CROSSDRO ANNUAL REPORT 2021

WP6: Stakeholder engagement, dissemination and capacity building

Research partners:

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1. Introduction

The CROSSDRO project began in September 2019. This project is made up of researchers from different centres and universities in Europe (Spanish National Research Council, University of Zaragoza, Lund University, Potsdam Institute for Climate Impact Research, Maynooth University, Selectia Research Institute of Field Crops), and it has been financed by different European and national institutions.

The main objective of the CROSSDRO project is to develop a multi-sectoral and cross-scale evaluation of drought impacts in complex European basins with contrasting climatic, hydrologic, environmental and socioeconomic conditions. The CROSSDRO project will evaluate the drought impact in different areas such as forestry, land cover, water resources, agriculture, hydroelectric energy, tourism, among others. To achieve this main objective, a series of specific objectives have been proposed, which include:

1. To assess the impact of drought on different sectors.
2. To analyse the connection between biophysical and socioeconomic drought mechanisms between different sectors and different spatial scales.
3. To analyse the capacity of models to reproduce the impact of drought on different sectors.
4. To understand the potential impact of drought under future scenarios of RCP and SSP.
5. To assess how environmental and social resistance to drought can be improved, as well as the adaptive response of society to droughts.

The objectives will be reached by means of experimental studies, both on the field and in the laboratory, remote sensing, historical series and modelling approaches that account for past droughts and future scenarios. In addition, it will be critical to involve key stakeholders to learn about past drought challenges and issues and specifically address their needs. The CROSSDRO project works on different hydrographic basins in Europe, located in Spain, Ireland, Germany and Moldova.

The participation of key stakeholders in the CROSSDRO project will take place in different study locations. The key stakeholders will be composed of people linked to different sectors and in different areas, such as land and water managers, information users, economic agents and farmers, among others. The interaction with the key stakeholders will be carried out through interviews, surveys and roundtable discussions.

This document summarises progress during 2021 in each basin with regards to work package 6: Stakeholder engagement, dissemination and capacity building.

2. DESCRIPTION OF PROGRESS (DEC 20 - DEC 21)

Boyne Basin, Ireland

Since the start of the project, the Maynooth University project team have engaged with key intermediaries and stakeholders with an interest in drought impacts in the Boyne catchment.

Cross-sectoral drought impacts and perspectives

Based on initial stakeholder meetings and online survey responses, we identified 18 target interviewees with either direct sensitivity to drought impacts in the Boyne or a national-level interest in drought. Interviews were delayed by several months to allow for more time for stakeholder mapping and to account for extra sensitivity when contacting participants during the ongoing Covid 19 pandemic. We approached target interviewees in January 2021 and conducted interviews between February and July 2021. We aimed to better understand stakeholder/sectoral sensitivities and understandings of drought, past drought experiences and challenges, and concerns about future drought events.

We developed two semi-structured interview protocols for Boyne and national-level stakeholders that were tailored to interviewees. All interviews were conducted remotely either via telephone, zoom or a similar virtual meeting platform. Interviews ranged from 30 to 100 minutes in duration.

We interviewed 40 individuals who can be broadly divided into three groups: individuals with a direct interest in drought from a livelihood perspective (n=6); individuals with a direct interest in drought from a recreational or general perspective (n=12); and those with an indirect professional interest (n=27) (Table 1).

Table 1: Type of interviewee

No.	Organisation	Roles / Position	Interest			Scale		
			Livelihood	Recreation / general	Professional	Boyne	National	Non-Boyne Local / regional
1	Kells Anglers	Angler		☑		☑		
2	Newgrange Gold	Business/ land-owner, Angler.	☑	☑		☑		
3	Inchamore house farm	Farmer, Vet, Business/ land-owner, Angler.	☑	☑		☑		
4	Hotwell farm	Business/ land-owner.	☑			☑		
5	Boyne Boats	Business owner, boater.	☑	☑		☑		
6	Sonairte	Charity volun-teer, horticultur-alist.		☑		☑		
7	Navan Anglers	Angler		☑		☑		
8	Birdwatch Ireland	Birder, conser-vationist.		☑		☑		
9	Waterways Ireland (Royal Canal)	Technical of-ficer, engineer.			☑	☑		
10	Heritage Boat Association	Boater		☑		☑		
11	Baltrasna Boreen biodi-versity group	Conservationist, citizen scientist.		☑		☑		
12	Ribbontail paddlers	Canoe club administrator		☑		☑		
13	Downing	Farmer, land-	☑					☑

	Group Water Scheme, Cork	owner, volunteer.						
14	Lacka Group Water Scheme, Tipperary	Farmer, landowner, volunteer.	☑					☑
15	Coillte Tree Nursery (Carlow)	Nurseries manager			☑			☑
16	Waterways Ireland	Senior environmental officer.			☑		☑	
17	National Federation for Group Water Schemes	Senior Development Co-ordinator.			☑		☑	
18	An Foram Uisce	Research Lead			☑		☑	
19	Irish Council for Social Housing	Volunteer, Rep on An Foram Uisce.		☑	☑		☑	
20	Bord na Mona	Land / estate manager			☑		☑	
21	Bord na Mona	Ecology lead			☑		☑	
22	Teagasc	Agricultural researcher			☑		☑	
23	Local Authorities Water Programme (LAWPRO)	Catchment manager (East/Midlands)			☑		☑	
24	PTR Forests	Forestry consultant			☑		☑	
25	Climate Action Regional Office (East/Midlands)	Coordinator			☑		☑	
26	Forest Service	Inspector			☑		☑	
27	Dept of Housing	Principal Water Advisor			☑		☑	
28	Dublin City Council	Climate Action Coordinator			☑			☑
29	EPA Research	Scientific Officer (Hydro & Groundwater)			☑		☑	
30	Climate Change Advisory Council	Secretariat			☑		☑	
31	Dept. of Agriculture	Vet, Director (Animal Welfare)			☑		☑	
32	Dept. of Agriculture	Adaptation policy officer			☑		☑	
33	Dept. of Agriculture	Agricultural inspector, Scientist.			☑		☑	
34	Irish Farmers' Association	Dairy Executive, farmer.			☑		☑	
35	Geological Survey Ireland	Scientist			☑		☑	
36	Trinity College Ireland	Conservation scientist			☑		☑	
37	Dept. of Agriculture	Policymaker			☑		☑	
38	National Parks and Wildlife	Eco-hydrologist			☑		☑	
39	Atlantic Salmon Trust	Fisheries scientist/consultant		☑	☑		☑	
40	Office for Public Works	Engineer			☑		☑	

TOTAL	6	12	26	12	23	4

Interview findings indicate that drought impacts in the Boyne (and Ireland more broadly) are understood and experienced from diverse perspectives.

Impacts on public water supplies

Despite not being able to meet anyone from Irish Water, we interviewed other national-level stakeholders from the Dept of Housing and others with recent experiences and knowledge of how public water supplies were impacted during the 2018 and 2020 events. Interviews suggest that, while there has been broad agreement for a long time of systemic problems with Ireland's supply network, experiencing two drought events so close together highlighted vulnerabilities and focused minds within the department of Housing. Dublin is considered particularly at risk due to the city's lack of storage capacity and increasing demand for water resources. According to a water advisor at the Dept of housing, Dublin is currently "operating on a 2 to 3% headroom [while] international practice would be nearer to 15 or 20%." (Dept of Housing). Several stakeholders highlighted how supplies relying on flashy catchments in the West can also be vulnerable even during short dry spells. In Spring 2020, run of the river supplies on the Cork-Kerry border were so low that Irish Water had to impose hosepipe bans, pressure reductions and rationing. Some sections of river needed to be sandbagged to abstract water and water tankers were also needed in some places. Several stakeholders also highlighted the serious risk posed by multi-year events as some reservoirs and aquifers need time to recharge. In terms of the Boyne catchment, public water supplies don't seem to be an immediate concern, but development of the Dublin-Belfast economic corridor could bring pressures in the long-term.

Impacts on group / private water supplies

While we did not report direct impacts on water supplies, the 2018 event alerted landowners and farmers in the Boyne to the potential vulnerability of private wells to drought. Interviewees recalled wells going dry in the 1970s/80s due to dry weather and arterial drainage. We found some farmers were also concerned about future restrictions on river abstraction during dry periods and the affect that could have on their farm costs and product quality.

Impact on watercourses and waterways

Waterways Ireland (the governmental agency responsible for management of the Royal Canal) and boaters and businesses on the Boyne were concerned about the impact of low flows on not only navigation but also the structural integrity of canal embankments and bridges as they dry out and crack. The Royal Canal, which runs across the Boyne catchment, is fed by Lough Owel which also supplies the town of Mullingar. During dry periods, Waterways Ireland supplement this supply by pumping water from the upper Boyne catchment into the Royal Canal.

Other stakeholders were concerned about low flows increasing water temperatures and adversely effecting quality as water becomes more concentrated and the watercourse's ability to assimilate wastewater diminishes. Some reported that often, when there's heavy rainfall after a dry spell, recently applied agricultural fertilizer and wastewater solids that build up in pipes are flushed into river systems. Low flows and reductions in water quality encourage weed growth and adversely impact fisheries, freshwater ecosystems, and their cultural and recreational value to society. For most stakeholders, drought is mainly understood as something that exacerbates

existing catchment pressures from agriculture, water management and historical drainage policies.

Impacts on dairy / livestock farming

It's clear from interviews with farmers, Teagasc, IFA and DAFM staff that dairy production is particularly at risk from drought in the Boyne and nationwide. For dairy and livestock farmers, drought is synonymous with shortages of grass and other crops for fodder and bedding. In fact, according to a member of the IFA dairy executive dairy farmers would drought define as "when your 21-day rotation doesn't replenish you with grass." All stakeholders reported that grass growth dropped dramatically in 2018, particularly in Munster and Leinster. They talked of "unfamiliar territory" and "a sector unprepared for such a long drought" as silage and straw prices "went through the roof". Similar conditions across Europe led to the EU and Irish government organising extra imports of feed. However, according to a Teagasc scientist, this safety value may not be possible in the future given that the EU green deal policies are looking to stop our dependence on the global supply chain of feed, as it is contributing to the destruction of tropical rainforests and carbon emissions. During the 2018 event, interviewees were encouraged to see farmers in the less effected northwest use social media to help move silage and straw around the country. According to several stakeholders, Teagasc's recommendation to farmers to spread fertilizer on crops during this time caused massive nitrate leaching when the rainfall finally arrived in August. It should be said, while there were clear financial and mental health impacts on farms, animal welfare, breeding and milk production was largely unaffected. There was widespread concern from interviewees about the general vulnerability of intensive dairy operations particularly those with high cow density. According to an animal welfare expert at DAFM, some dairy farms are operating at such a limit that the weather almost needs to stay perfect for them to survive.

There was also some concern from the dairy sector that drought could bring serious water shortages in the future particularly if intensification continues. Peak milk production and therefore water demand coincides with the summer. During this period, dairy cows require up to 70 litres a day and additional water is required for the milk production process and all the cleaning of the equipment and buildings. In term of impacts, shortages can lead to increased cow aggression and dominance issues. While a lot of farms have access to mains water, many of the larger more intense operations find it more cost-effective to privately manage water supplies. As a result, in 2018 some farms with intensive dairy herds ran out of water and had to abstract from nearby rivers. While this might not have been as widespread an issue as the fodder shortage, this was obviously a very stressful situation for the most vulnerable farms.

Impacts on tillage systems

In terms of tillage farming, 2018 and 2020 droughts impacted quality and yields on some farms. The wet autumn of 2017 and late, cold spring not only contributed to the 2018 fodder crisis but also meant that sewing windows for a lot of spring crops were missed. According to DAFM staff, irrigation is becoming more necessary in recent years particularly for potato farmers in the southeast. Some farmers are already starting to adapt to drier summer by moving to minimum soil disturbance systems to retain moisture in dry conditions. In the future, DAFM expects to see

grass and field beans in the southeast being replaced by deep rooted crop varieties or even crops like maize, soya or peas that are more tolerant to drought and associated pests.

Impacts on the forestry sector

Interviews with the forest sector indicate that drought can have significant impacts on newly planted forests. I interviewed someone from the forest service who went to sites in the Boyne during summer 2018 and reported severe stress and 100% failure on some sites for the first time in his career. It was so bad that DAFM had to set up a financial support scheme so that landowners and foresters could replant young trees that had failed. Young broadleaf forests planted in free draining mineral soil (e.g. in the southeast) were particularly susceptible. According to a consultant from PTR forest, survival seemed to be related to the ground preparation technique used when planting.

Impacts on wetlands and peatlands

Ecologists and conservationists in Ireland were concerned that more extreme drought will further destabilise and degrade wetlands and peatlands ecosystems that already have limited resilience. In 2018, wetlands dried up that had never previously been known to dry. According to one peatland ecologist, bog vegetation was like parchment paper peeling away from the peat underneath and in some places, because there was no moss or algae layer the surface easily cracked and crumbled. In terms of wildlife, interviewees highlighted how drought events and resulting fires can also have short-term effects on insect and bird populations. Bord na Mona (the semi-state company historically responsible for harvesting peat) would have welcomed drought as it increased productivity. However, as they are moving towards a policy of wetland restoration or rehabilitation, they are going to need to carefully manage water levels which could be challenging as demand for water resources increases and drought become more frequent and intense.

Second-order risks

Drought also brings secondary risks. Ecologists and foresters were concerned about fires starting on drained, harvested peatlands and forests during periods of prolonged dry weather. There were fires in the Boyne in 2018 and there is a long history of wildfires in Ireland causing damage to resources, wildlife, property, and infrastructure. Droughts are also likely to create conditions for bog slides in Ireland. In June 2020, an otherwise intact bog in Co. Leitrim slipped into a river. According to an ecologist I interviewed, this was caused by the dry weather in spring followed by intense rainfall in June. These events not only destroy peatlands, but the floods can also impact water quality, fish, biodiversity, farmland and infrastructure downstream. During previous dry summers, dust particles from peat harvesting and fires could also impact local air quality.

Prut Basin, Moldova

Selectia Research Institute of Field Crops (Moldova) has organized many events in 2021 dedicated to sustainable and resilient soil and crop management in the conditions of extreme weather conditions. This included 24 seminars with agricultural producers in different districts of Moldova and 6 scientific-practical conferences with the national and international participation. Simultaneously the work of the institute was reflected in 22 reports on the national radio and 23 reports on national TV.

Field trials with different varieties of winter wheat, winter barley, peas, soybeans have been visited by farmers of Moldova. Long-term field experiments with different crop rotations, systems of soil tillage and soil fertilization have been visited by both local producers as well as official representatives from the Government of Moldova.

The director of Selectia Research Institute of Field Crops has participated with two public lectures at the Academy of Sciences of Moldova on topics related to sustainable management of Chernozem soils in the conditions of global warming and the restoration of seed production in Moldova. These topics are very important especially in the pandemic situation for providing food security of the country.

Elbe Basin, Germany

Stakeholder activities were still largely hampered by the pandemic situation. On 21 October 2021 Tobias Conradt represented CROSSDRO in an expert hearing about high end climate change (i.e. end-of-century conditions under the pessimistic RCP 8.5 emission scenario) consequences for Germany. This was a four-hours virtual meeting with about 20 participants from German research institutions and ministries, organized by the Berlin-based Adelphi company and another of PIK's departments, with a break-out group focusing on drought effects in agriculture and forestry. For 30 November, Tobias Conradt was invited by a Bavarian producer of agricultural soil cultivation machinery (Horsch Maschinen GmbH, Schwandorf) to a panel discussion about future yield expectations and climate-change related pressures on agricultural production. The German-language talk was video-streamed live on the Internet.

Aragon Basin, Spain

There have not been opportunities for engagement or capacity building events this year in the basin as stakeholders and authorities are occupied in developing a new drought plan.