

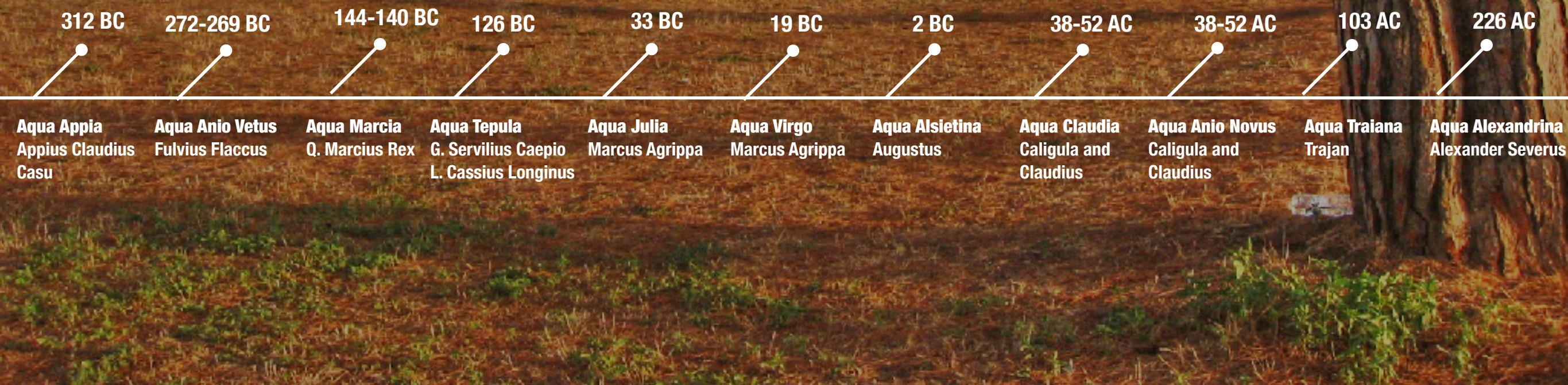
A customisable drought monitoring and seasonal forecasting service to support users' needs

Massimiliano Pasqui, IBIMET-CNR

Acknowledgements:

Elena Rapisardi, Ramona Magno, Tiziana De Filippis, Leandro Rocchi and Edmondo Di Giuseppe

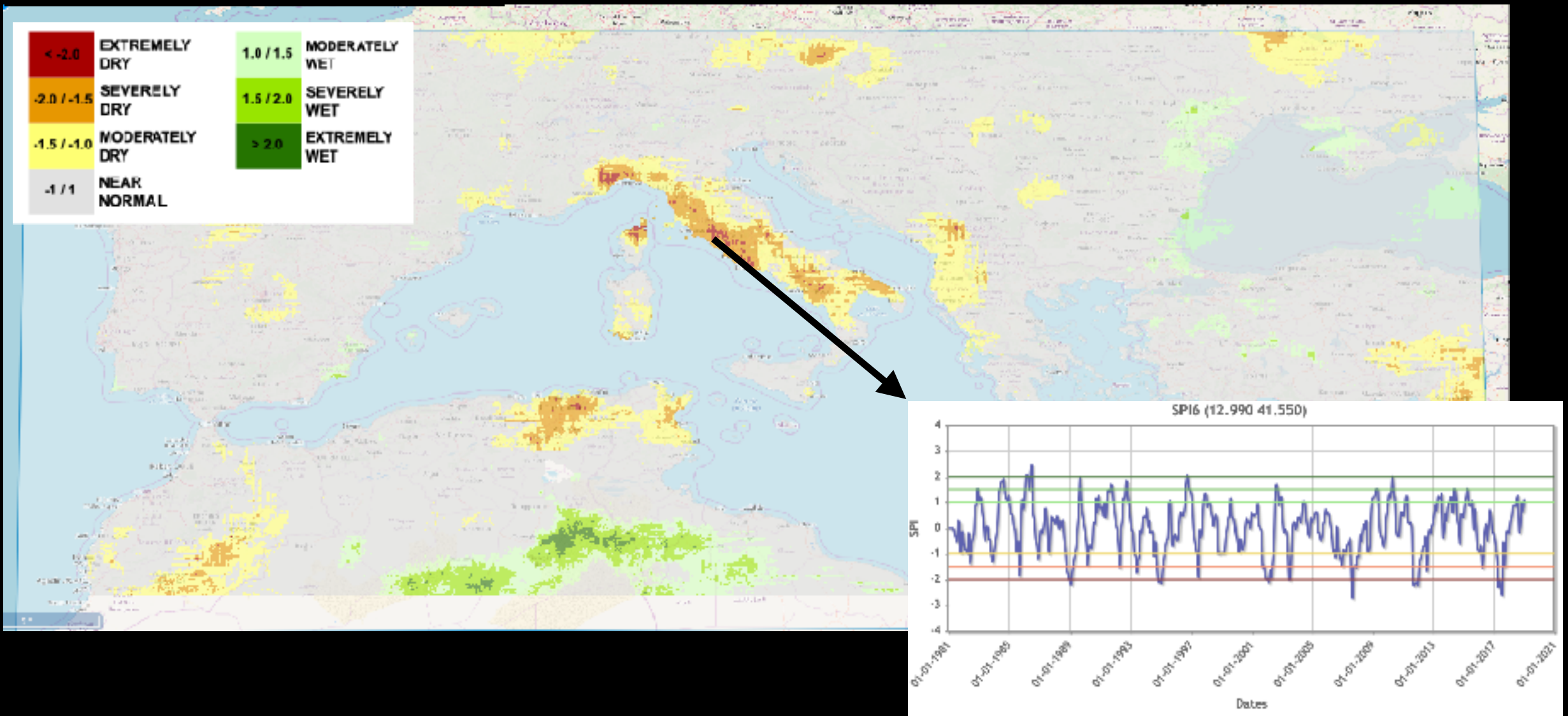
It is generally agreed that the city of ancient Rome had eleven major aqueducts built between 312 BC and AD 226 and possibly a few minor aqueducts, probably between eight and twelve in number. (Dembskey, E. J. 2009).



ROME (2017)

... after 2770 years, *ab urbe condita*, we “discover” the drought...

SPI6-Jun2017



ROME (2017)

... in the middle of an emergency phase, as usual!

SICCITÀ ROMA



22 MARZO 2018

"Prelevi liberi dal lago di Bracciano": Raggi con Acea, Comuni in rivolta

di CLEMENTE PISTILLI



04 SETTEMBRE 2017

Acquazzoni e città in tilt ma oggi Acea decide sul razionamento idrico a Roma

di VALENTINA LUPIA



31 AGOSTO 2017

Rubinetti a secco a Roma, ecco il "cervellone" Acea per gestire l'emergenza acqua

di LAURAMARI



30 AGOSTO 2017

Emergenza acqua a Roma, rubinetti a secco tra taniche e autobotti

di SALVATORE GIUFFRIDA



29 AGOSTO 2017

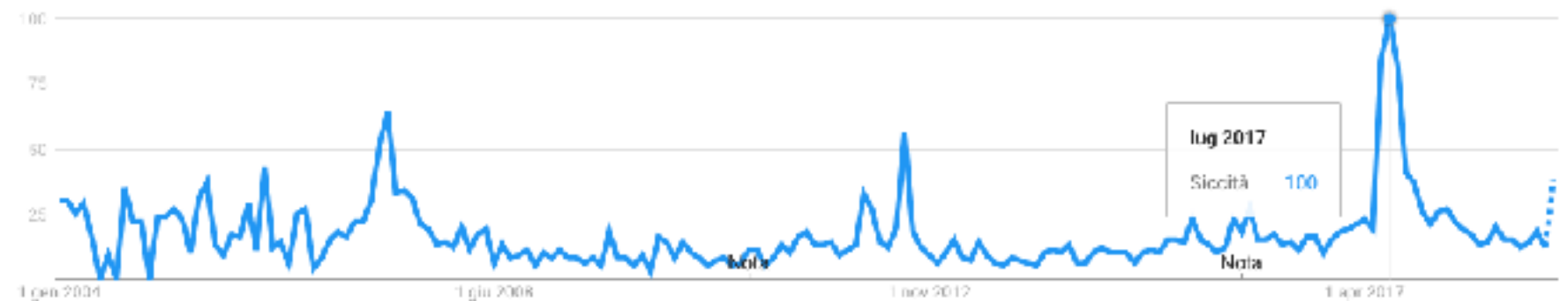
Siccità, danza della pioggia per l'acqua di Roma

di STEFANO COSTANTINI



29 AGOSTO 2017

Emergenza acqua, 20 avvisi di garanzia per captazione abusiva del lago di Bracciano



GOOGLE TRENDS

THE BURNING QUESTIONS

Are we, as scientists, really addressing users' needs in drought management?

What about the information chain between data purveyors/providers and endusers?

Is the information trustable/usable enough?





The **climate change** challenge is **unprecedented** for humanity and it requires a **deep change** in the way of thinking and acting at different levels



The climate scientist James Hansen has called two-degree warming “a prescription for long-term disaster.”



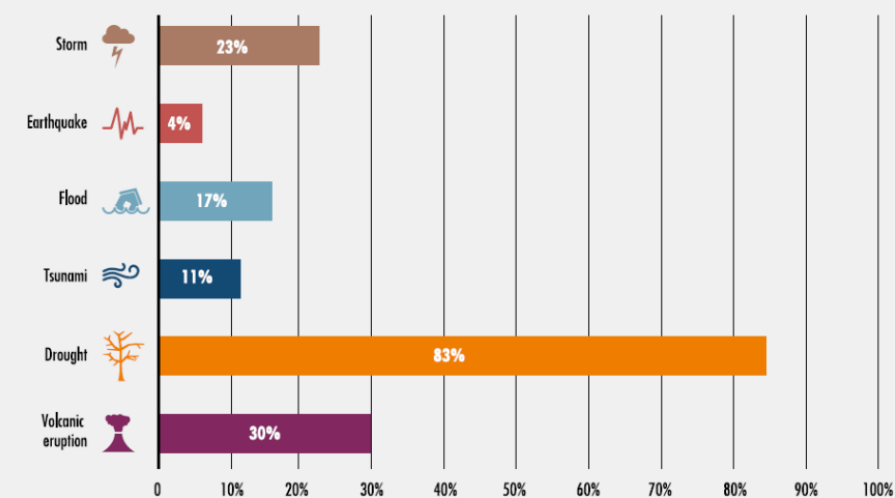
Three-degree warming is a prescription for short-term disaster.

[NWTimes.com]

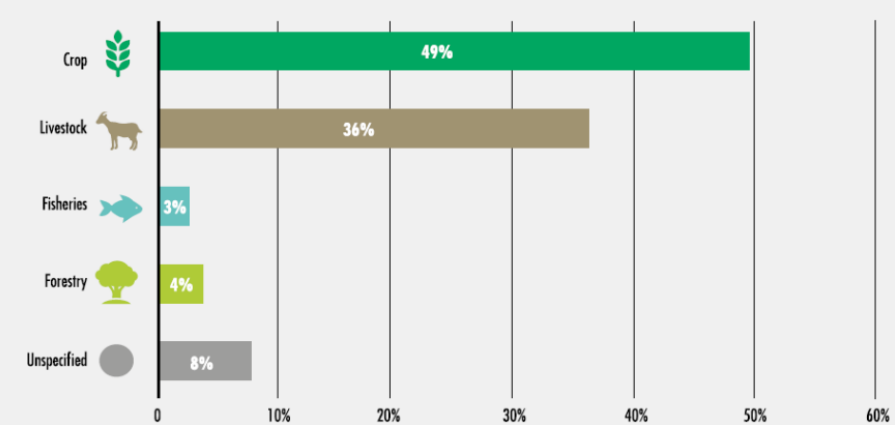
Losing Earth: The Decade We Almost Stopped Climate Change By Nathaniel Rich
Photographs and Videos by George Steinmetz
AUG. 1, 2018

FIGURE 30
CROP AND LIVESTOCK SUB-SECTORS INCUR THE HIGHEST DAMAGES AND LOSSES IN AGRICULTURE DUE TO CLIMATE-RELATED DISASTERS, OF WHICH DROUGHT IS THE MOST DESTRUCTIVE, 2006–2016

A) DAMAGE AND LOSS IN AGRICULTURE AS SHARE OF TOTAL DAMAGE AND LOSS ACROSS ALL SECTORS BY TYPE OF HAZARD



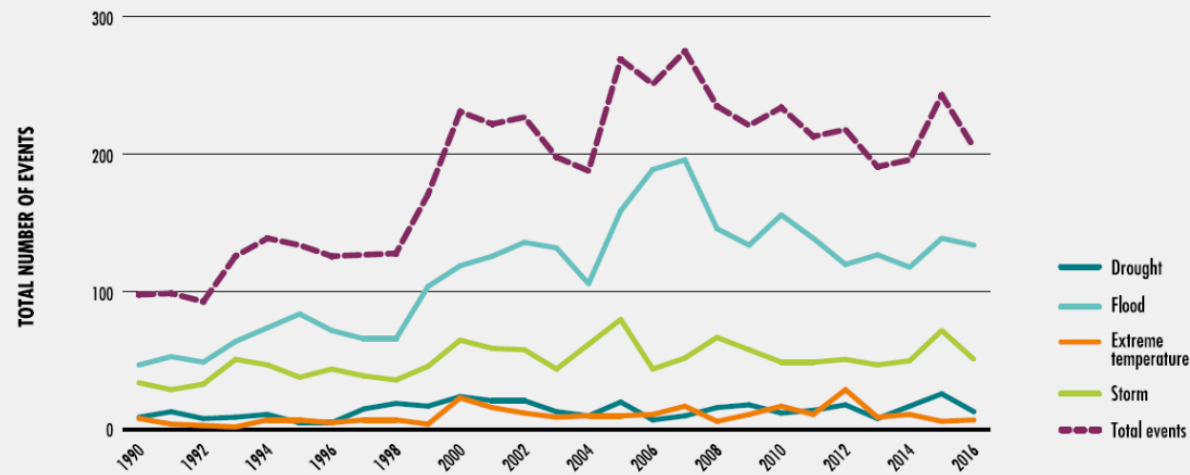
B) DAMAGE AND LOSS IN AGRICULTURE BY AGRICULTURAL SUB-SECTOR, PERCENTAGE SHARE OF TOTAL



NOTES: FAO, based on Post Disaster Needs Assessments (PDNA), 2006–2016. The sectors of fisheries, aquaculture and forestry often are under-reported. Impact of disasters is generally acknowledged in assessments, although rarely quantified in monetary terms.

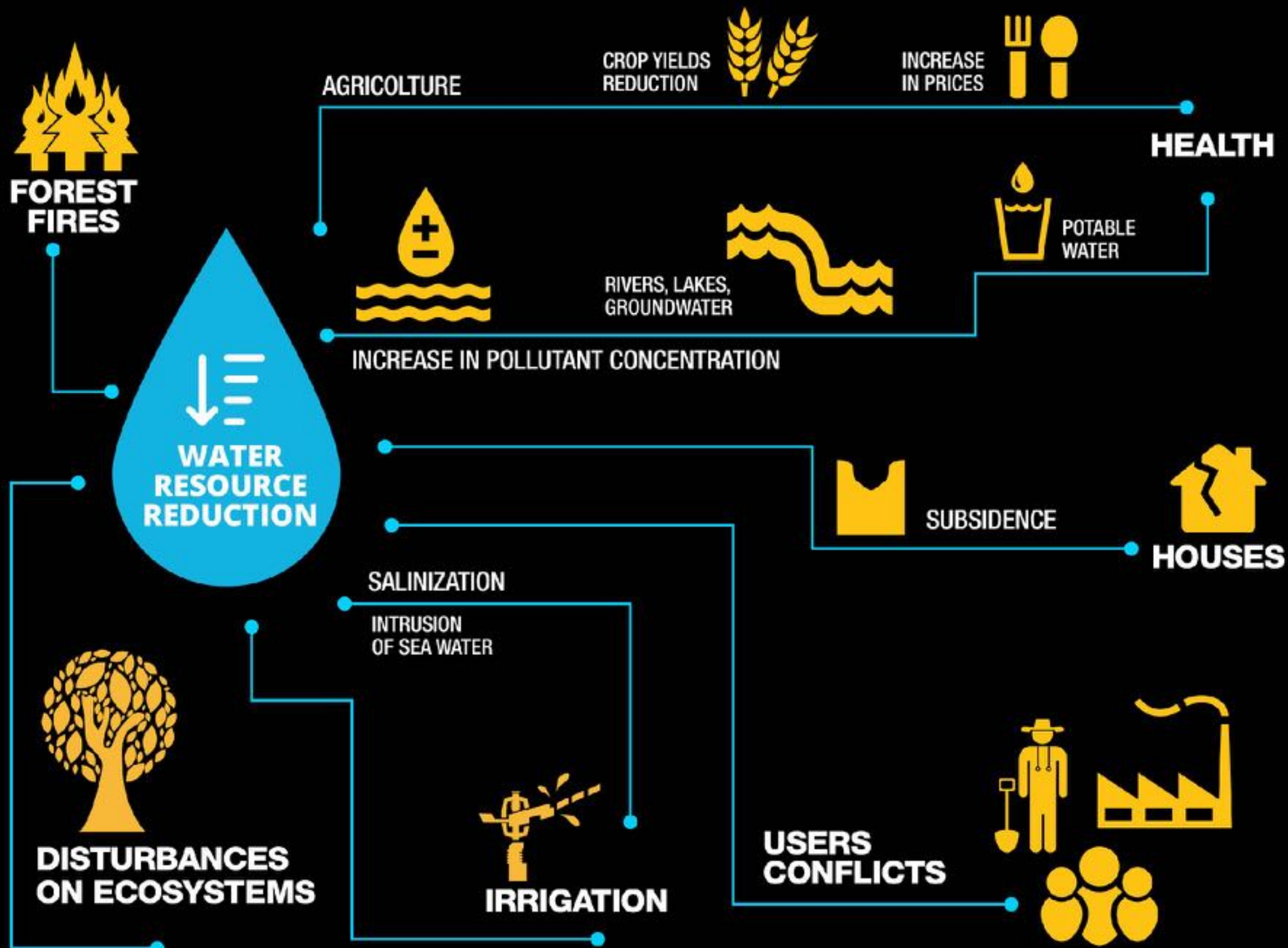
SOURCE: FAO. 2018. *The impact of disasters and crises on agriculture and food security 2017*. Rome.

FIGURE 15
INCREASING NUMBER OF EXTREME CLIMATE-RELATED DISASTERS, 1990–2016



The rising incidence of **weather extremes** will have increasingly negative impacts on **agriculture** because critical **thresholds** are already being **exceeded**.

Drought causes **83%** of all damage and loss to agriculture and **86%** to livestock (FAO).



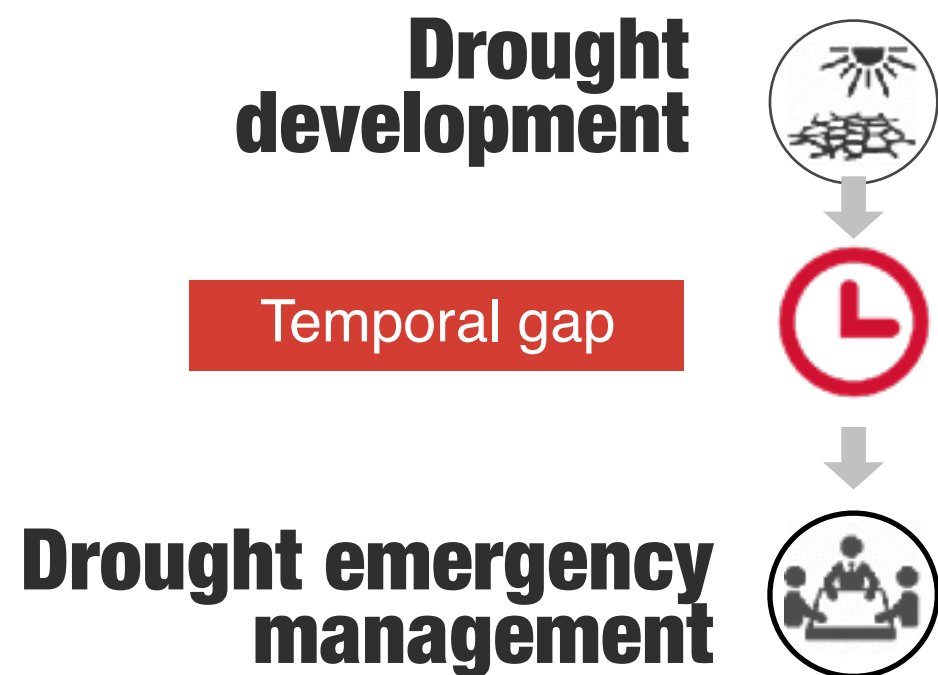
Content Design: Ramona Magno - Visual Design: Elena Rapisardi

Icons by the Noun Project: Garrett Knoll, Richard Cordero, Korawan M., Nikita Kozin, Jason Diworth, Richard Pasqua



As drought is a slow onset disaster, it is a powerful paradigm and training ground to test and develop new climate change resilience strategies.

BE PREPARED?



How to improve
Preparedness?

Proactive Solution

Preparedness

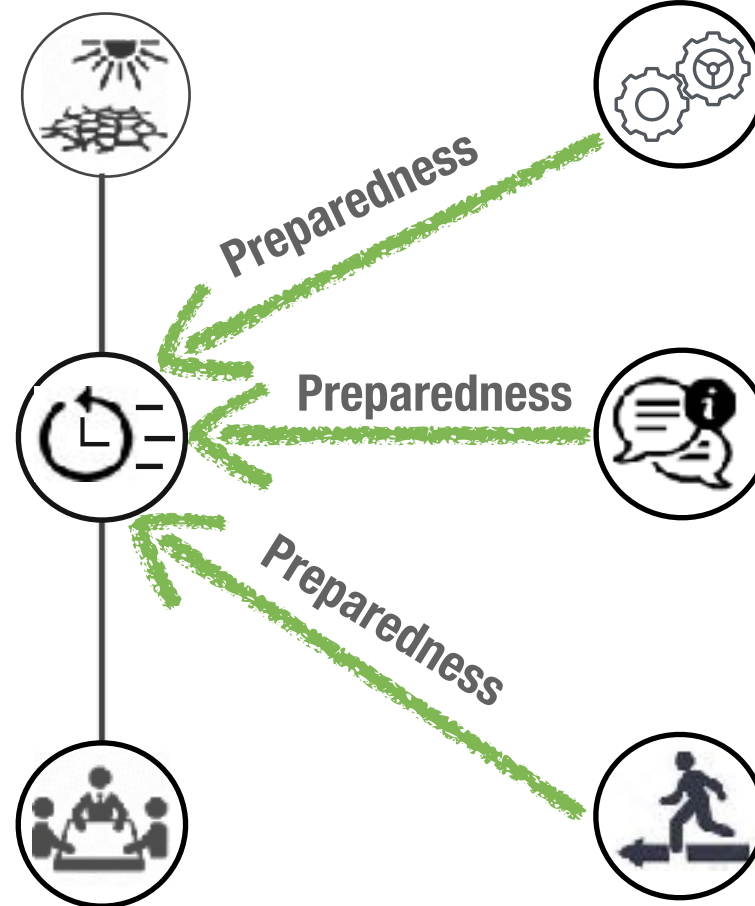


Measures which enable governments, communities and individuals to respond rapidly and effectively to disaster situation

Drought development

Using the temporal gap

Drought emergency management



Implementing an integrated system of monitoring and forecasting drought status and water resource availability

Providing **simple** and **timely information** on current and expected drought conditions.

Support decision making process to reduce impacts

To cope with and mitigate drought, it is essential:

To rely on **formal and informal cooperation** among national, regional and local partners that *share data and drought-related products and technologies*



To determine drought severity and its spatial extent, **observing current and future conditions** (precipitation, temperature, soil moisture, vegetation health, streamflow, reservoirs levels, etc.)



To **share no-cost and ready-to-use data and tools** between research institutions, government agencies, water authorities and general users (**open-data and interoperability**)



To **communicate the information** to decision makers and other stakeholders in a **timely** manner and **appropriate formats**

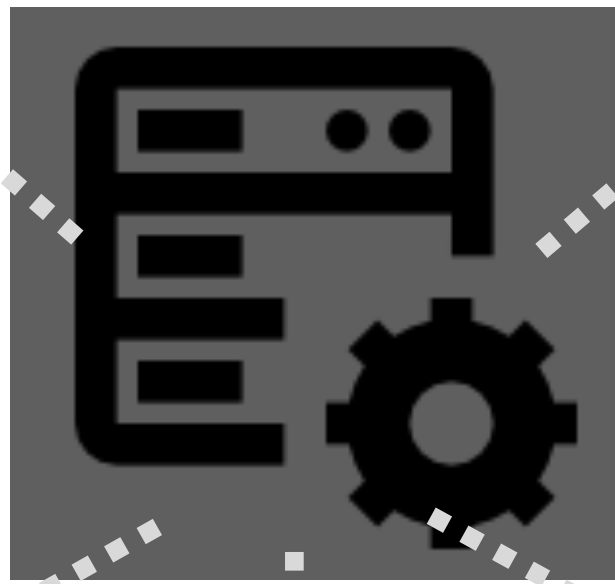




Water Authorities



Decision Makers



Farmers



Stakeholders



Researchers



monitoring and forecasting
to reduce response time

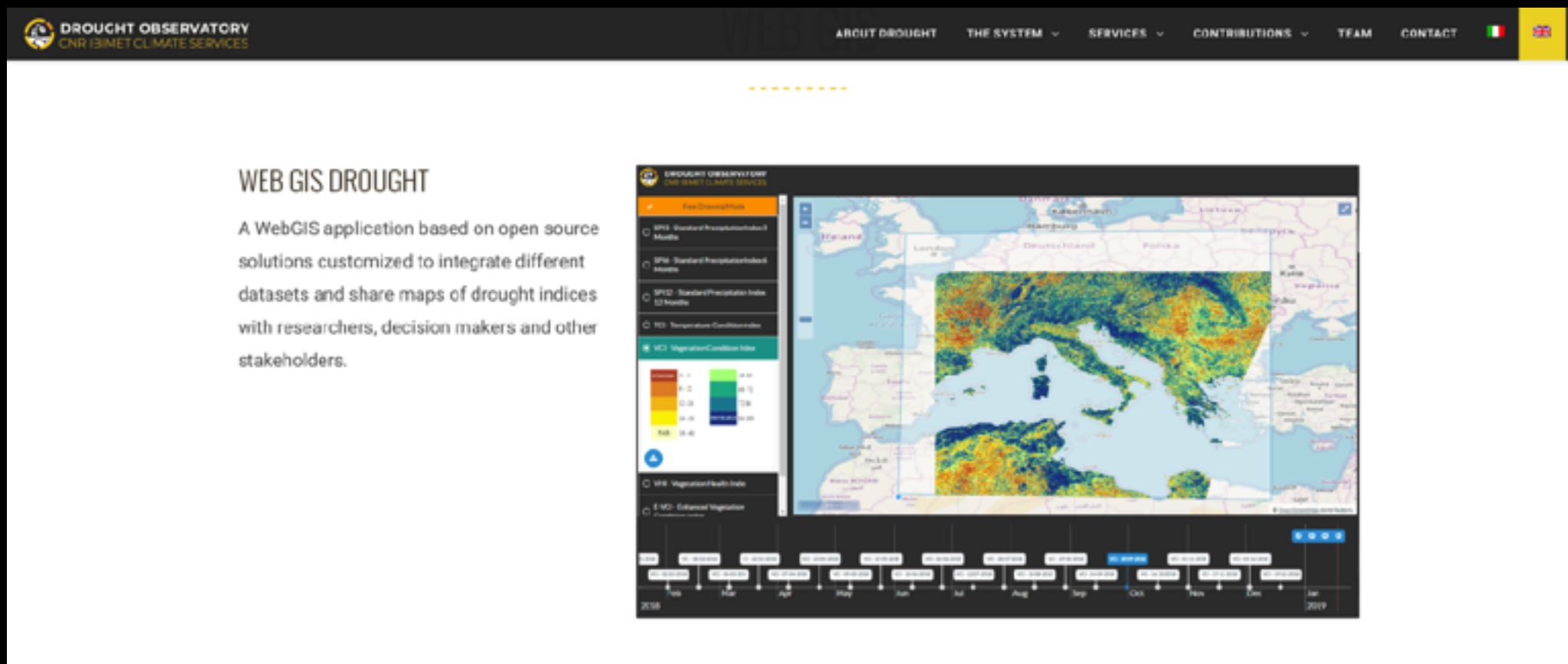


climate-based and
vegetation indices



open and interoperable
system

<https://drought.climateservices.it/>



<https://drought.climateservices.it/>

- ✓ Continuous updated information / Timely dissemination / Interoperability and data sharing
- ✓ Formal and informal cooperation between partners / users
- ✓ Open data: Products and appropriate formats / Availability of tools and information at no cost (not simple data sharing!)
- ✓ Expandable, easy to use and on-demand service

<https://drought.climateservices.it/>

**DROUGHT OBSERVATORY**
CNR-IRIS METECLIMATE SERVICES

THE SYSTEM ▾SDI ARCHITECTURESERVICES ▾Clear URL CacheCONTRIBUTIONS ▾Clear CacheDROUGHT TEAMCiao, Ramona MagnoCONTACT



OPEN DATA

Through CKAN and GeoServer, a complete catalog is supplied to publish data and metadata in several formats and standard protocols. Spatial data are discovered and ready to be reused by any third-party client applications, guaranteeing the integration of this climate data with other information types.

[Click here](#)



WEB GIS

A WebGIS application based on open source solutions has been customized in order to integrate different datasets and share maps of drought indices with researchers, decision makers and other stakeholders.

[Click here](#)



MONTHLY UPDATES

On the LaMMA Website monthly updates on Tuscan drought current and future conditions and local impacts are available, including press release. From the web page is also possible to access to the archive of monthly bulletins.

[Click here](#)



RESTful APIs

The RESTful web service allows to integrate any client application data from the Drought Observatory Spatial Data Infrastructure. The RESTful APIs developed are made available on the GitHub platform.

[Click here](#)



USER SURVEY

A survey is available to collect suggestions and needs from different users and to improve the effectiveness of operational services.

[Click here](#)



GLOSSARY

A selected list of drought related keywords taken from acknowledged glossaries: Earthlab, Intergovernmental Panel on Climate Change (IPCC), National Drought Mitigation Center (NDMC).

[Click here](#)

Open

Interoperable

Customizable

Web Services

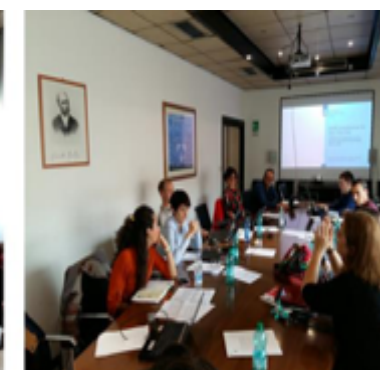
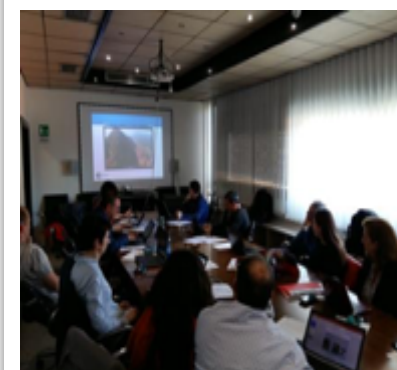
Next steps



 **DROUGHT OBSERVATORY**
CNR IBIMET CLIMATE SERVICES



 **CLIMATESERVICES**
TRAINING INITIATIVE



 **SERV_FORFIRE**
INTEGRATED SERVICES AND APPROACHES
FOR FIRE MONITORING

Adaptation and Change

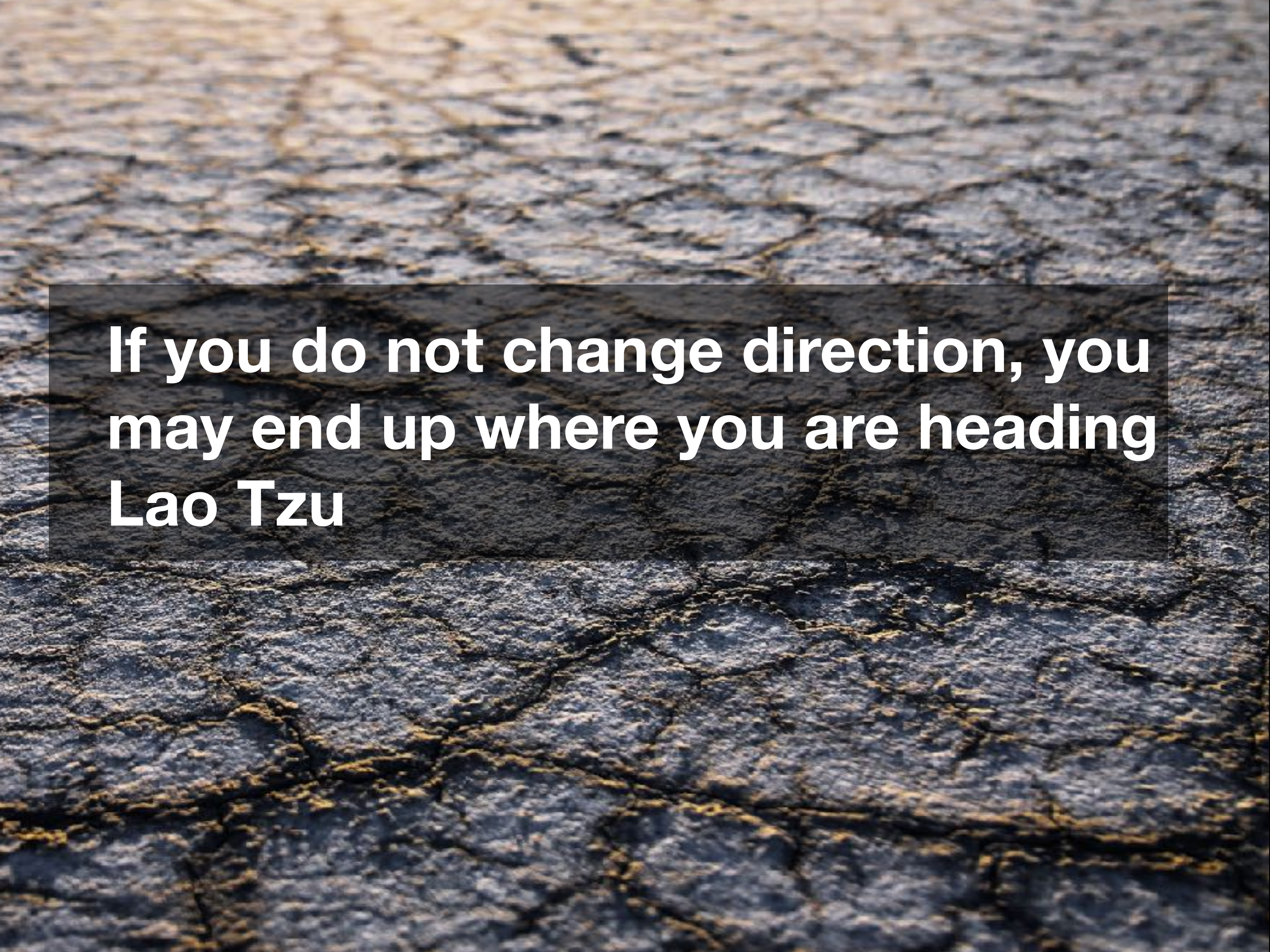
Climate Change adaptation is not a state to be reached, but a continuous transformation which implies continuous changes at different levels.

Climate Change implies not only individual readiness for change but the readiness of the society as whole.



NOTE FOR A NEW PARADIGM

- think|act “Glocal”
- strengthen communities **informed-behaviours** frameworks besides **informed-decisions** frameworks;
- **social learning**: support action and products to fill the gap between individual knowledge and scientific knowledge
- “**user needs**” is not just a “**glamour**” keyword
- strengthen **social negotiation processes** e.g. in water management: **options** could emerge from communities as a result of conflicts resolution

The background of the image is a close-up, high-resolution shot of a cracked asphalt surface. The cracks are irregular and form a complex network across the entire frame. The lighting is directional, coming from the upper left, which creates a play of light and shadow on the textured surface, highlighting the ridges and filling the cracks with deep shadows. The overall color palette is dominated by dark greys and blacks, with some lighter, almost white, highlights where the light hits the surface.

**If you do not change direction, you
may end up where you are heading
Lao Tzu**

Thank you!



Massimiliano.pasqui@cnr.it



Via dei Taurini, 19, Rome Italy



<https://drought.climateservices.it>



@massi_pasqui



@massimilianopasqui



@massimilianopasqui