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ROADMAP

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Sixth periodical bulletin

ROADMAP in a nutshell

The ROADMAP (EuROpean observAtory on Disaster risk and crisis MAnagement best Practices) Project, is a 18 months project funded by DG-ECHO under the call UCPM-2020-KN-AG. The project started on the 1st January 2021 and the main objective is to establish a European "Doctrine on disaster risk and crisis management", funded on the mutual cooperation between scientific communities and DRM authorities. The doctrine, that is intended as "a shared understanding of disaster management between decision-makers and scientific actors", will be based on selected experiences, best practices and implemented solutions in EU Member States.

- **Advisory Group**
  The Advisory Group (**https://roadmap.ci3r.it/advisory-group/**) is formed by selected experts on both science and decision-making in DRM from several Countries, covering different risks and phases of DRM cycle. The networking activities between the Project Consortium, that is composed by recognized research institutes, competence centres for disaster risk reduction and Civil Protection authorities, and the Advisory Group will result in the establishment of a European think tank/ observatory on disaster risk and crisis management good practices that could represent a first step towards a Community of Practice to operate within the Union Civil Protection Mechanism, in collaboration with the Disaster Risk Management Knowledge Center.

Project updates

In these last months of the project many activities have been carried out, in particular:

- on-going work on the definition of the Solutions Explorer web platform: a mockup was presented at the 5th DRM-KC annual seminar on 18 November 2021 - SESSION 5: Co-designing the Science Pillar;
- on-going work on the content of the three thematic papers that will be published during 2022;
- the 2nd webinar, entitled "Communication issues in DRM", was held on 6 December 2021, 10:00 - 12:30 AM (CET) (**https://roadmap.ci3r.it/publications/**);
- on-going work on the organization of the 3rd webinar that will take place next May;
- on-going work on the organization of the final workshop that will take place on 10 June 2022;
- on-going work on the drafting of the Vision Paper;
- constant engagement with the AG through the AG meetings in September, November 2021, and February 2022 to achieve the objectives of the project.

RISK – Good practices

Earthquake	Forest fires	**Food supply**
Hydrogeological	Biological	**Climate**

This sixth bulletin focuses on the management of emergencies related to climate change and food supply.
There is growing evidence of negative impacts caused by climate change on human health worldwide. These impacts are being experienced also in EU (EASAC, 2019[1]; Hobbhahn et al. 2019[2]), and the negative effects of climate change on food systems and food web are a critical part of the global impacts on human and planetary health (Mbow et al., 2019)[3]. Climate change threatens food security and livelihoods due to a combination of factors, which include the increasing frequency and intensity of climate hazards, lessening agricultural yields and reduced production, especially in vulnerable regions, increasing health and sanitation risks, raising water scarcity, and intensifying conflicts over scarce resources, which might lead to humanitarian crises as well as increasing displacement (Mbow et al., 2019). In this context, climate change is anticipated to affect all the four pillars that influence food security, namely: availability, access, stability and utilisation.

Food security dimension	Consequences of climate change
AVAILABILITY (sufficient quantity of food for consumption)	• Reduced agricultural production in some areas locally could affect dietary diversity • Changes in the suitability of land for crop production • Changes in precipitation patterns could affect the sustainability of rain-fed agriculture in some areas • Increases in temperature could lead to longer growing seasons in temperate regions and reduced frost damage • CO2 fertilisation could increase yields for those crops with the physiology to benefit from CO2 enrichment
ACCESS (ability to obtain food regularly through own production or purchase)	• Lower yields in some areas could result in higher food prices • Loss of income due to the potential increase in damage to agricultural production
STABILITY (risk of losing access to resources required to consume food)	• Instability of food supplies due to an increase in extreme events • Instability of incomes from agriculture
UTILISATION (quality and safety of food, including nutrition aspects)	• Food security and health impacts include increased malnutrition • Ability to utilise food might decrease where changes in climate increase disease • Impact on food safety due to changes in pests and water pollution

Source: World Food Programme (2012) Climate impacts on food security and nutrition: A review of existing knowledge[4].
The overall **availability** of food is triggered by changes in agricultural yields as well as changes in arable land. Changes in food production are affected by several climaterelated factors, including temperature, water availability, and atmospheric CO_2 concentration. Shorter crop growing cycles, caused by warmer temperatures, have negative effects on grain filling and consequently on crop productivity due to the reduced time for biomass accumulation and yield formation (Ciscar et al., 2018)[5]. Focussing on Europe, a reduction in crop yields has been already observed for various cereals in the cool growing conditions of northern Europe (e.g., Finland), as a result of temperature raise (PeltonenSainio et al., 2011)[6].

1 EASAC. The imperative of climate action to protect human health in Europe. Policy report 38, 2019.
2 Hobbhahn, N., Fears, R., Haines, A., and ter Meulen, V. Urgent action is needed to protect human health from the increasing effects of climate change. Lancet Planetary Health Vol 3, 2019, pp e333-e335.
3 Mbow, C., Rosenzweig, C., Barioni, L. G., Benton, T. G., Herrero, M., Krishnapillai, M., Liwenga, E., Pradhan, P., Rivera-Ferre, M.-G., Sapkota, T., Tubiello, F. N., Xu, Y. (2019): Food Security. - In: Shukla, P. R., Skea, J., Calvo Buendi, E., Masson-Delmotte, V., Pörtner, H.-O., Roberts, D. C., Zhai, P., Slade, R., Connors, S., Diemen, R. v., Ferrat, M., Haughey, E., Luz, S., Neogi, S., Pathak, M., Petzold, J., Portugal Pereira, J., Vyas, P., Huntley, E., Kissick, K., Belkacemi, M., Malley, J. (Eds.), Climate Change and Land, (IPCC Special Report), 437-550.
4 World Food Programme (2012) Climate impacts on food security and nutrition: A review of existing knowledge. WFP's Office for Climate Change, Environment and Disaster Risk Reduction, United Kingdom).
5 Ciscar, J. C., et al., 2018, Climate impacts in Europe: Final report of the JRC PESETA III project, JRC Science for Policy Report, Publications Office of the European Union, Luxembourg (http://doi.org/10.2760/93257).
6 Peltonen-Sainio, P., et al., 2011, 'Crop responses to temperature and precipitation according to long-term multi-location trials at high-latitude conditions', Journal of Agricultural Science 149(01), pp. 49-62 (DOI: 10.1017/S0021859610000791).

Changes in food production could in turn impact food prices, which would affect the ability of poor households to **access** food markets and could reduce dietary diversity and increase social inequity.
Moreover, decreased water availability and quality in some areas of the world could result in increased health and sanitation problems such as diarrheal disease which, together with changes in vector-borne disease patterns, has the potential to increase malnutrition, and finally negatively affect food **utilisation**. Extreme weather effects disrupt the **stability** of food supply as well as people's livelihoods. Increases in extreme weather, such as floods and droughttend to exacerbate this trend and could have a negative impact on livelihoods that depend on climate-sensitive activities such as rain-fed agriculture and livestock rearing (cf. Schmidhuber and Tubiello, 2007)[7].
Understanding the specific impacts of climate change on food security is challenging because vulnerabilities are unevenly spread across the world and ultimately depend on the ability of communities and countries to cope with risks. In Europe, certain regions may be particularly at risk, e.g., the Arctic and Mediterranean. In all European (?) countries, certain groups in the population may be more at risk, e.g., the elderly, children, migrants and those who are already ill (EASAC, 2017[8]; EASAC, 2019). Worldwide, projections suggest that the number of people at risk of hunger will increase by 10–20% by 2050 due to climate change, with 65% of this population in Sub-Saharan Africa. The number of malnourished children could increase by up to 21% (24 million children), with the majority being in Africa (Parry et al., 2009[9]; Nelson et al., 2009[10]).
In order to mitigate these impacts, research community and funders are trying since many years to study and disseminate recommendations and good practices relating to the different phases of the DRM cycle and to the various actors involved. These researches led to the preparation of the abovementioned documents, between which recommendations for governments on the policies to be implemented, on useful tools for monitoring and early warning, on practical actions at the territorial level in the field of soil and livestock management.

Stories of good practices:

An EPIC Response: Innovative Governance for Flood and Drought Risk Management[11]

In June 2021, the World Bank (WB) and Deltares (International research institute from Netherlands) published the report titled ***An EPIC Response: Innovative Governance for Flood and Drought Risk Management.*** The report presents a framework to manage the growing risks of floods and droughts in a changed climate. A new perspective, referred to as an "EPIC Response," is offered to better manage hydro-climatic risks. This perspective looks at floods and droughts not as independent events but rather as different ends of the same hydro-climatic spectrum that are inextricably linked. The report provides a comprehensive and systematic framework to help national governments lead a whole-of-society effort to manage these risks. An EPIC Response Framework shows how national governments can holistically manage floods and droughts: In the report are explained twelve fundamental building blocks to an EPIC Response. The report, furthermore, helps countries improve their responses by providing a template to gauge the effectiveness of their programs.

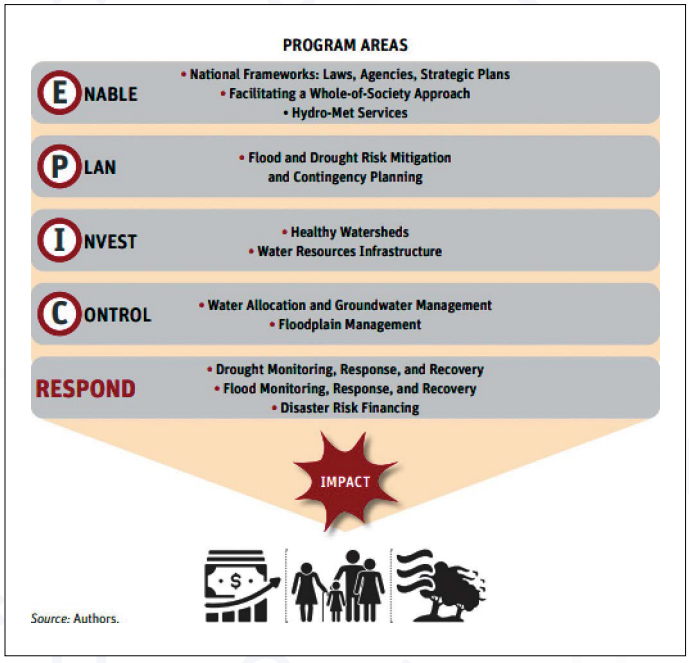

Figure 1 - The EPIC Response Framework (Image take from "An EPIC Response: Innovative Governance for Flood and Drought Risk Management-Executive Summary", p.7).

7 Schmidhuber, J., and F.N. Tubiello, 2007: Global food security under climate change. Proc. Natl. Acad. Sci. USA., 104, 19703–19708, doi:10.1073/pnas.0701976104.
8 EASAC. Opportunities and challenges for research on food and nutrition security and agriculture in Europe. Policy report 34, 2017.
9 Parry, M., Evans, A. Rosegrant, M.W. and Wheeler, T. (2009) Climate Change and Hunger: Responding to the challenge. Rome, Italy: WFP.
10 Nelson, G.C., Rosegrant, M.W. et al. (2009) Climate change: Impact on agriculture and costs of adaptation. Washington, D.C.: IFPRI.
11 rowder, Greg, Ana Nunez Sanchez, Brenden Jongman, Nathan Engle, Eelco Van Beek, Melissa Castera Errea, and Stephen Hodgson. 2021. "An EPIC Response: Innovative Governance for Flood and Drought Risk Management-Executive Summary." World Bank, Washington, DC (https://openknowledge.worldbank.org/handle/10986/35754).

The State of Food and Agriculture 2021[12]

The State of Food and Agriculture 2021 was prepared by a multidisciplinary team from the Food and Agriculture Organization of the United Nations (FAO). The report analyses the vulnerabilities of food supply chains and how rural households cope with risks and shocks. It discusses options to minimize trade-offs that building resilience may have with efficiency and inclusivity. The aim is to offer guidance on policies to enhance food supply chain resilience, support livelihoods in the agrifood system and, in the face of disruption, ensure sustainable access to sufficient, safe and nutritious food to all.

Better prepared for drought: Danube Drought Strategy[13]

Danube Drought Strategy is a document, published in 2019 by Slovenian Environmental Agency, that proposes a new framework for improved drought management in the Danube region. The core part of the Strategy is the Optimal Drought Management Model (ODMM). ODMM was developed as an integral part of the Danube Drought Strategy to initiate proactive national drought management in countries of the Danube region or elsewhere. It provides a conceptual scheme to demonstrate how national institutions, organisations and other stakeholders subjected to drought can work together prior to, during and after drought, in order to minimise the damage to the environment and to secure essential water supply across the country. In the model, the outcomes of national drought monitoring are connected with cooperative national response, thus corresponding to changing drought conditions: preventive actions during no-drought conditions, early response upon the occurrence of drought first signals and its further development, mitigating the effects when drought is present, and drought recovery afterwards. The model serves as a tool for institutional capacity building in terms of strengthened cooperation and support in decision-making process. The document concludes with some brief recommendations on how to enhance capability of the society to better cope with droughts on the long run.

Development, Adoption, and Management of Drought-Tolerant Corn in the United States[14]

The United States Department of Agriculture, in 2019, published the report Development, Adoption, and Management of Drought-Tolerant Corn in the United States. This report analyse data from the Agricultural Resource Management Survey (ARMS), on the Drought Tolerant Corn. Using data from USDA's Agricultural Resource Management Survey, this report documents trends in its development, adoption, and management, examining the role of drought exposure and moisture conservation practices, as well as genetically engineered seed traits, pricing, and irrigation.

Strategic framework for drought risk management and enhancing resilience in Africa[15]

The Strategic framework for drought risk management and enhancing resilience in Africa is an initiative of the FAO and UNCCD, and developed by Tsegaye Tadesse of the National Drought Mitigation Center at the University of Nebraska-Lincoln. This report, published in 2018, highlights six principles for a Drought Resilient and Prepared Africa (DRAPA).

1. Drought policy and governance for drought risk management;
2. Drought monitoring and early warning;
3. Drought vulnerability and impact assessment;
4. Drought mitigation, preparedness and response;
5. Knowledge management and drought awareness;
6. Reducing the underlying factors of drought risk.

The DRAPA strategic framework and its implementation are expected to ensure a substantial reduction of drought impacts on human lives in Africa. It would also lead to a significant reduction in drought impacts on economic and environmental assets of communities and countries in Africa.

Practical guidelines for Early Warning – Early Action plans on agricultural drought[16]

The SubRegional Office for Mesoamerica of the Food and Agriculture Organization of the United Nations (FAO) published, in 2020, "Practical guidelines for Early Warning — Early Action plans on agricultural drought". The document

12 FAO. 2021. In Brief to The State of Food and Agriculture 2021. Making agrifood systems more resilient to shocks and stresses. Rome, FAO. https://www.fao.org/documents/card/en/c/cb4476en

13 BETTER prepared for drought : Danube drought strategy / [authors Gregor Gregorič ... [et al.]; photographies Maja Tomic ... et al.]. - Ljubljana : Slovenian Environmental Agency, 2019. https://www.droughtmanagement.info/literature/Interreg-Danube_Drought_Strategy-2019.pdf

14 McFadden, Jonathan, David Smith, Seth Wechsler, and Steven Wallander. Development, Adoption, and Management of Drought-Tolerant Corn in the United States, EIB-204, U.S. Department of Agriculture, Economic Research Service, January 2019 https://www.ers.usda.gov/webdocs/publications/91103/eib-204.pdf?v=4176.

15 https://knowledge.unccd.int/publication/strategic-framework-drought-risk-management-and-enhancing-resilience-africa-white-paper

16 Fuganti, G., Minelli, M. and Rojas, O. 2020. Practical guidelines for Early Warning Early Action plans on agricultural drought. Panama City. FAO. https://doi.org/10.4060/cb0624en

aims to guide governments and other relevant actors in the development of early warning and early actions on agricultural drought plans that must be implemented before a drought event has significant impacts and causes damages and losses that could eventually become a disaster. The manual complements different instruments used at global and local levels to develop EWEA on agricultural and response plans related to drought.
This Guide seeks to link various instruments to enhance drought monitoring, together with the methods developed to measure impacts on agriculture and food security. This was done through bringing together a number of tools and concepts developed by different FAO divisions including the Global Information and Warning System, the Early Warning — Early Action system, the Agricultural Drought Monitoring and Early Warning System, and the Integrated Food Security Phase Classification (IPC).

National Drought Management Policy Guidelines[17]

The National Drought Management Policy Guidelines, published in 2014, provide a template for action that countries can use in the development of a national drought management policy and drought preparedness/mitigation plans. The process is structured in 10 steps that can be adapted by countries to reflect their institutional, infrastructure, legal, socio-economic and environmental context. These National Drought Management Policy Guidelines are an initiative of the Integrated Drought Management Programme and were developed by Donald A. Wilhite, founding director of the National Drought Mitigation Center, and currently a professor of Applied Climate Science in the School of Natural Resources at the University of Nebraska-Lincoln. It includes case studies from Brazil, Mexico, Morocco and the USA and will be continuously updated based on the experiences gained in the guidelines' application. The guidelines respond to a need for action-oriented drought policies, which Governments articulated at the High-Level Meeting on National Drought Policies.

Figure 2 - The 10 steps in the drought policy and preparedness process (Image take from "National Drought Management Policy Guidelines", p. 11).

Best Practices on National Drought Management Policy[18]

In 2013, the World Meteorological Organization (WMO), the secretariat of the United Nations Convention to Combat Desertification (UNCCD), and the Food and Agriculture Organization of the United Nations (FAO), in collaboration with a number of United Nations (UN) agencies and international and regional organizations, convened the High-Level Meeting on National Drought Policy (HMNDP).

17 https://www.droughtmanagement.info/find/guidelines-tools/guidelines/
18 https://library.wmo.int/?lvl=notice_display&id=10331

During the meeting, the development and implementation of pre-impact government programmes and preparedness plans and policies towards drought risk reduction were proposed. Examples of measures that should be considered as part of framing a national drought policy for each drought prone nation were shown. In particular, for the purpose of a drought management policy, 5 key areas have been identified and good practices have been proposed for each area. The areas identified during the meeting and in the published document, are the following:

1. Promoting standard approaches to vulnerability and impact assessment,
2. Implementing effective drought monitoring and early warning systems,
3. Enhancing preparedness and mitigation actions,
4. Implementing emergency response and recovery measures that reinforce national drought management policy goals,
5. Understanding the cost of inaction.

WOCAT SLM database[19]

The Global Database on Sustainable Land Management (SLM) of WOCAT (the World Overview of Conservation Approaches and Technologies) provides free access to the documentation of field-tested SLM data including SLM practices and maps from different places in the world and offers practitioners the opportunity to share their own SLM practice or map. The objective of documenting and assessing SLM practices is to share and spread valuable knowledge in land management, support evidence-based decision-making and scale up identified good practices, thereby contributing to preventing and reducing land degradation and to restoring degraded land.
The dataset, to date, contains 2194 SLM Practices published from 133 countries by 438 users. The practices are categorised into: SLM Technologies, SLM Approaches, UNCCD PRAIS Practices.

DRM Initiatives & News

Within the ROADMAP project goal of establishing a European observatory on disaster risk and crisis management good practices, some recent initiatives at international level have been scanned and pertinent information was collected and hereafter briefly summarized.

- **Land. Life. Legacy: From scarcity to prosperity[20]**
  Côte d'Ivoire has unveiled the logo and announced the theme of a major United Nations conference on the future of land management that the country is hosting from 9 to 20 May 2022 in Abidjan. the theme, '*Land. Life. Legacy: From scarcity to prosperity*' is a call to action to ensure land, the lifeline on this planet, continues to benefit present and future generations. The Convention is the global voice for land helping to rally commitments for sustainable land and water management worldwide for a resilient future, with healthy land as a solid foundation for all life. It is ratified by 197 countries, including Côte d'Ivoire, COP15 is expected to agree on actions to increase investment for land restoration and tackle the growing impacts of drought.

- **7th Session of the Global Platform for Disaster Risk Reduction (GP2022)[21]**
  The Global Platform for Disaster Risk Reduction is the main global forum to assess and discuss progress on the implementation of the Sendai Framework for Disaster Risk Reduction. The 7th session of the Global Platform (GP2022) will be organized by the UN Office for Disaster Risk Reduction (UNDRR) from 23 to 28 May 2022, in Bali, Indonesia. The event will be co-chaired by the Government of Indonesia and UNDRR.

- **8th International Conference on Flood and Urban Water Management (FRIAR 2022)[22]**
  The 8th International Conference on Flood and Urban Water Management (FRIAR 2022) will be organized by Wessex Institute of Technology from 6 to 8 July 2022 in Milan. The meeting is aimed to attract researchers, academics and practitioners actively involved in improving our understanding of urban water systems and flood events. It will bring together social scientists, surveyors, engineers, scientists, and other professionals from many countries involved in research and development activities in a wide range of technical and management topics related to urban water and flooding and its impacts on communities, property and people.

19 https://qcat.wocat.net/en/wocat/
20 https://www.unccd.int/news-events/cote-divoire-announces-theme-un-conference-land-it-hosting
21 https://globalplatform.undrr.org/
22 https://www.wessex.ac.uk/conferences/2022/friar-2022

- **Climate change and Water (2022)**[23]
  The international symposium Climate change & Water 2022 under the theme of extremes will be held 31 May 31 - 2 June 2022, in Tours in France. This international conference is open to the academics and socio- economic partners concerned by the variability of the water cycle and adaptation to extreme events. In this 2022 edition of the conference, extreme drought will be highlighted. Also, as far as this crop is particularly important in the Loire-Valley, a focus on wine production is proposed.

- **The World Day to Combat Desertification and Drought**[24]
  The United Nation's World Day to Combat Desertification and Drought is observed on 17 June each year to promote public awareness of international efforts to combat desertification. The day offers a chance to recognize that land degradation neutrality is achievable through problem-solving, strong community involvement and co-operation at all levels.

- **12th National Conference on Earthquake Engineering (NCEE)**[25]
  From 27 June to 1 July 2022, the 12th National Conference on Earthquake Engineering (NCEE) and the 2022 EERI Annual Meeting are held in Salt Lake City, Utah (USA). Both are an opportunity for researchers and practitioners to share the latest developments in all fields related to earthquake risk reduction. The conference brings together professionals from a broad range of disciplines: architecture, civil and structural engineering, seismology, geology, geophysics, geotechnical engineering, business, public policy, the social sciences, regional planning, emergency response, and regulation.

- **The 2nd Global Food Security & Sustainability Summit 2022**[26]
  The 2nd Global Food Security & Sustainability Virtual Summit 2022 will be held on the 30 June to 1 July 2022. This is one of the most important events that address the critical issues of food security from the local level to the global level, and from an interdisciplinary and systemic food systems perspective. The event will also showcase the latest technological innovations driving food production that will become a game changer for the food sector. The summit will invite multi stakeholders from governmental organizations, private sector businesses and NGOs to address the current disruptions and possible solutions on the world food supply chain. Discussions will also include issues surrounding sustainability and how societies and businesses can design more sustainable solutions in their entire food chain to minimize impact to the environment and reduce food waste. The event will also devote sufficient attention to the future of nutrition.

- **7th Global Food Security Food Safety and Sustainability Conference**[27]
  Conference Series LLC LTD will organize the 7th Global Food Security Food Safety and Sustainability conference from 16 to 17September2022 in Vancouver, Canada. The focus will be "Global Food Security Crisis Preventing from COVID 19". The purpose behind organizing the conference is to provide exposure to technologies, government / institutional assistance, increase international tie-ups and to provide knowledge about recent trends in Food Sector though this Food security conference.

23 https://calenda.org/915998
24 https://sdg.iisd.org/events/world-day-to-combat-desertification-and-drought-2022/
25 https://www.eeri.org/about-eeri/news/7277-save-the-date-for-12ncee-and-2022-eeri-annual-meeting
26 https://pinnaclegroup.global/gfsss/
27 https://foodsecurity.conferenceseries.com/