broad range of country case studies, including on the ICNIRP (2020) Guidelines
* EMF aspects of new deployment methods of wireless equipment.
* 5G EMF
* EMF in low-altitude airspace and drone
* AI in EMF evaluation
* EMF in smart wearable devices

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1. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-2)
2. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-3)
3. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-4)
4. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-5)