



Water and climate/environmental change: addressing current and future challenges

A Real Property of the

Antonello Provenzale CNR IGG and CIMA Research Foundation

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Luca Ferraris, Marina Mantini, Marco Massabò, Roberto Rudari (CIMA Research Foundation), Edyta Wosniak, Małgorzata Jenerowicz-Sanikowska (CBK PAN) The increase of atmospheric CO₂ concentration generated by anthropic emissions led to:

- Temperature increase (about 1.4 °C over land in 100 years)
- Higher evapotranspiration
- Higher energy in the atmosphere (intense events)
- Changes in the distribution of precipitation



Winter precipitation: (1981-2010) – (1951-1980)

Turco et al, GRL 2015

Less precipitation, more evaporative demand: higher probability of droughts



Risk of Drought Impact for Agriculture (RDrI-Agri) 2nd 10-day period of August 2021 JRC Global Drought Observatory (GDO) of the Copernicus Emergency Management Service

Impact on food security, hygiene and sanitation, access to resources Gender-associated differences in impact An environmental factor aggravating current geopolitical tensions

Challenges to be addressed:

• Water management in conditions of resource scarcity and high interannual variability (the examples of river Jordan, irrigation in Morocco, aquifer recharge)

- Risk reduction strategies for intense and localized precipitation events and sudden flood events
- Social, environmental and geopolitical consequences of climate-induced stresses and impact of human displacements

modified Copernicus Sentinel data (2015-2016), processed by Land Cover CCI, ESA

Crop growth as an indicator of the amount of water used for the irrigation of a crop. Contribution of remote sensing

- Food security and water management issues:
- towards intelligent management tools
- Crop growth monitoring: case of potato in Morocco
- Remote sensing and modelling methods



Specific objectives:

- Optimization of the use of the water
- Control of irrigation in the area
- Support of control and payment systems



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Multi-Hazard Risk Profiles

Scientific Modelling for Probabilistic Risk Assessment

Bring Risk Information closer to Decision Makers and practitioners



UNDRR - CIMA Research Foundation as part of the Programme: Building Disaster Resilience to Natural Hazards in Sub-Saharan African Regions, Countries and Communities.



www.riskprofilesundrr.org



Example: Floods



Use of Risk Profiles – Guidelines





UNDERSTANDING RISK



PREVENTION THROUGH RISK INTEGRATED DEVELOPMENT

UNDRR

UNDRR - CIMA Research Foundation as part of the Programme: Building Disaster Resilience to Natural Hazards in

Sub-Saharan African Regions, Countries and Communities.

Recent applications of the Risk Profiles





Food Security





Impacts on vulnerable components



Displacement and migration

UNDRR - CIMA Research Foundation as part of the Programme: Building Disaster Resilience to Natural Hazards in Sub-Saharan African Regions, Countries and Communities.







The project outcomes will be published on the developed "Online Geo-platform" including both the geospatial information and the informative reports and additional descriptive data

ARICA

A multi-directional analysis of refugee/IDP camp areas based on HR/VHR satellite data

Polish-Norwegian research project financed under Norway Grants the "Applied Research" program Project Leader :

dr Małgorzata Jenerowicz-Sanikowska, CBK PAN

https://arica.gridw.pl/en

The ARICA outcomes will all be available for students, researchers and stakeholders as a reference point for any activity affiliated with refugee/IDP camp's inhabitants interaction with environment documentation.



Further expanded in the EU project **EOTIST**, funded by EU grant 952111 involving CBK PAN, CERTH, CREAF, CNR









Field measurements, remote sensing, digital twins and permanent education:

- Field measurements in collaboration with local scientists and supporting partecipatory planning
- Remote sensing: Sentinels using multi-sensors
- Modeling: develop simplified water resource / ecosystem / societal models able to estimate future conditions and the effects of specific management and adaptation strategies
- Education and partecipatory actions

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