UNDP/GEF DANUBE REGIONAL PROJECT

DANUBE STUDY ON POLLUTION TRADING AND CORRESPONDING ECONOMIC INSTRUMENTS FOR NUTRIENT REDUCTION

DRAFT WORKSHOP REPORT
February 2005

In association with
Institute for Water Quality and Waste Management, Vienna University of Technology
and Jürgen H. Lottmann, Frankfurt

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FOREWORD

This Report is the result of a Study entitled *Danube Study on Pollution Trading and Corresponding Economic Instruments for Nutrient Reduction*, which has been commissioned by the *Danube Regional Project* to a consortia of consultants lead by the Danish engineering and consultant company NIRAS.

The main aim of the Study is to review international experience in relation to pollution trading and to assess the feasibility of applying such concepts to the nutrient discharges to the Danube River System, which are largely responsible for the eutrophication problems of the North-western Black Sea.

The main aim of this Report is to constitute the textual background for a basin wide **Completion Workshop** concerning the issues of the Study scheduled for **Friday the 25th of February in Baden bei Wien**. The Report target national decision makers and senior policy advisors responsible for the water quality of the Danube and the Black Sea. Consequently this report will put emphasis on policies and strategies, and the conceptual framework for implementing these policies and strategies.

The full result of the Study is reported in two background reports, which include the comprehensive review and feasibility assessment of applying pollution trading and corresponding economic instruments to the nutrients problem of the Danube and the North-western Black Sea:

- *Review Report* dated October 2004; and
- *Feasibility Report – Conceptual Assessment* dated February 2005.

These reports are available on request from the Danube Regional Project Office (*UNDP/GEF Danube Regional Project. Vienna International Centre. D0418 Austria.Tel. + 43 1 26060/5767. Fax + 43 1 26060/5837. www. icpdr.org/undp-drp/*), and they will also be available at the Completion Workshop.

This Draft Workshop Report will be amended and supplemented, especially in terms of the conceptual implementation framework, based on the discussions and the results of the Completion Workshop. **The Final Workshop Report** is consequently intended to form the policy and strategy, as well as conceptual implementation background and point-of-departure, for improved nutrient management in the Danube River System for the benefit mainly of the water quality of the North-western Black Sea.

As mentioned above the comprehensive review and feasibility assessment is available in the two said background reports. Further to this, the target group of this Report, and the Completion Workshop, is national decision makers and senior policy advisors. Consequently this Report will only give a cursory overview, and highlight strategic and policy options. Based on this it will identify important policy questions to be discussed at the Completion Workshop.

In this context **Chapter 1** gives an introduction and background to the Study including the scope of the Study and the questions that has been addressed by the Study. **Chapter 2** gives a cursory overview of study results with emphasis on highlighting strategic and policy options. **Chapter 3** identifies the main policy elements and strategy questions, to be discussed at the Completion Workshop.

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ABBREVIATIONS AND ACRONYMS

DaNUbs	Nutrient Management in the Danube and its Impact on the Black Sea (5th EU Framework Programme Scientific Project)
DRB	Danube River Basin. The full catchment area of the Danube
DRP	Danube Regional Project. The implementing unit for i.a. this assignment
GEF	Global Environmental Facility
GHG	Green-House Gases
ICPDR	International Commission for the Protection of the Danube River
N	Nitrogen in all its forms and compounds (Total Nitrogen)
NIRAS	The Danish company NIRAS Consulting Engineers and Planners A/S. The lead consultant for this assignment
NWBS	The North-western Black Sea, which is the target area for this Study
P	Phosphorous in all its forms and compounds (Total Phosphorous)
Study	This Study: *Danube Study on Pollution Trading and Corresponding Economic Instruments for Nutrient Reduction*
UNOPS	United Nations Office of Project Services. The contracting agency for this assignment

1. INTRODUCTION AND BACKGROUND

This Study is part of the overall and comprehensive UNDP/GEF Danube Regional Project (DRP), which started in December 2001, and which is scheduled for completion in December 2006.

The main aim of the DRP is to assist the Danube Countries (except Austria and Germany, which are co-operating countries within the DRP) in increasing their capacities for developing effective mechanisms and means for co-operation for the protection of the Danube and its final recipient the Black Sea. The DRP complements the activities of the ICPDR (International Commission for the Protection of the River Danube) to strengthen regional co-operation for solving transboundary water pollution problems.

The 13 (11 plus 2) Danube Countries are schematically outlined in Chart No. 1 below.

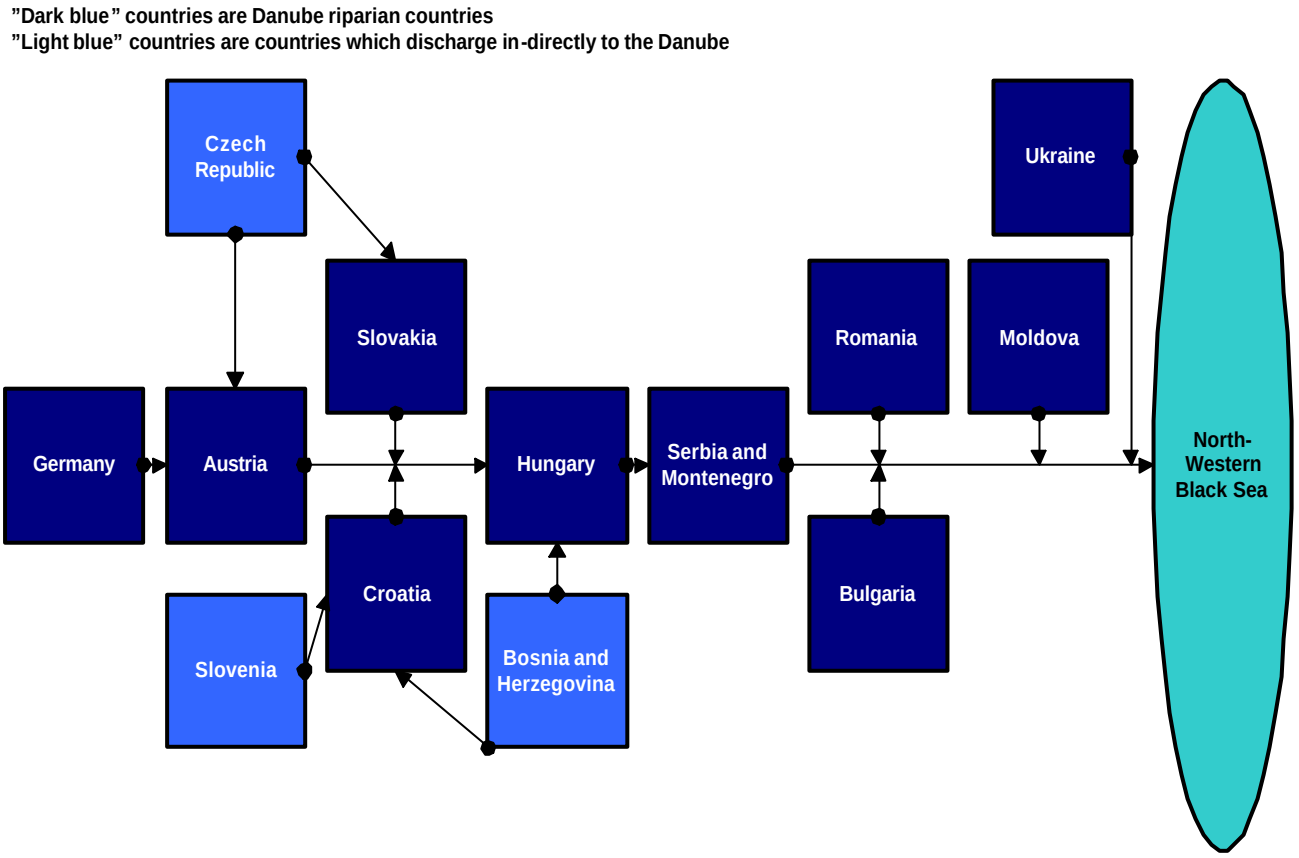

Chart No. : Schematical Presentation of the Danube with the Danube Countries

Due to the regional and transboundary character of the water pollution problems in the Danube and the Black Sea, there is a need to consider the application of regional means and measures to solve the pollution problems of the Danube and its final recipient.

A major regional water pollution problem is the eutrophication ("over-enrichment" with nutrients, which leads to degradation of water quality and aquatic life) of the North-western Black Sea due to the discharge of nutrients by the Danube. In this connection it could be considered to introduce the concept of "nutrient trading", well known from air pollution abatement, as a means of solving the eutrophication problem economically and co-operatively.

Based on this it has been decided within the DRP to investigate this further by a Study entitled *Danube Study on Pollution Trading and Corresponding Economic Instruments for Nutrient Reduction.* The scope and content of the Study, which has been contracted to NIRAS with associates based on a tendering process, is described in the *Inception Report* dated 8 March 2004, which was approved by DRP 2 April 2004.

The Study set out to answer the following questions as grouped in the following three main groups:

- **Nutrient Framework (Component A of the Study):**
    a. What is the present N (total nitrogen) and P (total phosphorous) load to the Danube, and how is it distributed on countries and the main dischargers: domestic, industrial and agriculture?
    b. What is the present N and P transformation capacity distributed on the main tributaries and reservoirs, and the delta?
    c. How much N and P reductions are needed in order to achieve the necessary water quality of the North-western Black Sea?
    d. How will the impact be on the discharges of N and P of improved wastewater management (which will decrease discharges) and increased and changed level of agricultural activities (which, if not counter acted, will increase discharges)?

- **Legal and Regulatory Framework (Component B of the Study)**
    a. To which extent will the present legal and regulatory framework of the 13 Danube Countries facilitate or constrain the introduction of nutrient trading?
    b. Based on this, which specific legal and regulatory gaps for the 13 Danube Countries can be identified, and how is the feasibility of timely filling these gaps for each country?
    c. Is it based on the legal and regulatory analysis advisable or not to introduce nutrient trading, and if yes what will be the necessary main legal and regulatory steps?

- **Economic Instruments (Component C of the Study)**
    a. What is the US, Australian and European experience and lessons-learned with pollution trading of air pollutants, green-house gases, and water pollutants?
    b. How can the above concepts and lessons-learned in principle be applied to the specifics of the Danube?
    c. Based on this is there an advantage in applying pollution trading as a means for nutrients reduction for the Danube River System, and if yes how could it be applied on the conceptual level?
    d. Is it based on the economic instruments review and analysis advisable or not to introduce nutrient trading, and if yes what will be the necessary main implementation steps?

2. CURSORY OVERVIEW OF STUDY RESULTS

The detailed and comprehensive answers to the study questions in Chapter 1 can be found in the two background reports referred to in the Foreword of which the Feasibility Report gives a comprehensive conceptual assessment.

In the following the overall findings and conclusions of the Study are summarised in the context of application of policies and strategies:

1. **The Danube River System is the main controller** of the eutrophication of the North-western Black Sea (NWBS) as the main load of N and P comes via the Danube.

2. **The NWBS has significantly improved** over the last decade due to the reduction in the nutrient discharge caused by the lower agricultural and industrial activities in a number of the Danube Countries with developing economies. The decrease in economic activities in these countries is caused by the economic crisis following the break down of the former Soviet Union in 1989.

3. **The present ecological status of the NWBS is close to being assessed "good".** Some problems remain with the fish stock, which is however assessed to be due to over fishing, and not nutrient discharge.

4. **Consequently the present nutrient loading is proposed "frozen" as the sustainable nutrient loading for the NWBS**. The management strategies should thus aim at counter acting possible increase in the load due to increase in agricultural or industrial activities or increase in population.

5. **Phosphorous seems to be the limiting nutrient for the NWBS**, and consequently counter acting strategies should first target the discharge of this nutrient.

6. However, as the Central Part of the Black Sea seems to be nitrogen limited, and as the ratio between phosphorous and nitrogen in the NWBS could be decisive if only phosphorous is targeted, **counter acting strategies should also target nitrogen for the Danube System**.

7. **Consequently a two-pronged strategy is proposed**. First target phosphorous, but keep a close watch on the development in the nitrogen discharge, and especially the relationship between phosphorous and nitrogen in the NWBS. Secondly, if the ratio changes in the wrong direction, counter acting strategies should be applied for nitrogen as well.

8. **The Danube is the main contributor to the NWBS with phosphorous** as 75 % of the load generates from the Danube. In average only 35 % of the phosphorous emissions is directly manageable as it stems from point sources. In average 10 % of the phosphorous emissions are non-manageable as it is so called "background emissions" from nature. In average only 35 % of the phosphorous discharged to the Danube system reaches the NWBS as it is transformed and/or stored in the Danube System on its way to the NWBS due to physical, chemical, biological, and microbiological processes.

9. **The complexity of the Danube River System** in terms of i.a. demography, economy, culture, geology, hydrology, hydraulics, climate, land use, etc. have to be carefully evaluated when applying regional, national and local counter acting strategies for nutrients.

10. Pollution trading of green-house gasses (GHG) is well developed, and with a fair amount of implementation experience, based on the Kyoto Protocol and its implementation mechanisms. As for water the concepts are not that developed, and the experience and case stories are limited. In relation to applying the experience from pollution trading of GHG to nutrients reduction in the Danube River System, **there is a significant contextual difference, which should be taken into account**. It is about the joint benefit. In pollution trading of GHG the basic concept is that everybody will benefit from a better global climate no matter where the reduction is introduced. This joint-benefit-concept is not directly applicable to possible nutrient trading within the Danube in relation to improving the water quality of the NWBS as the countries bordering and with direct access to the Black Sea will benefit substantially more than the upstream countries. However, when taken this into account it should also be taken into account that the 13 Danube Countries through being signatory to the two Conventions are committed to a shared and joint responsibility also for the quality of the Black Sea. Further, they are also committed to the polluter-pays-principle, which is not based on a benefit assessment. In relation to the lesser experience with pollution trading within water another significant contextual difference applies, as the major part of the case studies are within states and nations with the same economic standing. **In this context the Danube is very complex as it is trans-national as well as trans-regional.** Further, it covers a huge range from countries with very high institutional, legal, regulatory and administrative capacity and economic means, to countries with very limited capacity and limited economic resources.

11. At the international level water quality management in the Danube River System is regulated by two conventions: ***The Convention on the Protection and Use of Trans-boundary Water Courses and International Lakes***, and ***the Danube River Protection Convention***. For at majority of the Danube Countries the ***EU Water Framework Directive*** is a supranational and demanding basic law of water management. These Conventions, and the Directive, neither prohibit nor promote pollution trading. However, the EU Water Framework Directive includes a number of the necessary technical instruments and mechanisms for nutrient trading including the important monitoring programming. EU based legal and regulatory framework has to be addressed carefully as compliance has to be ensured with EU principles concerning e.g. state aid, unfair competition and discrimination. Especially the requirements of the use of BAT (Best Available Technology) and BAP (Best Agricultural Practice) in pollution abatement requires carefully consideration about what should be understood as "real emission reductions".

12. **The EU Water Framework Directive** is an important and basic instrument for water management in the Danube River System as a majority of the Danube Countries are either EU Member States or EU Accession Countries (Bulgaria and Romania). For the remaining 5 Danube countries it is to be expected that they will follow EU legislation. Consequently it should be investigated more in-depth to which extent pollution trading could be facilitated by the Directive and its sister directives.

13. **It seems that a mix of pollution trading with traditional "command-and-control" instruments and economic incentives, will be best suited for and applicable to the complex situation in the Danube River System**. This is mainly based on the complexity of the Danube

River in a number of aspects as outlined above, and taken into account that introduction and application of new and untraditional means and measures are resource demanding. Consequently the economic and water quality benefits could be outweighed by the increased administrative costs.

14. Based on the above, four contextual different scenarios could be discussed:

    I. **Business As Usual:** The management and control of P-emissions to the Danube is based on the international and regional Conventions and Directives, and the national legal and regulatory framework in the 13 Danube Countries.

    II. **Regulatory with basic point-source P-trading:** Same as Scenario I but supplemented with P-trading for the point sources, which is carefully formulated and managed, and only introduced where a clear economic benefit can be ensured.

    III. **Regulatory with full-fledged point-source P-trading:** Same as Scenario II but supplemented with as much as possible point source P-trading where the economic benefit is not fully clarified or ensured.

    IV. **Regulatory with full-fledged P-trading:** Same as Scenario III but supplemented with non-point source P-trading.

15. In line with the two-pronged P-strategy introduced in Point 7 above, **a two-phase overall strategy is proposed.** The first phase comprises P-increase counter acting strategies for the Danube River System. This will be premised on a comprehensive P-discharge and transformation monitoring programme with agreed compilation, processing and interpretation of monitoring results. Further, a comprehensive water quality monitoring programme for the North-western Black Sea with as well agreed compilation and so forth. The second phase is presumed to be N-increase counter acting or reduction strategies from the sea shore countries of the Black Sea in relation to the water quality of the Black Sea in the open areas. If the water quality monitoring in the NWBS reveals that the quality is changing to an unacceptable level due to the change in the N/P ratio caused by the second phase N strategies, then it has to be considered to introduce additional measures to limit N-emissions to the Danube River System.

16. **For the Danube River System a two-level strategy is also proposed**. The first level is the P-increase counter acting strategies on the overall regional level with the aim of keeping the discharge of P to the NWBS at the "freeze" level. The second level is P-increase counter acting and possible P-decrease strategies at the country and area specific level in order to solve semi-regional or local eutrophication problems for specific reservoirs and bigger slow flowing areas of the Danube River.

17. In the context of the Danube River System **three basic types of P-trading seems to be interesting and relevant:**
    - Inter-state State Level P-trading, where Danube Countries on the state level buy or sell state allocated P-increase rights and P-decrease obligations;
    - Entity-to-entity Inter-state P-trading, where an entity in one country buy or sell a national allocated P-increase right or a P-decrease obligation to an entity in another Country (it

could be wastewater treatment plants or factories producing P rich wastewater as detergent producing facilities).

- Entity-to-entity National P-trading, where entities within a country buy and sell P-discharges within the National cap.

18. In continuation of the above it is important to take into account, when setting up a possible P-trading facility, the **P-reduction requirements, which comes directly and not imposed by Conventions, from improved wastewater management** due to national legislation and/or EU Directives. Further, it is important in this context to take into account that some P-reduction requirements on wastewater management are "non-tradable" as they address semi-regional and/or local eutrophication problems, and consequently can not be transferred into a regional context in relation to the NWBS.

3. POLICY ELEMENTS AND STRATEGY QUESTIONS

The policy elements of a comprehensive nutrient management system for the Danube River System, with the aim of protecting the North-western Black Sea, could, premised on Chapter 2, consist of the following main elements to be jointly agreed between the 13 Danube Countries.:

I. **The present quality** of the NWBS is basically satisfactory and a "freeze" of the present quality should be proclaimed as the desirable situation. It should more in-depth be assessed if the present water quality is in full accordance with the quality objectives of the two Conventions and the EU Water Framework Directive with sister Directives.

II. In continuation of the above **the present P-load** from the Danube to the NWBS is the acceptable level, and consequently policies and strategies should focus on counteracting increase in the load. In this connection the specific number as tonnes total P per year should be agreed on as the "cap" for the P load from the Danube River System to the NWBS. Following this, a distribution and allocation of the cap to each of the 13 Danube Countries should be agreed upon by possible taken into consideration the transformation capacity of the Danube River System (due to this capacity 1 kg of P discharged by Germany will be significant "lesser" than 1 kg when it reaches the mouth of the Danube River System).

III. The principle that some countries, especially the countries which due to a present low economic activity have a low P-discharge, but have a need and potential for economic development, **should be allowed to increase their P-discharge**. This should be premised on that the increase in one or more countries should be counteracted by an equivalent decrease in a "package" of one or more countries.

IV. **The criteria for distribution**, and the calculation, of "increase-rights" as well as "decrease-obligations". **The actual distribution** and allocation of the increase-rights and the decrease-obligations on the 13 Danube Countries in amount and in time. The setting up, responsibility, and functioning of a **comprehensive inventory and monitoring system** of emissions and loads, able to measure reduction and increases by States and entities.

V. The setting up, responsibility and functioning of an **independent inter-state P-trading facility and organisation.** And the setting up, responsibility and functioning of an **entity-to-entity P-trading system** covering trading between entities within the same countries and between entities in different countries. It could be part of the first one.

Based on the previous the following policy and strategy questions **are proposed to the Completion Workshop Friday 25th of February 2005 in Baden bei Wien:**

Policy and Strategy Question No. 1: Should nutrient trading be promoted for the Danube River System as a mix with traditional command-and-control measures? Should it first target P, and should it be based on the "low-risk" scenario" or the "high-risk" scenario?

Policy and Strategy Question No. 2: Is the present water quality of the North-western Black Sea acceptable, and should the nutrient management consequently be based on "freezing" the present overall load from the Danube River System?

Policy and Strategy Question No. 3: Is the concept of P-increase counter acting strategies acceptable? If yes should an overall principle be applied that some countries could increase their P-emissions premised on that an equivalent P-reduction is provided by other countries?

Policy and Strategy Question No. 4: Should the transformation capacity of the Danube River System be taken into account when allocating P-loads or should it be based on gross emissions? If yes, how should this be done? As a linear function or based on regional, semi-regional or local specifics of the transformation capacity? If a linear function is chosen should it go from 1 in the mouth of the Danube to 0, x upstream in the Danube?

Policy and Strategy Question No. 5: By which criteria should respectively P-increase rights and P-decrease obligations be given to specific countries (the so called burden-sharing)? Should it be based on GDP and the concept of "rich countries taken a bigger share than poor countries"? Or which other political criteria (examples are given in the Feasibility Report Chapter 4) should be applied?

Policy and Strategy Question No. 6: If P-trading is introduced should it encompass all three principal trading possibilities (Inter-state State; Entity-to-entity Interstate; Entity-to-entity National) or only one or two of the options?

Policy and Strategy Question No. 7: How should the direct P-reduction through improved wastewater management be taken into account? Incorporated into the strategy and overall managed and monitored, or as an extra benefit, which will further lower the P-discharge?

Policy and Strategy Question No. 8: How should a possible P-trading facility be set up, and what should be its responsibility and functioning?

Policy and Strategy Question No. 9: How should the inventory and monitoring facility be set up, and what should be its responsibility and functioning? Should it be part of the above, or a separate independent entity?

Policy and Strategy Question No. 10: Which are the most important next steps?