NATIONAL REPORT ON IHP RELATED ACTIVITIES

Report Format

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JUNE 2014 – MAY 2016

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee
1.1.2 Status of IHP-VIII activities

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings
1.2.2 Participation in IHP Steering Committees/Working Groups
1.2.3 Research/applied projects supported or sponsored
1.2.4 Collaboration with other national and international organizations and/or programmes
1.2.5 Other initiatives

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

On the basis of Cooperation Agreement between ERCE PAS and University of Lodz in a field Ecohydrology, ERCE PAS participated in research of the following master thesis in cooperation with Department of Applied Ecology University of Lodz, in 2014-2016:

- Bartłomiej Szejn, 2014. The role of buffer zones in reducing diffuse pollution, including analysis of surface runoff in the buffer zones in agricultural areas
- Kiszalkiewicz Agata, 2014. Hydrological regulation of succession and self-purification of urban rivers
- Kolate Elina, 2014. Denitrifying barrier as an effective method to reduce the nitrogen load in groundwater
- Lewandowska Justyna, 2015. Influence of urban green areas on ecological, economic and social capital of the city of Lodz
- Magdalena Kobus, 2015. Analysis of the effectiveness of ecotones constructed on the shoreline of Sulejow Reservoir
- Pałkin Ewa, 2015. Comparative analysis of the possibilities of using sewage sludge and sediment as soil fertilizers
- Pietrasik Joanna, 2014. Comparison of denitrifying bioreactors in nitrogen removal from agricultural waste water
- Sobociński Adam, 2015. Comparison of the efficiency of removal of nitrogen compounds in the denitrification beds activated and non activated microbiological
- Tygielska Adrianna, 2014. Spatio-temporal dynamics of selected micropollutants in the urban river on the example of the Sokolówka
- Wałaszkiewicz Marta, 2015. The efficiency of wastewater treatment in the Sequential Biofiltering Model System in the wastewater treatment plant in Rozprza
- Wiązek Michał, 2014. Characteristics of populations of denitrifying bacteria colonizing beds to reduce nitrate compounds,
Participation in the ERASMUS MUNDUS Master of Science in Ecohydrology

ECOHYD is a unique international master course focusing on a new perspective on aquatic ecosystems restoration and long-term sustainability. The Ecohydrology Master Course is supported by a consortium build on highly experienced Higher Education Institution (HEI) in this field, as the UNESCO Institute for Water Education (Delft, Netherlands), the University of Lodz (Poland), the University of Algarve (Portugal), the Christian Albrecht University of Kiel (Germany) and the National University of La Plata (Argentina). Several institutions, as Research and UNESCO Centers, from Europe, Latin America, Asia and Australia are Associate Members of this course, contributing with their expertise in particular scientific areas, with offering advanced study courses and students exchange. The programme is facilitated by the European Commission for Education and Training and its ERASMUS MUNDUS Programme.

List of publications attached in 1.5

1.3.2 Organization of specific courses

Courses prepared and delivered within the ECOHYD - Erasmus Mundus Master of Science in Ecohydrology, developed in the collaboration with the University of Lodz

1. Ecohydrology
2. Ecotoxicrology
3. Environmental / Landscape Planning
4. Ecological Risk Assessment
5. Urban Ecohydrology
6. Phytotechnologies & Phytoremediation
7. Wetlands & Land-Water Ecotones

The target audience for the courses were the students accepted for the Erasmus Mundus course 2014-2015. The training involves classes, practicals and field work. The group included both students continuing their academic experience as well as professionals, who targeted at enhancing their knowledge, completing their education or reaching proficiency in broadly understood ecohydrology. The number of participants ranged from 10 to 15, depending on the course and the gender balance was maintained throughout the course.

Course prepared and delivered within the ECOHYD - Erasmus Mundus Master of Science in Ecohydrology, Summer School 2014, led by the University of Algarve and the International Centre for Coastal Ecohydrology:

- Long-term research in ecosystem management

The course has been delivered on 4-6th August 2014 as a part of the Summer School. It included lectures, discussion groups and practicals. The target audience was the group of Erasmus Mundus students. The group included students continuing their academic experience, professionals, who targeted at enhancing their knowledge, completing their education or reaching proficiency in broadly understood ecohydrology. It has been
attended by 15 people, with maintained gender balance (9 women, 6 men).

**Course prepared and delivered in collaboration with the University of Algarve and the International Centre for Coastal Ecohydrology:**

- **Urban ecohydrology**  
The course has been delivered on 5-6 and 13-14 March 2015. The target audience were professionals completing their specialist education in ecohydrological solutions to water management in cities. The group included 9 people, half of them were women.

- **Long-Term Socio-Ecological Research for solving wicked problems in water management.**  
The course has been delivered on 4-6 August 2014, at the Federal University of Vitoria, Vitoria, Brazil. The target audience was the group of Erasmus Mundus students attending Winter Course. It has been attended by 15 people continuing their academic experience and education.

- **Nature for the water management in the city.**  
Workshops organized within the International Water Days in collaboration with the Centre of Ecological Education "Źródła", in August 2013, in Łódź. The target audience were city inhabitants interested in implementation of ecohydrology in the City and the role of nature based solutions in integrated water management. The workshops has been attended by 40 people, both adults of different professional backgrounds and children.

**Interships:**

- **Ecohydrology for protection and sustainable use of water in rural-urban environment.**  
The 8 - month internship for the alumnus of the Instituto Internacional de Ecologia, São Carlos, Brazil - MSc Pedro Gatti Junior.

- **Molecular methods for tracking presence, variability and the specificity of organisms**  
The 3-month internship for the alumnus of the ECOHYD - Erasmus Mundus Master of Science in Ecohydrology - Mr. Ruben Roc Pamies

- **Application of biochemical and genetic tool in determination of threats and elaboration of solution of ecological biotechnology**  
The 3-week internship for the student of the Faculty of Process and Environmental Engineering, Lodz University of Technology, Poland - MSc Martyna Olczak.  
The 3-week internship for the student of the Faculty of Biology and Environmental Protection, University of Silesia, Poland – MSc Alexander Kowalczyk.

**Activities supported by the LIFE+ EKOROB project:**

**International Workshops Innovative and system solutions for mitigation of diffuse pollution: demonstration catchments in Europe under patronage of the Ministry of Environment for stakeholders of LIFE+EKOROB Project**  
On 2 - 4 June 2014, in Bronisławow, International Workshops "Innovative and system solutions for mitigation of diffuse pollution: demonstration
catchments in Europe’ were held. They were organised under LIFE+ EKOROB Project ‘Ecotones for reducing diffuse pollution’ (LIFE08 ENV/PL/000519), under honorary patronage the Ministry of Environment, by the Regional Water Management Authority in Warsaw and the European Regional Centre for Ecohydrology of the PAS. The workshops were organised to present and discuss proposed solutions to reduce diffuse pollution, which were developed under EKOROB Project and compiled as the Action Programme, which listed the proposals consulted during meetings of the Platform of Stakeholders. The Polish experience and tools elaborated under EKOROB Project implementation were presented in the context of actions delivered to reduce diffuse pollution in other European states.

The conference was attended by 98 participants representing 7 foreign institutes and 37 institutions involved in environmental protection, water management and agriculture, scientific institutions, personnel of agricultural consultation centres, representatives of local governments, ecology-oriented organisations, and chambers of agriculture.

**Specialist Training for Personnel of the Regional Boards of Melioration and Water Devices: Buffer zones and other measures to reduce diffuse pollution from agricultural areas, and improvement of the water condition**

On 2-3 July 2014, in Smardzewice, a specialist training ‘Buffer zones and other measures to reduce diffuse pollution from agricultural areas, and improvement of the water condition’ was delivered. The training was developed for personnel of the Regional Boards of Melioration and Water Devices from the territory covered by EKOROB Project – Lodzkie, Silesia, and Swietokrzyskie Provinces.

42 participants representing the following institutions took part in the training: Board of Melioration and Water Devices in Katowice; Board of Melioration and Water Devices in Kielce; Board of Melioration and Water Devices in Lodz; Regional Directorate for Environmental Protection in Lodz; Institute of Technology and Life Sciences; Department of Applied Ecology of the University of Lodz; Polish Angling Society, branch in Piotrkow Trybunalski.

**Specialist training for nature and biology teachers: Buffer Zones to Reduce Diffuse Pollution in School Education**

On 21 - 22 October 2014, in Smardzewice a specialist training entitled ‘Buffer Zones to Reduce Diffuse Pollution in School Education’ was delivered. This training was developed for life science and biology teachers from the area covered by EKOROB Project, and addressed to teachers of schools located on Sulejow Reservoir in particular.

35 participants, including 29 teachers – life science and biology teachers representing the elementary and lower secondary schools, and an academic teacher of the Department of Applied Ecology of the University of Lodz, took part in the training.

Participants of the workshops also took part in simulation games, exercises and learning activities proposed by Ms. Marta Jermaczek-Sitak of the ‘Zroda’ Centre for Ecological Activities. Teachers who took part in the workshops played the roles of students, and participated in fragments of demonstration lessons or modelling of teachers’ work with students in terms of the topics of agricultural pollution, circulation of nitrogen and phosphorus, eutrophication processes and ecotones.
Specialist Training for Employees of the Swietokrzyskie Agricultural Consultation Centre: Buffer Zones and Other Measures for Reducing Diffuse Pollution from Agricultural Areas
On 18-19 June 2015, in Modliszewice, in the headoffice of the Swietokrzyskie Agricultural Consultation Centre, a 2-day specialist training entitled ‘Buffer Zones and Other Measures for Reducing Diffuse Pollution from Agricultural Areas’ was held for 28 employees of the Swietokrzyskie Agricultural Consultation Centre.

Specialist Training for Employees of the Silesia Agricultural Consultation Centre: Buffer Zones and Other Measures for Reducing Diffuse Pollution from Agricultural Areas
On 15-16 September 2015, in Zawada Pilicka, a 2-day specialist training entitled ‘Buffer Zones and Other Measures for Reducing Diffuse Pollution from Agricultural Areas’ was held for 29 employees of the Silesia Agricultural Consultation Centre.

Information and educational meeting within EKOROB Project
6 Educational Meetings to raise ecological awareness of local communities in the field of causes and effects of the pollution from agricultural areas, and methods of its reduction. Presentation of ecotonic zone activity, including the use of denitrification wall as a solution for sustainable prevention of pollution influx coming with groundwater from intensively used land.

1.3.3 Participation in IHP courses

1.4 Cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water centres under the auspices of UNESCO

UNESCO IHP
- Maciej Zalewski – member of the Special Task Force for IHP-VIII
- Maciej Zalewski – member of the Scientific Steering Committee of the UNESCO IHP Ecohydrology Programme;
- Iwona Wagner – Chairperson of the Governing Board of UNESCO IHE

Other International Programmes:

International Networks:
- ILTER (International Long Term Ecological Research), Kinga Krauze, Scientific Committee
- LTER Europe (A Long Term Ecological Research Network) – Kinga Krauze vice-chair of LTER.
- ALTER-Net (A Long-Term Biodiversity, Ecosystem and Awareness Research Network) - Kinga Krauze, member of Council,
- CYANOCOST: Cyanobacterial blooms and toxins in water resources: Occurrence, impacts and management -Joanna Mankiewicz-Boczek
- European Innovation Partnership on Water, EIP Water AG RiverRes: Community of Practice on River Restoration- Kinga Krauze
1.5 Publications


Fratczak W., Izydorczyk K. (eds) 2015. Program działań dla ograniczenia zanieczyszczeń obszarowych w zlewni Pilicy. ERCE PAN


Godlewksa M., Doroszczyk L., Długoszewski B. and Kanigowska E. 2014, Long-term decrease of the vendace population in Lake Pluszne (Poland) – result of
global warming, eutrophication or both? Ecohydrology & Hydrobiology 14: 89-95


Urbaniak M., Gągała I., Szewczyk M., Bednarek A. 2016. Leaching of PCBs and nutrients from soil fertilized with municipal sewage sludge” Bulletin of Environmental Contamination and Toxicology DOI 10.1007/s 00128-016-1802-y


1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

1.6.2 Participation in meetings abroad

• 21st session of the IHP Intergovernmental Council, 18 – 20 June 2014, Paris, France, Maciej Zalewski
• Meeting of water related UNESCO Category II Centres, 15-17 December 2014, Koblenz, Germany, Katarzyna Izydorczyk
• World’s Large Rivers Initiative UNESCO International Hydrological Programme (IHP), 25-26 June 2015, Vienna, Austria, Maciej Zalewski
1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

The Interdisciplinary research group for sustainable city development

A platform of collaboration between academics and the city of Lodz authorities targeted at development of demand-driven research, filling the knowledge gaps in the areas of environment, sociology, economics and geography in the management system of the city and development of fast feedback loop between scientists and governors for better navigation of city projects.

Multi-Stakeholders’ Platform within EKOROB Project

Stakeholders (regional authorities, local authorities, NGO, universities) has been identified and integrated through development of a multi-stakeholders’ platform in order to share experience, transfer know-how and make decisions in accordance with the concept of public participation in the decision making process for sustainable development.

Development “Actions Plan to reduce diffuse pollution in the Pilica catchment”

It is a comprehensive document concerning the diffuse pollution formation and prevention in the Pilica catchment. It starts with a description of the catchment’s characteristics, identifies agricultural and municipal pressures, prescribes tools, and identifies the areas in a way to ensure that the proposed solutions in terms of reducing pressures coming from agriculture and municipal management are adapted to the local needs, both in the field of the environment and community.

Visits in ERCE:

- Visit of prof. Ruben Lara, Argentine Institute of Oceanography, Argentina; a long-term collaborator in the field of Coastal Ecohydrology. Lectures on: Ecohydrological adaptive approach and management perspectives in a rapidly changing semi-arid environment. May 2014,

- Visits of Akashah Majizat, Rahman from Putrajaya Corporation’s Head of Environment, Lake and Wetland Section and the Principal of a Civil
Engineering Consulting and Services firm in Kuala Lumpur, Malaysia.
11 September 2014,

- One-month Trainiship of Prof. Azime Tezer, Urban and Regional Planning Department, Istanbul Technical University (ITU). 7 August - 4 September 2015,

- Visit of Elena Kolate, 4-6 April 2016 representing the municipality of Salacgriva, Latvia. Working meeting aiming at the commencement of cooperation on the introduction, application of ecohydrological biotechnologies, developed in ERCE, to reduce pollution from agriculture areas in Latvia

1.7.2 Completed and ongoing scientific projects

**Research projects:**
- EU FP7 EXPEER: Distributed Infrastructure for EXPERimentation in Ecosystem Research. FP7-INFRASTRUCTURES-2010-1.
- EU Life+ EKOROB: Ecotones for reducing diffusion pollution. LIFE08 ENV/PL/000519.
- EU Life+ ENVEUROPE: Environmental quality and pressures assessment across Europe: the LTER network as an integrated and shared system for ecosystem monitoring. LIFE08 ENV/IT/000399
- CYANOCOST: Cyanobacterial blooms and toxins in water resources: Occurrence, impacts and management
- Testing the cascading thresholds approach for management alternatives in water-food-energy nexus – developing framework for dealing with wicked problems- University of Colorado, US, Kosciuszko Foundation, Kinga Krauze
- Polish – French Project “Sustainable development and management of river catchments at the example of Rhone and Loire river in France”. Edyta Kiedrzyńska.
- Polish - Czech project “Horizontal beaming as an element of acoustical fish stock estimation in lakes”, Małgorzata Godlewska
- Polish – China project “Spatial-temporal distribution patterns of fishes and their relationship with algae bloom in large lakes, Małgorzata Godlewska
- Do fish adapt to cyanobacterial blooms?, UMO-2012/05/B/NZ9/00980, Małgorzata Godlewska
- Application of reporter cell biosensors in ecotoxicology of cyanobacteria: new targets for bioactivity, UMO-2012/07/B/NZ8/03991, Joanna Mankiewicz-Boczek
- Microbial activators in denitrification deposits used for the treatment of nitrate pollution for the implementation of the Water Framework Directive and the Nitrates Directive PBS1/A8/0/2012, Maciej Zalewski, Joanna Mankiewicz-Boczek
- Assessment of the interaction between hepatotoxic cyanobacterium *Microcystis aeruginosa* and pathogenic bacteria of the genus *Aeromonas*, UMO-2012/07/N/NZ8/00599, Ilona Gagała
- Impact of sludge originated PCDDs/PCDFs on soil contamination and *Salix* sp. metabolism. Project financed by NCS no. UMO-2013/09/D/ST10/04043. Magdalena Urbaniak.
2. **FUTURE ACTIVITIES**

2.1 **Activities planned until December 2016**
ERCE recently focused on:

a. project which are implementing EH biotechnologies & systemic solutions
b. dissemination by E&H journal.

*Ecohydrology & Hydrobiology* is a supporting journal of *Ecosummit 2016. Ecological Sustainability: Engineering Change* conference that will take place 29 August - 1 September 2016 in Montpellier, France.

2.2 **Activities foreseen for 2017-2018**

- Continuation of research on the co-occurrence of cyanobacteria and other microorganisms, including bacteria and viruses, in order to select cyanophages capable of active degradation of blue-green algae and bacteria capable of degradation of the active cyanotoxins such as microcystins in waterbodies. Creation of our own bank of microorganisms to development of ecohydrologic biotechnologies.

- 2018 - International Conference on Ecohydrology, Łódź, Poland

2.3 **Activities envisaged in the long term**

In the long term perspective theoretical and experimental scientific research, education and implementation of Ecohydrology - an integrative sustainable sciences that aims to understand interplay between ecological and hydrological processes from molecular to river basin scales, to develop innovative ecosystem biotechnologies (e.g. dual regulation, phytotechnologies, microbial regulators, etc.) and systemic solutions, and to implement as an integrative management tool to harmonize societal needs with their enhanced sustainability potential, with reference to the UNESCO’s International Hydrological Program.