European Environment Agency

Draft minutes of the workshop on EEA water accounts

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To: Participants of the Workshop

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Enclosure(s): List of Participants
Presentations
Workshop agenda
Water accounts dataset

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Session 1 – Welcome and Opening
(Chaired by Stéphane ISOARD, EEA)

1.1 Setting the Scene - EEA freshwater activities

Stéphane ISOARD (EEA) opened the meeting and briefly introduced himself as well as explained the overall work done by the EEA on water accounts and expected outcomes from the workshop.

1.2 Tour de table

Participants briefly introduced themselves during the tour de table.

1.3 Update on the Commissions' activities in environmental accounting

Elisa VARGAS-AMELIN (DG ENV) presented the updates on EU COM activities in environmental accounting (focusing on water balances). It has been addressed on the historical background of the environmental accounting in Europe, the policy actions linked with broader EU policies (e.g. 7th EAP, Circular Economy, SDGs) as well as the European Strategy for environmental accounts 2019-2023 for six mandatory environmental accounts and some voluntary extensions.

DG ENV also stressed the use of WEI+ through WFD reporting cycle, the 5th WFD implementation report (adopted 26/2/2019) and the missing links between WFD and Economy (hybrid and quality accounts).

Session 2 – Introduction to the EU environmental accounting
(Chaired by Nihat ZAL, EEA)

2.1 – EU Natural Capital Accounting and KIP INCA project – EEA contributions

Jan-Erik PETERSEN (EEA) presented the links of 7th EAP and Natural Capital as well as relevancies to the KIP INCA project. The use of natural capital accounts in assessing ecosystem services to supporting assessment of ecosystems and their services has been highlighted in relation with the Action 5 of the EU Biodiversity Strategy. The purpose of the ecosystem accounting is to estimate ecosystem service flows and derive a monetary value where appropriate. Aims and planned outputs on accounts of ecosystem services are the following:

- Valuation of natural capital,
- Regular EU ecosystem accounting system by the end of 2020.

Tier I (extent accounts by biogeographical region) is currently being developed which covers:

- Example of NATURA 2000 network trends of ecosystem extent,
- Ecosystem conditions accounts including freshwater ecosystem condition accounts based on the WFD water body ecological status (only for surface water bodies),
- Biodiversity accounts,
- Spatial nutrient accounts.

It is also aimed to build a geospatial platform for multiple uses covering the ecosystem assessment, accounting, policy analysis, sectoral analysis and integrated assessment.

Overall, there is progress made with need of more ecosystem-thematic and spatial details (missing input data, systematic perspective on protecting natural & managing natural resources).

Discussion:
What are the indicators used in developing freshwater ecosystem extent and condition accounts?

Corine, WFD spatial data, CAPRI model, nutrient applications on agricultural land. More information can be found on a recent publication of EEA report 26/2018 ("Natural capital accounting in support of policymaking in Europe").

2.2 – Environmental accounting activities by Eurostat

Arturo DE LA FUENTE (Eurostat) presented the accounts as a framework on the interrelations between the economy and the environment (natural inputs, residuals etc.). Eurostat constructs the environmental accounts on a building block approach (GHG emissions, energy use, taxes on fuels, etc.) complying with the UN international standards (SEEA – CF) and experimental ecosystem accounting. Eurostat presented the two pillars in the EU: the European strategy on Environmental and Economic Accounting 2019-2023 and Regulation No. 691/2011. Eurostat works with two sets of modules: Physical modules (air emissions, energy flows, material flows and forests) and monetary modules (environmental taxes, environmental sector growth and jobs, environmental protection expenditure, environmental subsidies and resource management expenditure). Eurostat also participates in development of ecosystem accounts (INCA project explained in item 2.1).

Eurostat has tried to develop water accounts for many years, and has indeed a handbook but no data collection. The main obstacle is the lack of sufficient data sources to produce the water accounts, as seen by the national statistical offices. The distribution of responsibilities between stakeholders in the Member States about water information (ministry, environmental agency, national statistical office, hydrological institute, etc.) also complicates support in the Member States for a mandatory collection of water accounts.

Eurostat coordinates national statistical offices and continues the production of handbooks, which are used as frontline of methodological developments, because they update faster than the SEEA – CF. Methodological handbooks are published on the ESTAT website. Eurostat also provides compilation tools to produce some accounts from the underlying data sources and to produce environmental footprints. In addition, two Eurostat working groups exist and task forces have been created for discussing proposals and sharing national experiences on community/practitioners-based meetings.

Discussion:

Eurostat grants were very useful to give the importance to the way of developing the water accounts at the national level. Some of Member States are not able to produce water accounts due to budget limitations or missing water expertise or limited data. Providing grants to the development water accounts at the national level worked well in some countries but not in many others; eventually a critical mass of countries did not materialise.

Can water accounts be used as water footprints?
Eurostat publishes carbon footprints and material footprints based on environmental accounts. There is work to publish energy footprints in 2019. In principle, the same approach could be used to produce water footprints based on water accounts. There are similarities, but products import/export affect the water footprint.

What is the level of data collection on environmental subsidies?
Around one-third of MSs managed to provide data. This is a voluntary data collection, contrarily to other accounts, e.g. environmental taxes, for which all countries report.

2.3 – Introduction to overall structure and concept of the EEA water accounts for Europe

Philippe CROUZET (former EEA expert) addressed to the historical background on the importance of water accounting through the ages from ancient to the modern world. He also underlined development of the integration of water accounting into the official statistics (SNA, French developments in late 1970s and the formation of the London Group). CROUZET explained the conceptual Input/ Output model that environmental accounting is following with additional specific commenting on the methodological categorization of the data (surface, point e.g. streamflow etc.). He stressed the importance of stepwise implementation of the water accounts as more data are becoming available, as well as to the baseline rational for the statistical units (spatial and temporal) that are being used under the SEEA – Water framework.

Session 3 – Data foundations and processing – European data availability
(Chaired by Arturo DE LA FUENTE, Eurostat)

3.1 – European freshwater resources based on distributed water balance and flood simulation model (LISFLOOD)

Ad DE ROO (DG JRC) presented the activities on estimating Europe's water resources based on LISFLOOD model. The model covers in 5 km resolution the whole of Europe.

Some products based on that model are:

- Water demand maps from 1990-2016 - average annual water demand (population, land use data), industry locations etc.
- A set of indicators are produced. Future development is going even in more detail down to six hours (from daily) data.
- The workflow on WEI, irrigation water demand, conveyance and leakage losses which define the abstraction requirements.
- On e-flows 5-10th percentiles are applied and can be easily adjusted afterwards based on the feasibility of the study. Water transfers are not included.
- Changes in annual surface and groundwater recharge with climate projections.

- Soil water stress and change of water resources under the RCP8.5 climate scenario. Some scenarios with WEI based on 2-degree resolution of the Paris agreement have also been produced.

Discussion:

Can the model be implemented for the Member States? How to combine administrative and hydrological units? What are the underlying data e.g. is WISE SoE water quantity data used in the LISFLOOD model? At which level the outputs are validated?

The model can be run for the MSs as well. Results could be significantly improved based on planned work on the spatial fitting of the inputs. Data from Eurostat and national meteorological agencies are mainly used. The outputs are consulted with the national authorities.

3.2 – ENSEMBLES daily gridded observational dataset for precipitations and temperature and soil-water balance model

Blaz Kurnik (EEA) presented the main objective of climate and soil water balance information for the water accounts. The conceptual model implemented aims to provide climate data to the EEA water accounts for the following variables:

- Climate Data: gap filling and interpolation to improve or Change to ERA5 dataset (delivered by C3S),
- Soil data: include newly available soil properties,
- Phenology: introduce dynamical layer (currently stable phenology) delivered by CLMS.

3.3 – Data sources, surrogate data and methodologies for gap filling

Georgios BARIAMIS (ETC/ICM) made a brief introduction to the data structure of water accounts complying with SEEA – Water and data types used in the EEA water accounts production database (WAPD). A general elaboration has been conducted on the workflow for water accounts (data sources, analysis and integrations, water accounts modules, results, using the outputs of the water accounts in water scarcity assessments). A detailed introduction to the EEA water accounts database has been presented in groups of spatial information, environmental data (hydrological, climatic), water resources (abstractions, returns) and general socioeconomic information (e.g. demographics). Each of the data layers contained in the WAPD has been presented together with elaboration on time series with the EEA water accounts. ETC/ICM provided a synthesis on the streamflow database, the structure of data inputs at national/annual levels as well as the statistical methodologies for the gap filling in the database.

Methodologies for integration data on industrial and cooling water demands as well as spatial and temporal disaggregation from annual/national to monthly/regional (ECRINS-based) levels have been elaborated. A quantitative assessment on reported data versus surrogate data in the

WAPD was assessed by mentioning that the rate of surrogate data usage is for agriculture (72/28%), mining quarrying manufacturing and constructions (51/49%), water collection treatment and supply (44/56%), cooling water for energy (43/57%) and service industries (44/56%) for the 1990-2015 baseline.

Discussion:

How is water abstraction by source e.g. from groundwater and soil water is estimated?

ENSEMBLES data are used which is further modelled by the EEA soil-water balance application to estimate soil water and deep percolation. Internal distribution of the water abstraction from groundwater resources to economic activities are organized by modulation coefficients based on the country level data via the algorithm of the Nopolu application, which is the application used for developing the EEA water accounts. Water exchange database will also be shared with the participants.

What are the indicators used for estimating the industrial water demand? Is it based on economic output?

Water abstraction is based on the country data. Only gap filling is implemented by either linear or polynomial regression, or expert judgment in extreme cases or no data reporting (0% availability). Data on economic outputs is only used for temporal disaggregation or, in some cases, to estimate the returns component of the physical water asset accounts.

What about the water transfers?

Water transfers data are not available right now, therefore are not included at any level of the water accounts computation. In case water transfers are affecting the water balance of a region, each of the MS can provide more comments during the Eionet consultation period, and it might be elaborated on including (or not) the specific region into the general results.

What are the underlying data on water returns?

During the data collection stage, it was found that there is a range from 28-37% of water returns when compared with the water abstractions. Unfortunately, there is no other data source, still water returns are not widely reported – even in WISE SoE Water quantity.

How is water demand for tourism assessed?

An extensive work has been done back in 2015 where it was quantified the level of pressure that water demand for tourism poses on freshwater resources. Currently attempts are made on the attenuation of possible double counting, since there is no access on actual population flows among countries during touristic seasons.

Session 4. Spatial and temporal aggregation of European physical water assets accounts and flow accounts

(Chaired by Ad De Roo, DG JRC)

4.1 – Data sources, surrogate data and methodologies for gap filling

Georgios BARIAMIS (ETC/ICM), made a short introduction on the structural and algorithmic set up of the water accounts application (Nopolu) which is used by EEA. It is a stepwise process, based on selection of scenarios (spatial scale and timer resolution) by the user and is now working on SQL database environment due to increased needs in data storage and processing. When a complete run (12 steps) is finalised, all the results are exported and assessed (analysis, validation, cross checking etc.)

ETC/ICM provided a detailed clarification on the methodological approach of flow linearization process and implementation of modulation coefficients for temporal and spatial disaggregation of water uses (abstractions/returns). Encountered uncertainties with stream flows were presented for indicative river basins in percentage (± %) and in absolute volumes to show the level of differences when compared with open data sources (ODS). Finally, the heterogeneity of the respective European datasets available at the EEA and Eurostat was highlighted when compared with national data (case of Meuse RBD).

Discussion:

How is interpreted with the differences on water outflows?

There is no the same time range of information when comparing with modelled data. The level of difference is the result of several reasons: hydrographic detail, outflow of the main outlet while assessing the whole terrain to the sea and more than one river mouths etc.

How is implemented seasonal water allocation for irrigation?

Based on EEA phenological data a 5-monthly time range of agricultural seasons is identified across EEA countries, which is actually applied with different timing in the start of the season.

Can more elaboration be provided on the level of complexity in water utilization by the economic sectors and the difference in the data demands from the reporting?

It has to be developed rather complex algorithms and approaches to overcome different dimensions of water flows from environment to economy and within the economy under extended lack of data reporting. In case of extended participation in data reporting streams from the member countries, it wouldn't need to develop such complex computation processes for sectoral disaggregation. For example, the revised version of the WISE SoE 3 since 2016 is fully aligned with data requirements of water accounts.

Looking at the structure and content of the PSUT tables which has been presented, it is seen that the UN SEEA Water is followed but not actually UN SEEA Central Framework. As the UN SEEA CF

was published after the UN SEEA Water, it is highly recommended to follow UN SEEA CF instead of the UN SEE Water. That should also be taking into account when it comes to use certain terms.

The core of PSUT table is the column 'economic sectors', which are actually the drivers of pressures on water resources systems. On the use of terms, we agree but we use the SEEA for Water, which has certain specifications when approaching to classical economic accounting of monetary capital etc.

4.2 – Accounting tables (asset accounts, physical supply and use)

Nihat ZAL (EEA) presented the simplified water asset accounts and PSU tables for 2015 addressing the water flows from environment to economy and vice versa based on the horizontal (assets) and vertical (economy) dimensions of the tables. It has been underlined that the primary purpose of using the outputs of water accounts is to develop and update two main water quantity indicators: a) Use of freshwater resources (CSI 0018 – WEI+) and b) Water intensity of crop production (WAT006).

Discussion:

If opening and closing stocks in water asset tables can't be presented then it is hard to conclude that EEA develops the physical water asset accounts. Hence, what is presented should be regarded something else but not the asset accounts.

Estimating opening and closing stocks in the physical water asset accounts is very challenging and posing a number of uncertainties due to large difference in residence time of water in water bodies. For example, the residence time in rivers is no longer than three weeks, whereas it would be decades in groundwater aquifers. On the other hand, it is very high and detail data demanding which is not available at the European level. Nevertheless, there is the possibility to estimate opening and closing stocks in the asset table, however, that creates high uncertainty and not desirable to present such results, which would mislead the overall conclusions. Instead, seasonal changes in the water storage is estimated which is the one important variable for estimating the water exploitation index plus.

As for the water scarcity assessment, there is no agreed thresholds applied on the WEI+. However, the Member States participating in international fora do not object to the current use of Raskin thresholds (1997) for assessing the water stress levels estimated by the water exploitation index.

Session 5. Wrap-up and closure of the meeting

(Chaired by Stéphane ISOARD, EEA)

5.1 – Roadmap for future works and further validation of the EEA water accounts

Nihat ZAL (EEA) presented the short term and mid-term EEA planning for water accounts development.

On the short term:

- Eionet consultation and publication of the European water accounts database on the WISE.
- Making a dashboard available to the end-user with interactive querying facility for water accounts variables, visualization of water accounts components (in particular, water abstraction by source and by sector) and enabling the data downloading under WISE platform.
- WEI+ at the country level as the EU support to the global assessment on SDG 6.4.2

Mid-term planning includes:

- WFD spatial data integration in the Nopolu system (2020),
- Publication of updated EEA water scarcity report (2021),
- Update of the WEI+ indicator at sub-basin level (2021),
- Use of Copernicus products for water scarcity assessment (as of 2021),
- New version of WAPD (2021+).

5.2 – Meeting summary and conclusions

Stéphane ISOARD (EEA) expressed the appreciation that all participants made it possible and stressed the importance of these meeting in further improvement of capacity building through EEA networks (Eionet, NFPs, NRCs etc.). EEA can provide further support facilitating member states reporting and is always open to improve reporting obligations. EEA knows the limitations faced by the three people working on water accounts all these years, but it can be seen now their noteworthy achievements of these EEA and ETC/ICM combined efforts.

Participants underlined the importance of sharing knowledge and experiences between EEA and Member States on methodological implementation of the water accounts and its use in developing the water exploitation index at the basin level on seasonal resolutions.

It has also been expressed willingness among the EU institutions (e.g. JRC, EEA and Eurostat) for further collaboration and cooperation for sharing the available data and information in the field of water.

Stéphane ISOARD thanked to all participants for their contributions and supports, and closed the meeting.