

***Danube: Future* – A Sustainable Future for the Danube River Basin as a Challenge for the Interdisciplinary Humanities**

(Project Review)

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Abstract: The *Danube: Future* Project is a combination of regional, national and supra-national initiatives in interdisciplinary sustainability research with training and capacity building. It contributes to the sustainable development of the Danube River Basin (DRB) with particular focus on the humanities.

The DRB has a troubled political and environmental history. Environmental problems abound and impede economic growth and sustainable development. The interdisciplinary approaches need to take into account the long-term legacies of this complex history and this requires the competences of humanities and social sciences.

The project targets all 19 countries in the Danube catchment. It has been endorsed as joint activity by the Danube Rectors' Conference and the Alps-Adriatic Rectors' Conference, which link 82 universities in the region, and which are the largest institutional knowledge-producing and disseminating umbrella organization of the region. In September 2013 *Danube: Future* was adopted as a flagship project of the European Strategy for the Danube Region within Priority Area 7, Knowledge Society.

Keywords: Danube River Basin, sustainable development, long-term socio-ecological research, environmental history

Introduction

The *Danube: Future* Project is a unique combination of regional, national and supra-national initiatives in interdisciplinary sustainability research with training and capacity building. It contributes to the sustainable development of the Danube River Basin (DRB) with particular focus on the contribution of the humanities.

Danube: Future is a joint contribution of the Danube Rectors Conference and the Alps-Adriatic Conference, tapping the largest pool of institutionalised knowledge in the DRB. By involving the university network in a co-ordinated manner, the project will generate a knowledge base for the

DRB enhancing sustainable development by adding a humanities and social science perspective to current approaches to sustainability, which often remain in the realm of natural sciences. The output will support the creation of green jobs and strengthen civil society organizations, thus enabling the DRB countries to cope with the Grand Challenges of the future and take steps towards a more sustainable development of the economy of those countries.

Danube: Future was adopted as a flagship project of the EU-Danube Region Strategy, Priority Area 7 Knowledge Society on September 24th, 2013.

Project Background

Riverine landscapes have been changed by humankind for millennia. This is particularly true for the DRB, which consists of highly dynamic ecological and political systems. The river basin is shared by 19 countries with approx. 81 million people that communicate in 20 different languages, at least 17 of which are official national languages. This is connected with the eventful history of the Danube basin. To recognise and overcome this communication challenge will be indispensable for future decisions and policies. A plethora of environmental problems exists, environmental legacies abound and current conflicts of use are particularly intense in the riverine landscapes. Many of the problems will be exacerbated by global climate change. The Danube plays an important part in developing a climate-friendly trans-European transportation network.

The DRB long-term and recent history of conflict and nationalism has to be taken into account when developing policies. Communities have had to deal with the cultural and natural legacies of past interventions. The current situation of the DRB cannot be understood, and hence a sustainable future may not be planned, unless the common past of nature and humans is known and accounted for.

Sustainability problems transcend disciplinary boundaries and can only be addressed by inter- and transdisciplinary approaches. Sustainable development of riverine landscapes is particularly challenging as rivers are fragile ecosystems. *Danube: Future* seeks to contribute to the sustainable development of the DRB by bringing the humanities into an interdisciplinary dialogue. Environmental humanities are a new area of research whose potential for fostering sustainability transitions has not yet been tapped. Both societal and natural legacies limit the possibilities for future developments. A humanities' perspective on the effects and adaptability of societies to global climate change is urgently needed, as legacies of the past play a crucial, but currently underestimated role for possible sustainable futures. Interdisciplinary methods are necessary to deal with legacies, our cultural and natural, hybrid heritage.

If interdisciplinary humanities methods and approaches are used, changes in governance, values, and developments in the social, economic and legal situation can be studied in conjunction with the changes in biodiversity, sediment mobility,

soils, climate, precipitation, discharge patterns, and water quality. This will enable better and more implementable policies for a sustainable future of the Danube River Basin and support smart specialization strategies by elucidating the long-term evolution of the current socio-economic conditions. Sustainable development of a multi-lingual, multi-national and multi-cultural region presents an additional major challenge which calls for novel solutions.

Sustainability problems in the Danube River Basin

Since 2001, the Joint Danube Surveys have been done. A multitude of ecological problems in and along the river as well as in the catchment were identified (ICPDR 2002, 2008). The results are a clear sign of the unsustainable development of the DRB at the moment, and indicate that action towards sustainable development in the region is necessary and no longer deferrable. Channelization, flood protection dikes and hydropower dams affect in particular the upper stretch while in the middle and lower section pollution and the demise of fisheries prevail. Artificial water bodies for navigation, such as the Rhine-Main-Danube Canal, link river systems and consequently ecological systems, a situation potentially creating ecological havoc under conditions of climate change.

Many events with a bearing on sustainability occurred in the basin in the distant, and also in the recent past. The cyanide spills in Baia Mare and Baia Borsa in January and March 2000 with 100 000 m³ of waste water containing up to 120 tons of cyanide and heavy metals and 20 000 tons of sediments released into the Lapus River, the Somes and the Tisza rivers before entering the Danube River are one example (EU 2000).

As dangerous as spills might be, the environmental problems of the area have not arisen in recent years. In the Tisza River basin there are many industrial hot spots. Baia Mare is a region of particularly intensive industrial development and this led to a lot of incidents. Scientists have studied the environmental legacies in the area and demonstrated that heavy metal concentrations are much higher in the sediment than in the surface water posing a permanent risk in the area (MACKLIN *et al.* 2003). As MACKLIN *et al.* (2003) sum up their findings: "*Indeed, more widespread contamination is clearly arising from ongoing mining activity in the Cavnica, upper Lapus, Sasar and*

Tisla catchments. While not downplaying the short term ecological effects of the spills, they should be seen more as compounding much longer term problems associated with many decades of poorly regulated, and largely untreated, industrial, mining and urban discharges into local rivers.” (p. 256).

What can be learned from the Baia Mare spill and the astounding results of the mentioned study? The legacies of past practices determine the river development today. The contamination is stuck in the sediment. When it is mobilised, the pollutants are released into the environment. While it is easy to stipulate that pollution should be stopped, the crucial point is to implement such claims because this affects the future of the residents. Sustainable development has to take such issues into consideration.

Wars of the last centuries have left all kinds of legacies, but the sustainability problems created by the most recent conflicts are the most dangerous. To mention just two brief examples contained in the UNEP database for post-conflict environmental problems (UNEP and UNCHS 1999): In the report on the Kosovo war, depleted uranium penetrators are depicted, but the report makes clear that, while they are dangerous, the most problematic environmental legacies of the war are elsewhere, namely in the polluted industrial complexes. Pančevo in Serbia has become famous for 250 tons of liquid ammonia spilled into the Danube River during the war as a preventive measure to avoid killing a large numbers of people as result. This release was most likely responsible for fish kills reported in the Danube, up to 30 km downstream.

Even more important are the social insights that UNEP formulates in conclusion. *“Social, economic and administrative disruption are likely to cause an increase of pressure on natural resources, both within and outside protected areas (e.g. increased use of wood for cooking and heating, due to loss of electricity supplies). Tourism, and the income it generates will also be reduced, though, it should be recalled that development of skiing infrastructure in Kopaonik had been reported as a conservation problem. Experience from reconstruction activities in other Balkan countries shows that future reconstruction in Yugoslavia will place heavy demands on raw materials (e.g. gravel, rock, wood products, water).”* (UNEP and UNCHS 1999: 68)

The legacies of the recent war in the Balkans are

varied. To overcome the legacy of war is a sustainability challenge. This is also a task for the humanities and the social sciences, as it cannot be solved by natural sciences apart of the pollution problem. Each war creates new legacies not just of pollutants and destruction, but also of conflict and trauma which have to be overcome.

Long-term-socio-ecological-approaches to sustainable development

While sustainability studies offer a wide range of approaches, *Danube: Future* particularly emphasizes the importance of long-term socio-ecological approaches to sustainable development. This will help to overcome existing problems to implement “Integrated River Basin Management” (IRBM). IRBM has been defined as a process „*which promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems*” (BRAGA, LOTUFO 2008). However, there is a gap between theory and practice. VARIS *et al.* (2008) bemoaned the hiatus between the international recommendations and reality in large international river basins, and are concerned about the evolution in the quality of recommendations, which they do not find satisfying. MCDONNELL (2008) concluded that some new approaches are needed, which take on board important research findings emanating from fields such as social theory and geographical information science. This is encouraging news for those who believe in the study of coupled socio-natural systems, but a historical perspective does not rank high on the agenda of the author. For MCDONNELL (2008), historical data are solely used to characterise the baseline conditions of the area. BRAGA, LOTUFO (2008) mentioned the historical context in which the planning process is situated, but did not go into any historical depth in describing the antecedents influencing the planning process. VARIS *et al.* (2008) provided a very brief sketch of climate history in their case study on the Senegal River Basin, and recognised explicitly the “age-old” and recent history of such a river system.

This situation can be improved if long-term socio-ecological research (LTSER) is used. HABERL *et al.* (2006) concluded in their conceptual paper that sustainability-oriented long-term research made it necessary to link biological and physical processes

to governance and communication and to consider patterns and processes across several spatial and temporal scales. The authors were aware of the ‘*difficulties of combining data from in-situ measurements with statistical data, cadastral surveys, and soft knowledge from the humanities*’. The mentioned authors, like McDONNELL (2008), stressed the importance of including pre-fossil fuel system baseline data but they also discussed a methodical challenge they perceived as the ‘*often delicate balance between monitoring and predictive or explanatory modeling*’. The interdisciplinary group mentioned above found it ‘*challenging to organize a continuous process of cross-fertilization between rich descriptive and causal-analytic local case studies and theory/modeling-oriented generalizations*’. Their conceptual framework comprises research into socio-ecological metabolism, studies of land use and landscapes, governance and decision making, as well as studies of communication and knowledge in a transdisciplinary framework. Ideally, all these themes would be studied in an integrated fashion. HABERL *et al.* (2006) made clear that ‘*the ecological and social legacies of institutional and jurisprudential models introduced in the past*’ have to be studied, because ‘*the current situation is dependent on our material and immaterial inheritance*’.

Socio-ecological research in the DRB has to take two factors into account: the system of the river and the “human factor” in it, both of which have to be understood as an intertwined whole which is called a “socio-natural site”. Socio-natural sites consist of material arrangements, which are guided by cultural programs and, though material, are not “natural”. They are constantly re-constructed by means of practices, actions of humans, which require, though guided by ideas, some practical, physical interaction with the material of the arrangements. Arrangements can only be kept in working condition if labour is expended. Socio-natural sites result from practices. Their material precipitates are arrangements. Socio-natural sites are composites (nexuses) of arrangements and practices (WINIWARTER *et al.* 2013).

If we look at a river for the material side of the socio-natural site, typical arrangements are not only fortified river banks, weirs, harbors, but also power plants in the river, bridges and bathing beaches. The realm of possible human practices is determined by the already existing arrangements (the socio-ecolog-

ical inheritance). This inheritance has a bearing on the practices: If a power plant is in place, it is impossible to build a bathing beach at the same site.

In the Danube watershed, one can study the driving forces of changes in arrangements and changes in practices, in particular, history-policy links can be explored. Socio-natural sites such as the Danube River change all the time. Human beings react to this natural dynamics in their quest for energy, or rather, exergy. To continue living, living beings need exergy. Human beings create via their practices arrangements from the material world to harvest exergy. These arrangements deteriorate due to wear and tear. All arrangements are part of the evolutionary setting of humankind, either because of (evolving) humans taking part in them, or because of other living beings which evolve being part of them. The higher the extent of exergy which needs to be controlled in an arrangement, the more likely is its deterioration, and therefore, the more likely is the production of potentially harmful legacies and their long-lasting effects. Arrangements, as should be noted again, are neither natural nor cultural, they are hybrid material precipitates of practices (WINIWARTER *et al.* 2013).

Research in the Danube River Basin means to study a world of hybrids. Older arrangements (such as rectification works) influence younger ones. This changes the realm of possible actions for humans. Older arrangements are socio-ecological legacies and influence the practices of humans today. It is particularly important to take note of the irreversibility of interventions. Sustainability studies need to understand the transformations which characterise the present situation, those occurring thermodynamically or by biological evolution and those we bring about. In such a situation no single discipline has the key to success. Scientists from different disciplines have to work together.

Project Overview

Danube: Future and its link to European and basin-wide strategies

A consensus is in the making that sustainable development entails a principal departure from the current development pathways and will require a transition embracing society at large (WBGU 2011). It is clear that (higher) education will play a crucial role for the transition, but how this role will be designed

is as yet unclear. In the past the European research and higher education funds have not sufficiently focused on interdisciplinary co-operation. In particular, the humanities have not been stimulated to bring their expertise into an interdisciplinary portfolio of knowledge necessary for a transition to sustainability. From a humanities perspective, a sustainable future is impossible without sound knowledge about the past.

Based on the network of the two largest Rector's Conferences as an existing co-operative structure, interdisciplinary research and education in the DRB will be undertaken. Any path towards a sustainable future of the region has to account for the solution of pressing socio-ecological issues.

Danube: Future takes into account and links the Grand Challenges of the European Union and the triangle of sustainable development and relates them to the challenges on the macro-regional level as reflected in the pillars of EUSDR. While **Danube: Future** is considered primarily as a contribution to priority area 7 of the EUSDR it has strong links to other pillars and priority areas. The contribution of **Danube: Future** in capacity building and research is highlighted in relation to the pillars. In particular, knowledge crucial for the priority areas addressed in pillar "Protecting the environment in the Danube region" will be generated.

It should be noted that the main focus areas for intervention in the DRB as identified by the International Commission for the Protection of the Danube River (ICPDR), are well covered by **Danube: Future**. The long-term and interdisciplinary per-

spective will support an efficient protection of water resources as well as the reduction of eutrophication and toxic chemical releases by revealing the legacies of past activities. Together with flood risk mitigation this will contribute to creating healthy and sustainable river systems.

Some other future European research programs focus on cultural and natural heritage (e.g. Central Europe). **Danube: Future** adds to these approaches their integration into future planning and sustainable development.

Danube: Future is a multi-year program (2013-2020). It consists of two modules: (a) capacity building and (b) sustainability related research with a long-term socio-ecological component for which approaches and concepts such as LTSER or Socio-natural-Sites can be applied. The modules are connected by the **Danube: Future** core project which will create the DRB-Sustainability Knowledge Base as main output. The capacity building module started in 2013 with a first series of International Schools to be held yearly at least until 2015. These schools offer PhD-students and young post-docs of DRB universities and research institutions training in interdisciplinary sustainability research as well as in proposal writing and application. They will support knowledge exchange and transfer within the DRB-countries. It is envisaged to establish the International Schools as permanent activity beyond 2015 and 2020, respectively.

Further information about the project, its structure, aims and work can be found on www.danube-future.eu.

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