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**Best practices on how countries can utilize ICTs  
to adapt to the effects of climate change**

Recommendation ITU-T L.1501

ITU-T



# Recommendation ITU-T L.1501

## Best practices on how countries can utilize ICTs to adapt to the effects of climate change

### Summary

Recommendation ITU-T L.1501 provides guidance on how information and communication technologies (ICTs) can help countries to adapt to the effect of climate change. It also provides a framework and a checklist for countries to integrate ICTs in their national climate change adaptation strategies. The recommendation is part of the ITU-T L.1500 series Recommendations on adaptation to the effects of climate change. It is designed to assist countries in integrating ICTs into their national climate change adaptation strategies.

The Recommendation describes the complexity of climate change and explains why countries need to adapt. It also describes the role of ICTs in helping countries respond to the effects of climate change by looking at how various sectors use ICTs; including the ICT sector. It is designed to be a guide for regulators and policymakers to minimize the impact of climate change and provides a '*multi-level framework for ICTs integration in climate change adaption*' to assist countries in integrating ICTs in their national climate change adaptation strategies.

### History

| Edition | Recommendation | Approval   | Study Group | Unique ID*                                                                   |
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Climate change, country-wide adaptation, ICT.

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# Recommendation ITU-T L.1501

## Best practices on how countries can utilize ICTs to adapt to the effects of climate change

### 1 Scope

This Recommendation considers how countries can utilize ICTs to adapt to the effects of climate change. It provides a framework for countries on how to integrate ICTs into their national strategies for adaptation to climate change.

A checklist is provided as an instrument for policymakers to ensure that they have the necessary pre-requisites to adapt the suggested framework in their national legislations, and enabling them to assess the adoption and implementation of the framework.

### 2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T L.1500] Recommendation ITU-T L.1500 (2014), *Framework for information and communication technologies and adaptation to the effects of climate change*.

### 3 Definitions

#### 3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

**3.1.1 climate change** [b-IPCC 2007] and [b-IPCC SPM]: Climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity. The Intergovernmental Panel on Climate Change (IPCC) uses a relatively broad definition, referring to a change in the state of the climate that can be identified (e.g., using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcing, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.

NOTE – The IPCC makes a distinction between climate change that is directly attributable to human activities, and climate variability that is attributable to natural causes. For the purposes of this report, either definition may be suitable depending on the context of analysis.

**3.1.2 climate change adaptation** [b-IPCC 2001]: Adaptation to climate change can be defined as the adjustment in ecological, social or economic systems in response to actual or expected climatic stimuli and their effects. It refers to changes in processes, practices and structures to moderate potential harm or to benefit from opportunities associated with climate change.

**3.1.3 deforestation** [b-UNFCCC Glos]: Those practices or processes that result in the conversion of forested lands for non-forest uses. This is often cited as one of the major causes of the enhanced greenhouse effect for two reasons: 1) the burning or decomposition of the wood releases carbon dioxide; and 2) trees that once removed carbon dioxide from the atmosphere in the process of photosynthesis are no longer present.

**3.1.4 enhanced greenhouse effect** [b-UNFCCC Glos]: The concept that the natural greenhouse effect has been enhanced by anthropogenic emissions of greenhouse gases. Increased concentrations of carbon dioxide, methane, and nitrous oxide, CFCs, HFCs, PFCs, SF<sub>6</sub>, NF<sub>3</sub>, and other photochemically important gases caused by human activities such as fossil fuel consumption, trap more infra-red radiation, thereby exerting a warming influence on the climate.

**3.1.5 eutrophication** [b-UNEP GEO]: The degradation of water quality due to enrichment by nutrients, primarily nitrogen and phosphorus which results in excessive plant (principally algae) growth and decay. Eutrophication of a lake normally contributes to its slow evolution into a bog marsh and ultimately to dry land. Eutrophication may be accelerated by human activities that speed up the aging process.

**3.1.6 global warming** [b-IPCC 4th AR]: The increase in global average temperature due to the increase of atmospheric greenhouse gas (GHG) concentrations.

**3.1.7 maximum sustainable yield (MSY)** [b-OECD]: The yield corresponding to the level of maximum productiveness of the stock in stable conditions; the maximum average catch of a given stock which can be taken over the entire period of its exploitation.

**3.1.8 water cycle** [b-OECD]: The water cycle is the sequence of climatological events. The heat of the sun evaporates water from land and water surfaces; vapour, being lighter than air, rises until it reaches the cooler upper air level where it condenses into clouds; further condensation produces precipitation that falls to earth as rain, sleet or snow; some of the water is retained by the soil and some run—off returns to rivers, lakes and oceans.

**3.1.9 wetland** [b-UNFCCC Glos]: Land that stays flooded all or part of the year with fresh or salt water.

## 3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

**3.2.1 bioaccumulation:** Accumulation of toxic substances within an organism.

**3.2.2 biomagnification:** Accumulation of toxic substances along the food chain with the level of toxicity increasing at each trophic level.

## 4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

|      |                                           |
|------|-------------------------------------------|
| BOD  | Biochemical Oxygen Demand                 |
| CAF  | Cancun Adaptation Framework               |
| EPA  | Environmental Protection Agency           |
| GHG  | Greenhouse Gas                            |
| GIS  | Geographic Information Systems            |
| GOS  | Global Observation System                 |
| GPS  | Global Positioning System                 |
| ICT  | Information and Communication Technology  |
| IPCC | Intergovernmental Panel on Climate Change |
| MSY  | Maximum Sustainable Yield                 |
| NAP  | National Adaptation Plan                  |
| UNEP | United Nations Environment Programme      |

UNFCCC United Nations Framework Convention on Climate Change

UNPF United Nations Population Fund

## 5 Conventions

This Recommendation is in line with international conventions including; United Nations Framework Convention on Climate Change, 1992.

## 6 Overview of climate change adaptation

This clause offers a general overview of climate change adaptation including effects and possible impacts. Climate change is one of the major challenges that all countries face. It involves numerous stakeholders at the international, regional, national and community levels and entails the imperative need to foster collaboration among these stakeholders. The impact of climate change is likely to become progressively more significant in the decades to come [b-UNEP 2011].

Recently the effects of climate change seem to have grown quickly. In some cases, it might already be too late or too costly to cope with the impact by improving the hardware, e.g., by making various social infrastructures physically strong, resilient and highly durable. *"The earth's climate has already been altered to such an extent that mitigation (efforts to reduce the concentrations of greenhouse gases in the atmosphere) alone will be inadequate. Therefore adaptation (responding to the impacts of climate change) is increasingly necessary"* [b-UNPF 2013]. It is therefore extremely important to make the best use of ICTs in saving human lives and minimizing social damages and difficulties. Special attention should be given to remote and rural areas in developing countries where the social infrastructures and economic support are weak and thus effects and impacts of climate change could lead to worse damages than in cities and in developed countries.

Having recognized adaptation as one of the core pillars of global response to climate change (along with mitigation), there has been a rapid growth of interest in the subject and expansion in the development and implementation of adaptation projects. The UNFCCC addresses two fundamental response strategies to cope with climate change: mitigation and adaptation. While climate change mitigation aims at tackling and reducing causes of the climate change (e.g., GHG emissions and energy consumption), climate change adaptation aims at adjusting in ecological, social or economic systems in response to actual or expected climatic stimuli and their effects (e.g., surface temperature change, sea level raise, coastal wetland migration, increase in intense rainfall and increase in tornado, heavy rain, thunder and hail). The adaptation to such effects of climate change is realized, for example, by taking measures to reduce social infrastructure damages and/or facilitating opportunities.

ICT permeates every aspect of human endeavour and climate change adaptation is no exception. Leveraging and harnessing the immense potential of ICT will act as a force multiplier in increasing the impact of efforts to tackle climate change. In this context, ICT delivers innovative products and services that have a role to play at different stages of climate change adaptation processes. It can provide support in the process of information gathering, decision making, implementation and evaluation for climate change adaptation. For this purpose, ICT applications could support the delivery of particular adaptation actions in areas of vulnerability that are heightened by climate change impacts, including , water supply, food security, health services, ecosystem services and disaster management [b-IISD].

The ICT applications or tools used for the purpose of climate change adaptation should be developed with a holistic and integrated view of adaptive processes. This could incorporate mobile phones, internet application and mass media to foster adaptation at community, sectoral, national level and international levels [b-CDI 2012].

A supplement on ITU-T L.1500-series Recommendations will provide details on the effects and possible impacts of climate change.