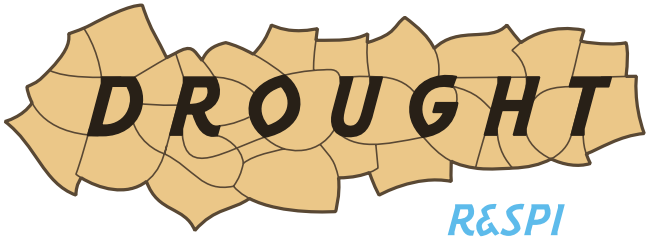
European Drought Reporter - origin



Fostering European Drought Research & Science Policy Interfacing
(2011–2015)

SEVENTH FRAMEWORK PROGRAMME

edc

EUROPEAN DROUGHT CENTRE

EDR & EDII

http://europeandroughtcentre.com

European Drought Reference (EDR) database:

- To learn more about **historical drought events**, view the EDR database: Click Here.
- To view **drought indicator (SPI)** values on a given date: Click Here.

European Drought Impact Report Inventory (EDII):

- To **query the EDII** and find reported impacts: Click Here.
- To **submit a drought impact report**: Click Here.

European Drought Reference Database - EDR

Summary of Major European Droughts

The EDR database was compiled as part of the EU funded DROUGHT R&SPI Project. The database is designed to provide a single, publically available site to disseminate detailed information about historical drought events in Europe. For additional information on this project and data collection, see the Project Overview. Major European droughts identified by the EU funded DROUGHT-R&SPI Project are listed below. Links provide detailed meteorologic and hydrologic drought indices, as well as information regarding economic, social, and environmental impacts.

Search:

			Climatological (SPI-6)			Hydrological		
Year	Location	Approx. Duration	Peak Date	Area (%)	Area (10^6 km^2)	Peak Date	Area (%)	Area (10^6 km^2)
1959	Northern Europe	5/1959-2/1960	17/10/1959	52.6	3,900			
1972	Northern/Eastern Europe	12/1971-7/1972	25/3/1972	57.6	4,268	20/3/1972	54.6	4,045
1973	Central Europe	1/1973-7/1973	20/2/1973	41.7	3,090	18/11/1973	50.2	3,724
1975-1976	Europe	11/1975-2/1977	27/7/1976	61.0	4,521	1/7/1976	71.2	5,277
1989-1990	Mediterranean	2/1989-10/1990	23/2/1989	43.8	3,248	11/5/1990	66.8	4,951
1991-1995	Mediterranean	2/1992-10/1994	11/6/1993	45.5	3,373	5/5/1993	57.9	4,291
1996-1997	Northern Europe	4/1995-7/1996	31/3/1996	49.6	3,674	4/3/1996	66.9	4,961
2000	East/Southeast Europe	1/2001-3/2001	23/1/2001	30.5	2,261	26/6/2000	54.0	4,004
2003	Europe	4/2003-11/2003	12/8/2003	54.8	4,063			
2004-2007	Iberian Peninsula	7/2004-6/2007	25/2/2006	38.0	2,817			
2007	Eastern Europe	2/2007-8/2007	30/4/2007	21.3	1,579			

European Drought Reference Database

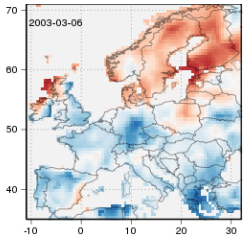
Drought of 2003

Europe

Progression of climatological (SPI-6) drought. Climatological drought is defined by the SPI-6, which sums precipitation over the previous 6 months and transforms this value to the standard normal distribution. Negative SPI values (shown in red) represent dry conditions, measured in standard deviations from typical conditions. Percent area in drought is calculated by summing all cells less than the 20th percentile (SPI < -0.84).

Drought Event Summary

The 2003 drought event is considered exceptio
precipitation deficits with record-setting heat e
evapotranspiration. At its peak, nearly all of Eu
peninsula and the far eastern Mediterranean. A
and extremely low discharge levels of rivers we



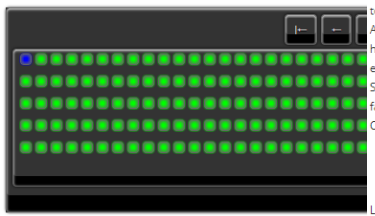
Climatological Drought

The 2003 drought event began with a precipita
located in Poland. Climatological drought rema
expanded to cover most of Europe. This rapid
Europe.

The most severe precipitation deficits, which o
at that point. This greatly increased evapotrans

The meteorological drought began to quickly r
France.

Progression of climatological (SPI-6) droug
transforms this value to the standard normal d
typical conditions. Percent area in drought is calculated by summing all cells less than the 20th percentile (SPI < -0.84).

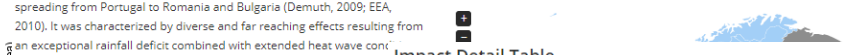


Drought Impacts

In terms of impacts the European drought of 2003 affected an area spreading from Portugal to Romania and Bulgaria (Demuth, 2009; EEA, 2010). It was characterized by diverse and far reaching effects resulting from an exceptional rainfall deficit combined with extended heat wave cond (EurAqua, 2004).

Agriculture was particularly affected in Southern and Central Europe: French, Italian, German, Austrian, Swiss, Slovakian, Spanish and Portu agriculture but also Eastern countries have been among the most affe by the drought and the heat wave in 2003 (COPA-COGECA, 2004; Swis 2004). In many countries of the South-Eastern European region, like Hungary, Slovenia, Croatia, Serbia and Montenegro 2003 was among t major agricultural droughts in recent years (AUA, 2011). The Internatic Disaster Database EM-DAT registered drought disasters in 2003 in Bos Herzegovina, Croatia and Hungary. Significant decreases in yields com to previous years were common, however with big variations per regic According to COPA-COGECA (2004), European livestock farmers were v hit due to the big impact on green fodder supply. Agricultural losses w estimated to amount to more than 10 billion Euros (COPA-COGECA, 2(Swiss Re, 2004). Governmental measures to mitigate the effects for th farmers were taken in several countries and also by the European Commission.

Local limitations and serious shortage problems in public water suppl and Germany. A few communities and single farms, which had depen supplied by emergency actions. However, immense demands during t depletion of resources, i.e. dried up springs and boreholes, extremely Austria authorities initiated the construction of additional (large scale)



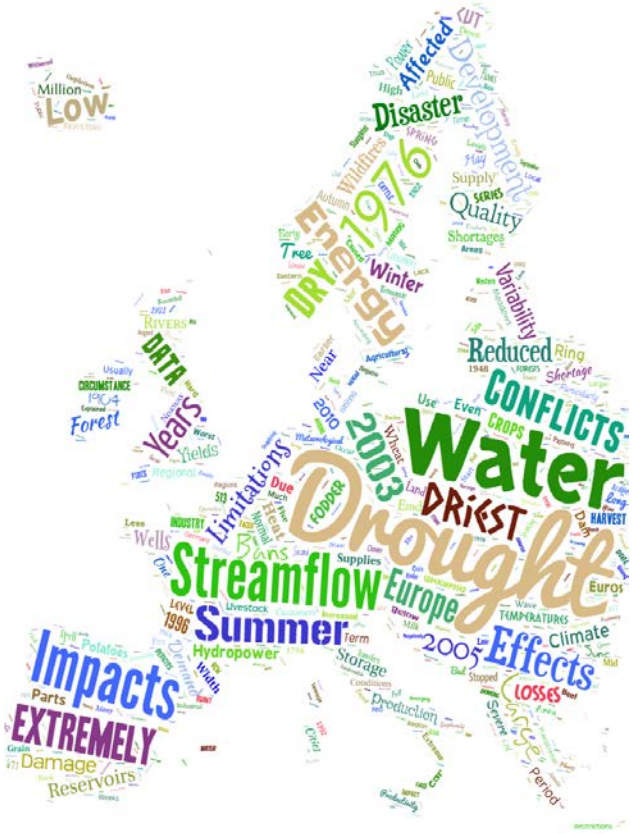
Impact Detail Table

10 records per page

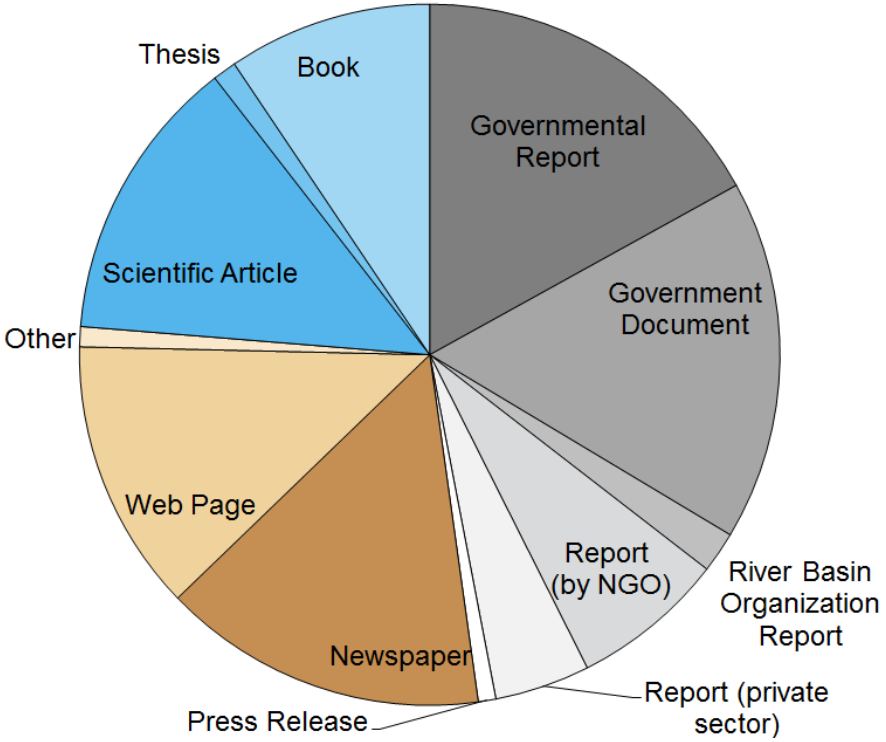
Search:

Drought Event	Country	Start Date	End Date	Impact	Impact Category	Impact Description	NUTS 1	NUT
2003 Europe	Magyarország	4/2003		1.1	Reduced productivity of annual crop cultivation: crop losses, damage to crop quality or crop failure due to dieback, premature ripening, drought-induced pest infestations or diseases etc.	Almost no precipitation since April, several plant are affected in their growth. Crop yield are estimated to be about 25% less than the year before. The government has announced that they would carry out assistance payments of aboout 240 Mio €.		
2003 Europe	Deutschland	6/2003		1.1	Reduced productivity of annual crop cultivation: crop losses, damage to crop quality or crop failure due to dieback, premature ripening, drought-induced pest infestations or diseases etc.	first damages due to drought were evident in June, accelerated maturing process, furthermore, drought caused damages on corn and beet	Schleswig-Holstein; Hamburg; Bremen; Niedersachsen; Mecklenburg-Vorpommern;	
2003 Europe	Italia	6/2003	8/2003	1.1	Reduced productivity of annual crop cultivation: crop losses, damage to crop	Reduction of agricultural production caused	Nord-Est; Nord-Ovest;	

European Drought Impact report Inventory – EDII



What we compile in the EDII



EDII information source types (July 2017)

From e.g. newspaper article to EDII entry

16. August 2015
Leserservice 0180/222 42 24 02 · www.der-sonntag.de

Der Sonntag
in Freiburg

Die Folgen der Dürre

Wochenlang Hitze und kaum Regen: Südbaden kämpft mit der TROCKENHEIT

Landwirte beklagen Ernteausfälle, Förster warnen vor Waldbränden und die Wasserversorger haben alle Hände voll zu tun. Auch wenn die Hitzewelle in Südbaden vorerst beendet ist: Ihre Auswirkungen werden noch lange zu spüren sein.

Ausgetrocknet: die Dreisam bei March. FOTO: SEEGER (DPA)

Das Schlimmste, was passieren kann, ist Kalk in den Kochtöpfen. Mit dieser Botschaft wandten sich die Stadtwerke Müllheim-Staufen diese Woche an ihre Trinkwasserkunden. Denn die wochenlange Trockenheit bereitet dem kommunalen Versorger Probleme: Die höher gelegenen Quellen geben nicht mehr genug Wasser her. Deshalb setzen die Stadtwerke stärker auf die Tiefbrunnen in der Rheinebene. „Wir haben kein Mengenproblem, weil wir an einem der größten Grundwasserspeicher Europas leben", sagt der technische Leiter der Stadtwerke, Michael Sattler. Allerdings werde das Wasser härter, was zu Kalkablagerungen führen kann. Das Rheintalgrundwasser ist mineralienreicher als das weiche Quellwasser aus dem Schwarzwald.

Auch in Freiburg sind die Auswirkungen der Dürre zu spüren. „Unsere Wassermeister haben derzeit sehr viel zu tun", sagt Yvonne Schweickhardt, Sprecherin des Regionalversorgers Badenova. Beim Wasserwerk Ebnet sei der Grundwasserspiegel so weit gesunken, „dass wir ihn nicht ohne Not weiter absenken wollen", sagt Schweickhardt. „Deshalb pumpen wir mehr Wasser aus Hausen nach Freiburg."

Hitze und Trockenheit führen zum einen dazu, dass Wasser fehlt. Kleinere Flüsse trocknen aus. Der Neumagen, der normalerweise von Münstertal nach Bad Krozingen fließt, ist nur noch ein Kiesbett. Zum anderen wird mehr Wasser verbraucht. Vor allem durch Gartenbesitzer und Landwirte. Anfang Juli hat Badenova einen neuen Rekordverbrauch festgestellt: „Wir haben an einem Tag 71 000 Kubikmeter Wasser nach Freiburg gepumpt, so viel wie noch nie", sagt Unternehmenssprecherin Schweickhardt. Die durchschnittliche Tagesförderung betrage etwa 48 000 Kubikmeter.

Landwirte unterschiedlich stark betroffen

Als Werner Räpple, Präsident des Bauernverbandes BLHV vom Kaiserstuhl, in dieser Woche nach Freiburg kam, wunderte er sich über den „starken Blätterabwurf der Zierbäume wie im Herbst". Die Bäume werfen einen Teil ihrer Blätter aus Wassermangel ab, um die übrigen ausreichend versorgen zu können. Sie retten sich quasi damit selbst. Für viele Landwirte hat die Trockenheit dagegen kostspielige Auswirkungen. Etwa in der Weidewirtschaft. Die dritte Maht sei dieses Jahr fast komplett ausgefallen, sagt Räpple. Erste Betriebe denken darüber nach, ihren Viehbestand zu reduzieren, um Kosten für den Futtermittelzukauf zu sparen. In Stuttgart hat der BLHV zudem angefragt, ob die Greeningflächen – also die fünf Prozent ökologischen Ausgleichsflächen – zur Futtergewinnung gemäht werden dürfen. Eine Antwort aus dem Ministerium steht noch aus.

Die Betroffenheit ist sehr unterschiedlich: Landwirtschaften mit sandigen, wenig speicherfähigen Böden haben massive Probleme. Andere, mit ausreichend Humus, erleben einen zwar heißen, aber doch einigermaßen normalen Sommer. Am massivsten betroffen ist der Maisanbau. Auf vielen Feldern in der Rheinebene haben die Pflanzen nicht einmal Kolben ausgebildet. In Schwanau bei Lahr haben Landwirte ihre Maisfelder jetzt als Futter für Biogasanlagen abgeerntet, um wenigstens noch etwas zu verdienen. „Die Ernte", sagt BLHV-Kreisvorsitzender Karl Silberer, „ist der Jahreslohn der Landwirte." Besser sieht's dagegen beim Getreide in Südbaden aus. Die vielen Niederschläge im Frühjahr haben die Ernte gerettet. In Nordbaden seien die Landwirte nicht so glimpflich davongekommen, sagt Silberer.

Auch die Forstwirtschaft muss mit Einbußen rechnen. „Die anhaltende Trockenheit lag in der Hauptwachstumszeit", sagt Südbadens Forstpräsident Meinrad Joos. „Das Jahr 2015 wird an den Bäumen in hundert Jahren noch ablesbar sein." An den Jahresringen. „Aber dieser wirtschaftliche Schaden ist in der langfristigen Denke der Forstwirtschaft zu verkraften."

Problematisch könne allerdings noch der Borkenkäfer werden. Bernhard Schirmer, neuer Forstdirektor in Bad Säckingen, erklärt, warum: „Bohrt sich der Schädling in den Baum, schüttet der zur Abwehr Harz aus und ertränkt damit den Käfer. Konnten sich Fichten in den Monaten vorher nicht ausreichend mit Wasser versorgen, produzieren sie zu wenig Harz." Da es im Winter und im Frühling viel geregnet hat, ging bis jetzt alles gut. „Der Borkenkäfer hat sich viel weniger ausgebreitet, als ich befürchtet habe. Das kann aber noch kommen", sagt Schirmer.

Forstpräsident Joos warnt außerdem vor der hohen Waldbrandgefahr: „Von Anfang März bis Ende Oktober herrscht grundsätzlich Rauchverbot im Wald. Das einzuhalten, ist dieses Jahr besonders wichtig."

DAG, RIX, NIL

Water Supply

At the waterworks "Ebnet" well site, groundwater level has dropped below the threshold for abstraction (…) therefore water is now pumped from the "Hausen" wells to Freiburg (…)

Ecosystems

(…) trees shed leaves (…)

Livestock farming

(…) Failure of the third cut of grass; emergency cattle sales necessary for some farmers(…)

Agriculture

(…) corn crops are most heavily affected. On many fields plants have not produced cobs(…)

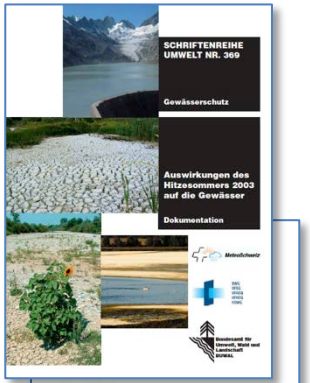
Forestry

(…) Effects in growth reduction expected (…)

*(…) high **forest fire** danger…*

Archiving impact reports

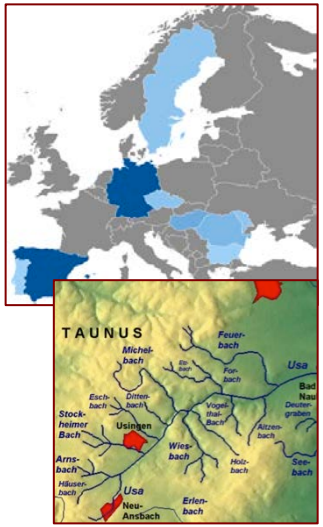
Information Source



Archiving impact reports

Information Source

Region Location



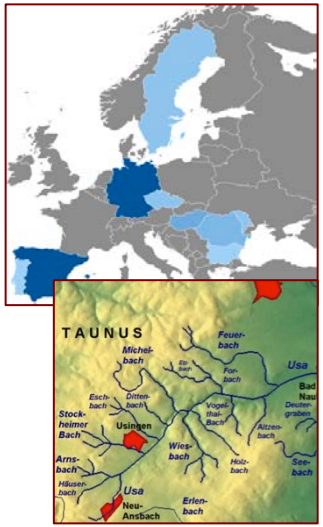
NUTS geocode, location, streams

Nomenclature des **U**nités **T**erritoriales **S**tatistiques

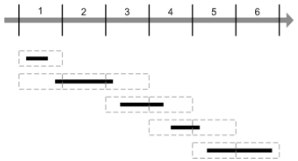
Eurostat 2007 edition

Archiving impact reports

Information Source → **Region Location** → **Time of Occurrence** → **Impact Categorisation**



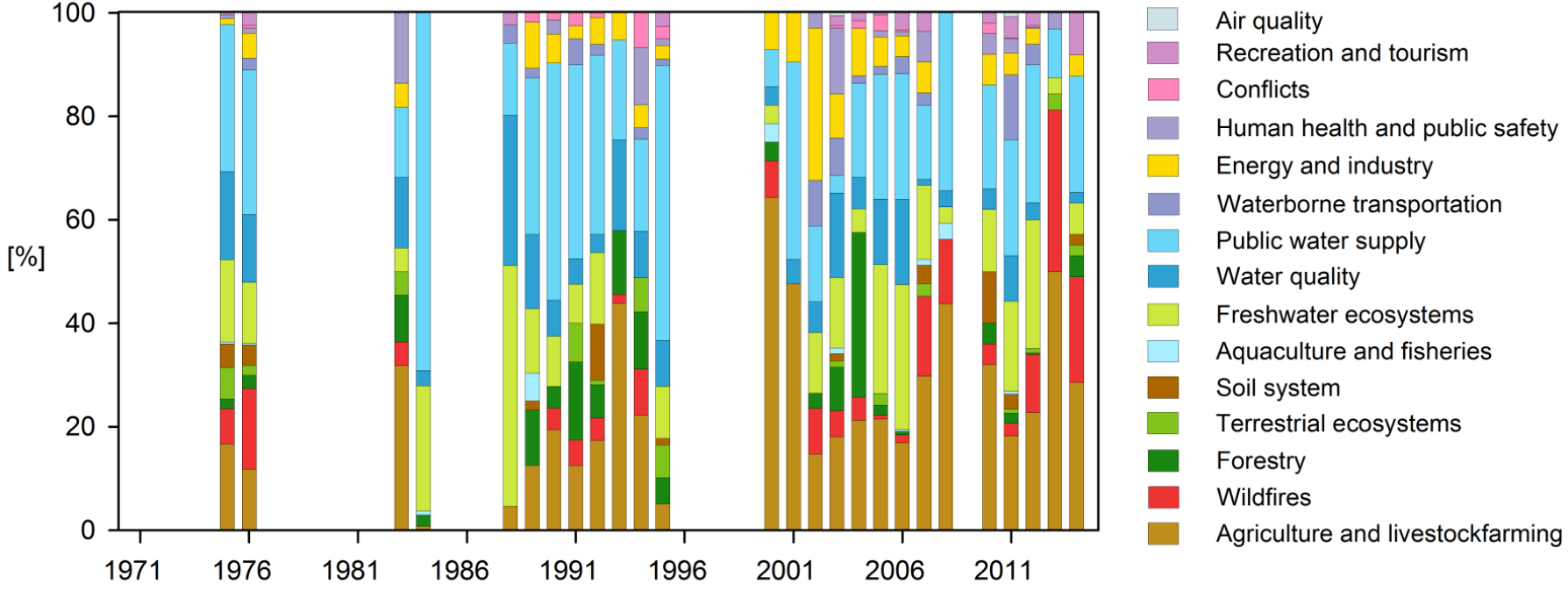
NUTS geocode, location, streams



year, month or season

Archiving impact reports: impacts categories

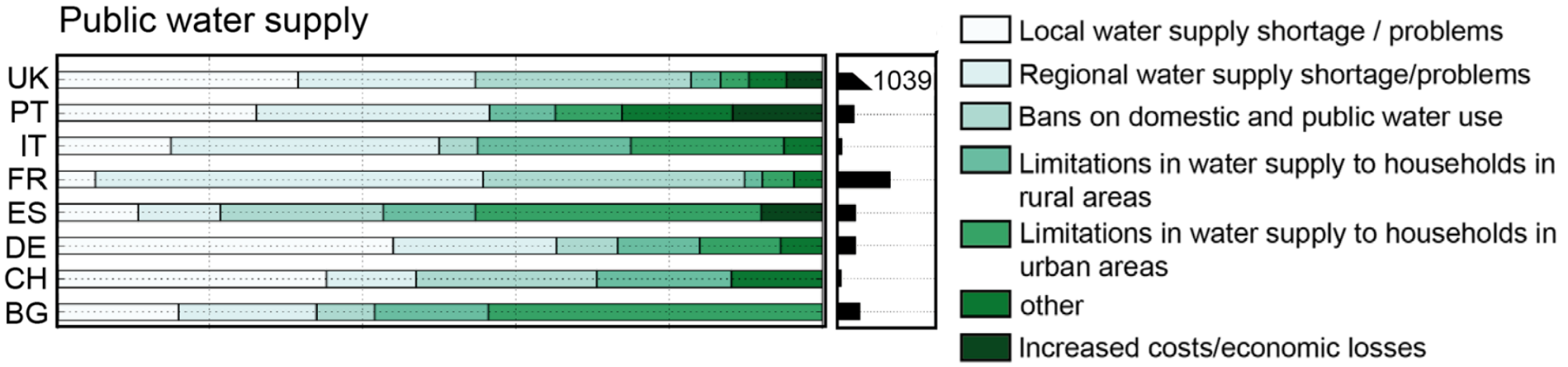
Information Source → **Region Location** → **Time of Occurrence** → **Impact Categorisation**



STAHL ET AL. 2016 (*NHESS*)

Archiving impact reports: impact category subtypes

Information Source → **Region Location** → **Time of Occurrence** → **Impact Categorisation**

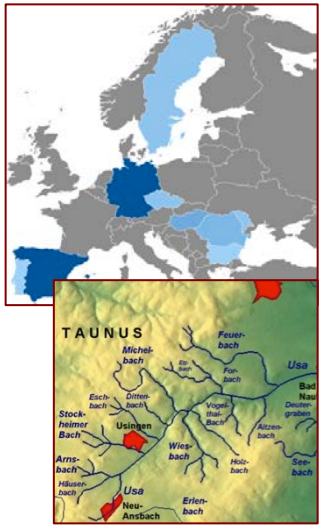


STAHL ET AL. 2016 (*NHESS*)

Archiving impact reports

Information Source

Region Location



NUTS geocode, location, streams

Time of Occurrence

year, month or season

Impact Categorisation

EDII Archive

ID	Location		
	Country	NUTS 1	NUTS 2
bf_1	Switzerland	Switzerland	Espace Mittellan
ik_1	Switzerland	Switzerland	Nordwes

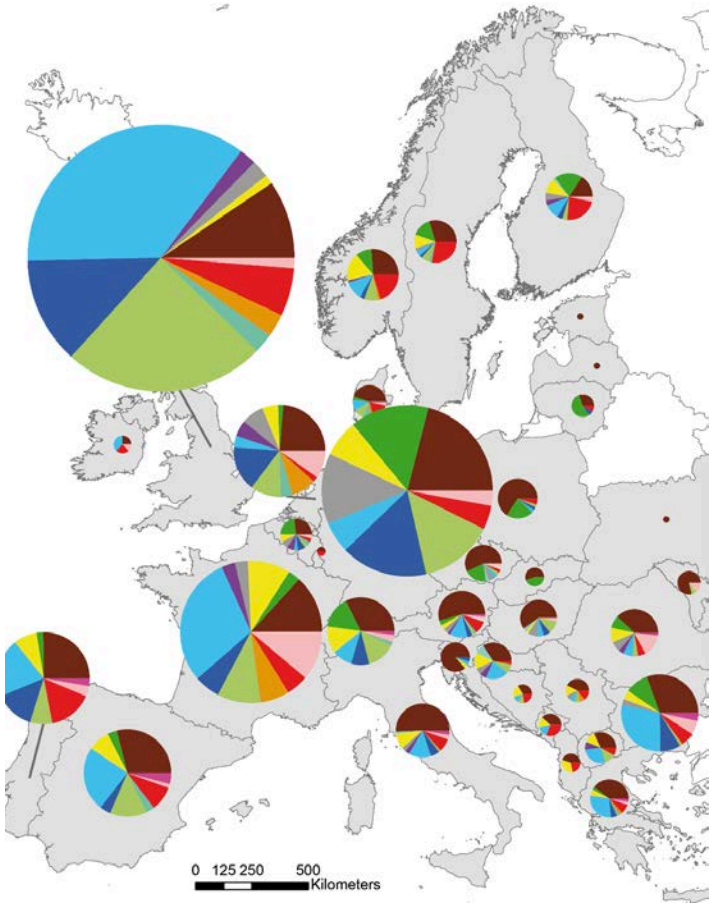
	NUTS 3	Location
bf_	Bern	nuclear power plant Mühleberg in Mühleberg
	Aargau	nuclear power plant Beznau in Döttingen (Zurzach)
	Bern;Luzern;	several parts of

	Impact details		
YYYY	categ.	type	description
2003	4	4.2;	Due to a lack of cooli were needed to redu
2003	4	4.2;	Due to a lack of cooli were needed to redu and August 2003.
	7	7.3;7 .4	Limitations and bans the lawn, filling of poo actions were necessa

Current contents

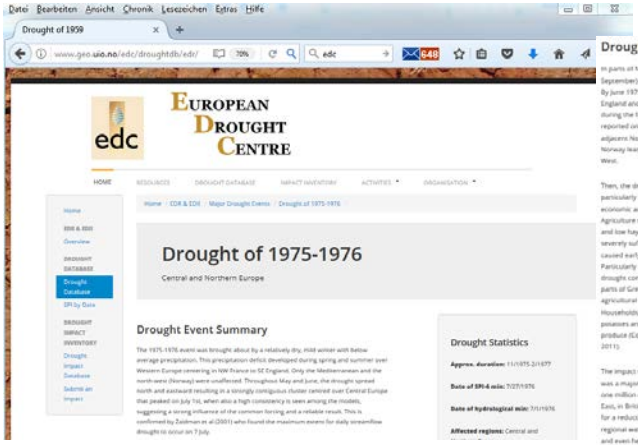
- **~6000** impact report **entries** with ~ 9000 impact types
- for **38 countries**

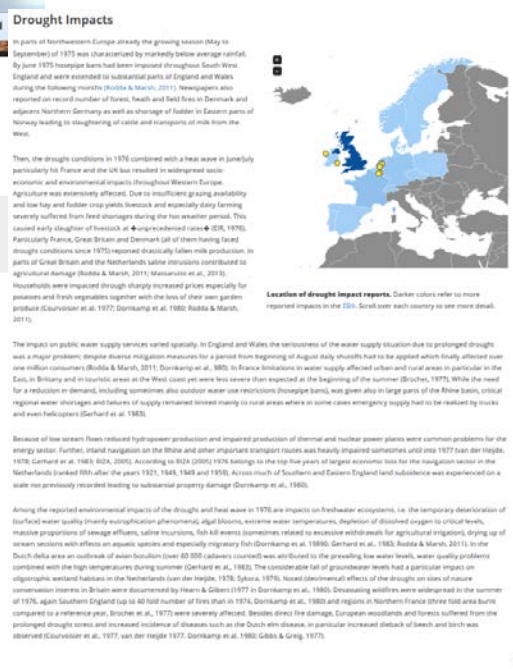
- far from being exhaustive and with biased coverages
  yet still a unique resource



EDII – possible applications

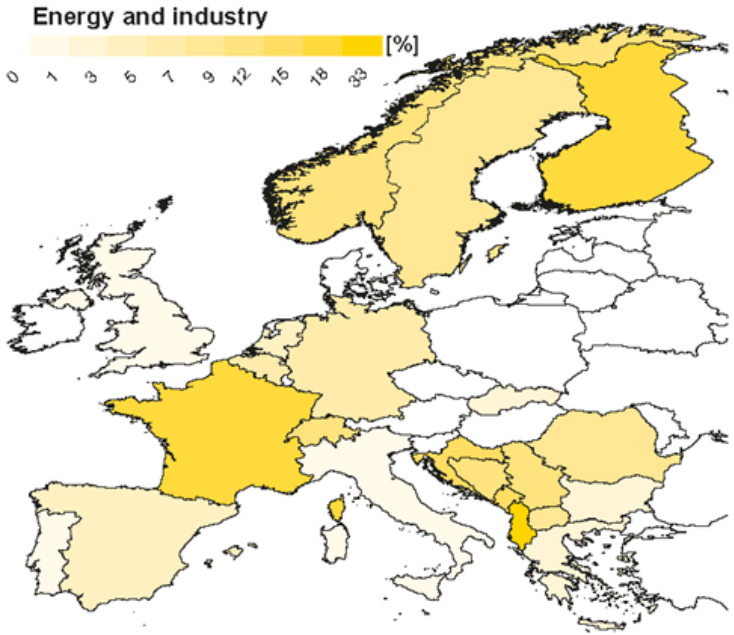
- as text-based archive – **anectodal evidence, narratives**
  see EDR

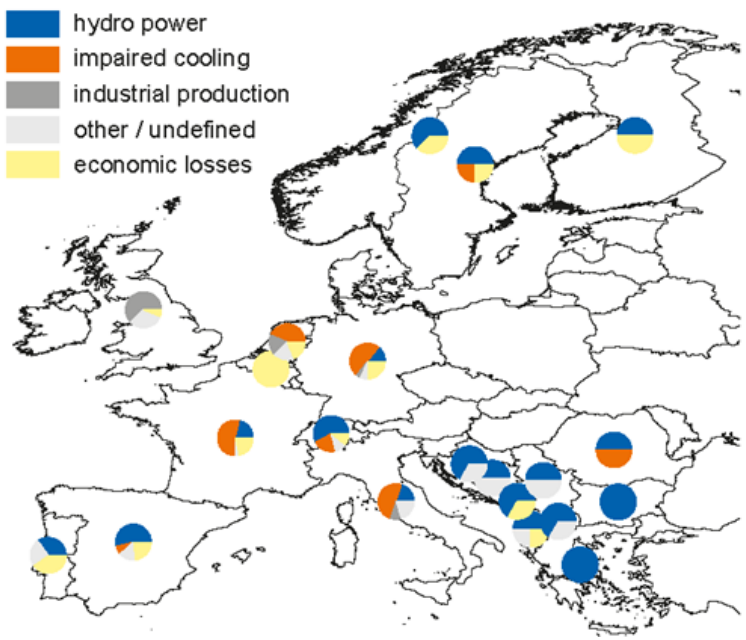




EDII – possible applications

- as text-based archive – **anectodal evidence, narratives**
- **visualisation**, impact/vulnerability assessment, impact profiles

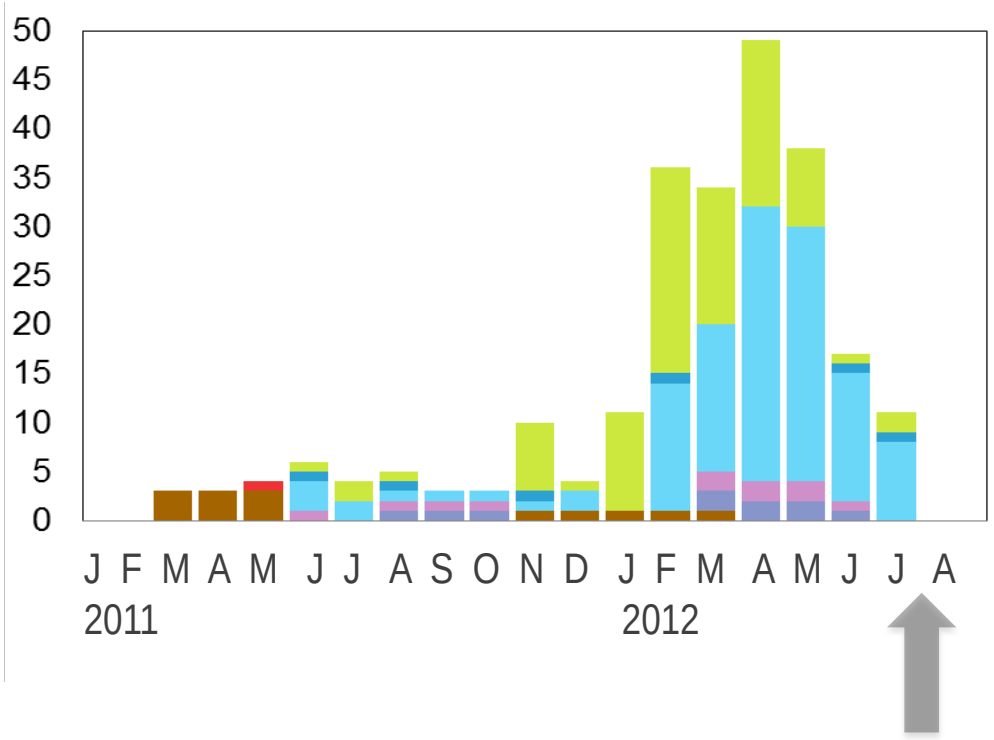




STAHL ET AL. 2015 (*Drought R&SPI Final Conference Proceedings*)

Temporal profiles

Reported impacts in SE England 2011–2012



Freshwater ecosystems

- **Jan/Feb 2012**: **Fish deaths** and **distress** in River Meon and a lake in Hampshire. 30 mature sea trout and 6 salmon reported dead.

Public water supply

- **Mar 2012**: In some regions in the east and south east of England **several domestic wells dried up**.
- **Apr 2012**: 7 water companies in the south and east of England imposed **temporary water use bans on 20 million customers**.

EDII – possible applications

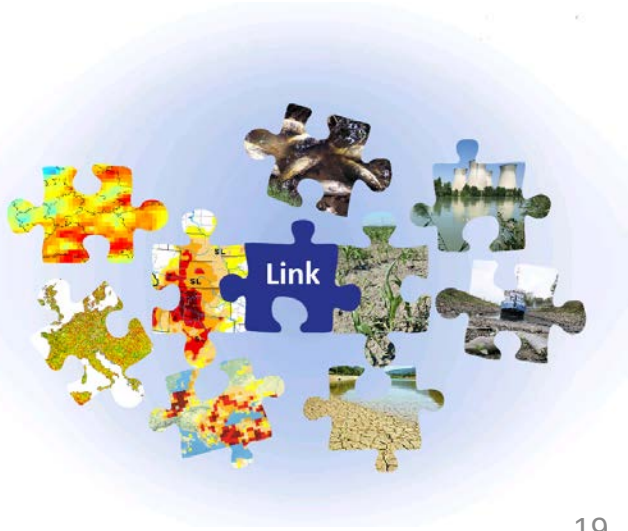
- as text-based archive – **anectodal evidence, narratives**
- **visualisation**, impact/vulnerability assessment, impact profiles

- analysing the **link between drought indicators and impacts**

  text-based drought impact information as

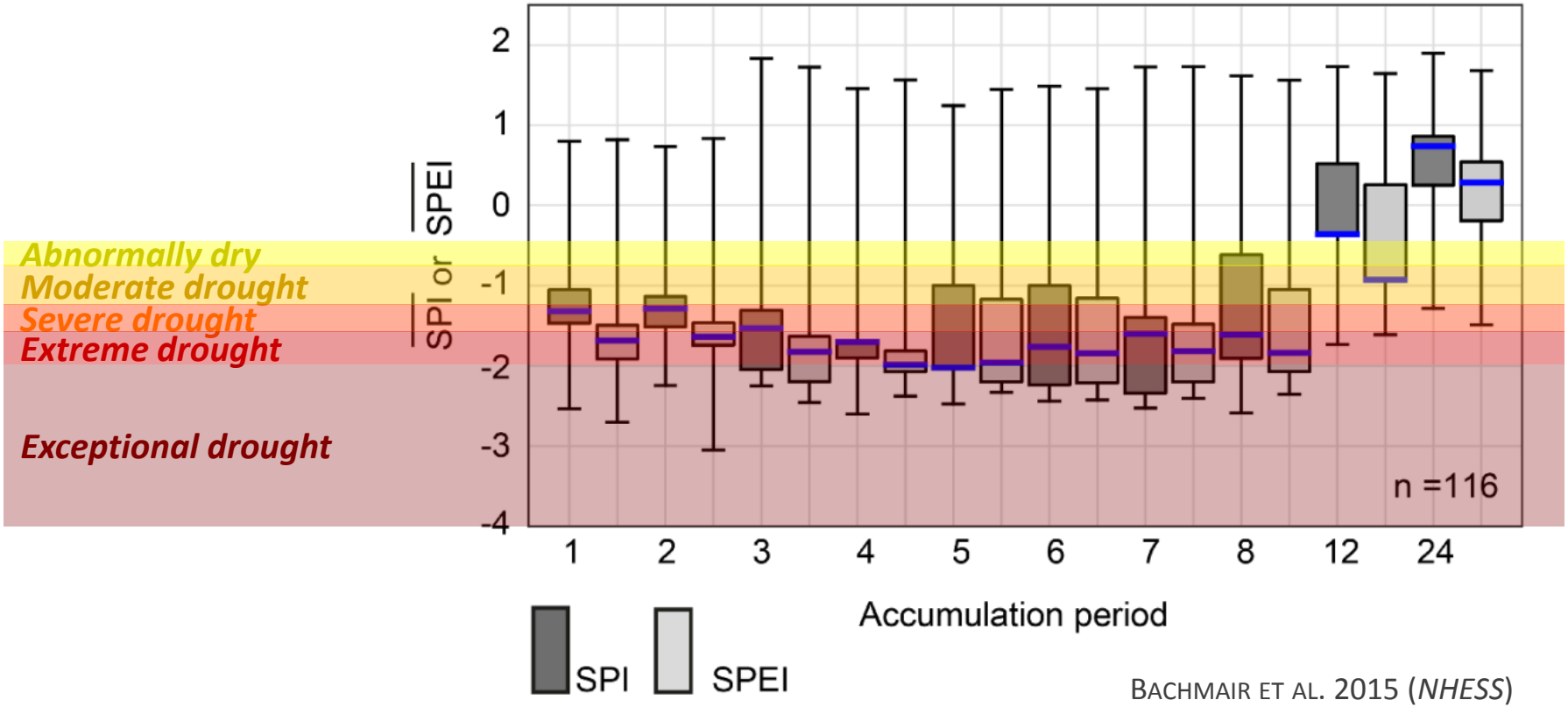
  – ground-truth to **evaluate** indicators and trigger values used in **DMEWS**

  – proxy for vulnerability / damage to **model drought risk**



Are applied thresholds meaningful for impact occurrence?

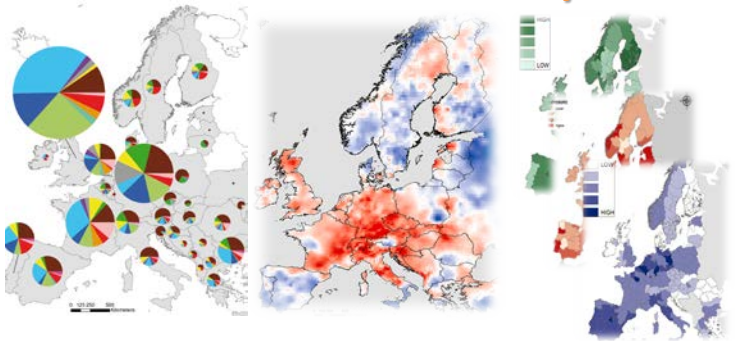
Indices values concurrent with impact onset in Baden-Württemberg



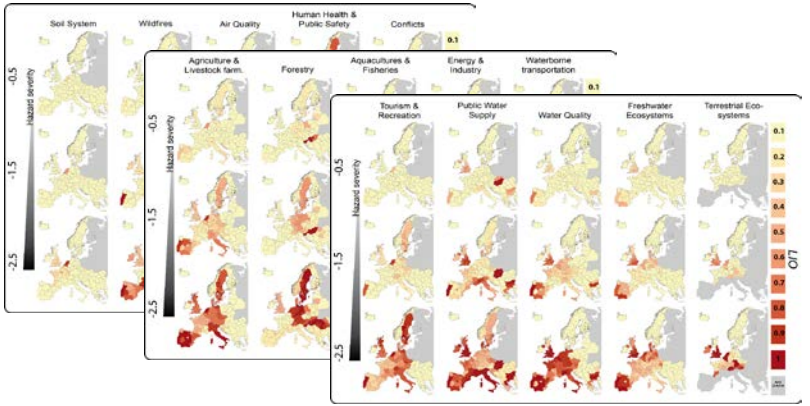
BACHMAIR ET AL. 2015 (*NHESS*)

Test indices on predictive skill, proxy for vulnerability, to model drought risk

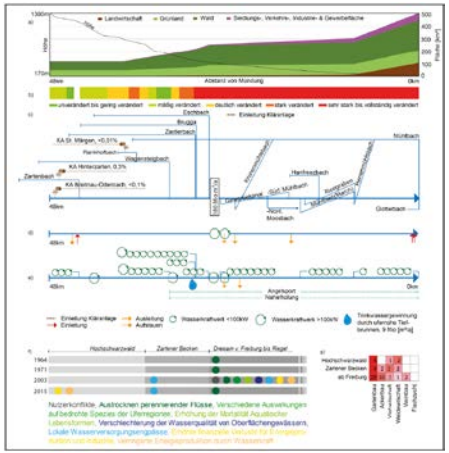
Impacts x Hazard x Vulnerability Factors = Risk



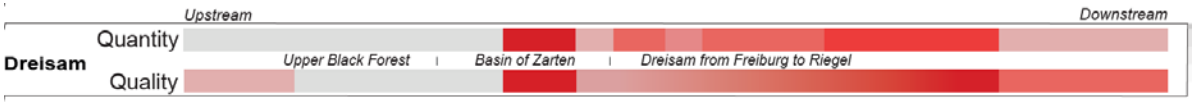
Likelihood of drought impact occurrence



(Blauhut et al. 2016)



Low flow risk

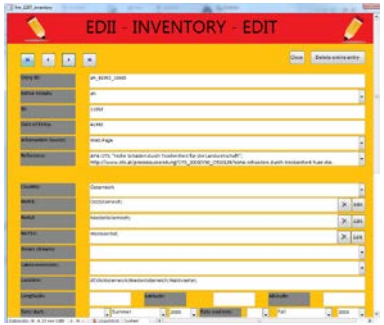


(Blauhut et al. 2017)

EDII – quo vadis

Offline working database

- currently in MS Access
- sub-set versions & regular updates possible
- easy to use → facilitates parallel working and checking by moderators



Online EDII

- on the EDC website
- frozen versions at the moment
- good to share the data

www.geo.uio.no/edc/droughtdb/

- Webcrawler
- Connection to national reporter systems → Czech republic
- Implementation to citizen science apps e.g. crow water

Acknowledgement

- **All EDII contributors and WP3 of DROUGHT R&SPI**:
  Vanda Acácio, Carlo Bifulco, Lucia De Stefano, Susana Dias, Daniel Eilertz, Barbara Frielingsdorf, Lukas Gudmundsson, Eleni Kampragou, Lieke Melsen, Henny van Lanen, Anne Van Loon, Antonio Massarutto, Dario Musolino, Lena Tallaksen, Julia Urquijo, and many more...

- **DrIVER project team**:
  Erik Tijdeman, Jamie Hannaford, Lucy Barker, Kevin Collins, Mark Svoboda, Cody Knutson, Neville Crossman, Ian Overton, and Mike Acreman

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