NEXUS ASSESSMENT OF THE DRINA RIVER BASIN

Final report of the Workshop

Introduction to the Climate-Land-Energy-Water (CLEWs) modelling framework and its use in the Nexus Assessment of the Drina River Basin

Contents

1. Scope of the workshop

The workshop aimed to make the participants familiar with the Climate, Land, Energy and Water systems (CLEWs) nexus methodology, used to quantitatively assess the energy-water interlinkages within the Nexus assessment of the Drina River Basin. By providing an overview of general concepts, tools used and hands-on experience on model building, the workshop opened the box of the modelling analysis to the audience and laid the ground for local uptake of the model infrastructure.

2. Description of activities

The workshop was held entirely online due to Covid-19 restrictions and was structured in two parts.

The first part (Day 1) was aimed at a broad audience. Based on the experiences from a similar workshop held in the previous days, the session was significantly redesigned compared to initial plans. Aim was to maximise the space for interactions with the audience. The welcoming session included a round of table to introduce the participants and their expectations. Afterwards, there was a short introduction to existing Nexus assessment methodologies and to CLEWs in a plenary presentation, followed by a longer Q&A session. This was run through Mentimeter, and it aimed at deepening the understanding of the expectations by the participants regarding CLEWs and collecting their perceptions of Nexus challenges in the Drina River Basin. Finally, the session concluded with a group exercise where the participants were called to discuss selected results of the Drina River Basin Nexus assessment, after being introduced to its structure, scenarios and main assumptions.

The second part (Day 2) aimed at an audience with basic modelling experience. Firstly, the participants were guided in the creation of a simple model with the CLEWs framework (focusing only on the electricity sector, for simplicity). With a follow-along exercise, they were introduced to ground concepts of CLEWs modelling and their link to the nexus challenges in the Drina River Basin. The exercise was carried out online, through individual workbooks that the participants could open on their laptops with a shared link. Secondly, the participants were guided in the expansion of the model and creation of scenarios with similar characteristics to those created in the Drina Nexus assessment. Finally, they navigated through all the resources and material used in the creation of the model (see below), so that they may learn where to find it and how to use it.

All the activities were designed so as to not require any software installation on the participants' computers. They were all carried out online, based on open-source infrastructure.

3. Feedback and conclusions from the sessions

The limited number of participants was deemed a potential driver for high interaction with the three tutors throughout the workshop.

The sessions moderated via Mentimeter on Day 1 were a good ground to discuss what are agreed to be the main nexus challenges to the basin, providing examples of how decisions made in one sector can influence those in other sectors. Through the implementation of the CLEW framework, participants identified potential opportunities for enhancement of cross-border cooperation, as well as the possibility of identifying adverse effects caused by decisions aimed at another sector. One participant deemed the CLEWs framework very

useful, while three thought it good to have. Participants were asked about previous experience with energy models, and four out of six said they did not have any prior experience. Some participants have suggested further developing the model using the CLEWs approach, combined with the knowledge they possess about the sectors and the data availability that they possess.

Figure 1. Screenshot of results of one Mentimeter survey.

However, the free interaction between participants and trainers was limited throughout the workshop and especially lower during the last session of Day 1, where the participants were able only to limited extent to extract insights from the online visualisation of the Nexus assessment's results. The reason for this likely lies in the limited time the participants had to analyse such results. Some of the comments focused on understanding the reasons for specific model assumptions (e.g. regarding the installation of future power plants), deviating from the objective of the session.

During Day 2 the participants carried out the hands-on exercises without issues and were able to gain significantly more insights on the functioning of the tools behind the Nexus assessment. The feedback from the participants was strongly positive. The tutors stressed the availability and accessibility of all the material (both related to the training and to the Nexus assessment model) and placed care in guiding the participants through all the resources, inviting follow up and further use.

ANNEX

A1. Agenda

Day 1 – July 8th, 2021

9:30   Welcome and introduction (Mr. Tassos Krommydas, Senior Programme Officer, GWP-Med, Mr. Francesco Gardumi, KTH Royal Institute of Technology)

10:00   Introduction to Nexus assessment methodologies and CLEWs (Francesco Gardumi, KTH Royal Institute of Technology)

10:30   Break

10:45   Climate-Water-Energy nexus issues in the Drina River Basin: what can be modelled (All, guided by Mr. Youssef Almulla, KTH Royal Institute of Technology)

11:30   The water-energy model of the Drina River Basin: methodology (Mr. Emir Fejzic, KTH Royal Institute of Technology)

12:00   *Breakout group session*: discussion on scenarios, selected results and methodological aspects in the Water-Energy model of the Drina River Basin (All)

12:45   Wrap-up and end of session (Mr. Emir Fejzic, KTH Royal Institute of Technology)

Day 2 – July 9th, 2021

9:45   *Follow-along exercise*: Creation of a simple electricity system model with the Open-Source energy Modelling System (Guided by Dr. Francesco Gardumi, KTH Royal Institute of Technology)

10:45   Break

11:00   *Follow-along exercise*: Creating scenarios with the simple model (Guided by Dr. Francesco Gardumi, KTH Royal Institute of Technology)

11:45   GitHub and model transfer: Detail on the Water-Energy model of the Drina River Basin and riparian countries – how it looks, how it works, where it is stored (Mr. Emir Fejzic, KTH Royal Institute of Technology)

12:15   Wrap-up and end of session (Mr. Emir Fejzic, KTH Royal Institute of Technology)

A2. List of participants

The table lists the registered participants and (marked in yellow), those who attended the workshop.

Name	Institution	Country	Date
Mirjna Fržović	ERS	Serbia	08-09.07.2021
Dušanka Tomanović	ERS	Serbia	08-09.07.2021
Vladimir Vasković	MoFTER	Bosnia and Herzegovina	08-09.07.2021
Minela Pita	MoFTER	Bosnia and Herzegovina	08-09.07.2021
Amela Ćeroć	EPBIH	Bosnia and Herzegovina	08-09.07.2021
Anisa Avdaković	EPBIH	Bosnia and Herzegovina	08-09.07.2021
Irvina Numić	EPBIH	Bosnia and Herzegovina	08-09.07.2021
Biljana Kilibarda	METEO	Montenegro	08-09.07.2021
Pavle Đurašković	METEO	Montenegro	08-09.07.2021
Marija Janjušević	EPCG	Montenegro	08-09.07.2021
Jelena Nikolić	EPCG	Montenegro	08-09.07.2021
Velimirka Perišić	EPCG	Montenegro	08.07.2021

A3. Links and material shared with participants

The material shared with the participants is available here:
https://kth.box.com/s/ahba1jgywart9y40euj6z2wzfddqfxyc.

It includes:

- Workshop concept note and agenda (.docx);
- Presentation for the first session of Day 1 (Welcome & Introduction; Introduction to Nexus assessment methodologies and CLEWs);
- Presentation for the second session of Day 1 (Presentation of the Water-Energy model of the Drina River Basin and riparian countries – underlying modelling framework (OSeMOSYS), key characteristics and assumptions)
- HTML file for the last session of Day 1 (Discussion - guided by trainers from KTH - on scenarios, selected results and methodological aspects in the Water-Energy model of the Drina River Basin)
- Presentation for the third session of Day 2 (GitHub and model transfer: Detail on the Water-Energy model of the Drina River Basin and riparian countries – how it looks, how it works, how to use it and run it using Jupyter Notebook)

KTH drafted also news items presenting the activities and their outcomes, published at the GWP website.

Besides the presentations, several links to supplementary materials and tools were shared during the workshops:

- Online exercise to get started with the modelling tools (Session I of Day 2): https://mybinder.org/v2/gh/KTH dESA/UNECE Capacity-Building/main?filepath=cb_simple_example.ipynb
- Online exercise on scenario analysis with the modelling tool (Session II of Day 2): https://mybinder.org/v2/gh/KTH dESA/UNECE Capacity-Building/main?filepath=cb_simple_example.ipynb
- User guide for the modelling tool: https://osemosys.readthedocs.io/en/latest/
- Q&A forum for the modelling tool: https://groups.google.com/g/osemosys
- Model used for the Drina Nexus assessment: https://github.com/KTH-dESA/UNECE-Capacity-Building
- Open access and free self-learning course on the CLEWs methodology, with tutorials (ca. 30 hours study): https://www.open.edu/openlearncreate/course/view.php?id=7244