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Central and Eastern Europe

HOW TO COMMUNICATE DROUGHT

*A guide by the Integrated Drought Management Programme in
Central and Eastern Europe, 2019*



The Global Water Partnership Central and Eastern Europe (GWP CEE), is an international network, which comprises 12 Country Water Partnerships in Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Moldova, Poland, Romania, Slovakia, Slovenia and Ukraine and more than 200 partners located in 15 countries. Its mission is to advance governance and management of water resources for sustainable and equitable development. GWP CEE is a part of global network that consists of thirteen regions across the world.

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The World Meteorological organization (WMO) is a specialized agency of the United Nations. It is the UN system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interactions with the oceans, the climate it produces and the resulting distribution of water resources. WMO has a membership of 191 countries and territories.

www.wmo.int



Integrated Drought Management Programme for Central and Eastern Europe (IDMP CEE) supports the governments of Bulgaria, the Czech Republic, Hungary, Lithuania, Moldova, Poland, Romania, Slovakia, Slovenia and Ukraine in the development of drought management policies and plans. It also builds capacity of stakeholders at different levels for proactive integrated drought management approach and tests innovative approaches for future drought management plans. It is part of the Integrated Drought Management Programme (IDMP), which was launched by WMO and GWP at the High-level Meeting on National Drought Policy in March 2013. Further information on the IDMP is available at www.droughtmanagement.info



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Note to the reader

This guide is compiled by the Integrated Drought Management Programme Central and Eastern Europe (IDMP CEE) to help communicate drought in Central and Eastern Europe, and is based on available literature and findings from relevant works wherever possible. The Guide addresses the communication needs of media, practitioners, and policymakers. This is a *living document* and will be updated based on the experiences of its readers. IDMP CEE encourages experts engaged in the management of drought and media involved in environmental issues in CEE region and beyond to participate in the enrichment of this publication. For this purpose, comments and other inputs are cordially invited. Authorship and contributions will be appropriately acknowledged. Please kindly submit your inputs to: gwpcee@gwpcee.org. Subject: “*How to communicate drought in Central and Eastern Europe*”.

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1. This guide

This guide supports the CEE regional Integrated Drought Management Programme (IDMP) to increase public awareness and understanding of drought and to encourage people to get involved in reducing the risks. Understanding drought and its impacts can empower those affected to influence government policy towards avoiding crises and introducing long-term drought management strategies.

However, there is a problem. Organisations and professionals that monitor and manage drought often experience difficulties in communicating the complexities of drought to the public. Also the media who write about drought are often criticised for sensationalising the issues by highlighting empty reservoirs and dry river beds and scaring people rather than informing them about what they can do to lessen the impacts.

This guide offers to bridge the gap between water professionals and the media. Water professionals have a responsibility to present information to the media that is factual, straight forward, with fewer numbers and statistics, and likely to stimulate media and public interest. Equally, the media need to use their presentation skills to go beyond sensationalism and find ways of arousing deeper public interest in drought so that people are empowered to engage in actions that can avoid many of the serious problems that droughts bring.

This guide will be of value to both water professionals and journalists. For journalists, the guide sets out what people really need to know about drought, the steps that professionals are taking to reduce the impacts of drought, and how people can benefit from engaging in reducing the risks. For water professionals the guide offers experiences of working with the media to communicate drought in ways that increase public interest and engagement. For both, selected case studies demonstrate the many facets of drought and how professionals and the media can work together for the public benefit. The guide concludes with some principles and good practices to help improve communications between water professionals, the media, and the public.

2. What we need to know about drought

What do you think about when you hear the word 'drought'? For the public it can mean water restrictions at home; for farmers it is loss of crops and income; for industry it is loss of production and jobs; for the environment it means loss of flora and fauna, and amenity like boating and fishing; and for governments droughts can mean lost revenue as economic growth slows. For some people in more extreme climates and social settings, drought can mean famine and death.

Although many people think of floods and droughts as rare and extreme events, they are in fact normal and recurring natural hazards. They are just part of the natural cycle of weather events and have always been with us throughout history. People are more aware of floods than droughts as they are highly visible. Intense and prolonged rainfall increases runoff and swells rivers causing banks to overflow with immediate and devastating impacts on people's lives, the economy, and the environment. Droughts occur when there is a lack of rainfall and are much less visible, at least initially. However, they too can devastate economies, society, and the environment and their impact can last long after rainfall returns to normal.

Droughts threaten everyone

Droughts threaten every country and have no respect for national borders. Globally droughts cause US\$6-8 billion of damage every year and affect more people than any other hazard. Droughts affect both developing and developed countries where impacts on industry and economic growth can be costly. California, in the US, experienced a severe 5-year drought from 2013. In 2015, Sao Paulo, a mega-city in Brazil experienced its worst drought for more than 80 years – a paradox in a country that has one of the world's largest freshwater rivers. The UK, with a reputation for grey skies and rain, experienced a severe two-year drought in 2011-2012 with major impacts on public water supply, agriculture, and the aquatic environment. Europe also has a humid climate but is increasingly prone to drought. Central and Eastern Europe (CEE) experienced a severe drought in 2015 that provided the catalyst for engaging in serious drought management planning.

Droughts are beginning to raise concerns among governments and the general public who are asking: How much damage is inflicted by drought? On whom and where? Who is going to pay for it? How can we best prevent it, or at least reduce the damage done and the costs of recovery?

React or act?

Most countries react to droughts as crises requiring emergency interventions. But this can be costly, and it does little to prepare everyone for the next drought which they hope will not happen again.

The alternative is to act before droughts occur to reduce the risks and their impacts. Governments are now being encouraged to take this approach. It is the main goal of the CEE regional Integrated Drought Management Programme (IDMP) established in 2013 and designed to increase the capacity and ability of CEE countries to better cope with drought. Globally, few countries take such actions. There is often an intention to do so, particularly during a severe drought. But once the rain returns, apathy can quickly set in, until the next drought... Some call this the *hydro-illogical cycle* of drought (Box 1).

Box 1 - The *hydro-illogical cycle* of drought

The *hydro-illogical cycle* describes the pathway through a drought in much the same way as the more familiar *hydrological cycle* sets out the pathway of water from the oceans, to rainfall on the land which then flows in rivers back to the sea. Droughts are slow to become visible and because most countries do not prepare for them, this can quickly lead to panic, crisis, and emergency action. Rain usually brings relief and then apathy sets in as people relax and re-focus their attention on the many other pressing issues of the day. That is, until the next drought...

Diagram source: National Drought Mitigation Centre, University of Nebraska



2.1 What does *drought* mean?

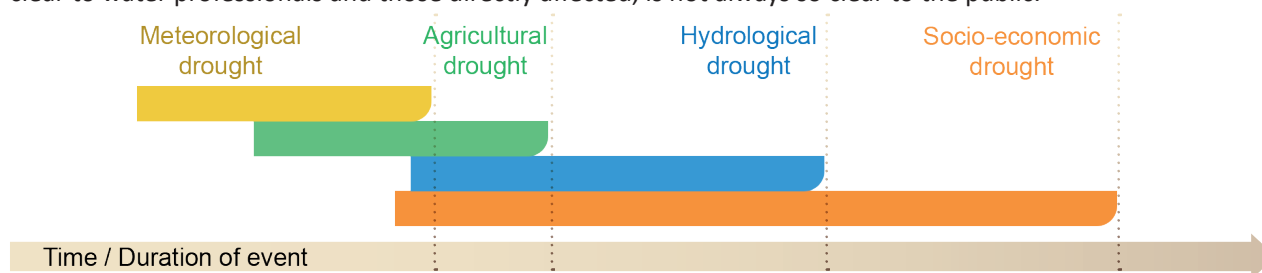
In simple terms, a drought is a period when rainfall is less than what we consider as *normal* or *expected* and there is not enough water to meet the demands of human activities and the environment. However, not all droughts cause problems or become crises. It all depends where and when they occur. What is most important is the impact that drought has on people, industry, agriculture, and the environment. It is the shortage of water for all these uses that leads to problems and if they not addressed, they eventually become crises. This is the main reason why, in practice there is no internationally accepted way of defining drought beyond the fact that there is a water shortage (deficit) in the soil, rivers or reservoirs. It all depends on the impact of the water shortage.

The following examples illustrate how different countries with different climates and priorities think about drought:

- In most of **South America** drought-prone areas are defined as those with average annual rainfall less than 800mm.
- In **Turkey** the meaning of *drought* varies from province to province, and even among different government departments. This can lead to confusion over how to deal with drought.
- In **China**, Shandong province, drought is described as mild, moderate, severe, and extreme and these are based mostly on urban priorities. The levels are defined by set values of increasing water deficiency that trigger specified actions to conserve water resources.
- In the **UK** drought is primarily concerned with domestic water supply but recent droughts have focused more attention on agriculture, energy supplies, and the environment.
- In **CEE** drought impacts on agriculture are of greater concern than those on public water supply, particularly in SEE region or Lower Danube countries where food production is still a large part of the national economy and people's livelihoods.

2.2 Lots of different droughts

When drought is described only in terms of lower than expected rainfall, it is referred to as a *meteorological* drought. Other names for drought are related to their impact. These include *agricultural*, *hydrological*, and *socio-economic* drought. The common feature is that impacts often persist long after a meteorological drought has ended – i.e. when it starts to rain again (Figure 1). The distinction between the various droughts, while clear to water professionals and those directly affected, is not always so clear to the public.



• Figure 1 Characterising drought and drought impacts

Agricultural droughts

Agriculture and food production often provide the first visible impacts as a meteorological drought develops. Crops need water and even short periods of warm weather and no rain can seriously affect yield and quality. Agricultural droughts initially have minimal impact on most people's daily lives. They are not usually widely reported by the media beyond the farming press, until there are fears of food shortages and price increases. At this point they become newsworthy. The main impact is among agricultural communities, when loss of income can be both immediate and long-lasting well beyond the time when the rain starts again.

Box 2 - Agricultural droughts can happen fast

A European farmer said that *agricultural droughts happen fast*. This seems at odds with the idea that droughts are slow to develop. But across Europe, where farmers rely mostly on rainfed farming, one or two weeks without rain in the growing season can cause serious problems for high value vegetable and fruit growers – 10 days without water is enough to kill a crop.

When the weather is warm and dry and soils are light and sandy, soils start to dry and if crops are at a critical growth stage, water shortages can seriously damage yield and crop quality. This in turn impacts crop marketability and farm incomes and the industries along the value chain that process, package, and distribute food products. Some farmers invest in irrigation to solve this problem, but they really expect it to rain. When they realise that it is not going to rain and they need to start irrigating, it is often too late, and most do not have the equipment to quickly make up the deficits and so crops suffer stress – hence the farmer comment that *agricultural drought happens fast*.

Source: Author's personal communications with farmers

In developed countries, agricultural droughts do not just affect farming and rural livelihoods, they also affect agri-businesses and food supply chains that are part of highly capitalised, intensive farming. Financial losses can be considerable for local producers, but supermarkets may have access to international markets to maintain food supplies for customers. This may satisfy local demand but importing food may just be changing one drought risk for another (Box 3).

Box 3 - Importing food can put others at risk

Many European countries regularly import food and in doing so they are also importing the water used to grow the food – known as *virtual water*. The UK for example, imports almost half of its food requirements in a normal year and in doing so imports some 50 km³ of water embedded in the food.

Much of this food comes from countries like Spain, Morocco, and Egypt that are already water short and can ill afford to export such large amounts of water. By importing food rather than growing it at home, the UK is *exporting* its environmental and social risks to water stressed countries that are less able to manage their water and climate-related risks. During agricultural droughts the UK can increase food (and water) imports to compensate for the reduced home production. But many food exporting countries also suffer droughts which exacerbate water stress that they are already experiencing. Thus, solving one country's drought problems can increase another country's water crisis.

In developing countries, agriculture tends to dominate GDP and food security depends largely on food grown locally to provide basic nutrition and livelihoods for many millions of smallholder farmers. A prolonged agricultural drought can result in starvation and death for many unless emergency food aid is available.

Even in temperate climates, like CEE, rainfall can be unpredictable. Irrigation is one option to reduce the risks of crop failure, but not all farmers have access to such facilities, nor can they afford them. Those who do invest in irrigation, have other risks to consider. If drought persists and river flows are low, farmers cannot abstract water, and this may jeopardise their investment in irrigation. Farmers have little flexibility in such circumstances as they cannot move their farms or abstraction points to more favourable locations. Public water supply companies have no such problems as they can move to alternative water sources or in extreme circumstances, they can use water tankers. In temperate climates, irrigation only reduces the risk, it does not eliminate it.

Hydrological droughts

Hydrological droughts usually follow agricultural droughts with signs of reduced river flows, low groundwater levels, and wetlands drying out. This impacts all abstraction, for public water supply, energy generation, industry, and irrigation farming, and reduces flows into aquatic ecosystems. Water shortages may last for months or even years after a meteorological drought has ended depending on how long it takes for the hydrological systems to recover. This varies from catchment to catchment. Rivers in clay soils recover quickly because rainfall rapidly runs off the land and into the streams and rivers. However, some rivers rely on groundwater for their flow and these recover much more slowly. The rainfall must first infiltrate into the soil and recharge the groundwater which in turn feeds the rivers. This process can take months and sometimes years before a rainfall event emerges as river flow.

Socio-economic droughts

Socio-economic droughts are so called because they impact every aspect of our daily lives. They affect our health, livelihoods, businesses, forests, tourism, transportation, energy, and our environment. In turn many of these impact national economies as they can reduce income from taxes and increase expenditure to address the problems. Some countries call them *water supply droughts* because they directly impact everyone through reductions in public water supplies and water-rationing.

Governments, and even those directly impacted by drought often think that a drought is over once rainfall resumes. Untangling this in the public's mind needs careful handling and understanding among all those affected (Box 12).

Being clear what we mean by drought

What is clear from various drought studies is that if we wish to convey the seriousness of droughts, we need more universally accepted means of describing and characterising what we mean by *drought*. At present it is *ad hoc* and can confuse the public.

Although experts have yet to agree on universally accepted terms, drought needs characterising in two ways:

- By the meteorology of drought (lack of rainfall, severity, and duration), and
- By the drought impacts – agricultural, hydrological, and socio-economic. These quantify economic, social, and environmental losses as they evolve across an affected area and for as long as the impacts last.

The first is a starting point that many countries have reached because they regularly monitor rainfall. The second complements this by establishing who and what is affected, for how long, and what measures and actions are needed to address the impacts.

Currently, most countries only monitor rainfall. The simple reason is that many do not have the will or the capacity to monitor the impacts of drought, not just during a drought, but also after the event when some impacts continue for some considerable time, even months or years. In the CEE region the DriDanube (Drought Risk in the Danube Region) project is taking positive steps to improve drought monitoring and in turn improve steps to mitigate drought impacts (Box 4).

Box 4 - Monitoring drought in the Danube basin

Partners in the River Danube basin have developed an innovative and interactive tool – Drought Watch (www.droughtwatch.eu) – which will enable more accurate and efficient drought monitoring and early warning for the entire Danube region. This interactive web-based tool will help stakeholders to understand how drought is developing in real time. It will not just benefit drought professionals, water managers and farmers, but also enable decision-makers to take timely and proactive steps to mitigate the impacts of droughts as they develop.

Source: Drought risk in the Danube region – Dridanube: www.interreg-danube.eu/dridanube

Video on [Drought Watch](#)

Some countries collect and analyse data on drought impacts in terms of people suffering, crops and animals lost, and losses to the economy, but these are usually gathered well after the event as historic record and as a means of informing future drought risk. This is useful of course for planning, but not so helpful for guiding decision-making during the drought itself. For this we need systems that monitor drought and provide early-warning plus real-time data as a drought progresses. Communications are then vital to ensure that the information is published and distributed in time for organisations and individuals to take action (see chapter 5).

Droughts are complex natural hazards. No two droughts are alike.

Box 5 - Do you understand what *drought* means?

Try answering the following questions to see how well you understand what drought means.

Two teams of experts are independently asked to characterise the same drought episode in a country. Would they find similar results?

A moderate drought in a country resulted in US\$7 billion in damages and a severe drought 5 years later caused US\$3 billion of damages. What conclusions can you draw from comparing the two drought episodes?

2.3 When is a *drought* not a *drought*

Droughts are not the same as aridity and water scarcity. Aridity refers to lands that naturally lack water through geography or climate and are degraded, barren, and unproductive. In such places, the challenges of water shortages are ever-present. Drought can further exacerbate the livelihoods of those who rely on such meagre rainfall, but it is not the root cause.

Water scarcity affects every continent and is not just about a temporary lack of rainfall but a permanent water deficit over the year.

The general lack of understanding between water scarcity, aridity, and drought often causes confusion between science and policy communities and to some extent this is one of the several reasons given for the lack of progress in improving drought management in many parts of the world.

2.4 Drought impacts

Some drought impacts can be immediate and short-lived, while others are long-lasting causing problems over many months or even years. They ripple through the economy from the immediate loss of crops and income to long-term impacts on health, taxes, environment, and national income. In rural areas, reduced crop productivity can result in lower farm incomes, increased food prices, unemployment, and migration. In vulnerable communities, farm incomes can take many years to recover.

Box 6 - Citizens monitor drought impacts

To increase the capacity to report on and manage drought-related risks, the DriDanube project is using *citizen science* to gather and process valuable data on drought impacts. The project encourages citizens to become on-the-ground observers and report on drought impacts on a weekly basis. As most droughts impact agriculture, observers are asked to fill in a simple questionnaire to assess soil moisture, impacts on vegetation, and whether or not farmers are using irrigation. The information is fed back to the project centre and provides real-time data to inform decision-making and help mitigate further, and possibly damaging impacts. The results are presented visually on DroughtWatch, a web-based platform under *Drought impact assessment*. The information is also expected to increase general awareness of drought and its impacts among the population. So far the project has registered over 1000 observers across 10 countries, 800 of whom regularly report their observations.

Source: National reporting networks – DriDanube project. <https://questionnaire.intersucho.cz/en/>

Drought impacts are also symptoms of underlying vulnerability. These can be economic, social, and environmental; they can vary in importance from one country/community to another, and they are often interconnected. Drought in the River Danube basin, for example results in low river levels that affect shipping movements. This in turn impacts tourism and local economies, and cereal grain exports towards the Black Sea. Failures in agriculture impact industries that process and package food products, cause unemployment, and this affects local retail businesses that rely on customers with money to spend.

Understanding these vulnerabilities forms the foundation for developing drought risk management measures and building drought resilience (see chapter 5). Table 1 shows typical losses due to drought, the sectors involved, and the people most affected.

Nature of losses	Sectors	Concerned
Direct production and income	Agriculture, water, fisheries, forests, tourism & recreation, environment and wildlife	Mostly producers, private sector; also, communities & governments
Assets/infrastructure	Several	Producers/practitioners, communities, government
Incidental economic	Health, economy (taxes), social (disruptions, migration, theft, etc.)	Mostly communities, individuals, governments; also, producers/practitioners, other countries
Emergency response cost	Economy	Essentially government, also families, communities
Collateral	Hikes in food prices in other countries, migration abroad	Global economy, other countries

• Table 1 The impacts of drought

3. Coping with drought

3.1 Crisis management

Most countries deal with drought as a crisis in much the same way they approach other natural disasters such as floods and earthquakes. The problem is that emergency action only treats the symptoms of droughts rather than their root cause. The approach seeks only to re-establish the status quo and does little to prepare the ground for the next drought. Indeed, approaching drought in this way can increase people's reliance on government and donors to provide aid in times of crisis. Thus, helping people in the short-term may only increase their vulnerability to future droughts.

Droughts are not like other crises

Although droughts have similar characteristics to other crises, there are some important differences that need taking into account. Droughts do not have immediate and dramatic impact, nor do they damage or destroy infrastructure. Nevertheless, the impact can be just as devastating as other emergencies both socially and economically. Droughts develop slowly; changes are gradual and not easily recognised; and only become emergencies when serious impacts begin to emerge, and it is often too late to take remedial action. This may be only a matter of weeks in an agricultural drought but last months or even years for more severe hydrological and socio-economic droughts.

Droughts attract little attention at the beginning and are not very newsworthy for the simple reason that what is happening is not obvious – and most people like to enjoy a few weeks of warm, dry weather. Most countries do not have early warning systems in place for drought and there is often little enthusiasm for any action to reduce risks, or to inform the public of possible problems that may turn out to be unnecessary when it starts to rain again. Only when the impacts gradually emerge, usually through their effect on water and food supplies, do droughts become crises and emergency action is needed.

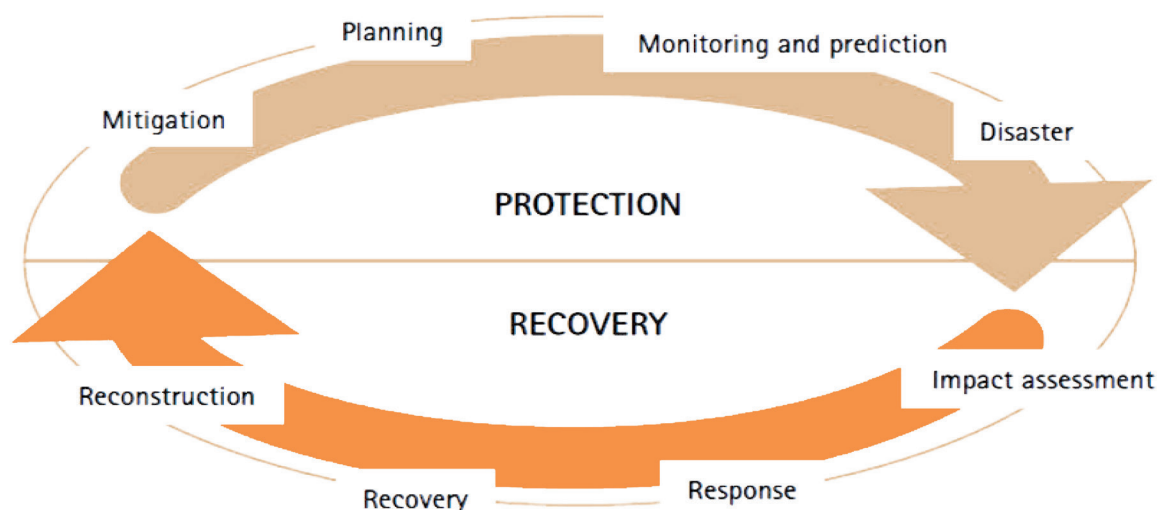
At this point, droughts are like other emergencies that governments are well acquainted with. Depending on the severity and impact, they create an urgent need for transport, food relief, work programmes, and credit relief so that people can maintain their livelihoods until the drought is over. Experience from many countries suggests that actions are usually too little and too late.

3.2 Risk management

Droughts are inevitable but taking early and planned actions to avoid or lessen many of the more serious impacts before they become crises makes sense on many fronts. This is the essence of drought risk management. It can reduce costs, it is good resource management, it adds to the public perception that government is doing its job properly, and it can lessen the impacts of a changing climate. Although this is the most obvious thing to, few countries do this.

The risk management approach follows a recognised approach to dealing with disasters known as the *disaster management cycle* (Figure 2). The recovery phase begins when the drought ends and steps are taken for return to the status quo. The protection phase then begins, and based on the drought experience, steps are taken to reduce future risks, so the community is better prepared for the next drought.

Risk Management



Crisis Management

- Figure 2 Cycle of disaster management. Source: National Drought Mitigation Centre, University of Nebraska, Lincoln

After each drought an assessment is made of how well the system coped and recommendations are made to improve it. The cycle is not a one-off event. It is a continuous process of assessment and improvement – a process of adaptive management.

Box 7 - Some definitions

Disaster risk - The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity (UNSDR, 2017)

Vulnerability - The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity (UNFCCC, 2014)

Mitigation or risk management measures - Mitigation (of disaster risk and disaster): The lessening of the potential adverse impacts of physical hazards (including those that are human-induced) through actions that reduce hazard, exposure, and vulnerability. Mitigation (of climate change): A human intervention to reduce the sources or enhance the sinks of greenhouse gases. (IPCC, 2012)

Source: www.droughtmanagement.info/find/glossary/

3.3 From crisis to risk management

Moving from crisis to risk management will not be easy. Rather than relying on one or two organisations to deal with drought, risk management requires all those involved from government departments to communities, to work together, solve problems, make and implement plans that reduce drought risks, and prepare for the next drought crises – an integrated approach to drought management.

This is a major shift in thinking about drought especially as most governments still manage water resources in *silos*. Many public and private organisations use water. Typically, a ministry of public works has responsibility for managing domestic and industrial water supplies and sanitation; a ministry of water and energy manages water for generating hydro-power and cooling power stations; and a ministry of agriculture and environment is responsible for managing water for agriculture, irrigation, and the aquatic environment. Historically, ministries have focused on their particular tasks to the exclusion of other water interests even though they are all exploiting the same resource. But as long as water was plentiful this fragmented *silo* approach was not a problem.

Problems occur when there are water shortages and serious conflicts arise among users. Water engineers tend to rely on crises like droughts as a catalyst for change. Droughts can mobilise interests that are often invisible to policy-makers and they bring people out of their silos and get them talking and working together to find solutions. This was the beginning of the movement towards an integrated approach to managing water resources called Integrated Water Resource Management (IWRM). The idea being that if the water and water-using sectors worked together they could more amicably negotiate the trade-offs needed to keep supply and demand in balance. It is of course in everyone's long-term interest to do this. IWRM is a simple and compelling idea and hard to disagree with. But it not so easy to put this into practice.

Nevertheless, water management practices are slowly changing from a silo approach and governments are looking to adopt an integrated approach to water management. The Global Water Partnership (GWP) are at the forefront of this approach that has now been adopted as a central feature in the United Nations 2030 Development Agenda. Most Member States are developing plans for IWRM, though many have yet to put them into practice. This will be the most challenging part as each country's unique mix of natural resources and social, cultural, and economic circumstances will require a bespoke solution. There is no simple *one-size-fits-all* solution.

The pressures for change come from several sources. The world's population is growing rapidly, the demand and competition for water is increasing, climate change is introducing additional uncertainties over future resources, and there is a desire among nations and people to reduce the risks and impacts of natural disasters, like floods and droughts.

Drought risk management, while focusing attention on one aspect of water management, sits well within national water policies and is an integral part of the drive to improve water resources management and increase water security.

4. Drought management: making plans

Strategic drought management is the theme of the Integrated Drought Management Programme (IDMP), established in 2013 by the World Meteorological Organization (WMO) and the Global Water Partnership (GWP). This is a global initiative to encourage governments to move from crisis to risk management, to develop drought management policies and plans, and take a coordinated approach to drought management. It supports stakeholders at all levels by providing policy and management guidance and by sharing scientific information, knowledge, and best practices.

A drought management policy sets the scene for robust planning and investment decisions, ensures early intervention and risk reduction, and reduces the costs of damage from drought. Some governments may hesitate because of the costs and the complexities, but it is always a good idea to assess the costs of not planning as well as the costs of doing so to be sure that planning offers many benefits.

The starting point is a national drought policy that establishes a clear set of principles to govern drought management and impacts. The overriding principle is to emphasise risk management through mitigating the impacts of drought and preparing for future drought events. The policy is directed toward reducing risk by developing better awareness and understanding of drought hazards and the underlying causes of society's vulnerability to drought.

The ingredients for effective drought management planning are many. They include strong political commitment, effective governance, strong institutions to support integration, stakeholder participation from the bottom-up, and a firm legal framework that defines responsibilities and institutional collaboration.

Based on a wealth of experience the IDMP set out *10-steps* to help governments develop their national drought policy and has adopted *three pillars* of drought management that form the building blocks of a successful drought policy.

4.1 The 10 steps

The 10 steps for developing policy are fully explained in *National Drought Management Policy Guidelines: A template for action* (WMO & GWP, 2014) and are summarised in Figure 3.



• **Figure 3: 10 step process of drought planning**
Source: Adapted from WMO and GWP 2014.

They are generic steps designed to be flexible so that each country can develop their own plan allowing for different national social, economic, institutional, and economic circumstances.

IDMP in CEE merged these 10 steps into seven steps in the context of the Water Framework Directive (WFD), encouraging countries to develop a Drought Management Plan as part of their River Basin Management Plan.



• **Figure 4: Preparation of the Drought Management plan in the context of the EU WFD.**
Source: GWP CEE Guidelines for the preparation of Drought Management Plans in the context of the EU Water Framework Directive, 2015.

4.2 The three pillars

The *three pillars* that form the building blocks of a successful drought policy are: monitoring and early warning; vulnerability and impact assessment; and mitigation, preparedness and response (Figure 5). They provide a structure for critically reviewing the way a country deals with drought and enables strengths and weaknesses to be identified.

All three pillars must be in place for the policy to succeed. It is like a three-legged stool. You can sit on it with confidence but if one leg is weak or missing then you will fall over.

Pillar I – monitoring and early-warning

You cannot manage what you do not measure, and you cannot measure what you do not monitor. This is the essence of monitoring and early-warning systems (MEWS). Most countries have MEWS for hazards like earth-quakes, flooding, storms, and forest fires but few have MEWS dedicated to drought. Most natural hazards, by their nature, provide little warning and so governments and agencies try to prepare in advance so that they can quickly respond when they occur. A similar MEWS for drought would help to detect the early signs of drought, improve proactive responses, and trigger actions.



• Figure 5: Pillars of drought effective drought management.
Source: www.droughtmanagement.info

You cannot manage what you do not measure ... and you cannot measure what you do not monitor

Governments often try to add drought to their existing MEWS. But because droughts have many different characteristics to other crises, droughts may not get the attention they deserve. Monitoring and forecasting weather conditions, though important, is not enough. Information on river flows, groundwater, water supply trends vegetation, and soil moisture all help to provide early warnings and to assess the potential severity of a pending drought.

Communication is a vital part of MEWS. Interpreting data and disseminating information will enable those exposed to drought to take action to avoid or reduce risk. Information must be timely, clear, understandable, and practical for users. Different water users will require different information about the same drought. A water supply company will want detailed hydrological information to forecast public water supplies, while farmers will require advice about irrigating their crops, and the public will want information on how to save water in their homes.

Drought indicators are used that integrate several aspects of drought rather than just a single rainfall value. Some are simple but have limited use, others are more complex and require lots of data and processing to be useful (Box 8).

Many countries are still only able to provide information on *where we are now* with little or no capability to monitor real-time conditions and assess *what may happen soon*. They lack the capacity to process drought data and the organisational structures to analyse and communicate even the limited information that is available for effective and timely intervention. The media could play an important part in bridging this information gap, but they can only do this when provided with the right information.

Box 8 - What are drought indicators?

Most indicators use meteorological information such as the popular and widely used Standardised Precipitation Index (SPI). This is simple to use but is limited to meteorological drought. It is not so useful for forecasting agricultural droughts, which requires a link between the weather conditions and crops being grown. Similarly, SPI for assessing hydrological and socio-economic droughts requires a link between SPI and impact indicators.

More complex and comprehensive drought indicators are available. The US, for example, relies on a complex mix of 30 parameters.

Pillar II Vulnerability and impact assessment

Assessing what happens during and following a drought can provide answers to questions like: *Who is affected by drought? What is at risk and why?* and *What are the priorities/ranking for dealing with them?* Planners are then able to prioritise monitoring, identify people and groups most at risk, and the actions needed to reduce risks.

Most countries collect data on drought impacts, such as the numbers of people suffering, loss of industrial production, crop and animal losses, and the impact these have on the national economy. But these data are usually only gathered long after an event is over and coverage is largely determined by research interests and available funding. The assessments are useful for future planning but not timely and consistent enough to guide more real-time drought decision-making. Nevertheless, limited data are better than no data in supporting short to medium-term drought planning.

Pillar III – Mitigation, preparedness and response

This is about taking actions to reduce risk and improve responses to drought emergencies as and when they occur.

Vulnerability and impact assessments (pillar II) inform the need for actions and in turn the actions feedback to reduce vulnerability and impacts. MEWS (pillar I) provides information to reduce risk and in turn, feedback from actions taken can help to improve monitoring and communications services.

Collaboration, feedback, and persistence

Clearly, collaboration and information feedback among the three pillars of activity are essential for effective drought management. This process must be continuous and persistent to avoid the complacency that so often sets in during periods of normal rainfall. Deficiencies in any of the three pillars will inhibit the effectiveness of drought planning and management.

4.3 Drought management in Central and Eastern Europe

Drought risks are increasing

Although many people still think of droughts as rare events, they are increasing in number and intensity across the European Union and over the past 30 years the estimated cost of drought is over €100 billion (Bokal and Müller, 2018). Like many others, CEE countries are affected by droughts that seem to be longer-lasting and more severe in their impact. The public, governments, and operational agencies are increasingly aware of the risks. Climate change just adds to challenges facing the region with predictions of warmer and drier summers, warmer winters with unchanged average levels of annual rainfall, and increased frequency of extreme weather events.

Most CEE countries suffered during recent droughts in 2003 and 2012, and 2015 was particularly severe. In 2015, Slovakia experienced its most severe drought in over 100 years with temperatures reaching 35°C over a period of 23 days. In the past, droughts were infrequent, water shortages were rare, and groundwater resources were plentiful. However, the climate in southern Slovakia, is rapidly changing and becoming closer to that of northern Italy or Spain and will further increase water demand across all sectors. Slovakia's economy relies on agriculture and drought puts many thousands of farmers' livelihoods at risk. All this has largely prompted the government to become the first in the region to begin work on drought management planning to reduce drought risks and to be better prepared for future droughts.

Slovakia is not alone in experiencing drought. Romanian agriculture suffered in 2015 and again in 2016 affecting over 1 million hectares of agricultural production of corn and sunflower that meant farmers again applied for EU compensation for loss of production.

In 2017 tourists planning to travel by boat along the River Danube from Budapest to Vienna were seriously affected by record low water levels that left boats stranded and travellers facing long bus journeys and disrupted holidays. This in turn affected businesses along the Danube that service tourists and the boats.

In 2018, Czech Republic media reported that water levels in the River Elbe were so low that so called *hunger stones* were exposed, that marked low water levels in the river dating back to 1616. An inscription on the stones says, *when you see me, cry*.

All CEE countries have well-developed meteorological and hydrological monitoring systems but as yet, many do not have systems in place to make good use of the information to support decision-making in areas like agriculture and energy production. Drought also does not recognise administrative borders, and this adds to the complexity of managing water resources and drought in the region. However, most CEE countries share water in river basins, like the Danube, Tisza, and Sava, and a number of platforms are now in place to encourage information sharing. Sava GIS is one of the best examples of a river commission platform for data sharing though the current focus is on flooding rather than drought. DroughtWatch and the Drought Management Centre for Southeastern Europe are other good examples.

Implementing IDMP

Individual countries may seek ways of reducing their drought risks but taking action alone will undoubtedly impact on other who share the same water resource. Shared problems require shared solutions. Countries within river basins must work together to monitor drought and its impacts and use common methodologies so that each country can make informed decisions about drought.

Shared problems require shared solutions.

In 2013, 10 CEE countries made the first steps towards an integrated approach to drought management and together launched an IDMP to combat the growing threat. The first phase of the programme (from 2015-2017) was designed to bring together policy-makers and other key stakeholders, including farmers, from over 40 organisations across the 10 countries to identify strong and weak areas, and examine how together they could make plans to improve drought management. The main achievements of the first phase were (WMO and GWP, 2015):

- A concise overview of the current approaches to drought management in CEE
- A guideline published for preparing a Drought Management Plan that complements the EU Water Framework Directive
- Improved communication links among experts and policy-makers at country level
- Increased capacity to implement national Drought Management Plans
- A collection of existing drought monitoring indices, methods, and approaches from the CEE region, and the establishment of a link and integration of data into the European database and monitoring service (European Drought Observatory)
- Demonstrated innovative approaches to drought management
- Exchanges of information and results, with organizations in the region that deal with similar issues

Phase II (2017-2019) focused on further building the region's capacity to change ad hoc drought responses into proactive drought management. DriDanube project (funded by Danube Transnational Programme and coordinated by Slovenian Environmental Agency) contributed a lot to this overall goal by supporting stakeholders involved in drought management on different levels to become more effective before and during drought, and in preparing for the next drought.

Box 9 - Preparing for drought in Slovakia

Slovakia, an active partner in IDMP CEE took this step-by-step approach to applying drought management guidelines which were taken up by Slovakia's government. In partnership with the IDMP CEE, in 2017, an inter-ministerial working group that included stakeholders from relevant sectors was tasked to prepare the region's first country-level Drought Action Plan. In 2018, the Action Plan was launched to regional acclaim. Focused on anticipation, prevention and action, the plan has the potential to lead the way in mitigating the effects of Europe's new climate.

Source: www.minzp.sk/files/sekcia-vod/hodnota-je-voda/h2odnota-je-voda-akcny-plan-riesenie-dosledkov-sucha-nedostatku-vody.pdf

Developing drought management plans and putting them into practice is still in its infancy and clearly this is not a 100m dash, rather it is a marathon. It is a process and not a project, it has milestones, but there is no completion date. It will be a process of collaboration and continually improving facilities and services to reduce risks and tackle emergency droughts as they occur. It is about moving from recovery to protection, from crisis management to risk management (Figure 2).

4.4 Is drought management synonymous with long-term development?

Many people ask: Is long-term economic development the same as reducing drought risks? The answer is yes but it is not the whole story. If economic development was the answer, most of western Europe would be relatively free of drought impacts. Recent experiences clearly demonstrate that this is not the case. So how do these two issues fit together?

If economic development was the answer, most of western Europe would be relatively free of drought impacts.

Long-term development is largely driven by the threats from climate change and how this will impact on our daily lives. Energy and carbon tend to be the focus of attention to reduce the risks of climate change, but of more immediate concern are the impacts of extreme droughts (and floods) that we are already experiencing. We can blame climate change for bringing about these events, but we cannot always blame climate change for their impacts. Thus, experts suggest that long-term planning for water security should be the focus of adapting to climate change. Planning for the likely future variability of water resources will better prepare everyone for tomorrow's climate.

The challenge is to capitalise on the common aspects of long-term plans to increase water security and reduce the impacts of drought, and the need for emergency measures that can be a drain on valuable and limited financial resources. This is often called the 'no regrets' approach that avoids spending money on events that may not happen. However, evidence suggests that in many countries such levels of collaboration between those organisations responsible for long-term planning and those for managing disaster risk have yet to be established.

5. Managing drought – case studies

To bring a sense of reality to these generic drought planning processes, case studies from South Africa and the UK demonstrate how countries, that normally enjoy regular annual rainfall, cope with drought events.

They demonstrate many facets of drought, the impacts on both urban and rural communities, and the attention from the media. They also show how difficult and complex drought can be, how it impacts different people in different ways, and how complacency can lead people into making decisions that can prove costlier in the long-run. In particular, they show how droughts can be highly political events and that climate change should not always take the blame for drought crises.

5.1 South Africa

Between 2014 and 2017 Cape Town, South Africa experienced its worst drought in living memory. Yet in 2013 the Cape had its highest annual rainfalls in decades and public reservoirs were full. The drought began in 2013 but like most droughts this was not fully appreciated until much later when it became a crisis requiring emergency action. Early signs occurred in 2015 when municipal reservoirs were only 71% full. In 2016 they dropped further to 60% and in 2017 to 38%.

Local government told residents to reduce water use which, for wealthier urban households, meant reducing use from some 2,000 litres per person per day down to 50 litres per person per day (Box 10). However, Cape Town is also home to a significant poorer community that are already used to such meagre supplies. Both local and international press picked up quickly on what dramatically became known as 'day zero' – when planners began predicting when reservoirs would eventually run dry.

Assessing the impact of this drought the main question was: – How and why did Cape Town (almost) run out of water? The simple answer was to blame climate change for this extreme event. But hydrologists showed that the drought was within the normal hydrological variability for the Cape region. This suggested that the problems lie much deeper in poor water planning and management, the politics of investing in water resources, and people's beliefs and their behaviour toward using water.

Don't blame climate change. People and poor planning are behind most urban water shortages.

World class science

South Africa has world-class water scientists and engineers and relies on sophisticated hydrological modelling using historical data to manage both supply and demand for water. Droughts were recorded in the 1930s, 1970s, and in the early 2000s and are all reflected in the models. River flows and groundwater are carefully monitored and matched with demand to determine how much water storage is needed and to assess the likely risks for households, industry, agriculture, and the environment.

For decades policy-makers heeded advice from engineers about demand and supply in a region where municipal water demand was increasing because of a growing urban population and improving living standards. Agriculture was also consuming more water for irrigation, an essential input for producing the region's high-quality wines and fruit (Box 10). Lucrative fruit exports markets for out-of-season produce across Europe were growing and so too were more local urban markets across Africa. Agriculture consumes a lot of water particularly in warm dry weather. In the Cape, agriculture has rights to consume one third of the region's water resources. But officials appeared sanguine about agricultural water demand, because a series of wet years prior to the drought had diverted attention away from the high demand for irrigation water during dry weather.

Box 10 - Water use is not the same as water consumption

Water use and water consumption have very different meanings, yet they are usually lumped together to describe water demand. This is like counting apples and oranges as the same fruit. We use water for domestic and industrial purposes and once we are done with it, we put it back into the drains so that it can be cleaned up and used again. The recycled water becomes a resource for others to use.

Water for irrigation and for environmental purposes is consumed. The water is transpired through vegetation into the atmosphere and is lost to the immediate hydrological cycle. There is no flow back into the soil once the crops get hold of it. Water for power stations is a mixture of use and consumption as some is evaporated during cooling processes. So separating use and consumption for the purposes of planning and management is vital for proper water accounting.

Constraints to development

In the early 2000s, water resources planning flagged the need to build more dam capacity. But two constraints came into the equation. First was the desire to protect the environment by limiting dam development. It was suggested that solutions to water shortages lay in water conservation measures and managing domestic and agricultural water demand rather than increasing the supply. The second constraint was that officials were reluctant to spend money on dams, the region was enjoying good rainfall, reservoirs were mostly full, and there were other pressing needs for limited funds. One official was reported to say "it is not practical to ring-fence billions of Rand for the possibility of a drought that may not come to pass".

Three consecutive dry years has rather moderated that view. Direct costs of the water crisis included: reduced water revenue, jobs and production losses in agriculture and industry, and in tourism. The estimated loss was over 2.5 billion rands (€150 million). Water tariffs have risen by 26%. Experts suggest that investment in dams would have cost much less than this and would have provided cheaper insurance even if the dams proved to be unnecessary.

"Day zeros" are not inevitable.

Need for improved communications

Water professionals argue the greatest challenge is getting political decisions made in a timely fashion and with public support. Water engineers and scientists need to develop the language, formats, and tools that enable politicians, policy and decision-makers, economists, lawyers, and the public to understand the world of water management and to avoid the *hydro-illogical water cycle of drought* and complacency (Box 1). The media has an important role in this communications process that can empower professionals, politicians, and the public to act in the best interests of water security.

Since May 2018, winter rains have brought reprieve to the citizens of Cape Town. Concerns that water supplies may run out in the summer have been set aside, hopefully, for another year. But the city remains vulnerable.

Source: Adapted from Muller, 2018

5.2 United Kingdom of Great Britain

The UK is not usually thought of as a country affected by drought. However, a drought over two consecutive years, 2011 and 2012, significantly changed attitudes in government and water-users to the threat of droughts.

The UK's temperate climate means that both too much and too little rainfall often causes problems. Too much, usually in the winter months when flood control and land drainage is needed, and too little usually in the summer when public water supply restrictions may be needed, and agriculture and the aquatic environment suffer.

Although the main drought concerns focus on domestic water security, impacts on industry, agriculture, and the environment, can be significant. Home grown agricultural production is important to the UK. It underpins the country's food and drink industry, which is worth £110 billion and employs 3.6 million people.

Most agriculture is rainfed and nationally only 1-2% of freshwater withdrawals are for agriculture. However, most of the withdrawals are concentrated in the drier south-east where soils are sandy and provide ideal growing conditions for 150,000 hectares of irrigated high-quality fruits and vegetables. Thus, on a warm, dry day in summer, up to 50% of water abstracted will be for agriculture.

Water demands from other sectors, including environmental protection, are rising and take precedence over water allocations for agriculture in times of drought. Thus, drought in the south-east puts both primary production on the farm and the wider food and drink industry at risk.

There have been notable droughts over the last century but the drought in 2011-2012 affected most of England and was the driest 18 months for over 100 years. The effect of two dry winters led to low groundwater levels across the country, and municipal reservoirs were low across south and central England, some at their lowest recorded levels. Seven water companies introduced temporary use bans for 20 million customers (30% of the population).

The dry spring and summer in 2011 made life difficult for both rainfed and irrigation farmers as an agricultural drought developed. Drought continued into 2012 and rivers and groundwater did not recover as would normally be expected from winter rain. Municipal and irrigation farm reservoirs could not be refilled in readiness for the 2012 summer. The drought continued into the early summer of 2012 and brought major problems for water companies as they struggled to maintain public water supplies. Several water companies introduced restrictions. In London water shortages threatened the viability of the Olympic Games. Politically this was anathema and emergency measures were introduced to ensure that the Games did not suffer.

Summer 2012 proved to be devastating for farmers who rely on rainfall for growing cereal and fodder crops. Also for irrigating farmers growing fruit and vegetables as their reservoirs were empty. The aquatic environment suffered badly.

Box 11 - Water abstraction rules

All water abstractions from rivers and groundwater are licensed by government. In times of drought the Environment Agency, which manages water resources, has the power to stop farmers irrigating. Such decisions are not taken lightly, and are often negotiated with farmers in advance to avoid disruption to food supplies. But irrigation is not considered to be an *essential water user* like water supply and the environment. Irrigation is a commercial risk to be borne by farmers and this can constrain private investment in what is expensive on-farm storage.

The government convened emergency meetings with all the water and water-using sectors to discuss and plan contingencies. Ahead was the prospect of continuing drought, another dry winter, and water companies with little spare capacity to continue supplying water. To reduce the risks, emergency plans were introduced to connect water networks from the wetter north of the country to the drier south to maintain limited supplies. The impacts of most concern were possible irreparable damage to aquatic ecosystems, and heavy financial losses, particularly in the highly productive and capital intensive agricultural sector where impacts ripple throughout the food supply chain from primary crop production to food supplies in the shops, the food and drink industry, and employment. Farmers were faced with little choice but to restrict or stop planting crops. The fire service too was concerned about the outbreak of forest and heath fires as there was little water available for fire-fighting.

Fortunately, in summer 2012 it started to rain, but the unusually heavy storms produced record widespread flooding and people suffered damage to property. Farmers, who were originally short of water, were unable to harvest crops because the land was too wet to allow machinery onto the land. The impacts of the drought were felt for many months after this event (Box 12).

Box 12 - 2012 was the *wettest drought on record* in the UK

Towards the end of the 2011-12 drought, heavy rainfall caused severe flooding along the Thames valley, yet drought orders remained in force because of continued public water supply shortages. This was confusing for water users who expected to return to normal. It was raining hard and yet water was still restricted.

So how does a water company explain all this to its customers without appearing to be mismanaging the situation. The supply came from groundwater which was slow to recover, and extensive publicity was needed to explain that it can take many months (even years) for aquifers to recover. To overcome the problem, the water companies used humour. London buses carried large posters say this was *the wettest drought on record!* This helped people to understand the vagaries of dealing with both droughts and floods at the same time and the challenges that water companies faced in maintaining municipal water supplies during periods of acute shortage.

Outcomes from this event

One significant outcome from this near catastrophic event was the development of a national drought plan (Environment Agency, 2017). This set down an institutional structure for drought management and specific actions in different regions that reflected different water related risks and priorities. Identified drought stages range from *developing drought*, to *drought*, *severe drought*, and then to *recovering drought*. The drought recovery phase was considered just as important as the build-up phases. An immediate and prime concern as drought develops was the aquatic environment, compliance with the Water Framework Directive (WFD), and protection for Sites of Special Scientific Interest (SSSIs). *Developing drought* identifies risks of environmental damage to wildlife and plants and, depending on the locality, the Environment Agency will trigger voluntary restrictions on water abstractions for agriculture, domestic supply, and canal/river navigation.

A declaration of drought will trigger permits to water companies to maintain domestic supplies and apply restrictions on irrigation in key areas to protect the environment. Restrictions are imposed when low river levels are considered harmful to the environment. *Severe drought* triggers *category 1 incident response mode*. This includes emergency restrictions on domestic and commercial water-users and may invoke a COBRA meeting (a quirky title for a crisis meeting of government chaired by the Prime Minister in Cabinet Office Briefing Room A in 10, Downing Street in London).

The 2011-2012 drought triggered government to spend over £12 million on a major five-year programme of research to support improved decision-making that identifies, predicts and responds to the various drivers and impacts of drought.

One useful outcome for irrigation farmers is an online application that enables them to assess their financial business risk from drought based information such as past local weather events, planned cropping patterns, and water allocations/restrictions (UKIA, 2019).

The drought also triggered some farmers to form water abstractor groups to enable them to negotiate more effectively with the Environment Agency as the regulator. This has improved relationships between farmers and the regulator so that potential water short-falls can be negotiated early in the season rather than when crops are in the ground (UKIA, 2019).

The UK has now redefined drought in terms of impact and recognises *environment drought* and *agricultural drought* whereas in the past *drought* really meant *water supply drought*. However, government agencies are reluctant to declare an *agricultural drought* as the word *drought* is so emotive, there are concerns about causing panic as the media are inclined to interpret this as stand-pipes in the streets, water tankers distributing water to farms and villages, and dry river beds. Agencies currently prefer to talk about *pro-longed dry spells*. This has less impact on the media and the public who are most likely to be enjoying the warm dry weather. The downside is that this underplays the importance of water for producing the nation's food and does little to highlight and inform people about the potentially serious threat to food supplies and national food security.

Another drought in the summer of 2018 demonstrated just how different drought can be. The north-west, which is normally wet, suffered a severe drought, with low reservoir levels and water supply restrictions. While municipal reservoirs in the normally drier south-east were full and operating normally. Farm reservoirs were also full and irrigating normally, though rainfed crops suffered badly from lack of rain.

Agricultural drought in the UK has focused some attention on food security both in terms of production at home and imported food – currently the UK imports more than 50% of its food. Critics point out that importing food also *imports* water used to grow the food (called virtual water) and this often comes from countries that also suffer from water scarcity and droughts. For example, 16% of fresh fruit and vegetables come from Spain, 14% is imported from South Africa's Cape region, and other food comes in from Morocco, Egypt, and Peru. In

encouraging imports from drought prone countries, the UK is seen as increasing its food security at the expense of others and exporting its environmental problems to countries that do not have the same control over their environment that the UK enjoys.

This is in essence how the world food market works. A lack drought management planning in those countries that supply the UK can in the long-term severely impact both their own water security and UK food security. Many countries across Europe follow a similar pathway and have come to rely on food imports from drought-prone countries. Water connects us all in many ways that we have yet to discover.

6. Communicating drought: case studies

It seems self-evident that informing the public about drought will influence behaviour towards water and that the media have a central role to play in this. But is there evidence to support this, do people listen, do they read the papers, and do they act to reduce water-use, and if so, what lessons can we learn from this?

Many governments and water companies issue information on drought to inform the public but ensuring the message is delivered, read, understood, and appropriate actions taken is much more difficult. For some, communication is largely a one-way marketing exercise in which water companies and government agencies target groups with adverts and slogans such as *save water shower with a friend*. But does this work? Public awareness of water and drought-related issues is clearly important in times of water shortage, yet it is a relatively unexplored component of water-use behaviour. The following are two evidenced-based examples that demonstrate how the media influenced the public to respond to drought.

6.1 Media changes water-use behaviour in California

Following California's worst 5-year drought on record (2011-2017), researchers assessed the influence of press coverage in increasing public awareness and in reducing water-use in the home.

In 2015, in response to a growing water crisis, California's governor mandated a 25% reduction in urban water-use across the state. Prior to this announcement residents in San Francisco Bay Area were known to be using less water than in previous years. The question was: *What was driving residents to do this?* The answer was in part due to media coverage.

Researchers examined water use data from the Bay Area from 2005 to 2015 – a period with two distinct droughts, the latter one receiving high media coverage compared to an earlier drought between 2007 to 2009. They also counted the number of articles related to drought that nine national and regional newspapers ran during the same period. Drought coverage was less during the earlier drought because of other big news stories. The more severe period however, captured state and national attention and the number of drought-focused articles published each month increased from 2014 onwards. Drought in California was interesting, and it was the news of the day.

California always attracts a lot of media attention. However, the later drought further intensified media cover with 30 times more drought-focused newspaper stories written per month than in the earlier drought. Researchers suspected that spikes in media coverage were driving the reductions in water-use that water engineers were observing (Figure).

Another question was: *Were people reading the news stories?* An analysis of Google internet search data provided an answer. The search term 'California drought' significantly increased in the Bay Area at the same time as the number of newspaper articles increased.

The research results suggested that newspaper coverage did in fact contribute to reductions in water-use. For example, the results showed that an increase of about 100 drought stories over two months was associated with a reduction of 11-18% in typical household water-use.

Between June 2014 and April 2017, Bay Area water agencies reported water-use was down by 10-35%. They were encouraged that their efforts to inform the public through the media were successful. A comment from a senior agency staff was *People do care if you give them the right set of information – they react, they respond, and they change their behaviour.*

Sources: Kimberly and Ajami, 2017; Benson, 2017.



• Figure 6: Media coverage of the recent California drought surged in 2014, coinciding with a fall in household water consumption. (Quesnel & Ajami 2017).

6.2 Media influence water use in New Mexico and Arizona

In the two adjacent states of New Mexico and Arizona in the US, researchers investigated how culture, political history, and stage of economic and social development can determine how the media and the public respond to drought. New Mexico and Arizona share the same semi-arid climate with 480mm average annual rainfall, but the population in the two states respond quite differently to drought.

Between 2002 and 2004, both states experienced one of the most severe droughts on record. A study of tree rings, a common indicator of past droughts, showed that such severe conditions had rarely occurred over the past 1,000 years.

Research into media coverage following the drought showed that differences in culture, political history, and water infrastructure, all influenced the way in which the public in each state responded. Using keywords from the states' main newspapers it was clear that New Mexico experienced more conflict and Arizona more surprise about the drought.

In Arizona most people live in urban communities that have well established water storage and distribution systems and as such people were buffered from the drought.

In contrast, in New Mexico there was a much greater sense of emergency among the government and the public. This reflected the state's extensive rural as well as urban populations, the poorly developed water storage and distribution systems, and the prevalence of conflicts over water rights.

The study illustrated that media coverage can be effective in making the public aware of drought but with very different outcomes.

Adapted from Sonnetta et al, 2006.

6.3 Why some droughts get more coverage

Not all serious droughts attract the same level of media coverage, as California illustrates. During the California drought, the internet was saturated with articles, maps, and *before-and-after* (drought) photographs. It also received extensive coverage on social media, such as Twitter, where it became a *trending* (much talked about) topic. Drought coverage was referred to by some as *drought-porn* or *drought shaming* because the coverage focused on the more dramatic impacts on both urban and rural areas.

In the US, some 40 states are likely to experience water shortages in the coming years, but reports suggested that California attracts most attention because of its cultural significance – the power of Hollywood – and its economic importance, particularly agricultural. Irrigated farming consumes 80% of the available water and farmers have strong political clout that attracts more media attention than in other states.

Less media attention, however, does not mean that other droughts are less important. The impacts may be far more serious. One journalist commented *many major (drought) events do not have their own Twitter account*.

Low media coverage may also just reflect low public interest, particularly in countries where droughts are a regular occurrence.

Some politics of drought

Politics can also influence media attention. In some countries, governments actively encourage media coverage to gain public understanding and support, and to encourage people to engage in saving water. In others, the media may be relatively silent, to downplay the issues to cover up inadequacies in reducing drought risk, or to avoid civil unrest. There may also be strong commercial interests that wish to downplay long-standing environmental concerns such as deforestation which can impact water conservation and water security.

Source Adapted from Cole, 2015.

7. Communicating drought: principles and practices

There is a growing body of social science research that explores cultural changes in the way we use water and how people perceive drought risk that could prove useful for water professionals, government, water companies and the media. A recent study focused on communicating drought in the UK, but many of the lessons from this are applicable to situations in other countries, including CEE (*the following draws substantially from Climate Outreach, nd.*).

Principles

- People are more aware of climate change than drought and so information that link the two may have more traction.
- Timing is important – identify the best time to engage. Early warnings, though important, may not be newsworthy, as nothing is really happening, and it may be a false alarm if it starts to rain again. More newsworthy is during a drought or immediately after an event. Waiting until the rainfall is well-established again will be too late as complacency sets in and people move onto other worries. Remember the *hydro-illogical cycle* (Box 1).
- Perceptions about drought are shaped by recent events. If there has been a recent drought then people are more likely to show interest. This has proved to be the case for climate change.
- There is no *one size fits all* communications strategy for drought. Remember different audiences will respond to different types of drought.
- The various media may also respond differently to drought. Local media may focus in detail on how drought is affecting local communities, whereas national media may take a broader and less detailed view. Specialist media may focus on specific issues of drought, like the farming press providing detailed information for farmers.

Good practice

Developing the best messages – know your audience

People respond to a good story grounded in well-held values – something that people can immediately identify with that includes a challenge, a resolution, and a return to stability. Scientific accuracy is needed but science alone is not enough to stimulate interest and too much science will put many people off reading further.

People are more likely to engage when they hear about the impacts of drought, such as unpredictable harvests and food shortages, and tourism – the low water levels in the Danube during drought severely impacted the river cruising industry, which was what the media picked up on.

Different audiences will respond to different types of drought. The public will be much more aware of domestic water shortages and the threat of stand-pipes in the street. Farmers will be more concerned about agricultural drought and the impact on their crops. Most people show more interest in long summer droughts than winter droughts. Most may not even recognise low winter rainfall as drought, though water planners will be wary because winter rains can be important for replenishing groundwater reserves and filling storage reservoirs.

Visual images can enhance messages, but research shows they must be used with care. Disaster pictures ('drought porn') can grab attention but it can leave people feeling overwhelmed. Images that show action to reduce risks and how people are adapting to drought help people to feel closer to events and to act.

Focus on local as well as the *big picture*. People respond more to local and national pictures rather than international events over which they have little control.

There is a lot of uncertainty surrounding drought and too much talk about *if* may be unhelpful. A more acceptable term is *risk*. It is common language among the media and politicians and is more familiar to the public. Media coverage benefits for starting positively with what you know rather what you do not know.

Fear has been traditionally used to change attitudes, but research shows that the link must be personal and direct e.g. *smoking causes lung cancer so give up smoking*. Attempts to instil fear of drought may not work. Drought issues are much less personal unless people are directly affected, such as no water coming out of the tap. A more positive approach is to highlight actions that people can take to reduce risks.

Choose the right messengers

People are more likely to engage with messengers they trust.

Messages about drought can be complex and confusing and need careful handling. Examples include explaining to the public there is no drought because municipal reservoirs are full, while farmers are angry because they are experiencing a severe agricultural drought or farm animals are dying of thirsts while people are filling their swimming pools. Telling the public that drought restrictions are still in force even though it has started to rain again will require clear simple messages from professionals.

These are difficult issues to communicate in simple terms. In such circumstances the tendency is for people to rely on the messenger – can he/she be trusted to provide the right information and analysis. Trust builds slowly; any perceived dishonesty can destroy it immediately and future messages may not be valued or believed.



8. References

- Benson E (2017) How press coverage helps conservation. High Country News Oct. Available at <https://climateprotection.org/media-coverage-helps-conservation-flood-drought-news-can-reduce-water-use/>
- Bokal S, and Müller R (2018) Integrated drought management in central and eastern Europe. WMO Bulletin: vol 67(1). Available at <https://public.wmo.int/en/resources/bulletin/integrated-drought-management-central-and-eastern-europe>
- Climate Outreach (nd) Communicating drought risk in a changing climate. Available at <http://dryproject.co.uk/wp-content/uploads/2016/08/Climate-Outreach-DRY-Drought-Risk-and-You-Aug-2016.pdf>
- Cole I (2015) Drought media: does it help? <http://geographical.co.uk/people/cultures/item/1076-drought-in-the-media-does-it-help>
- Environment Agency (2017) Drought response: our framework for England. June 2017. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/625006/LIT_10104.pdf
- Fresh Water Alliance (2018) Drought message guide. Available at https://www.freshwateralliance.ca/10_drought_messages
- Integrated Drought Management Help-Desk and library. Website <http://www.droughtmanagement.info/>
- Kimberly JQ, and NK Ajami (2017) Changes in water consumption linked to heavy news media coverage of extreme climatic events. *Sci. Adv.* 2017;3: e1700784 25 October. See also video available at <http://waterinthewest.stanford.edu/publications/changes-water-consumption-linked-heavy-news-media-coverage-extreme-climatic-events-0>
- Muller M (2018). Lessons from Cape Town's drought. *Nature* Vol 559 12 July. Available at https://www.researchgate.net/publication/326228676_Cape_Town%27s_drought_Don%27t_blame_climate_change
- Sonnetta J, BJ Morehouse, D Finger, G Garfind and N Rattray (2006). Drought and declining reservoirs: Comparing media discourse in Arizona and New Mexico, 2002–2004. *Global Environmental Change* 16 (2006) 95–113.
- World Meteorological Organization (WMO) and Global Water Partnership (GWP) (2016). Handbook of Drought Indicators and Indices (M. Svoboda and B.A. Fuchs). Integrated Drought Management Programme (IDMP), Integrated Drought Management Tools and Guidelines Series 2. Geneva. Available at http://www.droughtmanagement.info/literature/GWP_Handbook_of_Drought_Indicators_and_Indices_2016.pdf
- This handbook covers some of the most commonly used drought indicators/indices that are being applied across drought-prone regions, with the goal of advancing monitoring, early warning and information delivery systems in support of risk-based drought management policies and preparedness plans
- World Meteorological Organization (WMO) and Global Water Partnership (GWP) (2015) Integrated Drought Management in Central and Eastern Europe: Compendium of Good Practices. Available at http://www.droughtmanagement.info/literature/idmp-cee_compendium_en.pdf
- This Compendium is the final publication of the first phase of the GWP/WMO Integrated Drought Management Programme in Central and Eastern Europe (IDMP CEE). It provides an overview of the programme's outputs and accomplishments achieved in the period from 2013 to 2015.
- World Meteorological Organization (WMO) and Global Water Partnership (GWP) (2014) National Drought Management Policy Guidelines: A Template for Action (D.A. Wilhite). Integrated Drought Management Programme (IDMP) Tools and Guidelines Series 1. WMO, Geneva, Switzerland and GWP, Stockholm, Sweden. Available at http://www.droughtmanagement.info/literature/IDMP_NDMPG_en.pdf
- The National Drought Management Policy Guidelines 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. 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.
- Video on <http://waterinthewest.stanford.edu/publications/changes-water-consumption-linked-heavy-news-media-coverage-extreme-climatic-events-0>
- UKIA (2019) The Irrigators' Handbook. UK Irrigation Association Available at www.ukia.org
- Experiences of past droughts and practical guidance for farmers facing the prospects of drought in the UK.

