April Progress Report – 2015

SfP 984440

A model to predict and prevent possible disastrous effects of toxic pollution in the Tisza River watershed

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e) The Summary Report

Annex 7

OUTLINE OF THE SfP SUMMARY REPORT

SfP – Model to predict and prevent disastrous toxic pollution effects in the Tisza River watershed
SfP – 984440
A Model to Predict and Prevent Possible Disastrous Effects of Toxic Pollution in the Tisza River Watershed

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Approval Date: **20 November 2012** Effective Date: **26 February, 2014**
Duration: **3 (three years), February, 2017**
NATO Budget: **248,750.00 EUR**

Information about the SfP Project through Internet: *http://granturi.ubbcluj.ro/NATO984440/*

Abstract of Research

The project research is focused on the creation and implementation of a model of joint monitoring, forecasting and coordination of the actions to prevent pollution in the Upper Tisza Watershed in Ukraine and Romania. The model has three components: 1. Methodology for the inventory of the main sources of pollution and substances that can penetrate into the river in emergency situations based on European requirements; 2. Methodology for the identification and quantification of the chemicals with potential toxic effect in the Tisza River ecosystem based on biological, instrumental and radiocarbon analyses; 3. Creation of a GIS (Geographical Information System) compatible model based on comprehensive GIS data layers, Digital Elevation Models (DEM) and other specific layers like: pollution hot-spots, land use, climate, rainfall and so on, to assess the scenarios of emergency situations by computer simulation in order to provide data in a short time about the effect of pollution in order to prevent the negative consequences over the human and environmental health. Special attention is focused paid on the elaboration of a guideline for a common prevention plan between Ukraine and Romania, for the Tisza River Watershed, to minimize the negative pollution consequences related to the NATECH events.

Major Objectives

The overall goal of the project is the creation and the implementation of a system of joint monitoring, forecasting, information sharing, and coordination of actions to prevent pollution in the Upper Tisza Watershed in Ukraine and Romania. **The auxiliary goals** are the know-how to Ukrainian authorities/researchers and building the capacity of research groups to independently carry out up-to-date the environmental studies on pollution transport, floods, early-warning and disaster prevention. The Project will address the following general objectives:

1) Inventory of the threats and hazardous sources on the territory of Romania and Ukraine based on the European requirements for data acquisition, analysis and reporting.
2) Elaboration of the list with the hazardous substances that can enter into the river in emergency situations.
3) Harmonization and development of the sampling and analytical procedures for the determination of the river pollution in agreement with the WFD and EQSD requirements.
4) Identification of the River Basin Specific Pollutants using the bioassays and modern analytical techniques.
5) Development of method for the monitoring of emergency situations using the radiocarbon analysis.
6) The assessment of a scenario based on emergency situations in a pilot area by computer simulation.
7) Development of a guideline for a common preventive plan between Ukraine and Romania for the Tisza River Basin, to minimize the negative pollution consequences related to the NATECH events.
8) Dissemination of knowledge and expertise to end-users and stakeholders in Ukraine and Romania.

***Overview of Achievements since the Start of the Project until (*31 March of current year)**

The achievements of these thirteen months consist in the complete performing of *the **Actions**: **1.1.** Watershed characteristics and land use; **1.2.** Creation of a database of potentially dangerous sources of pollution and hazardous substances that can penetrate into the river in the event of an emergency; **1.3.** Determination of "hot spots" - the places of the water sampling for the analysis of the river pollution by the dangerous substances; **3.1.** Selection on a suitable model for a pilot basin in Romania. The model should be GIS coupled and requires easy usage with data already available from the water authorities in Romania and Ukraine.*

Other ***Actions*** such as ***2.4.*** *The development of methods for the determination of organic pollutants using chromatographic techniques and chromatography-mass spectroscopy analysis and* ***2.6.*** *Field investigations in the upper Tisza River Basin in Romania and Ukraine in order to determine the actual pollution using the existing standardized methods of analysis and the methods developed in the project* have been started. Methods for analysis of some nonsteroidal anti-inflammatory drugs, steroids, antibiotics and anticancer drugs using SPE and LC-MS/DAD analysis have been developed by NPD. A method for the analysis of some plasticizers using SPE and GC-MS was also developed and validated. Five campaigns (2014 - November, December, and 2015 - January, February and March) have been performed in the Romanian Tisza River Watershed by NPD to collect water samples and to analyze some priority substances for the determination of the actual pollution stage of the main Romanian tributaries and Tisza River. 30 of priority substances including polyaromatic hydrocarbons, pesticides, halogenated compounds, plasticizers and heavy metals have been analyzed. Regarding PPD these two actions are in delay due to the problems of payment transfer on the seller account. Until now the first 50% of the total price of GC-MS value was transferred on the seller account and the procedure for delivery and installation will be performed in a short time. ***Actions 3.2.*** *Gathering input data and converting it for GIS usage in the model. Data sources and data of water quality measurements* and ***3.3.*** *Creating scenarios of river pollution by toxic substances in emergency situations (by using the selected model)* have been continued and the activities are in schedule. The obtained results were disseminated to all end-users, stakeholders and general public using the project website, written reports and scientific materials.

- **Payments through NATO Funds: 88.600,82 EUR**

- **Milestones for the Next Six Months**

In the next six months will be finished ***two Actions*** such as: ***2.1.*** *Development and standardization of methods for sampling water, sediment and biological material;* ***3.2.*** *Gathering input data and converting it for GIS usage in the model. Data sources and data of water quality measurements*. The following ***four Actions*** will be continued: ***2.4.*** *The development of methods for the determination of organic pollutants using chromatographic techniques and chromatography-mass spectroscopy analysis;* ***2.6.*** *Field investigations in the upper Tisza River Basin in Romania and Ukraine in order to determine the actual pollution using the existing standardized methods of analysis and the methods developed in the project;* ***3.3.*** *Creating scenarios of river pollution by toxic substances in emergency situations (by using the selected model);* ***5.*** *Dissemination of results to all end-users, stake-holders and general public using the project website, and written reports.* ***Four new Actions*** will be started as follows: ***2.1.*** *Development and standardization of methods for sampling water, sediment and biological material;* ***2.2.*** *Methodology for the evaluation of the waters and sediments toxicity using biological tests;* ***2.3.*** *Development of methodology for the identification of the source of pollution using radiocarbon analysis;* ***2.5.*** *The research of the state of river pollution using EDA methodology.* A special attention will be paid to the PPD for the installation of their GC-MS equipment and the training of specialists as a necessity for developing in well conditions the actions 2.4. and 2.6.

- **Implementation of Results**

For the implementation of the project results the chosen way was to invite end-users and stakeholders to participate at the common project meetings. Such meetings were organised between 27th - 29th of May, 2014 in Uzhgorod, Ukraine, and between 27th -28th of November, 2014, at Sighetu Marmației, in Romania.

- **NATO Consultant**
  Dr. Jaroslav Slobodnik, Environmental Institute, Koš, Slovak Republic.

- **Other Collaborating Institutions**

End-Users

i) State Service of Ukraine for Emergency Situations, Kyiv, Ukraine
ii) Hydrometeorological Centre of Ministry of Ecology of Ukraine, Kyiv, Ukraine
iii) Central Geophysical Observatory of of Ministry of Ecology of Ukraine, Kyiv, Ukraine
iv) Territorial Department of SSES of Ukraine in Transcarpathian Region, Uzhgorod, Ukraine
v) State Ecological Inspections in Transcarpathian Region, Uzhgorod, Ukraine
vi) Transcarpathian Regional Centre for Hydrometeorology of State Service of Ukraine for Emergency Situations, Uzhgorod, Ukraine

Stakeholders

i) Maramures Agency for Environmental Protection, Baia Mare, Romania
ii) Maramures Inspectorate for Emergency Situations, Baia Mare, Romania

Intellectual Property (IP) Rights

Not the case at this moment.

Abbreviations: *(give full expression for all abbreviations which occur in this summary)*