

Table S1. Description of the affected regions and associated impact for six extreme CHDs: 1950, 1959, 2003, 2012 and 2015.

1950	Anomalously dry summer characterized also by high temperatures in central Europe (Briffa et al., 2009); The longest and one of the most severe droughts over European Russia; Rainfall deficit at Pan-European level (Spinoni et al., 2015)
1955	The longest drought event in Fennoscandia; the most affected area was the Northern Europe (Spinoni et al., 2015); 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, reduced productivity of livestock farming (e.g. reduced yields or quality of milk, reduced stock weights) and increased costs/economic losses in Scandinavia (EDC, 2012)
1959	The most severe drought in Fennoscandia, the most affected area was the northern and eastern part of Europe (Spinoni et al., 2015); 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, in Northern/Central Europe, reduced productivity of livestock farming in Northern/Central Europe, increased costs/economic losses (458 million euros in Nederland), reduced tree growth and vitality, local water supply shortage / problems (drying up of springs/wells, reservoirs, streams), limitations in water supply to households in rural areas, (temporary) water quality deterioration/problems of surface waters, increased mortality of aquatic species, increased burned area, increased number of wildfires (EDC, 2012)
2003	Severe drought from May to September (EDC, 2013); The most affected areas were central France and eastern Austria (Laaha et al., 2017); Air temperatures were extremely abnormal with monthly anomalies of up to 6 °C in a large part of Europe (Rebetez et al., 2006), over 100 million affected people (EU, 2010) and direct economic impacts of 17.134 billion Euro (EEA, 2019); Local limitations and serious shortage problems in public water, decreased the quantity and quality of the harvests, particularly in Central and Southern European agricultural areas; important loss of crops more than 25 000 fires were recorded in Portugal, Spain, Italy, France, Austria, Finland, Denmark and Ireland; the estimation of forest areas destroyed reached 647 069 hectares; decrease in nuclear power production and water use restrictions in 75 % of the French departments; local limitations and serious shortage problems in public water supply (UNEP, 2003);
2012	Severe drought in Romania, grain production fell by almost 40% in Romania, but also in Bulgaria and Hungary (Pana, 2013); Economic costs due to climatological events : 3.909 million Euro (EEA, 2019); In July 2012 there were 16 consecutive days of heat, rainfall deficit, almost the whole month of July with an average temperature of over 32°C; in some regions in Romania, the crop production loss was ~97% (Pavnutescu, 2012); Several localities were left without drinking water due to the prolonged drought, the authorities restricting consumption and transported water by tankers for the population and animals (economica.net, 2012a); Temperatures repeatedly exceeded 35°C in July, from eastern Italy to the Black Sea region and even Ukraine, mean temperature was with about 5 degrees above normal for this period (economica.net, 2012b); In the Republic of Moldova the drought has strained the situation of the cereals market, there has been an increase in market prices of wheat, corn and other cereals, the drought caused a economic crisis (point.md, 2012);
2015	In France, Benelux, western Germany, northern Italy, northern Spain, the Czech Republic, Poland, Ukraine and Belarus the rainfall deficit was greater than 100-130 mm, representing a reduction of about 50-60%, and in some cases even 80%, compared to the long-term average (EDO, 2015); Almost 75% of the area of Germany was under at least moderate drought in July 2015 (Ionita et al., 2017); Maximum daily temperatures consistently above 30°C for durations of 30 to 35 days (DG Environment – European Commission, 2007); The most affected areas were the central and eastern part of Europe and the northern Balkans (Laaha et al., 2017); Restrictions to civil and industrial water uses, losses in agricultural production reductions or even the complete cessation of inland water transportation, increases in forest wildfires, impacts on forestry (e.g. reduced biomass accumulation, insect attacks and diseases), limitations to energy production (hydropower and cooling) (EDO, 2015), Direct economic impacts 2.172 billion Euro (EEA, 2019) and ~1250 related deaths (Munich RE, 2020); Crop losses of up to 50% were reported in the Czech Republic, Germany, Poland and Slovakia, across central Europe and parts of eastern Europe (e.g. Romania) hundreds of towns and villages faced drinking water supply deficiencies (Van Lanen et al., 2016).

References:

- Briffa, K. R., van der Schrier, G. and Jones, P. D.: Wet and dry summers in Europe since 1750: Evidence of increasing drought, *International Journal of Climatology*, 29(13), doi:10.1002/joc.1836, 2009.
- DG Environment – European Commission: Water Scarcity and Droughts in-depth assessment Second Interim Report – June 2007, The European Commission [online] Available from: https://ec.europa.eu/environment/water/quantity/pdf/comm_droughts/2nd_int_report.pdf, 2007.
- economica.net: Seceta începe să lase populația din Vaslui fără apă potabilă. ISU intervine în zonele afectate, economica.net [online] Available from: https://www.economica.net/seceta-incepe-sa-lase-populatia-din-vaslui-fara-apa-potabila-isu-intervine-in-zonele-afectate_29975.html, 2012a.
- economica.net: Valul de căldură din Europa afectează grav recolta de porumb, în paralel cu seceta din SUA, economica.net [online] Available from: https://www.economica.net/valul-de-caldura-din-europa-afecteaza-grav-recolta-de-porumb-in-paralel-cu-seceta-din-sua_29780.html, 2012b.
- EDC: European Drought Impact Inventory Query, European Drought Centre [online] Available from: <https://www.geo.uio.no/edc/droughtdb/edr/impactdatabaseresults.php>, 2012.
- EDC: Drought of 2003, Europe, European Drought Centre [online] Available from: https://www.geo.uio.no/edc/droughtdb/edr/DroughtEvents/_2003_Event.php, 2013.
- EDO: Drought News August 2015, EDO Combined Drought Indicator (CDI) –Situation on 31 July 2015. [online] Available from: <http://edo.jrc.ec.europa.eu>, 2015.
- EEA: Economic losses from climate-related extremes in Europe — European Environment Agency, [online] Available from: <https://www.eea.europa.eu/data-and-maps/indicators/direct-losses-from-weather-disasters-3>, 2019.
- EU: Water Scarcity and Drought in the European Union, European Union Publication Office [online] Available from: https://ec.europa.eu/environment/pubs/pdf/factsheets/water_scarcity.pdf, 2010.
- Ionita, M., Tallaksen, L. M., Kingston, D. G., Stagge, J. H., Laaha, G., Van Lanen, H. A. J., Scholz, P., Chelcea, S. M., Haslinger, K., Lanen, H. A. J. Van, Chelcea, S. M., Haslinger, K., Scholz, P., Chelcea, S. M. and Haslinger, K.: The European 2015 drought from a climatological perspective, *Hydrology and Earth System Sciences*, 21, 1397–1419, doi:10.5194/hess-21-1397-2017, 2017.
- Laaha, G., Gauster, T., Tallaksen, L. M., Vidal, J. P., Stahl, K., Prudhomme, C., Heudorfer, B., Vlnas, R., Ionita, M., Scholz, P., Van Lanen, H. A. J., Adler, M. J., Caillouet, L., Delus, C., Fendekova, M., Gailliez, S., Hannaford, J., Kingston, D., Van Loon, A. F., Mediero, L., Osuch, M., Romanowicz, R. J., Sauquet, E., Stagge, J. H. and Wong, W. K.: The European 2015 drought from a hydrological perspective, *Hydrology and Earth System Sciences*, 21(3), 3001–3024, doi:10.5194/hess-21-1397-2017, 2017.
- Van Lanen, H. A. J., Laaha, G., Kingston, D. G., Gauster, T., Ionita, M., Vidal, J. P., Vlnas, R., Tallaksen, L. M., Stahl, K., Hannaford, J., Delus, C., Fendekova, M., Mediero, L., Prudhomme, C., Rets, E., Romanowicz, R. J., Gailliez, S., Wong, W. K., Adler, M. J., Blauhut, V., Caillouet, L., Chelcea, S., Frolova, N., Gudmundsson, L., Hanel, M., Haslinger, K., Kireeva, M., Osuch, M., Sauquet, E., Stagge, J. H. and Van Loon, A. F.: Hydrology needed to manage droughts: the 2015 European case, *Hydrological Processes*, 30(17), 3097–3104, doi:10.1002/hyp.10838, 2016.
- Munich RE: Heatwaves, drought and forest fires in Europe: Billions of dollars in losses for agricultural

sector. [online] Available from: <https://www.munichre.com/topics-online/en/climate-change-and-natural-disasters/climate-change/heatwaves-and-drought-in-europe.html>, 2020.

Pana, M.: Agricultura – scădere drastică în 2012: Seceta nu justifică prăbușirea randamentelor, cursdeguvernare.ro [online] Available from: <https://cursdeguvernare.ro/agricultura-scadere-drastica-in-2012-seceta-nu-justifica-prabusirea-randamentelor.html>, 2013.

Pavnutescu, M.: Cea mai mare seceta, din ultimii 50 de ani, green-report.ro [online] Available from: <https://www.green-report.ro/cea-mai-mare-seceta-din-ultimii-50-de-ani/>, 2012.

point.md: Seceta din 2012 provoacă o nouă criză economică, pointnews.md [online] Available from: <https://point.md/ru/novosti/ekonomika/seceta-din-2012-provoaca-o-noua-criza-economica>, 2012.

Rebetez, M., Mayer, H., Dupont, O., Schindler, D., Gartner, K., Kropp, J. P. and Menzel, A.: Heat and drought 2003 in Europe: a climate synthesis, *Annals of Forest Science*, 63(6), 569–577, doi:10.1051/forest:2006043, 2006.

Spinoni, J., Naumann, G., Vogt, J. V. and Barbosa, P.: The biggest drought events in Europe from 1950 to 2012, *Journal of Hydrology: Regional Studies*, 3, 509–524, doi:10.1016/j.ejrh.2015.01.001, 2015.

UNEP: Impacts of summer 2003 heat wave in Europe, *Environment Alert Bulletin*, 2, 1–4, 2003.