ITU Regional Development Forum 2018 (RDF-ARB)

Algiers – Algeria, 12-13 Feb. 2018

Emergency communications and Climate change

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Session Objectives

This session will provide an overview on the trends related to emergency communications and climate change, but also, the related activities at the international level. It also provides an overview on how ICT could play a pivotal role in the different phases of disaster management, climate change monitoring, mitigation and adaptation. Algeria's key achievments on these topics will also be presented.

Trends and International Activities

Emergency communications

2006-2015 Annual average **Vs** 2016

Disaster Statistics

Economic Losses	>	138 Billion USD / 154 Billion USD
Occurence	>	395 / 342
Total deaths	>	22884 / 8733
Total people affected	>	441 / 569

Source: Annual Disaster Statistical Review 2016 The numbers and trends
Centre for Research on the Epidemiology of Disasters (CRED)

2006-2015 Annual average **Vs** 2016

Disaster Statistics (Continued)

Economic Losses

Occurence

Total deaths

Total people affected

- ✓ **Hydrological Disasters** (*Floods, landslides*)
- ✓ **Meteorological Disasters** (*Storms, Extreme temperatures)*
- ✓ **Climatological Disasters** (*Droughts , Wildfires)*
- ✓ **Geophysical Disasters** (*Earthquakes/Tsunamis, volcanic activities and mass movements of geological origin)*

Source: Annual Disaster Statistical Review 2016 The numbers and trends
Centre for Research on the Epidemiology of Disasters (CRED)

Emergency telecommunications

International activities

✓The Amateur Service provides a tool that allows disaster victims to report their situation to the outside world and to ask for rescue

✓United Nations Office for Disaster Risk Reduction (UNISDR) is the UN office dedicated to disaster risk reduction

✓OCHA uses all available means of telecommunication to monitor events and immediately alert the international community of the need to mobilize appropriate resources

✓UN-SPIDER is a programme within the UN that is designed to provide universal access to all types of space-based information and services relevant to disaster management.

✓ An international document which was adopted by UN member states, it sets four specific priorities for action & seven global targets

Emergency telecommunications

ITU actitivies

✓ The value of telecommunications **for helping people in need** is recognized **in the constitution** of the International Telecommunications Union (ITU) and each of its three sectors – the radiocommunication, standardization and development bureaus - have activities related to **early warning and disaster relief, article 40** states that ***"international telecommunication services must give absolute priority to all telecommunications concerning safety of life at sea, on land, in the air or in outer space"***

✓ **Article 5** of the the **ITRs** reinforces the constitution by stating that " ***Safety of life telecommunications, such as distress telecommunications, shall be entitled to transmission as of right and shall, where technically practicable, have absolute priority over all other telecommunications*** "

Emergency telecommunications

ITU actitivies (Continued)

✓ **The Tampere Convention on disaster relief** is an international treaty, that simplifies the provision of telecommunications equipment by other states for use in relief operations by waiving the regulatory requirements of the assisted state such as the need to obtain a license for radio frequency use and any restrictions that may apply to the importation of equipment

✓ **The Geneva Plan of Action adopted by WSIS in 2003** called for the strengthening and expansion of "*ICT-based initiatives for providing medical* ***and humanitarian assistance in disasters and emergencies***" *and the establishment of "monitoring systems, using ICTs, to forecast and monitor the impact of natural and man-made disasters, particularly in developing countries, least developed countries and small economies*".

✓ This commitment was reiterated in the **WSIS Tunis Agenda for the Information Society in 2005**

ITU actitivies on DR & NRR

Phases	Prepardness (Before disaster)	Response & Relief (during disaster)	Recovery & reconstruction
Disaster relief systems	Disaster Detection	Emergency Alert Evacuation assistance Safety Confirmation	Healthcare for victims
Network Resiliency & Recovery	Highly reliable Telecom Infrastructure	Emergency Telecommunication Telecommunication in disaster Area Temporary Telephone Services Communication network for rehabilitation	
Electric Power Supply	Highly reliable Power Supply Emergency generator & battery	Ensuring electric power supply including refuling method	

ITU actitivies on DR & NRR

Disaster detection

✓**Ubiquitous sensor network applications** and services studied by ITU-T Study Group 16 (Multimedia coding, systems and applications) can be used for the **early detection of natural disasters.**

✓ITU-T Recommendation L.81 (**Monitoring systems for outside plant facilities)** approved by Study Group 15 can also be useful for disaster detection.

Emergency alert

✓ITU-T Study Group 17 has developed the **Common Alerting Protocol (CAP),** which is a general format for exchanging **all-hazard emergency alerts** and **public warnings** over all kinds of networks.

Emergency telecommunication

✓ ITU-T Study Group 2 has developed Recommendation **E.161.1** related to Guidelines for selecting an **Emergency Number for public communications networks**. has also developed Recommendation **E.106** for an **International Emergency Preference Scheme for disaster relief operations (IEPS**) dealing with the prioritisation of calls during a disaster.

✓ ITU-T Study Group 11 has studied **Signalling Protocols for emergency telecommunication** and Multi-level precedence and a Pre-emption (MLPP) mechanism for public communications networks

ITU actitivies on DR & NRR

Telecommunication in disaster area

✓**Power Line Communication (PLC)** technology can be **applied easily to telecommunication in a disaster** area immediately after the power supply has been restored because PLC uses the same line for communication as that used for electrical power. PLC has been standardized as the ITU-T G.996x series in Study group 15 and IEEE standard 1901 for broadband communication, and has been discussed as smart grid technology in ITU-T FG-smart grid, IEEE P1901.2

Highly reliable telecommunication network

✓ Study Group 5 has studied the **protection of telecommunication equipment against lightning.** Study Group 15 is studying transport equipment functionality Recommendations to provide **survivability capabilities** as well as addressing multi-layer survivability interactions. The approved Recommendations are G.808.1, G.873.1 and G.8031 for linear protection, and G.808.2, G.873.2 and G.8032 for ring protection & Shared mesh protection.

Temporary telephone services

✓ Study Group 2 has developed Supplement E.Sup.1 that describes operational aspects for the implementation of E.164 country code 888 for E.1100 series Recommendations

ITU actitivies on DR & NRR

Disaster prediction & detection

✓ Disaster prediction and detection have been investigated by ITU-R Study Group 7 (Science services).

✓Meteorological aids, meteorological-satellite and Earth exploration-satellite services play a major

✓They include providing w**eather warnings and climate predictions, and the detection and tracking** of earthquakes, tsunami, hurricanes, typhoons, forest fires, and oil leaks

Emergency alert

✓ **ITU-R SG 5 (Terrestrial services)** & **ITU-R SG 4 (Satellite services**) have studied the use of amateur services for receiving and distributing **alert messages.**

✓ **ITU-R Study Group 6 (Broadcasting service)** has studied the use of terrestrial and satellite broadcasting services (radio, television, etc.) for **disseminating alerts** and **providing advice** to large sections of the public.

✓ ITU-R Study Groups 4 and 5 have also studied the use of mobile services (land, satellite, maritime services, etc.) for **distributing alerts** and advice to individuals.

ITU actitivies on DR & NRR

Evacuation assistance

✓ITU-R Study Group 7 has studied an earth exploration-satellite service for **assessing damages and providing information related to planning relief activities.**

Highly reliable telecommunication network

✓ITU-R Study Groups 4 and 5 have studied a **harmonized frequency channel plan** to **reduce frequency interference** and to maintain a **highly reliable telecommunication network.**

ITU-D

Question 5/2 Utilization of telecommunications/ICTs for disaster prepardeness, mitigation and response a report was published in the last study period

Other SDOs

highly reliable power supply and electric power (ISO/IEC)

✓ **A highly reliable power supply** and electric power distribution technology are being discussed by IEC technical committee 96 (Transformers, reactors, power supply units, and combinations thereof).

Some informational RFCs (IETF) in two specific technical areas were developed :
Requirements for Internet Emergency Preparedness in the Internet
&
Framework for Supporting Internet Emergency Preparedness in Internet Protocol (IP) Telephony

✓Established an IETF Working Group (WG) in the Real Time Applications and Infrastructure Area) to address **Internet Emergency Preparedness (IEPREP).**

Promising technologies

Local wireless mesh network system

✓ Based on decentralized mesh architecture and avoids total network blackout that is caused by damage to part of the network

Movable and deployable ICT resource unit (MDRU)

✓ The MDRU is a collection of information and communication resources that are packaged as an identifiable physical unit, movable by any of multiple transportation means, and can be deployed as a stand-in for damaged network facilities and so substitute for their functionalities.

Portable Emergency Communication System (PECS)

✓Have at least the following components ;
User terminals : Analogue and Digital Radios , Mobile Phones, Satellite Interfaces , IP based Integration Switch , Antennas , Power Units ,Accessories

Portable erbium-doped fibre amplifier (EDFA)

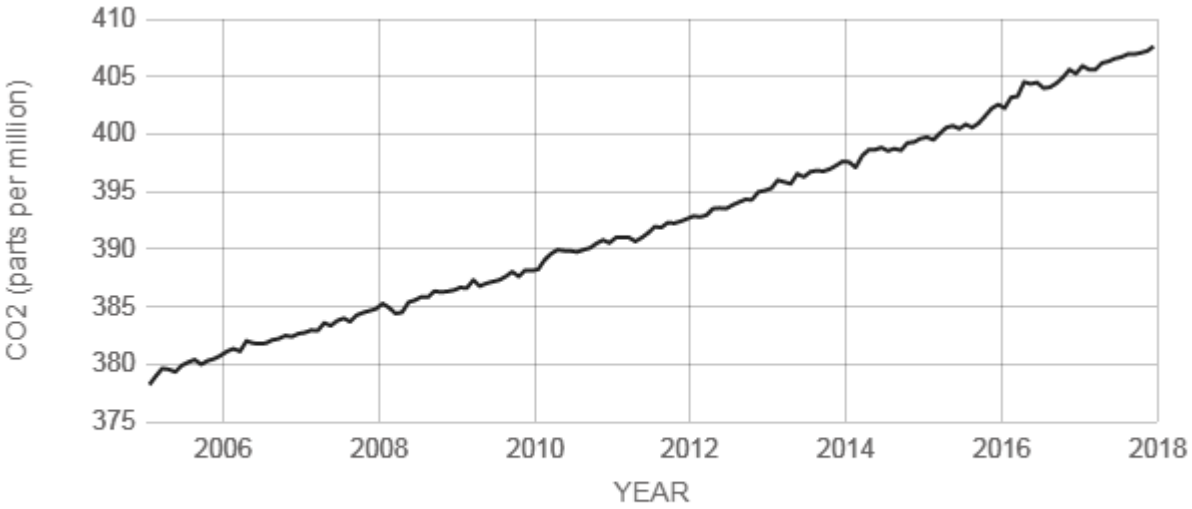
✓Can enable the swift reconnection of surviving fibre links to optical fibre networks or provide a means of bypassing any damaged network infrastructure

Trends and International Activities

Climate change

Trends in climate change

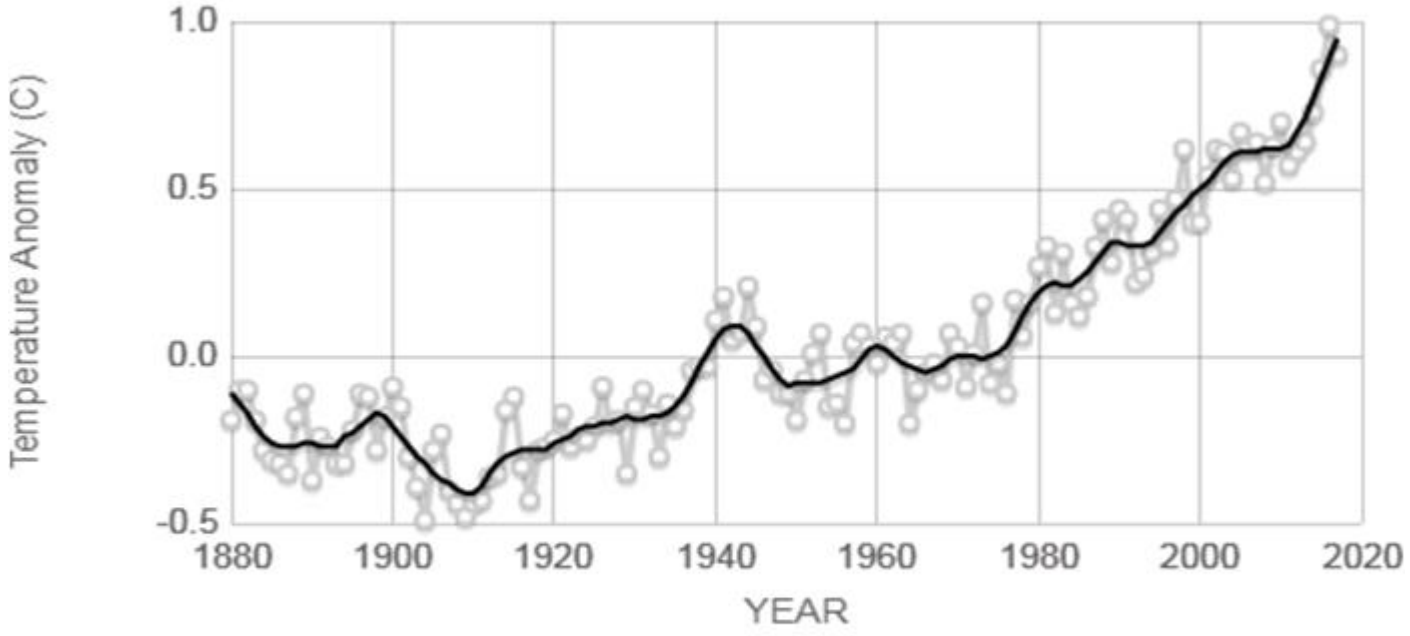
Carbon Dioxide > 407.62 ppm /Since 2005



Source: https://climate.nasa.gov/vital-signs/carbon-dioxide/

Trends in climate change (Continued)

Global Temperature > 0.99 °C



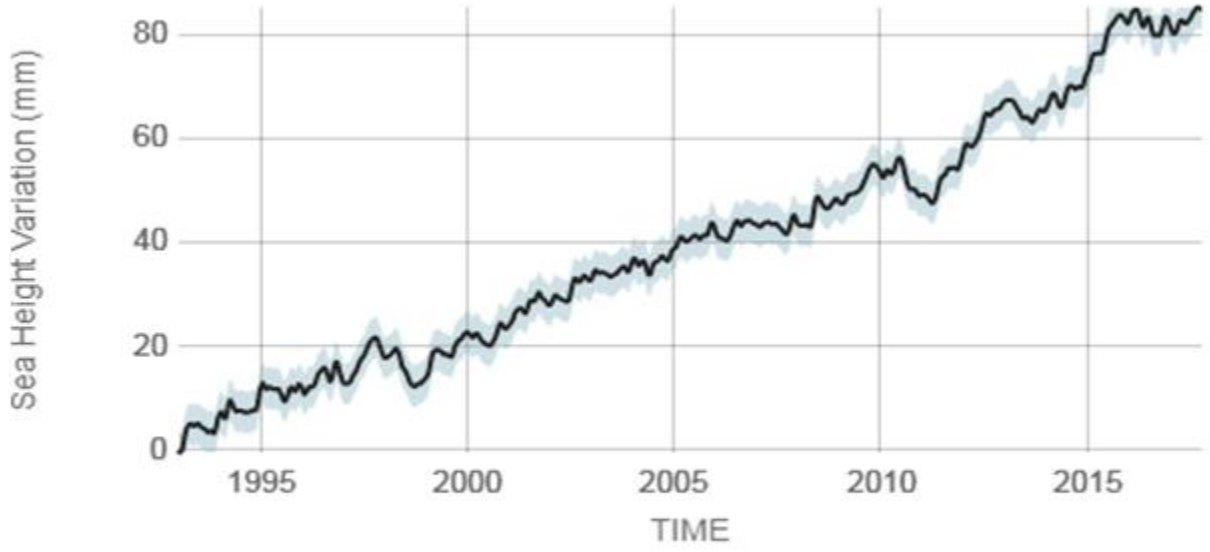
Source: https://climate.nasa.gov/vital-signs/global-temperature/

Trends in climate change (Continued)

Sea Level

82.8mm since 1993

3.2mm/ Year



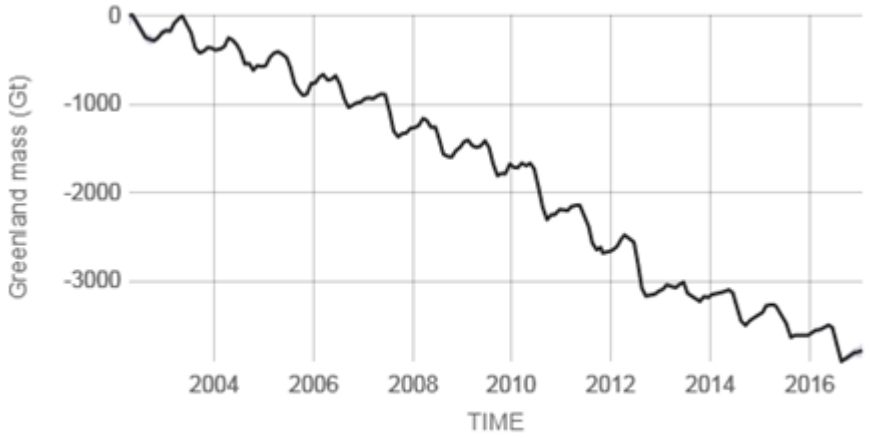
Source: https://climate.nasa.gov/vital-signs/sea-level/

Trends in climate change (Continued)

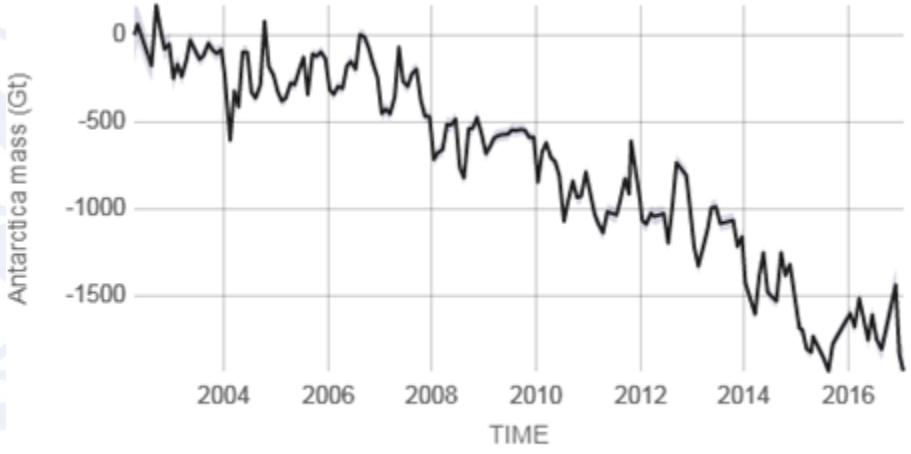
Land Ice

Earth's polar sheets have been losing mass since 2002

Greenland - 286 Gt/Year



Antarctica - 127 Gt/Year



Source: https://climate.nasa.gov/vital-signs/land-ice/

ICT for climate change

Terrestrial systems (weather-observing stations)

- ✓ Thermometers, Barometers,
- ✓ Hygrometers for measuring humidity;
- ✓ Anemometers for measuring wind speed;
- ✓ Pyranometers for measuring solar radiation;
- ✓ Rain gauges for measuring liquid precipitation

Satellite systems

- ✓ Meteorological aids, meteorological-satellite and Earth exploration-satellite service (EESS) play a major role
- ✓EESS data represent a veritable revolution in our understanding of the climate system, the most striking example of this being in relation to sea levels.

Marine systems

- ✓ **Moored and autonomous drifting buoys** have revolutionized the observing system capabilities and made a global system possible

ICT for climate change (Continued)

Submarine cables systems

✓ Discussions on developing a strategy and roadmap that could lead to enabling the availability of submarine repeaters equipped with scientific sensors for ocean and climate monitoring and disaster risk reduction (ex: tsunamis)

Airborne meteorological systems

✓ Weather balloons are launched twice daily, and continuously transmit weather telemetry to a ground station using something called a **radiosonde**

✓ **A dropsonde** is a special radiosonde that is launched from research aircraft and measures winds, pressure, temperature, and humidity while descending on a parachute

ITU actitivies in climate change

ITU Sectors

✓ ITU-R is responsible for identifying the necessary radio-frequency spectrum for climate monitoring.
✓ITU-T Study Group 5 has developed several Recommendations,
✓ITU-D report on Question 6/2 ICT & climate change was published

WSIS Action Line C7

✓ ITU's work on climate change and the environment is closely linked to the **WSIS Action Line C7**, Together with WMO and UNEP, ITU is the facilitator of this action line.

Connect 2020 Agenda

✓ Target 3.3: Green House Gas emissions generated by the telecommunication/ICT sector to be decreased per device by 30% by 2020

Collaboration with other Stakeholders

✓ several joint initiatives and partnerships with other UN agencies, organizations, governments, businesses, academia, local authorities and NGOs, **ITU-UNESCO/ IOC-WMO JTF, GeSI..etc**

The Sustainable development Goals (SDGs)

✓Ensure availability and sustainable management of water and sanitation for all

✓Ensure access to affordable, reliable, sustainable and modern energy for all

✓Ensure sustainable consumption and production patterns

✓Take urgent action to combat climate change and its impacts

✓Conserve and sustainably use the oceans, seas and marine resources for sustainable development

✓Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

✓ Make cities inclusive, safe, resilient and sustainable

International initiatives on climate change

✓ **UNFCCC** objective is to stabilize greehouse gas concentrations in the atmosphere at a level that would prevent human impact on environement interference with the climate system.

✓**The parties to the convention** have met annually in **Conferences of parties (COP)** to assess progress in dealing with climate change.

✓**WMO** publishes an annual Greenhouse Gas Bulletin, with details on atmospheric concentrations of long-lived greenhouse gases including carbon dioxide, methane and nitrous oxide.

✓ Cover a wide range of issues regarding the atmosphere, marine and terrestrial ecosystems, environmental governance and green economy.

✓ Dedicated to the task of providing the world with an objective, scientific view of climate change and its political and economic impacts

Climate change mitigation

Mitigation › **Reducing climate change**

involves reducing the flow of heat-trapping greenhouse gases into the atmosphere

Energy efficiency ›

- ✓ Green Data centers
- ✓ Metrics & measurment methods for; Telecommunication networks/equipments
- ✓ Metrics & measurmement for power and cooling equipement for telecommunications and Data centers

ICT for reducing GHG emissions ›

✓ Global reduction of 12Gt CO2e by 2030 foreseen in the SMARTer 2030 report results from an analysis of the impact of ICT enablement

Science based Targets ›

✓ Targets adopted by companies to **reduce GHG emissions** are considered "science-based" if they are in line with the level of decarbonization required to keep global temperature increase below 2°C compared to preindustrial temperatures, as described in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

Climate change mitigation (Continued)

The ICT centric approach

Energy ✓Abate **1.8Gt CO2e** ✓Generate **$0.8 trillion** in new revenue opportunities.

Food ✓Smart Agriculture could reduce water needs by **250 trillion liters and abate 2.0Gt CO2e**

Health ✓ ICT could deliver E-Health services to **1.6 billion people** across the developing and developed world.

Learning ✓ Expectations **450 million E-Learning participants** in 2030, helping to raise incomes by 11%

Building ✓ Cut **2.0Gt CO2e** from the housing sector, **reducing energy costs by $0.4 trillion** and creating **revenue opportunities of $0.4 trillio**n.

Mobility & logistics ✓ smart logistics, and other ICT enabled solutions could **abate 3.6Gt CO2e,**

Work & Business ✓ E-Work could add **$0.5 trillion** while freeing up 100 hours per E-Worker annually

Manufacturing ✓ Smart manufacturing could abate **2.7Gt CO2e.**

Climate change adaptation

The framework for ICT & adaptation to the effects of climate change

Country's utilization of ICTs to adapt to climate change

✓Countries can utilize ICTs to adapt to the effects of climate change.
✓ **ITU-T L.1501** defines the framework for countries to integrate ICTs into their national strategies for adaptation to climate change

Adapting ICTs to climate change

✓ ICT need to be both robust and resilient
✓Planning or upgrading ICT infrastructure to adapt to the effects of climate change.

Use of ICTs to climate change adaptation in cities

✓**ICTs can play in helping cities to adapt to climate change.**
✓Urban stakeholders need to consider novel approaches to integrate the use of ICTs in climate change adaptation strategies and policies

Climate change adaptation (Continued)

The case of the agricultural sector

ICT to monitor site conditions including land use planning

✓**geographic information systems (GIS)** and **remote sensing (RS) technologies** represent two key tools for land planning and management

Computer modelling and agricultural forecasting

✓Modelling the weather for agricultural forecasting

✓Computer modelling is also used to calculate water and fertilizer requirements

ICT to promote knowledge sharing and improve management

✓integrating ICT into irrigation management

ICT for risk management

✓Providing early warning systems to mitigate risks

ICT to distribute climate-smart agricultural information to/from farmers

✓mobile information services to push information on climate-smart agriculture to farmers

✓Mobile technology to collect data

ICT for automatic control of greenhouses

✓sensing networks and information processing systems enables automatic control

How these trends can be reflected into this RI?

What's needs to be done

1- Collaboration/Cooperation

- ✓ Regional collaboration
- ✓ Exchange best practises & use cases
- ✓ ITU role as a facilitator between regional countries to enhance cooperation among theme.
- ✓ Joint coordination activities among regional countries in common issues

What's needs to be done
2- Capacity building

✓ Training is a key

✓ workshops/seminars to rise awarness about issues related to emergency communications and cliamte change

✓ the role of ICT in those issues

✓ Work on how to implement the Case studies, reports, recommendations published

What's needs to be done

3- Trageting projects

✓ Targeting specific ICT projects that reflect coutry's realities

✓ Initiating projects at the early stages ex; **early warning projects** for emergency communications, **remote sensing** with radio communication systems for climate change

✓ Monitor these projects

Key acheivments in Algeria

The 2020 Algeria's National Space Programme

• The **ALSAT** Program (*Earth observation, disaster monitoring.*)

In missions :

✓Alsat -2 (*Alsat-2A / Alsat-2B*)
✓Alsat-1B (*Micro-satellite*)
✓Alsat-1N (*Nano-satellite*)

Mission ended:

✓Alsat-1 (*The First Algerian EESS part of DMC* ***« Disaster Monitoring Constellation »*** *constellation*)

• The **Alcomsat-1** satellite

✓The first GSO telecommunication satellite system, provides; ***Internet access***, ***boradcasting services, telephony & emergency communication***.

The Alsat satellites in assessing damages & disaster detection

Flooding

The satellite imaging showed all its importance in the organization of the help;

✓**Evaluation of the damages** of the concerned regions
✓ **Prevention** by the mapping(cartography) of flood-risk areas and sizing of the devices of fight against the floods.

Forest fires

✓ **The images have monitored the forest fires** & used to refine the demarcation of the surfaces traveled by the fire
✓ It has helped **to evaluate the impact** over the affected region.

Infrastructure Security: The ORSEC plan in Telecommunications

The Terrestrial infrastructure

✓Composed of two solutions;

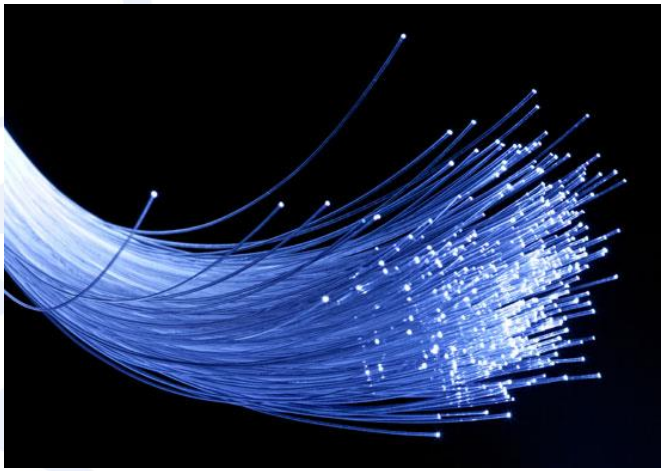
- The first relies on connecting subscribers via a system of **Wireless towable containers based on WLL- CDMA** technology.
- And the second relies on **a wired system** (3000 wire lines)

✓Deployed in eight national regions

The ORSEC plan in Telecommunications (Continued)

The submarine Infrastructure

✓ The Orval system, an over 560 km fiber-optic undersea cable that will link Oran in Algeria to Valencia, Spain.



✓The system supports 100-Gbps wavelengths and a design capacity of 20 Tbps.

✓This speed and capacity will facilitate the delivery of broadband services to an estimated 42 million Internet users in Algeria and Spain.

The ORSEC plan in Telecommunications (Continued)

The Space Infrastructure (Alcomsat-1)

✓ Provide services, including telecommunications, broadband internet, audio transmission, broadcast and television, satellite-based navigation, remote education, as well as enterprise and **emergency communications.**

✓The coverage areas include Algeria, Sahel, and other regions in North Africa

✓Incorporates a total **of 33 transponders including ;**

- **19 Ku-band** (*9 are used to broadcast TV and digital radio channels, while the remaining are used to provide communications in North African regions, at speeds of 2Mbps*)
- **12 Ka-band** transponders,
- **02 L-band** transponders

Future visions of the ORSEC plan

✓ New approach aims at optimizing and improving the implementation of ORSEC plan, to ensure the fast and efficient management during a disaster

✓New technological solutions

✓Setting up the ORSEC command, control center, and an Information System for Management of risks.

✓The new ORSEC plan, will allow to effectively improving management of crisis assist with decision, to implement emergency plans, and strengthen local capacity for response

Thank you