Output Factsheet

Output title: Drought User Service with manual

Summary of the output (max. 2500 characters)

Drought User Service (DUS) with newly available remote-sensing data and technology has been developed and designed for operational use by national authorities, drought experts and untrained individuals. It was developed as a user-friendly yet feature-rich tool for drought monitoring and early warning which enables the user to browse, view and examine drought-related datasets. This is further supported by an extensive User Manual which gives a general overview about the whole system and further on an extensive description about all the features and functionalities.

DUS is an open-source web application with Geographic Information System (GIS) functionality that provides spatial and temporal view of several drought-related datasets such as Soil Water Index anomalies, Normalized Difference Vegetation Index anomalies, Relative Vegetation Condition, Surface Water Balance, precipitation and temperature datasets, and it integrates also estimated drought impacts on crop collected weekly through national reporting networks and static drought risk maps (crop yield loss and rainless periods), both developed within the project. For each dataset, a short description as well as an extensive product-factsheet is available within the DUS. A complete list of all included datasets is provided in the User Manual http://droughtwatch.eu/#/manual.

The system of DUS consists of two main components: a JavaScript application that is based on Aurelia framework, and a MapServer component used to serve drought-related products map tiles as the Web Map Service (WMS). The WMS and other cartographic material are displayed using the OpenLayers library. Along with displaying regularly updated drought indices, DUS user interface has several functionalities built in for better drought characterization: it allows users to obtain exact value over any specific location; to display past state across the region by browsing through calendar; to overlap drought indices for any correlation; to get basic dataset statistics over given area; to display and exporting time series graph or time lap animation; and others.

DUS User Interface was named and branded for public as “Drought Watch” and made available via the URL http://droughtwatch.eu/.

Contribution to the project and Programme objectives (max. 1500 characters)

Drought User Service with manual along with planned national trainings of stakeholders for DUS directly contributes to:

1) Project objectives: specific objective no. 1 “Improvement of drought monitoring by operational innovative service”.

2) DTP Priority Axis 2: Strengthen transnational water management and flood risk prevention;

Improve preparedness for environmental risk management (Programme SO2.4);

3) DTP Priority Axis 4: Improve institutional capacities to tackle major social challenges; Support to the governance and implementation of the EUSDR.

Transnational impact (max. 1500 characters)

Through enabling wide geographical coverage of integrated datasets in DUS that extend beyond area of participating countries, DUS can be used also by countries outside the Danube Region to monitor and forecast drought events through several indicators, which are based on satellite or modelled data. Satellite-based Soil Water Index and Normalized Difference Vegetation Index currently cover, apart from DriDanube area, also Bulgaria, Moldova, most of North Macedonia (previously FYROM) and some small parts of Poland and Ukraine while Relative Vegetation Condition index covers central and eastern Europe area, from Benelux to Belarus and Ukraine and from Germany and Poland to Albania. Modelled datasets such as Surface Water Balance and 60-day Average Temperature Percentile at 2m above ground level, refreshed 10-daily, are available also for all countries in the frame of Drought Management Centre for Southeastern Europe (DMCSEE) and cover also Italy, southern half of Germany, southern Poland and most of Ukraine.

End-users in mentioned countries, too, can benefit from using DUS in their operational day-to-day work. This also means DUS enables monitoring of drought conditions through the same set of indices across all intersecting countries, meaning it allows harmonized monitoring of drought conditions and thus comparable view on drought conditions.

Contribution to EUSDR actions and/or targets (max. 1500 characters)

With the organization of the national training day in every participating country between November and December 2018 the DUS was introduced to a wider public. The participants (national authorities and stakeholders) were trained how to use the DUS, which ensures regular drought impact reporting system and on-time information on drought status in the Danube region.

Therefore, it has direct contribution to:

1) EUSDR Priority Area 4, Action 12: organisation of DriDanube events to strengthen general awareness;

2) EUSDR Priority Area 5, Action 4: to strengthen cooperation among drought response authorities (early warning system, management); harmonizing regional disaster risk assessment methods and measures also through early detection of drought signals via DUS; comparable data/information system on extreme events integrated into the DUS (also remote sensing datasets).

Performed testing, if applicable (max. 1000 characters)

DUS was tested during 1st pilot action in the Czech Republic, Croatia, Montenegro and Romania, mainly focusing on known past drought years. Further testing of DUS tool (statistical analysis of indices in relation to national ground data) is planned for period 5.

Integration and use of the output by the target group (max. 2000 characters)

DUS User Interface was designed in an iterative approach with wide range of stakeholders from

all target groups. It began with forming an online questionnaire through which their wishes, requirements and suggestions for the shape of tool were collected in order to develop a tool that would best support their operational work. Further feedback from project partners and associated strategic partners was considered, gathered during project meetings, national trainings and seminars but also via email correspondence throughout project lifetime. This ensures a User Interface is user-friendly and meets the needs of various level of users, from basic to experienced users, involved in different drought management aspects.

Partners also organized national trainings on use of DUS for wide range of stakeholders, such as staff from meteorological offices, civil protection, participants from the policy level and supporting expert teams (ministries, farmer associations, etc.) where they came in contact with DUS tool and its features. By involving them also at several events where DUS was presented, and also national working meetings, national stakeholders further familiarized themselves with the tool which raises possibilities for their active use of DUS even after the project ends.

Geographical coverage and transferability (max. 1500 characters)

Operative drought datasets is DUS cover area that geographically stretches also outside participating countries (described in "Transnational impact" section above) while static products in DUS such as drought risk maps (maps of expected risk for crop yield loss in relation to severity of drought; expected length of rainless periods within vegetation season based on historic data) include area of participating countries.

Regardless of the content of DUS products and the supportive material, DUS has been developed as a web-based open-source tool and can thus be used by any user independently of geographic borders. At the same time, DUS is programmed in a way that enables integration of additional (drought-related) datasets, and can thus extend drought monitoring through existing drought indices over wider (European) area as well as integrate additional ones to meet specific national drought monitoring needs.

Durability (max. 1500 characters)

Durability of the developed tool is ensured by using open-source software and standards, such as the Aurelia framework, MapServer, etc. in the programming of the user interface. Operation of the DUS is financially guaranteed till the end of 2019, after which durability is to be achieved through intensive search for sustainable maintenance.

Synergies with other projects/ initiatives and / or alignment with current EU policies/ directives/ regulations, if applicable (max. 1500 characters)

As part of the DriDanube project, project partners EODC and TU Wien capitalized with another project that deals with establishing a general regional earth observation platform for the Danube region (EOP-Danube). EODC, TU Wien and other partners started the national project BMon that also uses a cloud-based system for high-resolution soil moisture monitoring.

Output integration in the current political/ economic/ social/ technological/ environmental/ legal/ regulatory framework (max. 2000 characters)

The Drought User Service helps numerous authorities to monitor recent and quantify historic drought events. This supports better cooperation between the emergency response authorities and stakeholders. To know in real-time where and when drought conditions are developing is also the first step from crisis-oriented drought management approach towards risk-

management based drought management approach. DUS finds its place for operative use in day-to-day work of institutions, involved in national drought management, within the DriDanube Strategy (another project output) and its step-by-step protocol for response during different stages of drought. In connection with proposed Strategy for improved drought emergency response, DUS offers a basis for individual countries to better prepare for next drought events.