

NATIONAL REPORT ON IHP RELATED ACTIVITIES OF NC IHP Slovenia

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JUNE 2018 – APRIL 2020

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

The Slovenian NC IHP UNESCO meets at the end of the current year and confirms the reports on the work performed and the program of work and use of funds for the next year. Thus, NC held its session on 5/12/2018 and.... The composition of NCs changed slightly in 2019 so that NCs now consist from representatives:

- ❖ UNESCO Office, Ministry of Education, Science and Sport, Republic of Slovenia
- ❖ Department for Emerging Challenges and Threats, Directorate for Multilateral Affairs, Development Cooperation and International Law, Ministry of Foreign Affairs, Republic of Slovenia
- ❖ Slovenian Water Agency, Ministry of the Environment and Spatial Planning, Republic of Slovenia
- ❖ Slovenian Environment Agency, Ministry of the Environment and Spatial Planning, Republic of Slovenia
- ❖ Faculty of Civil and Geodetic Engineering, University of Ljubljana
- ❖ Biotechnical Faculty, University of Ljubljana
- ❖ Faculty of Natural Sciences and Engineering, University of Ljubljana
- ❖ UNESCO Chair on Water-related Disaster Risk Reduction, University of Ljubljana
- ❖ Faculty of Civil Engineering, Transportation Engineering and Architecture, University of Maribor
- ❖ Karst Research Institute, Science and Research Center of the Slovenian Academy of Sciences and Arts
- ❖ Water Management Society of Slovenia
- ❖ Former Chairman of the Slovenian IHP National Committee

Prof. dr. Matjaž Mikoš has been elected President of the Slovenian National Committee IHP UNESCO for the period 2019-2023.

1.1.2 Status of IHP-VIII activities

Due to natural conditions and socio-economic needs, traditional topics for Slovenian NC in the frame of VIII IHP program are

THEME 1: WATER-RELATED DISASTERS AND HYDROLOGICAL CHANGE

In this area, the work transferred to the Chair UNESCO Chair on Water-related Disaster Risk Reduction (est. 2016), University of Ljubljana

Focal Area 1.3: Benefiting from global and local Earth observation systems by developing and maintaining experimental river basins and

THEME 4: WATER AND HUMAN SETTLEMENTS OF THE FUTURE, where he has been working on a book for many years: More room for water

THEME 6: WATER EDUCATION, KEY FOR WATER SECURITY, where we develop our knowledge in the field of water science, engineering and policy within the framework of the University of Ljubljana and cooperate within the international Master degree study programme "Flood Risk Management" together with IHE Delft, TU Barcelona and TU Dresden.

To a lesser extent, the Slovenian NC IHP also participates in other topics of the IHP-VIII program.

- Participating to the 23rd meeting of the IHP Intergovernmental Council, June 2018, Paris, France. At the conference, prof. Brilly was elected Chairman of the Finance Committee of the IHP Council.
- Attending the 58th IHP Bureau meeting in Paris in September 2019.
- Participating to the Euromediterranean Network of Experimental and Representative Basins (ERB), September 2018, Darmstadt, Germany.
- Participating to the 1st UNESCO-VISUS Expert Meeting (MUVEx) at the University of Udine, September 2018, Udine, Italy, and organizing the 2nd UNESCO-VISUS Expert Meeting (MUVEx) at the University of Ljubljana, October 2019. MUVEx is a UNESCO project for the assessment and management of the risks of school buildings exposed to natural disasters.
- Leadership Meetings of IHP National Committees of the Danube River Basin, October 2018, Slovakia and Kyiv, Ukraine, November 2019.
- Digitalization (scanning) of the Proceedings of the IHP Danube Conferences and Research Reports.

1.1.3 Input on IHP-IX

Slovenian NC IHP commented on the draft report of the phase IX program. Prof. Brilly actively participated in the discussion in the preparation of the draft program material to be presented at the next IHP Council meeting in 2020. Prof. Brilly participated in IHP IX strategy Working Groups: Water Governance, and Data.

1.2 Activities at the national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

Members of NC IHP actively participated at the scientific symposium organized by University of Ljubljana, Faculty of Civil and Geodetic Engineering annually in March "Goljevščkovi dnevi" (Goljevšček days), at technical conferences "Mišičevi dnevi" (Mišič days), organized by Water Management Bureau Maribor annually in November/December, and at scientific annual conference of the Slovenian Association of Geodesy and Geophysics, held annually in January.

1.2.2 Participation in IHP Steering Committees/Working Groups

1.2.3 Research/applied projects supported or sponsored

We have developed a unified method for estimation of benefits of structural and non-structural flood risk reduction measures (called KR PAN). Based on this method, we have also developed a computer application that enables the calculation of expected flood damage in GIS environments. The estimates can serve as a support for assessing and comparing the benefits of foreseen flooding measures in the preparation of the economic part of public finance investment documentation.

As a part of the eco-hydrological monitoring, we also monitored evaporation measurements, intercepted precipitation and open-air precipitation in 2019. We regularly maintain measuring equipment on the experimental Gradašćica basin. In addition of measurement water levels and precipitation at the Kuzlovec creek, we also monitor the physicochemical parameters. There are three disdrometers installed (Hajdrihova 28 outdoors, Hajdrihova 28, and in Črni Vrh above Polhov Gradec), which are continuously maintained and controlled to enable real-time transmission of precipitation data from the disdrometer to a web page. In 2019, more extensive maintenance of field equipment was carried out on the experimental river basin of the Gradašćica river, additional gauges and devices installed to measure water levels in riverbeds. Measurements of water chemistry complement hydrological monitoring in the Kuzlovec watercourse. This year we installed other measuring equipment for continuous monitoring of soil moisture. WE put the sensors located in three ground horizons. These data will significantly contribute to the knowledge and understanding of the hydrological mechanisms of nutrient release.

The national research programme Water Science and Technology, and Geotechnical Engineering (grant P2-0180), with its objectives, directly supports the work of IHP and the UNESCO Chair. The Program Team focused on developing, validating and testing (in a real-world environment) selected tools/methods/technologies in the fields of leadership and geotechnics with the explicit goal of improving our understanding of natural environments and cultural landscapes and technological / infrastructure systems for better governance and management. The objectives of the group, which are directly related to the contents of the UNESCO Chair, are:

- Analyses and simulations of relevant parameters influencing water- and geo-related hazards and risks.
- Advanced monitoring and modelling techniques for studying interactions between hydrological and biogeochemical cycles.
- Modelling and analyses of hydro-meteorological events and their consequences with an emphasis on extreme events in the changing environment.
- Developing advanced monitoring and modelling techniques for landslide hazard and risk assessment and landslide mitigation.

1.2.4 Collaboration with other national and international organizations and/or programmes

- City Museum of Architecture (MAO) at the exhibition Living with Water - the southern part of the Ljubljana River Catchment, at the Science and Literary and Research Competition “Water Detective” organized by ICRO, UL FGG and MAO.
- ERB – Euro-Mediterranean Network of Experimental and Representative Basins (erb-networks.simdif.com)
- EURaqua - European Network of Freshwater Research Organizations (<http://www.euraqua.org>)
- CUAHSI - Consortium of Universities for the Advancement of Hydrologic Science (<https://www.cuahsi.org/>)
- ICOLD - International Commission on Large Dams (<https://www.icold-cigb.org/>)
- INTERPRAEVENT - Research Society works to set up preventive protection against disasters and supports interdisciplinary research to protect our living space against flooding, debris flow, avalanches and mass movements. (www.interpraevent.at)
- ICL - International Consortium on Landslides (<http://icl.iplhq.org/>)
- IAHR - International Association of Hydraulic Engineering and Research (<http://www.iahr.nl/>)
- EGU – European Geosciences Union (www.egu.eu)
- IAHS - International Association of Hydrological Sciences (<https://iahs.info/>)

1.2.5 Other initiatives

In the past years, the Slovene IHP site <http://ksh.fgg.uni-lj.si/ihp/> regularly maintained and published current news, annual reports and information on experimental catchments, and regularly maintain databases of measured data and provide online access to measured data from various of KSH projects. Since early 2020, a new IHP site www.ncihp.si is under construction.

The UNESCO Chair on Water-related Disaster Risk Reduction (www.unesco-floods.eu/) regularly publishes and updates news on their own activities carried out and planned, documenting them with reports and multimedia material such as pictures and videos, and updating them with links to other websites with more detailed information.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

1.3.2 Organization of specific courses

The UNESCO Chair of Water-Related Disaster Risk Reduction continued the implementation of the international Master study programme in Flood Risk Management (FRM). IHE Delft is running the FRM program in collaboration with the universities of TU Dresden, TU Barcelona and the University of Ljubljana. The program was recognized as one of the better Erasmus Mundus EU educational programs in the last period. The University of Ljubljana provides lectures on Socio-economic and institutional framework for flood risk

management and Spatial planning for flood protection. Under the mentorship of Assoc. Prof. Mojca Šraj and co-mentoring of Prof. Brilly, one of the students of the FRM program completed complex studies of high-water in the Danube river basin.

UNESCO Chair on Geoenvironmental Disaster Reduction at Shimane University, Matsue, Japan organized the 2020 Field School on Geoenvironmental Disaster Reduction from February 10 to 16, 2020, and Assist. Prof. Bezak was invited lecturer at this field school.

University of Baja, Hungary and the Faculty of Civil Engineering in Belgrade prepared a postgraduate program on flood protection InterFloodCourse and involved lectures given by prof. Brilly in climate change impact on floods.

Within the EU DAMOCLES project, we hosted a doctoral student from Turkey, who prepared examples of hydrological modelling of flood events due to snowmelt in Slovenia.

When possible, such cooperation was finished with an international or at least national publication in periodicals.

1.3.3 Participation in IHP courses

1.4 Cooperation with international/regional water centres under the auspices of UNESCO

UNESCO category II centre IHE Delft Institute for Water Education, the Netherlands.

UNESCO category II centre International Research and Training Centre on Urban Drainage (IRTCUD), Belgrade, Serbia.

UNESCO category II centre International Research Institute on Artificial Intelligence = IRCAI, Ljubljana, Slovenia

UNESCO Chair on Open Technologies for Open Educational Resources and Open Learning, Institute Jožef Stefan, Slovenia.

International Consortium on Landslides (ICL), Kyoto, Japan.

The ICL Adriatic-Balkan Network in Landslide Risk Reduction, University of Rijeka, Croatia.

World Centre of Excellence in Landslide Risk Reduction of the International programme on Landslides (IPL), Faculty of Civil and Geodetic Engineering, University of Ljubljana, Slovenia.

UNITWIN/UNESCO/KU/ICL Landslide Risk Mitigation for Society and Environment Cooperation Programme, Kyoto University, Japan.

UNESCO Chair on prevention and sustainable management of geo-hydrological hazards, University of Florence, Italy.

UNESCO Chair on Intersectoral Safety for Disaster Risk Reduction and Resilience SPRINT-Lab, University of Udine, Italy.

UNESCO Chair on Integrated River Research and Management, University of Natural Resources and Life Sciences, Vienna, Austria.

UNESCO Chair/International Network of Water-Environment Centres for the Balkans on 'Sustainable Management on Water and Conflict Resolution', Greece.

UNESCO Chair on Water for Ecological Sustainable Development (W4ESD), University of Belgrade, Serbia.

UNESCO Chair on Intersectoral Safety for Disaster Risk Reduction and Resilience SPRINT-Lab, University of Udine, Italy.

UNESCO Chair on Geoenvironmental Disaster Reduction, Shimane University, Matsue, Japan.

1.5 Publications

Slovene NC IHP supports web sites of the UNESCO Chair WRDRR (www.unesco-floods.eu) and its own web site (www.ncihp.si) with more details on publications.

Slovene NC IHP supports active participation at international (and national) scientific and technical conferences, and supports publishing scientific papers in international peer-reviewed journals. Scientists with support of Slovenian IHP published 39 peer-reviewed original and review scientific papers and 11 chapters in scientific books.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

2nd Meeting of UNESCO VISUS experts (October 29 – 30, 2019) in Ljubljana on "School safety upgrading strategies in multi-hazard prone areas", where the Ljubljana Declaration was accepted.

1.6.2 Participation in meetings abroad:

- on a working visit to the Polytechnic di Turin and the SiTI Research Institute to discuss the possibilities of pedagogical and research cooperation between organizations, June 2018, Turin, Italy
- 8th International Conference on Water Resources Management (IAHS), June 2018, Beijing, China
- at the Euroaqua meeting at the Deltares Institute in Delft, The Netherlands, in July 2018
- an invited lecture at the inauguration of the newly established UNESCO WENDI Chair at Kyoto University, Japan, July-August 2018, Kyoto, Japan
- at the Catchment Science Doctoral Summer School, August 2018, Birmingham, United Kingdom
- with an invited lecture at the 7th ASEM Sustainable Development Dialogue, September 2018, Budapest, Hungary
- at the International Conference on Natural Hazards and Risks in a Changing World, October 2018, Potsdam, Germany
- at the Interpraevent Int. Symp. 2018 in the Pacific Rim, October 2018, Toyama, Japan
- at the Groundwater Model Calibration Using PEST intensive course, September 2018, Milan, Italy
- at the Catchment Science Doctoral Summer School, August 2018, Birmingham, United Kingdom

1.7 Other activities at the regional level

1.7.1 Institutional relations/cooperation

Assoc. Prof. Mojca Šraj cooperated with Technical University of Vienna (a team of hydrologists led by Prof. Blöschl) and scientists from other European countries, in publishing the article in prestigious journal *Nature* on the impact of climate change on floods in Europe (<https://www.nature.com/articles/s41586-019-1495-6>).

1.7.2 Completed and ongoing scientific projects

TOUREST - Tourism water management for sustainable ADRIAN coastal areas (2018-2019), INTERREG. We cooperate in the preparation of an expert list of indicators of water use in tourism activities. The indicators embedded in an online tool, developed as part of the TOUREST project, which enables businesses involved in tourism to evaluate the water efficiency of their activities. A separate web-based tool has also developed for local communities facing problems in providing sufficient quantities of water for water supply during the main tourist season. In the ADRIAN region, this coincides with arid summer conditions.

DAREFFORT - Danube River Basin Enhanced Flood Forecasting Cooperation Project. INTERREG Danube Transnational Program (2018-2021). We are reviewing the existing flood forecasting and ice forecasting methods and practices in the Danube River Basin. The main task of the project is to assist in the implementation of the Danube flood risk management plan following the Flood Hazard Directive. The report is produced as part of the European Dareffort project and is freely available on the website. The main purpose of the research is to address the shortcomings of existing flood forecasting practices, and experts and policymakers will be able to identify practices and needs in other countries and gain a comprehensive overview of complex forecasting systems. We presented results at the EGU International Conference in Vienna. Together with fellow hydrologists and meteorologists with ARSO, we also organized a workshop "Flood forecasting, alerting and cooperation in flood response", aimed at different stakeholders in Slovenia.

At Chongqing Technology and Business University (China), we are working on advanced mining methods for hydrological forecasting data on use cases from China and Slovenia. In 2019 we made a working visit to China and also a visit of a Chinese representative to our country. Together we have prepared an article entitled "Short-term streamflow forecasting using the feature-enhanced regression model", published in prestigious journal *Water Resources Management* (<https://doi.org/10.1007/s11269-019-02399-1>).

COST CA15113: SMIRES – Science and Management of Intermittent Rivers and Ephemeral Streams (2015-2019).

COST CA16209: LAND4FLOOD: Natural Flood Retention on Private Land (2017–2021).

COST CA17109: DAMOCLES: Understanding and modelling compound climate and weather events (2018–2022).
BI-DE/18-19-008 Stochastic precipitation models for soil erosion estimation.

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2020

Slovene NC IHP UNESCO will continue to support UNESCO WRDDR CHAIR at University of Ljubljana in implementation of VIII IHP UNESCO programme.

Slovene NC IHP is coordinating national committees for IHP UNESCO in the Danube River Basin and their research efforts. A workshop is planned for November 2020 in Ljubljana. We will proceed with the digitalization of existing printed materials (e.g. reports and proceedings from conferences of the Danubian countries) and with production of new materials in electronic form, freely available for the hydrology scientific community.

Prof. Brilly, member of Slovene NC IHP was elected as representative of II region in IHP Bureau. The meeting of the NC IHP UNESCO of II region countries is planned for November 2020 in Ljubljana.

Slovene NC IHP as member of the IHP Council will support the work of IHP Bureau and IHP Council in Paris.

NC IHP and UNESCO WRDRR Chair will contribute to the draft of IXth Programme of IHP and will actively participate at 24th session of the IHP Council.

Slovene NC IHP will support the IHP project World's Large Rivers Initiative (WLRI).

Slovene NC IHP will further develop and intensify research activities in experimental basins and cooperation within the Euro-Mediterranean Network of Experimental and Representative Basins (ERB, <https://erb-network.simdif.com/>). We are planning to attend the next ERB Conference in Elba, Italy in September 2020 that will be postponed to a later date.

WE will continue to support activities of other UNESCO chairs within the existing network, especially through the ICL community in the field of landslide risk reduction, and through already established cooperation within the international hydrology community. In 2020, we will participate at the IPL/ICL virtual conference to be held from November 1 to 5, 2020, where we will report on the research results of the World Centre of Excellence in Landslide Risk Reduction (2017-2020).

2.2 Activities foreseen for 2021-2022

Slovene NC IHP will support the forthcoming 3rd Congress on Waters in Slovenia held in 2021.

We will actively participate to the World Landslide Forum 2020 to be held in Kyoto, Japan from November 2 to 6, 2021 (postponed due to COVID-19).

We will support water diplomacy efforts of the Slovenian Government and will support the organization of the Slovenian Presidency of EU in 2021.

We will further support all kind of national and international educational efforts and activities in the field of hydrological sciences and integrated water management led by University of Ljubljana, as well as in flood risk management and community (society) capacity building and development through risk dialogue with diverse stakeholders.

Slovene IHP will cooperate on the development and maintenance of the multilingual Glossary of hydrology.

Furthermore, we will maintain and develop the existing Experimental river basins in Slovenia, and will support action “More room for water”.

2.3 Activities envisaged in the long term

Maintenance and development of the existing Experimental river basins in the framework of the UNESCO Programme ERB.

Leading national and participating to international development in water science and technology, and education.

Contributing in cooperation NC IHP of Danube River basin.

Contributing to IXth Programme of IHP UNESCO.

Further support of the UNESCO Chair on Water-related Disaster Risk Reduction in all of its activities and networks.

Cooperating with UNESCO family (chairs and centres) in water science, technology and policy research and education.

Cooperating in the field of natural disaster risk reduction with International Research Society Interpraevent.

Contributing to network efforts for landslide risk reduction by cooperating within the ICL networks, world centres of excellence, and IPL projects, all within the Kyoto 2020 Commitment as a part of Sendai Framework for Disaster Reduction 2015-2030 and Agenda 2030 Sustainable Development Goals.