Bridge over troubled waters

Professor Dr Geza Jolankai outlines the work of the Seventh Framework Programme support project he is currently coordinating on behalf of VITUKI, which seeks to identify those gaps between research and policy that are hindering the offset of certain problems in water management amplified by climate change

Can you begin by describing the overall objective of the ClimateWater Stakeholder Platform?

The objective of the stakeholder platform of ClimateWater is to gain significant reaction of potential stakeholders on the issue of how to bridge the gap between adaptation strategies of climate change impact and European water policies. From my experience, which includes working on around 40 European projects, the reactions of potential stakeholders have always been very low, thus proving the 'gap between science and policy makers'. This is probably the largest problem of water management and indeed environmental management more widely.

Almost all water resources are shared by human society and nature. Can ClimateWater help to find equilibrium between their divergent needs?

ClimateWater is a 'supporting action' project; we can advise how to find the equilibrium between the needs of man and nature, but not solve it. Nevertheless, we do think that in earlier projects we have identified the ecohydrological strategies to be applied for finding the equilibrium between these divergent needs.

Have you identified any particularly successful water management strategies that could be adopted on a global scale? Is there a need to create tailored measures for local and regional scenarios?

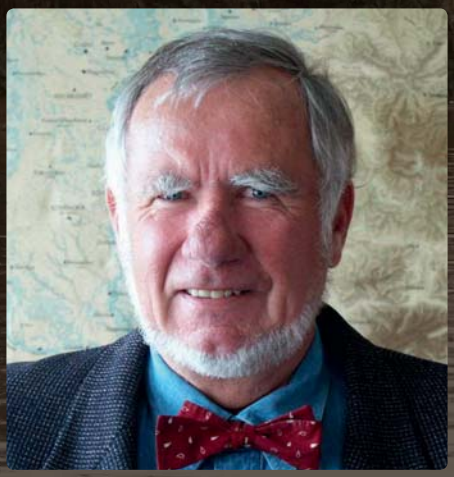
Yes, ecohydrology is the global solution for many, although not all, water impact problems. There is a strong and very urgent need to tailor local and regional scenarios to this approach. As such, the approach needs much greater financial input and far more field studies than is the present case. The methods have been developed and presented in earlier projects (Tisza River Project, LIFE-Szigetkoz, INCAMOD amongst others), but they are not currently in use. The main reason for not using this approach is that neither national or international stakeholders, nor EU forums, wish to support unavoidable follow-up activities that would be needed to keep the decision support systems in working order: renewing databases with new data, carrying out additional field measurements for verifying and calibrating the existing tools etc.

Conversely, are there any commonly implemented water management strategies that appear to have a detrimental effect on water resources?

Yes, there are many but the near-complete neglect of strategies against climate change-induced diffuse or non-point source pollution in most of the water-related policies and management strategies is extremely detrimental and can be the source of epidemics and other serious health and nature hazards.

Have you identified any significant issues that could hinder the implementation of the EU Water Policy? What is the principle aim of the EU Water Policy?

EU water-related policies, along with their newly formed strategic changes, have been formulated with good intentions, but they fully ignore pollution control strategies, which although long existing, seem to be newly amplified by extreme rainfalls and flashy-runoff. The principle aim of EU water policy is still to be identified, but hopefully at the end of this small project we will give the main input to it. This would probably aim towards an international trans-boundary catchment basin (River Basin) approach to managing the fate of the water, its quality, constituents, and the ecosystems and their ecotones, in such a way that will ensure the equitable use of all water-related resources by man and nature over the entire basin.



Can you outline the main challenges that lie ahead on what appears to be an obstacle-strewn path towards preserving our water resources effectively?

International trans-boundary legislation must be fully reworked to allow for the enforceable equitable use of the water resources both when in excess and when in shortage with special regard to pollution control eg. the 'Polluter Pays Principle' must be adhered to. Presently the very small letter amendments and/or footnotes of all international agreements and conventions exclude the enforceability of the equitable use. Another issue of special interest is the operation of the early warning accident emergency systems, as many more climate induced pollution catastrophes are likely to happen. There are many existing systems and they are potentially all dormant, never calibrated, verified with field measurements and no new data. To name just one system, the DYNDIS model of our own development (Jolánkai and Biro 2001) that properly simulated the Baia Mare/Nagybánya cyanide accident, but was never updated or upgraded to working order due to the lack of national and international funding. I must mention that there are no other working accident forecasting systems in the Danube Basin.

Improving water management policy

With climate change increasingly impacting upon water resources and their quality, the **ClimateWater** project aims to find the gaps in water policies that hinder the sound planning of adaptation strategies of climate change impacts on water resources

11 YEARS AGO the EU established the Water Framework Directive (WFD) as a direct response to public concern over water shortages and pollution levels. However, concern has grown in recent years over the noticeable disparity between European strategies related to climate change impact and how these are taken into account in water policies. An example is the new policy reforms aimed at the consideration of strategies against climate change in River Basin Management Planning (RBMP), which are considered by some to be lacking the effective planning suggested by its name.

One issue is that the WFD and most other water-related policies do not consider diffuse or non-point source pollution problems that are reaching catastrophic levels due to changes in the climate. Significant pollution caused by flooding include waste water from sewerage systems swamping streets, the washing away of pollutants, and disease spread by cadavers of dead animals, yet most water policies are consistently failing to incorporate action that might prevent or ameliorate these contaminants entering drinking and other water resources and deteriorating natural ecosystems.

A larger issue still is that climate change events over the past few years – both in Europe and beyond – seem to contradict many of the forecasts upon which some policies and directives have been based. For example, predictions of the highest daily precipitation in many places has been forecast lower than the eventual reality, resulting in small creeks washing away bridges and roads, river dam failures and unforeseen landslides. In a bid to address these issues the ClimateWater project and its Stakeholder Platform has been set up with a consortium of 11 institutions, to look at providing the missing links between scientific approaches and the tools offered by policy makers.

PROJECT PROCESS

ClimateWater – an EU support action project funded under the Seventh Framework Programme (FP7) – aims to analyse and synthesise existing data regarding water related impacts of climate change. The project will look at current adaptation strategies, both European and global, developed to tackle the impacts of climate change and observe how these are taken into account in water policies. With this information the project will then identify research needs in the field of climate impact on the water cycle and water users.

In addition to the collation and analysis of data, the most important output of the project will be the identification of gaps that would hinder the implementation of the EU water policy in combating climate impacts on water. The project ultimately seeks to formulate a coherent framework of adaptation strategies for climate change impacts on water resources, water cycling and water uses of society and nature with special regard to those that water policy has to take into account when considering climate change impacts.

COLLECTING THE DATA

Professor Dr Géza Jolánkai, coordinator of the project in the VITUKI research institute is explicit about the best method for analysing and synthesising current data: "My advice is to look through all important project documents of international organisations in a 'vertical approach'. This means that all impacts, adaptation strategies, research needs and the identification of gaps in the existing water policies should be viewed together simultaneously for major topics," he elucidates.

CLIMATEWATER

BRIDGING THE GAP BETWEEN ADAPTATION STRATEGIES OF CLIMATE CHANGE IMPACTS AND EUROPEAN WATER POLICIES

OBJECTIVES

To formulate a coherent framework on adaptation strategies of climate change impacts on water resources, water cycling and water uses of the society and nature with special regard to those that water policy has to take into account when considering climate change impacts.

PARTNERS

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PROFESSOR GÉZA JOLÁNKAI was born in 1942 and has an MSc in Civil Engineering and a diploma as a Hydrologist and Water Resource Manager. Since 2004 he has been Professor at the University of Debrecen, Faculty of Engineering, alongside his role as scientific advisor for VITUKI, Budapest which he has held since 1966. He specialises in combined water-and-environmental (ecohydrological) research and computer modelling studies at catchment scale. More than 120 of his papers have been published and he has led roughly 40-50 larger international projects.

The major topics chosen by the team cover four particular areas specific to the impact of water-related climate change: major flood-related impacts; drought and water scarcity; water quality and water pollution; ecosystem- and ecotones-related impacts. The resulting papers, reports and other publications provide summary of each area, including predictions as to the pattern they may follow in the next few years before outlining the existing adaptation strategies developed to tackle each one in different areas across the world. The selection was made on the basis of identifying adaptation strategies that have a common basis of the need for river-basin-wide planning of the fate of water and its chemical constituent through natural and manmade systems, with special regard to the outstanding role of aquatic ecosystems. These strategies are referred to as ecohydrological strategies – helping to aid the best use of water by man and nature and creating appropriate storage in soil, in wetlands and in impoundments also helping to control water quality with the help of ecosystems by improving their resilience and resistance.

COHERENT FRAMEWORK

The study has so far demonstrated that the catchment modelling tools presently used in some countries for RBMP are not suitable, as they are multivariable hundred parameter conceptual models that cannot be calibrated or verified. Dr Jolánkai highlights why this is a genuine problem: "The calibration, regular re-calibration and verification of the planning tools must be the essence of RBMP, on which the future of water systems and thus the economy and natural resources of the EU will depend". In the future, this problem will be further aggravated by the impacts of the changing climate, requiring adaptation strategies and measures of more accurately forecasted effects; thus, he continues: "Simple, robust, calibrable-verifiable ecological-hydraulic-hydrological models are urgently needed".

Applications of a suitable model, developed through earlier projects of VITUKI by Dr Jolánkai and his team, have been demonstrated using large river basin case studies. It has also been shown that the presently available databases, plus the lack of process-orientated field experiments, do not allow for the application of suitable planning tools and therefore the planning-tool development must be associated with the review of the present routine monitoring systems and with the support of regular field experiments. Dr Jolánkai highlights the importance of this element: "This is the essential requirement to ensure that the planning tools are regularly maintained, re-calibrated and verified so as to avoid the modelling results ending up in drawers as is so often the case."

FUTURE RECOMMENDATIONS

The project has shown that the data presently collected in various WFD monitoring stages is not sufficient to effectively plan adaptation strategies. ClimateWater has represented only a supporting action but, through its discoveries, Dr Jolánkai hopes this issue will be effectively tackled: "The follow-up will be big research projects running over many years with repeated extra field measurements for keeping the existing systems alive with database filling and verification-calibration efforts".

The ultimate objective is to develop a river basin-scale ecohydrological planning tool – a model that serves as a predicting-forecasting tool of the fate of water and its constituents. This tool could then be used to form the basis of the RBMP procedure of the WFD. Such a system used at catchment scale could benefit many sectors of the economy: flood control; drought management; agriculture as a whole and; nature conservation with special regard to wetland and terrestrial/aquatic ecotone management. Appropriate and EU-wide support through financial, administrative and legal means would be required and so the careful restructuring and reformulation of nearly all water related EU policies, starting with WFD and its accessories and facilities would be necessary. Moreover, a highly important additional requirement is that the equitable use of the quality and quantity of water resources of river basins be ensured in an enforceable manner by relevant international legal regulations, agreements and conventions. Hopefully, through the project's work, policy makers will begin to better understand the measures that must be taken to protect our water resources in the long term.