Climate Information for Sustainable Development under the Climate Change

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Global Change

- Population
- Surface Temperature
- CO2 concentration
- Energy Consumption
- Globalization
- Loss of rainforest
- Species extinctions
Sustainable Development Goals

To end all forms of poverty, fight inequalities and **tackle climate change**, while ensuring that **no one is left behind**.
Sustainable development through Low carbon economy

• Transform industrial activity more efficient and energy effective

• Less resource intensive industry

• “SMARTER” (Innovative) economy in all senses
  • Requires change in conventional socioeconomic activity
No one left behind

- The most vulnerable
- The least developed
- With minimal capacity

Development though “smarter” economy is more urgent but even more challenging where socioeconomic basis is fragile to environmental change
**Climate Impacts on the LDCs**

- **Direct cause (Disaster)**
  - Tropical cyclones
  - Heavy rainfalls
  - Heat waves
  - Droughts (!)

- **Indirect cause**
  - Famine, Water issues
  - Epidemics

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**Syrian civil war**

**Drought**

**Migration to urban area**

**Increase instability**

**Conflicts**

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**Middle East Drought That May Contribute to Syrian War is Worst in 900 Years, Study Says**

Source: TIME

**Armed-conflict risks enhanced by climate-related disasters in ethnically fractionalized countries**

Source: PNAS
Climate Impacts on the LDCs

• Unfavorable weather conditions deteriorate the emergency situation and response actions


Still 55000 people are in the camp (2016)
2.5 million Haitians need humanitarian aid.

Cholera outbreak (2010)
Climate

- Expected environmental condition of lives on earth

\[
\text{Climate} = \text{Expectation}
\]
Climate Change

Climate Change = Change our Expectation!

Low carbon economy
Change expectation?

Change Your Expectations and Find Your Happiness

Climate prediction
Climate change and variability

- Climate Change: long-term
- Climate Variability: short-term (related with extreme weather/hazards)

- Changing characteristics of climate variability is a key of climate change
Tackling Impact of climate change

• Is mostly experienced via extreme weather events (variability)

• If we have some info on such variability, we may react as we “expected” : climate prediction
  • Smart decision making using climate prediction information

• Converting climate information on current climate variability to action : no-regret and resource effective measure to tackle climate change and to achieve sustainable development goals

• no emission!
Seasonal prediction

• Target: seasonal weather statistics with a few months lead time
  • Mostly, seasonal or monthly mean Temp. or Prec.

• Why we do this? : for planning
Every month, many NHMSs and climate centers regularly generate seasonal forecast for next 3-9 months.
Global Framework for Climate Services

Make climate information available for decision making

User Interface Platform
Users can make their voices heard through the Platform and make sure climate services are relevant to their needs.

Climate Services Information System
The production and distribution system for climate data and information products that address user needs.

Observations and Monitoring
The essential infrastructure for generating the necessary climate data.

Research, Modeling and Prediction
To advance the science needed for improved climate services that meet user needs.

Capacity Development
It will support the systematic development of the institutions, infrastructure and human resources needed for effective climate services.

Priority areas
- Agriculture and food security
- Disaster risk reduction
- Energy
- Health
- Water
Climate Services Information system

Currently “working” information flow is seasonal prediction.
Current capability: ocean origin skill

Able to produce reliable information in some area (tropics) and ENSO limitation in predicting local climate condition
Application of climate prediction

- Application forecast model

Seasonal Climate Forecasts
  up to 3m lead
  • temp., prec., ...

Spatial/Temporal Downscaling

Rice Pest Model

Process-based/Empirical Models

Seasonal Pest Outlook

Source: K.h. Kim (APCC)

Seasonal Streamflow Forecasts
Date: November 2017–January 2018

Source: BoM

Seasonal forecasting of fire over Kalimantan, Indonesia

A. C. Spessa\textsuperscript{1,19}, R. D. Field\textsuperscript{2,13}, F. Pappenberger\textsuperscript{4,5,6}, A. Langner\textsuperscript{7}, S. Englhart\textsuperscript{8}, U. Weber\textsuperscript{9}, T. Stockdale\textsuperscript{8}, F. Siegert\textsuperscript{4,13}, J. W. Kaiser\textsuperscript{4,10,11}, and J. Moore\textsuperscript{12}

National Implementation of Climate Services

• Each country has “Met. Services” (provider)
• Increasing perception on extreme weather (user)
• Climate related Risk Management (goods)
  ⇒ using Climate information for benefit

• Public sector driven but Public-Private partnership is essential
Summary and conclusion

• Sustainable development needs “smarter” activity
  • More effective use of resources
  • No-regret measures to tackle climate change

• Climate Variability is a key man to deal with (in particular, developing countries)

• Climate prediction (seasonal prediction) is settled down as a usable climate information

• Using climate prediction in other sector is widely attempted and may be possible (but needs more efforts)
  • Well aligned with SD

• Relatively good setting for National Implementation

• Worth to pay more attention!
Thank you