

REPORT

BFB-PA7-005

TUKE – Technical University of Košice, Slovakia

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NIBIO - Norwegian Institute of Bioeconomy Research, Norway

Prof. Ketil Haarstad



Activity description

The activity was aimed at promoting cooperation between the Technical University of Košice (TUKE), Slovakia and Norwegian Institute of Bioeconomy Research (NIBIO), Norway, specifically cooperation among experts from Slovakia and Norway in the field of water management especially water balances in urban and rural areas and application of “blue-green infrastructure” in a changing climate. The aim of the proposed grant was the exchange of information, data, knowledge and experiences in the relevant programme area with output of the increased awareness of and education about adaptation to climate change in Norway and Slovakia. This aim was completely fulfilled. We focused our activities to natural water retention measures in urban as well as rural areas. Mentioned measures can contribute to reducing the risk of floods and water scarcity and drought while also improving the status of surface and ground water bodies. Natural water retention measures can support the achievement of the goals of a range of EU policies, including those for surface water, groundwater and coastal management, nature conservation, agriculture, forestry, urban, disaster risk management, green growth and climate change mitigation and adaptation. The tasks and goals of activities within the project implementation were research materials collection, preparation of joint scientific publications and its publication in the research journals and/or conferences` proceedings, preparation of joint international projects and lectures for students. Benefit is also promoting of PhD students as well as graduated students from the both organizations to the project implementation.

Outputs, results, conclusions

Objectives and focus of the grant follow objectives of structural and regional policies of the European Community, they can help achieve mainly the goals of key EU policies such as the Water Framework Directive, the Floods Directive and Habitats and Birds Directive. The priorities of this grant included cooperation among experts from Slovakia and Norway in the field of water management, exchange of knowledge and experiences, research and innovation with aim of adaptation to climate change – flood and drought risk prevention and protection respecting development of infrastructure. The project focused on designing and identifying the existing natural water retention measures that aim to protect and manage water retention using natural means and processes. These therefore build up green infrastructure, for example, by restoring ecosystems and changing land use. Mentioned measures have the potential to provide multiple benefits, including flood risk reduction, water quality improvement, groundwater recharge and habitat improvement. Project objectives were focused on the strategic priorities namely adaptation to climate change as well as improving the effectiveness of related public services and the development of sustainable resources, economic growth and enhancing competitiveness with urban and rural development. This objective was ensured in the particular project, preparing the cooperation between academic department and research institute (TUKE and NIBIO) from Slovakia and Norway. The main focus of the project was to modernize and to make the system of support research and development and improve the conditions of educational and research process more effective at university- and research institute levels. Charge of the project monitored the calls and the response to the challenges - the preparation of projects mainly the following programs, eventually other in the future.



The priority objective of the project was the exchange of persons and information, research materials and experiences in order to meet specific goals:

- Exchange of experts, information, documentation and experience at working meetings for the preparation of joint international cooperation. It targets project participants involved in design and implementation of water retention measures as part of plans and programmes addressing water, floods, biodiversity, climate change adaptation, forestry, agriculture or urban issues.
- Preparation of joint publications and other outcomes of scientific research work of investigators. The research work was directed investigators to the selection, design and implementation of natural water retention measures in Slovakia and Norway - capturing the multiple benefits of nature-based solutions.
- Collection of research materials - the mutual exchange of knowledge not only of works of project's departments, but also the acquisition of contacts in organizations and workplaces, agencies dealing with similar issues. It places the emphasis on the multiple-benefits of water retention measures that can deliver and on the required policy coordination and coherence that is required to make best use of these measures in urban as well as rural areas.

All planned activities served as a background for the future cooperation of NIBIO and TUKE.

There were two seminars organised within the project implementation phase – in December at NIBIO in Norway and in January at TUKE in Slovakia what is the main and the most important output of the project.

The detailed description of the project outputs and results are characterized below.

• Published articles – 3:

Martina Zelenáková, Daniel Constantin Diaconu, Katin Haarstad: **Infiltration As Water Retention Measures In Urban Areas**. In: SPACE 2016. Košice: TU, 2016 S. 1-2. ISBN 978-80-553-1488-4

Rastislav Fijko, Martina Zelenáková: **Možnosti zberu dát pre potreby vytvárania hydrodynamických modelov**. In: Zborník recenzovaných vedeckých prác ÚEI 2016. Košice: TU, 2016 S. 11-20. ISBN 978-80-553-3062-4

Vlasta Ondrejka Harbuláková: **Indirect methods for evaporation measurements - an overview**. In: Zborník recenzovaných vedeckých prác ÚEI 2016. Košice: TU, 2016 S. 118-123. ISBN 978-80-553-3062-4

• Published articles online – 2:

Zuzana Poórová, Pavol Purcz, Zuzana Vranayová: **Retention of green roofs following the questionnaire and its respondent's answers**. In: Czech Journal of Civil Engineering. Vol. 2, no. 2(2016), p. 139-144. - ISSN 2336-7148
http://www.scientificjournals.eu/magazine/2016/CJCE_2016_02.pdf

Martina Zelenáková, Daniel Constantin Diaconu, Katin Haarstad: **Urban Water Retention Measures**. In: Procedia Engineering: SPACE 2016, Štrbské Pleso, Slovakia. Vol. 46 (2016), in press. - ISSN 1877-7058
<https://www.journals.elsevier.com/procedia-engineering/special-issues> (in March 2017)



Adaption to Climate Change (ACC) – PA7



- **Social networks – 45 blogs online:**

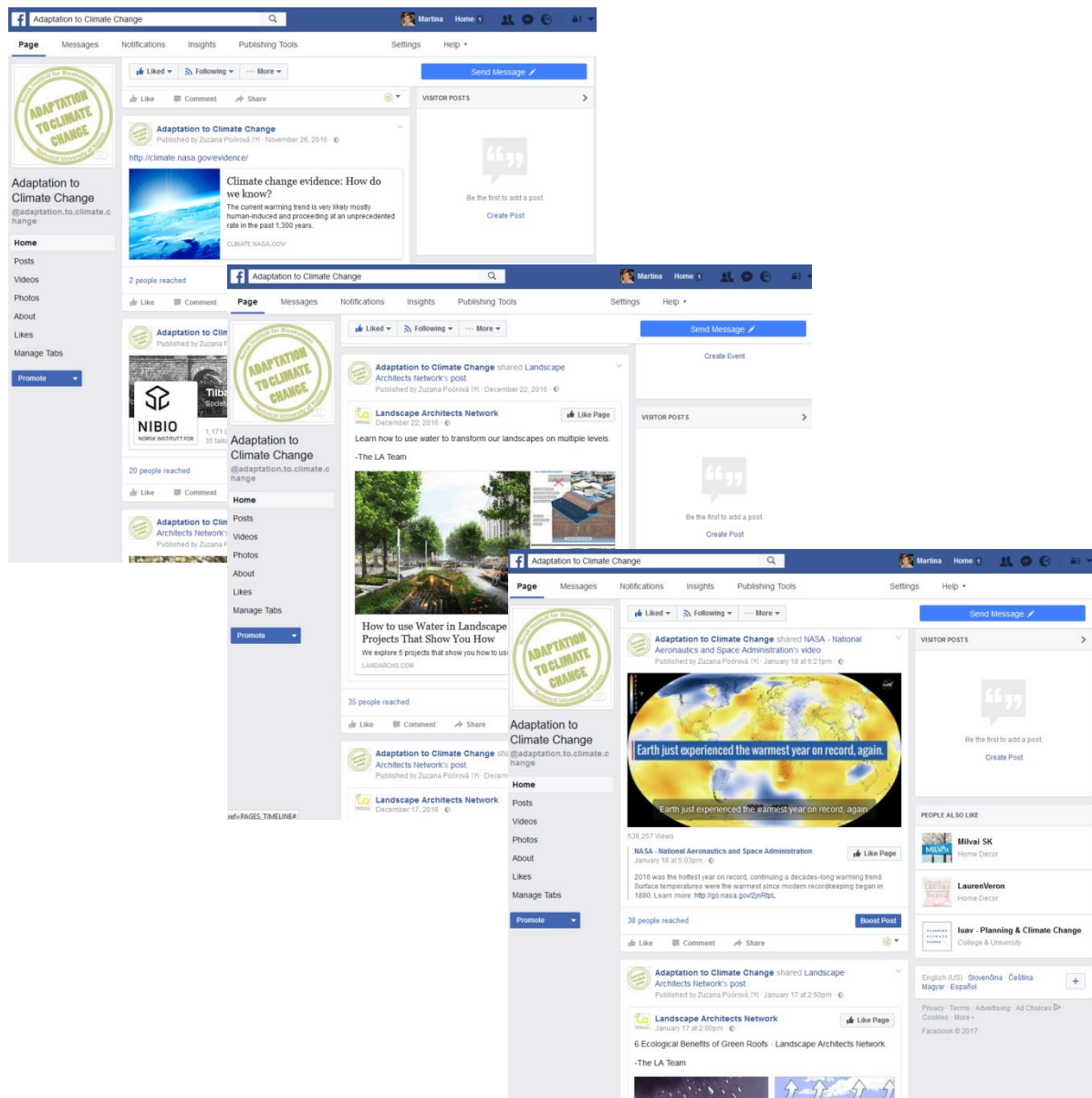
<https://www.facebook.com/adaptation.to.climate.change/>

eg.

https://www.facebook.com/adaptation.to.climate.change/?hc_ref=PAGES_TIMELINE&fref=nf

https://www.facebook.com/LandscapeArchitectsPage/?hc_ref=PAGES_TIMELINE&fref=nf

https://www.facebook.com/NASA/?hc_ref=PAGES_TIMELINE



- **Direct emails about the implementation of the project – 14+10=24:**

The direct emails about the project implementation and seminars were sent to the following institutions:

- 3x Slovak Hydrometeorological Institute (Slovenský hydrometeorologický ústav RP Košice),
- 3x Slovak Water Management Enterprise (Slovenský vodohospodársky podnik OZ Košice),
- 3x Eastern Slovakia Water Company a.s. Košice,
- 3x Mendelu University in Brno,
- 2x DHI, Slovakia, s.r.o.
- the State department,
- Norad (Norwegian Agency for Development Cooperation),
- Niva (Norwegian Institute for Water Research),
- Norsk Vann (Norwegian Water, a NGO)
- The Norwegian Water Resources and Energy Directorate, NVE
- Norwegian Agriculture Agency, Landbruksdirektoratet
- The Norwegian Environment Agency, Miljødirektoratet
- State of the Environment Norway
- Miljøkommune the Environmental Community
- Anita Borge, Coordinator of the PURA Project

- **Expert seminars – 2 – according to the program:**

<https://www.facebook.com/adaptation.to.climate.change/photos/pcb.1823071607909819/1823071094576537/?type=3&theater>

The first seminar took place at *NIBIO - Norwegian Institute of Bioeconomy Research* in Ås, Norway on 12-13 December 2016 with the following course. *Ketil Haarstad*, Norwegian team leader in the project welcomed all participants at NIBIO and they introduced themselves. *Martina Zelenakova* Slovak team leader briefly presented the Programme *Adaption to Climate Change (ACC) – PA7* and the related activities of Technical University of Košice included in the project. Then Håkon Borch, Head of Department Urban Greening and Environmental Engineering, introduced the NIBIO and the Department of Urban Greening and Environmental Engineering (history, vision and research activities in a nutshell). After lunch break researchers from NIBIO had expert presentations, exactly the following. Trond Mæhlum, Researcher at the Department Urban Greening and Environmental Engineering, presented NIBIO's activities related to "Blue-green infrastructure" in urban and rural areas for water balance and risk reduction of floods, water scarcities and droughts. Ketil Haarstad, Research Professor at the Department Urban Greening and Environmental Engineering, presented NIBIO's activities within circular management of water and natural resources/nutrients. Adam M. Paruch, Research Professor at the Department Urban Greening and Environmental Engineering, presented NIBIO's activities within water quality assessment with a particular focus on climate change and microbial water contamination. Adam O'Toole presented pros and cons of biochar. Then the seminar was continuing with debate on the Norwegian and Slovak R&D contribution to the project: activities and outputs of bilateral cooperation led by leaders of the project Ketil Haarstad and Martina Zelenakova. In the conclusion all the participants of the seminar discussed project dissemination: publicity, web page (facebook page), social network, visibility and future opportunities for institutional cooperation between Norwegian and Slovakian Partners, e.g. EEA, EU, ERA projects. The next day the Slovak team visited Norwegian study sites (see the next point of the report). Then all participants continued at NIBIO in queries and discussion on the Norwegian research activities at NIBIO as well as in summary and planning the project activities in Slovakia.



Adaption to Climate Change (ACC) – PA7



The second seminar took place at *TUKE - Technical University of Košice* in Košice, Slovakia on 23-24 January 2017 with the following course. *Martina Zelenakova*, Slovak team leader in the project welcomed all participants at TUKE and then in “round table” all guests and participants briefly introduced themselves. *Martina Zelenakova* also briefly presented the Programme *Adaption to Climate Change (ACC) – PA7* and the related activities of Technical University of Košice. Then *Magdalena Balintova*, Head of Institute of Environmental Engineering, introduced the Institute and its projects and activities. After lunch break researchers from TUKE had expert presentations, exactly the following. *Zuzana Vranayova*, Professor at the Department of Building Facilities, presented TUKE’s activities related to “Green Cities of Future” and rainwater management in urban areas. *Martina Zelenakova*, associated professor at the Department of Environmental Engineering continued presentation about rainwater management in urban areas and also presented activities within water balance management and risk reduction of floods, water scarcities and droughts. *Vlasta Ondrejka Harbulakova*, assistant professor at the Department of Environmental Engineering, presented topic of water quality assessment with a particular focus on climate change. *Pavol Purcz*, assistant professor at TUKE, presented statistical assessment of environmental data. Then the seminar was continuing with debate on the Norwegian and Slovak R&D contribution to the project: activities and outputs of bilateral cooperation. In the conclusion all the participants of the seminar discussed project dissemination and future opportunities for institutional cooperation between Norwegian and Slovakian Partners, exactly preparation of a new EEA grant application – organisation of the event, international conference. The next day experts from Norwegian team – Ketil and Adam had a lecture for students and staff of Faculty of Civil Engineering. Then the Norwegian team visited Slovak study sites (see the next point of the report). Then all participants continued at TUKE in queries and discussion on the research activities at TUKE as well as in summary and planning the next grant.

- **Site visits – 4:**

Site visits in Norway (13th December 2016):



Adaption to Climate Change (ACC) – PA7

Treatment wetlands in Follo District, the Lake Gjersjoen catchment



Assurdalen excavation and refilling

Site visits in Slovakia (24th January 2017):



Dam Ružín





Laboratories of Faculty of Civil Engineering at Technical University of Košice

- **Experts – 7:**

The following seven experts had participated in the project implementation.

NIBIO: Ketil Haarstad, Adam Paruch, Hakon Borch, Trod Mæhlum; TUKE: Martina Zeleňáková, Vlasta Ondrejka Harbuláková, Pavol Purcz, Zuzana Poórová

- **Lecture for students – 2:**

Within the second seminar the experts from Norwegian team had a lecture for students and staff of Faculty of Civil Engineering at Technical University of Kosice. Ketil Haarstad had lecture about Circular management of water and natural resources/nutrients and Adam Paruch had lecture about Water quality assessment with a particular focus on climate change and microbial water contamination. 39 persons, students and staff of TUKE, attended the lectures.

Project implementation was useful for the both institutions TUKE and NIBIO. Achieved outputs and results prove sustainability, what is proved also by the preparation of a new grant of bilateral fund at national level for 2016 in thematic component: environmental, with eligible activity – international conference “Water in Environment, which is planned for November 2017.

