

UNDP/GEF Danube Regional Project

**Policies for the Control of Agricultural Point
and Non-point Sources of Pollution
&
Pilot Projects on Agricultural Pollution Reduction
(Project Outputs 1.2 and 1.3)**

**Final Report for
Danube Regional Project Outputs 1.2 & 1.3**

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**GFA Terra Systems
in co-operation with Avalon**



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& “Pilot Projects on Agricultural Pollution Reduction”
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Final Report for Danube Regional Project Outputs 1.2 & 1.3

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Preface

The overall aim of the Danube Regional Project (DRP) is to support the activities of the International Commission for Protection of the Danube River (ICPDR) in implementing a regional, basin-wide approach in 11 countries of the Danube River Basin (DRB) to solving the trans-boundary problems associated with the protection of the Danube River - including the sustainable management of surface and ground waters, the reduction of water pollution and the protection of water related ecosystems.

Objective 1 of the DRP is the creation of sustainable ecological conditions for land use and water management. Under this objective there are two key outputs relating to agriculture:

Output 1.2 – *reduction of nutrients and other harmful substances from agricultural point source and non-point sources through agricultural policy changes*

Output 1.3 – *development of pilot projects on reduction of nutrients and other harmful substances from agricultural point source and non-point sources*

The main focus of the UNDP/GEF assistance to controlling agricultural pollution is to:

- identify the main sources of agricultural pollution within the countries of the DRB
- review the current state of policy development for agricultural pollution control in the DRB countries
- identify the main administrative, institutional and funding deficiencies in the development and implementation of these policies
- provide support for developing the concept of Best Agricultural Practice (BAP) in the DRB countries – including improvements in the management of livestock manure, minimising the use of fertilisers and pesticides, better use of crop rotations and creation of buffer zones
- identify and develop pilot programmes and projects (e.g. training and institutional development) for introducing and promoting the concept of BAP in order to improve environmental management practices in agriculture in a number of priority countries.

Phase I of Output 1.2 and 1.3 was preparatory and undertaken by GFA Terra Systems (Germany) in co-operation with Avalon (Netherlands). The GFA Terra Systems/Avalon consultancy team consisted of 6 international consultants and a network of 35 national experts in the 11 central and lower DRB countries eligible for UNDP/GEF assistance. The main focus of their work was:

- Updating available information on the use of agro-chemicals in the 11 central and lower DRB countries
- Supporting the development of existing DRB inventories of non-point source agricultural pollution
- Surveying and reviewing the current state of policy development for controlling agricultural pollution in the central and lower DRB
- Identifying priorities for the strengthening of agricultural pollution control policies in the DRB
- Preparing a general concept of Best Agricultural Practice (BAP) for promoting farm management practices which are less polluting
- Identification and preparation of potential pilot projects for demonstrating the general concept of Best Agricultural Practice (BAP) at catchment level in priority countries of the central and lower DRB during Phase 2 of the DRP
- Preparation of recommendations for agricultural policy reforms for the promotion of BAP in central and lower DRB countries to be implemented during Phase 2 of the DRP

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Acronyms & Abbreviations

BAP	Best Agricultural Practice
BAT	Best Available Techniques
CAP	Common Agricultural Policy
DRB	Danube River Basin
DRP	Danube Regional Project
EC	European Commission
EU	European Union
GEF	Global Environmental Facility
GFP	Good Farming Practice
ICM	Integrated Crop Management
ICPDR	International Commission for the Protection of the Danube River
IPM	Integrated Pest Management
MONERIS	Modelling Nutrient Emissions in River Systems
UNDP	United Nations Development Programme
WFD	Water Framework Directive

1 Purpose, Approach & Methodology of the Project Components

1.1 Preparation of Inventories

Non-point Sources of Pollution

The purpose of this project component was to prepare a clear and easy-to-understand summary of the final results of the project entitled "Harmonised Inventory of Point and Diffuse Emissions of Nitrogen and Phosphorus in the Danube Basin" undertaken by the Institute of Freshwater Ecology and Inland Fisheries (IGB), Berlin. The project aimed to determine and calculate the annual nutrient emissions into the Danube River for the period 1998 to 2000 by applying the so-called MONERIS (Modelling Nutrient Emissions in River Systems) mathematical model to the 388 sub-basins of the Danube River.

The summary was prepared specifically to support the work of the ICPDR Emissions Expert Group (EMIS-EG) during their work on assessing the significant pressures from both point and diffuse sources of pollution for the DRB Roof Report 2004.

Fertilizer and Manure

The aim of this project component was to a) develop an inventory of fertiliser market products for the central and lower DRB on a country-by-country basis, as well as an overview of trends in manure production, and b) to review the typical use and misuse of fertilizers and manures, together with the potential for reduction of environmental impact.

Due to the limited availability of data sources on mineral fertiliser use in the region, national experts in each of the DRB countries under study were asked to undertake a survey of:

1. the types of N and P mineral fertiliser that are commonly used in agriculture and horticulture
2. the amounts of mineral N and P fertilisers typically applied in their own country and how they are used (e.g. what crops are they applied to)
3. information on the characteristics of N and P mineral fertiliser use by farmers, including approximately what percentage of the crops grown currently have mineral fertilisers applied to them, the current average or "typical" application rate (kg per ha) for N and P fertilisers, the typical time of fertiliser application (e.g. in autumn or spring) and any information available on bad practice by farmers regarding the use of these fertilisers
4. identification of problems relating to the use of mineral fertilisers, including known "bad practice".

Pesticides

Pesticide usage in the central and lower DRB countries has declined significantly since the early 1990s. The aim of this component was to prepare an inventory of those pesticides still in use in the DRB countries under study - together with descriptions of observed misuse, potential impact upon the environment and potential for reduction.

The approach taken was to focus upon a total of 24 so-called priority pesticides for the DRB – these are pesticide substances that regularly occur in the aquatic environment of the catchment and are of special concern for environmental and/or human health reasons. Due to the limited availability of data sources on pesticide use in the DRB, national experts in each of the central and lower DRB countries under study were asked to undertake a survey of:

1. available data on the amount of these pesticides applied in DRB countries and how they are used (e.g. what crops are they applied to, number of applications etc.)
2. available information on bad practice by farmers and others regarding the use of these pesticides

The experts mainly submitted data based upon sales data and on the recommendations from the pesticide product registration. Actual use data by location, crop and active ingredient were generally

not available and could not be submitted. Therefore the figures presented mainly relate to general estimations of national usage of the priority pesticides.

Agricultural Pollution Control Policy

The purpose of this review was to develop understanding of the existing policy context regarding agricultural pollution control in the 11 central and lower DRB countries. In particular, the review aimed to classify, describe and analyse 4 key issues:

1. The current policy objectives and strategies of the different DRB countries regarding the control of water pollution caused by agriculture
2. The various policy instruments and practical measures that are currently used in the DRB countries in order to promote the control of water pollution caused by agriculture (e.g. to implement national policy objectives) - this included regulatory, economic and advisory/informative, as well as project-based instruments and measures
3. The overall effectiveness of the “policy mix” used to control water pollution, with particular attention given to the targeting of policies and any reasons for poor implementation
4. The effectiveness of the institutional arrangements that are operating to implement the various policy instrument and measures - are the institutions effectively organised to implement policies and practice for agricultural pollution control? Do the relevant institutions have appropriate power and authority? Are sufficient resources allocated to the relevant institutions?

In order to collect the necessary information, a survey was designed and undertaken by national experts working in each country of the 11 DRB countries under study. The information gathered were analysed in order to draw recommendations for policy reform.

1.2 Concept of Best Agricultural Practice (BAP)

The objective of developing a concept of “best agricultural practice” (BAP) under Output 1.2 of the Danube Regional Project was to support the design of new agricultural pollution control policies for the central and lower DRB countries that will promote the greater integration of pollution control considerations into the day-to-day management of crops, animals and agricultural land by farmers in the central and lower DRB.

There are no concrete and universal definitions available for what is or is not best agricultural practice (BAP) and so a location-specific concept had to be developed for the central and lower DRB countries targeted by this project.

A draft concept was developed by the project team and presented for discussion at the Workshop on “Promoting Best Agricultural Practice in the Danube River Basin” organised by the project consortium on 6 – 7 October 2003 in Zagreb, Croatia.

This workshop was a key activity that brought together a unique cross-section of policy-makers in agriculture and water quality from all 11 central and lower DRB countries, together with the GFA national experts and consultants, to participate in discussion of the problems and potential practical solutions associated with agriculture and water pollution in the region. The specific objectives for the workshop were as follows:

1. To develop understanding of EU policy developments regarding agricultural pollution and “good/best agricultural practice”
2. To present information collected on a) agrochemical use in the DRB and b) current status of agricultural pollution control policies
3. To introduce and discuss a draft concept of Best Agricultural Practice (BAP) for the DRB

The workshop was structured to balance a number of presentations from keynote speakers and consultants with the opportunity for discussion and feedback at a national level.

Of particular value were two “break-out” sessions during the workshops during which the national representatives were divided into 3 working groups according to their country’s status regarding EU accession (i.e. the principal driving force for policy reform in the DRB at present). This approach worked well, allowing the opportunity for discussion and feedback at a national level without the complications arising from the widely differing policy-making context currently created by further EU enlargement into the DRB.

1.3 Policy Recommendations for Introduction of BAP (DRP Phase II)

The preparation of recommendations for agricultural policy reforms (e.g. new legal and institutional instruments) for the promotion of BAP during Phase 2 of the DRP was founded upon the review and analysis presented in four key documents produced within the framework of Output 1.2:

- *Inventory of Agricultural Pesticide Use in the Danube River Basin Countries*
- *Inventory of Fertiliser and Manure Use (with reference to Land Management Practices) in the Danube River Basin Countries*
- *Inventory of Policies for Control of Water Pollution by Agriculture in the Danube River Basin Countries*
- *Draft Concept for Best Agricultural Practice for the Danube River Basin Countries*

The recommendations also drew upon the conclusions from the international workshop held in Zagreb in October 2003 that brought together a comprehensive cross-section of policy-makers in agriculture and water resource management from all eleven central and lower DRB countries to discuss the problems and potential practical solutions associated with agriculture and water pollution in the region.

1.4 Proposals for Pilot Projects (DRP Phase II)

Following on from the preceding project components came the development of a) the concept of pilot projects as “tool” for promoting BAP in the central and lower DRB and b) the preparation of pilot project proposals for implementation in Phase 2 of the DRP during the period 2004 – 2006.

It was proposed that the 7 priority countries of the central and lower DRB that will be eligible for pilot project activities are:

- EU *Pre*-accession Countries (accession likely after 2004) - Romania, Bulgaria and Croatia (currently preparing its application for EU membership)
- EU *Non*-accession Countries - Bosnia & Herzegovina (including Republica Srpska), Serbia and Montenegro, Moldova and Ukraine

National experts in these countries began a process of identifying potential pilot projects according to national priority. This led to the compilation of a “long list” of project proposals that were further refined according to certain pre-determined selection criteria.

A key activity in the development of the BAP pilot project proposals was the workshop on “Developing Pilot Projects for the Promotion of Best Agricultural Practice in the Danube River Basin” that was organised by the project team on 19 – 20 January 2004 in Bucharest, Romania. This brought together agricultural and environmental policy-makers, representatives of agricultural extension services and environmental NGOs from the 7 priority countries, together with the GFA national experts and consultants, with the specific objectives of:

- Raising awareness of the potential role of pilot projects and extension services in promoting the reduction of agricultural pollution in the DRB (priority countries)
- Defining the function of pilot projects as a “tool” for a) building the capacity of extension services and b) supporting policy reform for agricultural pollution control

- Discussing and agreeing on clear selection criteria for pilot projects
- Presenting outlines of the proposed BAP pilot projects for review and discussion
- Refining proposed pilot projects.

The workshop was structured to balance a number of presentations from keynote speakers and consultants with the opportunity for discussion and feedback at a national level.

2 Achieved Results

2.1 Preparation of Inventories

Non-point Sources of Pollution

The data presented in this inventory were derived from the final results of the project entitled "Harmonised Inventory of Point and Diffuse Emissions of Nitrogen and Phosphorus in the Danube Basin". The inventory was prepared as a series of national data sheets summarising a) the annual nutrient emissions into the Danube River from agriculture via groundwater, tile drainage, soil erosion and surface run-off estimated by the MONERIS (Modelling Nutrient Emissions in River Systems) mathematical model, and b) the average national nutrient surplus (i.e. positive nutrient balance) of agricultural topsoil.

Fertilizer and Manure

A range of mineral fertiliser products containing nitrogen (N) and phosphorus (P) are available to farmers in DRB countries. There are no consistent patterns to the products being, except to say that the most commonly used products in any country are inevitably those that are locally the cheapest such as ammonium nitrate, calcium ammonium nitrate (CAN) and urea.

The rapid decline (40-50 kg N/ha) in the N balance of agricultural land in central & lower DRB countries since the late 1980s suggests that there has been a significant reduction in the risk of diffuse N pollution from agriculture – this is associated both with the significant reduction in N fertiliser use by farmers in the region and the 50% decline in livestock numbers.

There are now indications that fertiliser use by farmers in the region is increasing again with an 18% increase in total fertiliser N consumption (thousands tonnes/year) by all central and lower DRB countries during the period from 1997–2002. Not surprisingly, the increase in fertilizer N use greatest (up to 30%) in those countries preparing for EU accession in 2004 and it is highly likely that this trend will continue with the implementation of the CAP in these countries.

Despite the relatively low levels of fertiliser use and manure production in most central and lower DRB countries, the risk of significant nutrient loss to waters is increased greatly by a number of "bad practice" by farmers that are consistently reported in all countries, including bad timing of fertiliser application; spreading fertiliser and manure on frozen and snow covered ground, sloping land and too close to surface waters; not considering the nutrient requirements of the crops that fertilisers (and manures) are applied to e.g. over-application of fertiliser N at the time of sowing; treating manure as a "waste" product rather than a valuable source of nutrients – this commonly leads to the over-application manure and slurry to small areas of land; in the poorest rural areas, manure is often dumped in village waste heaps, streams and ponds etc., and; manure storage facilities are often poor - without adequate storage facilities, manures are often applied to land at inappropriate times when there is high risk of leaching or run-off.

In order to reduce the risk of diffuse pollution by nutrients (N and P) from agriculture it is necessary to encourage practical farm management techniques that minimise the opportunities for nutrients to accumulate in a form that is susceptible to loss. By using current and evolving scientific knowledge it is possible to develop simple practical guidelines for the management of the nutrient inputs most commonly used by farmers – namely mineral fertilisers and manures. These should be applicable to all farmers at little or no cost thereby minimising the need for financial incentives. Furthermore, it should always be stressed to farmers that improvements in nutrient management also means improvements in productivity, cost-effectiveness and ultimately profit.

The promotion of even the most basic "good practice" for farmers should be a high priority for national governments and will benefit both farmers (through improved efficiency, productivity and profit) and the environment. Policy objectives are recommended for all national strategies aiming to reduce nutrient pollution from agriculture, together with comments on policy instruments that should

be adopted where appropriate to national context (not all policy instruments are appropriate to all countries).

Pesticides

Of the 24 priority pesticides identified in the central and lower DRB countries, only three are authorized in all DRB countries, seven are not authorized in any DRB country, while others are restricted in some countries. The priority pesticides currently in use are all “high use” pesticides. The most widely used pesticide substance in the region is copper, but since this is relatively immobile it represents more of a localized soil pollution problem than a water pollution problem. The next most commonly used pesticide was the herbicide Atrazine, followed by the herbicides 2,4-D, Alachlor and Trifluralin.

The reported total use of priority pesticides is the highest in Hungary and the Czech Republic. It is also clear that a high percentage of crops in the DRB countries do not receive any pesticide applications at all. The pesticide usage data submitted by the national experts are only estimations since they are based upon sales data (except Czech data) and often neglect trade. Furthermore, the collected data only presents a picture of pesticide use at a national level – it is not possible to estimate pesticide use at a catchment level without significant extra survey work.

The problems commonly associated with pesticide use in the DRB include: uncontrolled and illegal trade of pesticide products; high use in certain areas and on certain crops (e.g. Atrazine is mostly used in maize); poor storage, including old pesticide stores; use in excess of recommended rates; unauthorised use on crops they are not registered for; cleaning of spraying equipment and disposal of unused pesticide, pesticide containers and “spray tank washings” nearby to or even in water courses; drift of pesticide spray to adjacent areas due to the old spraying equipment used; lack of knowledge of and/or compliance with obligatory “buffer zones” for surface waters and other protected areas, and; poor timing of application.

The current low use of agricultural pesticides in the central and lower DRB presents a unique opportunity to develop and promote more sustainable agricultural systems before farmers become dependent again upon the use of agro-chemical inputs. There is concern, however, that as economic conditions improve again (e.g. with the expansion of the Common Agricultural Policy into those DRB countries joining the EU) that there is a risk of pesticide use increasing again.

The national governments of all central and lower DRB countries should therefore aim to effectively control pesticide pollution in order to minimise the risks presented to human health, the quality of environmental resources and the integrity of natural ecosystems in the region. As with fertilisers and manures, policy objectives are recommended for all national strategies aiming to control pesticide pollution from agriculture, together with comments on policy instruments that should be adopted where appropriate to national context.

Agricultural Pollution Control Policy

All national experts reported some goals for water protection in their countries, although there is a general lack of clear and targeted strategies for water protection that integrate different policy measures and show the necessary path to the achievement of indicated goals. Most progress towards the development of comprehensive water protection strategies has been made in those countries preparing for EU accession in 2004 since these countries will shortly have to take over the whole range of environmental legislation in the *acquis communautaire*, including the EU Water Framework Directive.

Four basic types of policy instrument for the control of agricultural water pollution were reviewed:

Regulatory Instruments – many of the main agricultural pollution issues (nutrients, pesticides, farm waste and agricultural run-off) are addressed by existing regulatory instruments in the DRB countries, with the most extensive coverage of issues in those countries preparing for EU accession in 2004. In most other countries, existing regulatory instruments tend to be rather general with relatively few specific regulatory instruments in place. Consequently there is much potential to prepare more

targeted instruments to prevent water pollution through the control of specific farming practices – also to improve compliance and enforcement.

Economic Instruments - not surprisingly, the economic instruments used in the DRB countries are mainly disincentives due to the lack of financial resources to introduce incentive schemes. Where economic instruments are in place they do not currently address all pollution issues in all countries. The number of incentive measures in the four countries acceding to the EU in May 2004 is expected to increase with EU accession and the availability of EU co-financing for rural development measures, such as agri-environment programmes.

Advisory/Information Instruments - the transfer of knowledge and information to farmers via advisory/informative instruments can play a key role in changing the management practices of farmers and reducing agricultural pollution. However, the most frequent limitation upon this type of instrument for controlling agricultural pollution in the DRB is that the actions taken are too small with insufficient staff and financial resources. There is large potential to further develop advisory/information instruments in all countries.

Project Based – there are various types and sizes of projects targeting the prevention of agricultural water pollution with a tendency towards research and policy implementation in those countries working towards EU accession in 2004 and later.

Based upon the results of the policy review, the following general recommendations were made for all central and lower DRB countries:

- to design more targeted and integrated strategies for the control of agricultural pollution
- to improve the control and enforcement of regulatory instruments for agricultural pollution control
- to put more emphasis upon the design and implementation of advice/information measures for agricultural pollution control
- to develop within available resources financial incentives as appropriate economic instruments for promoting agricultural pollution control
- to promote organic farming and integrated crop management techniques as viable alternatives to the use of agrochemicals
- to design and implement standards of Good Farming Practice
- to increase farmer and advisor awareness of the importance of agricultural pollution control
- to support capacity building amongst relevant stakeholders for the implementation of agricultural pollution control policies

2.2 Concept of Best Agricultural Practice (BAP)

For the purposes of this project, the term “best agricultural practice” (BAP) is only applied to farm management practices that reduce the risk of pollution occurring from agricultural non-point sources in the DRB – this includes classical diffuse pollution and “small point source” pollution arising from multiple, small-scale (and often accidental) discharges that occur from different farming activities.

There are no concrete and universal definitions available for what is or is not best agricultural practice (BAP). It is our understanding that BAP actually encompasses a broad spectrum or hierarchy of activities that must be interpreted according to local agronomic, environmental, social and economic context. Not all elements of this hierarchy are relevant in all countries of the central and lower DRB – instead Best Agricultural Practice is defined as: ***“...the highest level of pollution control practice that any farmer can reasonably be expected to adopt when working within their own national, regional and/or local context in the Danube River Basin”***

With this definition BAP can be applied as a uniform concept across the whole DRB, but the actual improvement in the level of environmental management/performance (i.e. to “move up” the hierarchy and adopt more demanding pollution control practices) that we can expect from farmers in different regions/countries will vary significantly according to:

- a) the agronomic, environmental and socio-economic context in which they are operating
- b) the availability of appropriate policy instruments
- c) the availability of appropriate capacity, knowledge, information and other institutional and technical resources for supporting farmers

The objective of policy strategies for agricultural pollution control in the different DRB countries should therefore be to encourage farmers to “move up” the BAP hierarchy as far as possible in the context in which they operate and deliver the highest level of pollution control that it is feasible for them to do. The function of available policy instruments and measures for achieving this “shift” can be summarised as follows:

- a) **Disincentives** for dropping below the minimum level of environmental management practice that is acceptable
- b) **Appropriate interventions** for promoting and sustaining the minimum level of environmental management practice on as many farms as possible, and
- c) **Incentives** to go beyond the minimum level of environmental management practice and deliver a higher level of environmental performance

Obviously the pursuit of such strategies will require a combination of policy instruments – the so-called “policy mix” - to achieve optimal pollution control and a number of additional factors will influence the selection of these instruments, including environmental effectiveness, economic efficiency, equity and accessibility to farmers, administrative feasibility and cost, and political acceptability.

2.3 Policy Recommendations for Introduction of BAP (DRP Phase II)

See the following section entitled “Further Development and Introduction of Policy Instruments Adapted to National Conditions” under **Recommendations for Phase II**.

2.4 Proposals for Pilot Projects (DRP Phase II)

See the following section entitled “Practical Demonstration of BAP within the Framework of Pilot Projects” under **Recommendations for Phase II**.

3 Recommendations for Phase II

The “Recommendations for Policy Reforms and for the Introduction of Best Agricultural Practices in the Central and Lower Danube River Basin countries” have been developed to introduce new legal and institutional instruments for reduction and control of water pollution from non point sources of agricultural activities.

Further steps for the implementation of the proposed policy reforms and the introduction of measures for Best Agricultural Practices in Phase 2 of the Project are presented in the following sections:

- Further development and introduction of policy instruments adapted to national conditions
- Practical demonstration of BAP within the framework of Pilot Projects
- Project implementation arrangements for Phase 2

3.1 Further Development and Introduction of Policy Instruments Adapted to National Conditions

In the report on “Recommendations for Policy Reforms and for the Introduction of Best Agricultural Practices in the Central and Lower Danube River Basin countries” six Strategic Aims with eleven Objectives for measures for control and reduction of agricultural pollution have been identified related to:

1. Use of mineral fertilisers and manure,
2. Use of pesticides,
3. Compliance and enforcement of regulatory instruments,
4. Development of appropriate economic instruments,
5. Development of capacities of agricultural extension services,
6. Promotion of organic farming and other low input farming systems.

The policy aims and objectives described have to be adapted to national and regional conditions focusing on the review and further development of the legal and institutional frame at the national level. In this context, the needed assistance should be provided to EU Accession Candidate Countries – due to join the EU after 2004: Bulgaria and Romania and possibly Croatia (preparing application to join the EU) and to non-EU Accession Countries: Bosnia-Herzegovina, Serbia-Montenegro, Moldova and Ukraine. Most of these countries should also benefit from agricultural demonstration projects for the introduction of BAP in the Danube River Basin.

For practical implementation of proposed policies a two step approach is anticipated:

In the first step specific guidelines should be developed for each of the above mentioned countries to facilitate reviews of national agricultural policies and legislation and to strengthen institutional arrangements for the introduction of BAP:

- to improve agricultural practice (fertiliser, manure and land management) and to reduce the risk of diffuse nutrient pollution through better management of fertilisers and manures,
- to reduce the levels of harmful active substances used for crop protection by prohibiting and/or substituting the most dangerous pesticides with safer (including non-chemical) alternatives,
- to encourage the proper use of pesticides by farmers and other operators, and to assure compliance with regulatory instruments through the control of specific farming practices,
- to develop and introduce appropriate economic instruments to encourage implementation of BAP,
- to review and adapt the mandate and structure of agricultural extension and advisory services,
- to develop the capacity of agricultural extension and advisory services for the promotion of BAP,

- to develop and support pilot projects for the promotion of BAP by agricultural extension and advisory services,
- to promote certified organic farming and other low input farming systems as viable alternatives to the conventional use of mineral fertilisers and pesticides.

This work should be carried out by national consultants in close cooperation with international assistance. Specific outlines for the review of existing national legislation and proposals for changes and/or amendments of the legal and institutional frame should be prepared to facilitate the introduction of the concept of Best Agricultural Practice (BAP) at the national level. Policy reviews should also take into account trans-boundary issues to enhance regional cooperation as well as the requirements of the process of EU integration in adopting relevant EU directives and regulations into national law.

Taking into account the limited financial capacities of the UNDP/GEF DRP, it would be necessary to identify complementary sources of financial support to assist Governments in reviewing and amending national legislation to reduce water pollution from non-point sources of agricultural activities in line with the proposed recommendations for the introduction of Best Agricultural Practices.

This can best be achieved in the frame of Twinning Projects that are presently financed primarily by European Commission funds to support the accession process in adapting national legislation and developing mechanisms of compliance in line with EU requirements (Implementation of the Water Framework Directive and other relevant directives for water protection and environmental management).

Therefore, **in the second step**, EU-funded twinning projects should be promoted and developed (outline of project description) and sources of financial and technical support for project implementation should be identified to assure effective introduction of new concepts for agricultural pollution control in national policies and legislation.

In a potential twinning project, consultants and staff of public authorities of EU member states advise their colleagues from comparable public institutions in the partner country. The key person in each twinning project is the Pre-Accession Advisor (for EU accession candidate countries) or the Partnership Advisor (for other countries). For the whole duration of a project (generally one or two years) the Advisor makes his/her services available to the respective public authority in the partner country. For this period, he/she is on leave from his home office. The advisor is supported by an experienced project manager from the administration of his/her home country. This increases the efficiency of projects because it facilitates the coordination and availability of other contributions (in particular short-term assignments) of the EU member state. In addition, twinning may also comprise study tours and internships for Government officials from the partner countries in administrations of the EU member states. Similar EU programmes are also available for the private NGO sector (Support to Civil Society and Local Initiatives).

Review and amendment of national policies and development of respective legislation should be considered as an iterative process that takes into account the opinions and needs of the stakeholders concerned as well as trans-boundary issues related to land management and environmental protection. In this context, particular attention should also be paid to reviewing institutional mechanisms for promotion of BAP focusing on the mandate and the needed support of agricultural extension services.

The financial support for twinning projects should be mobilized in the frame of bilateral and multilateral assistance relating to the EU enlargement process and assistance to South Eastern Europe (EU CARDS programme). This approach is in line with GEF operational principles to generate additional financial and technical support for national capacity building and further implementation of GEF proposed measures for nutrient reduction in the DRB countries.

3.2 Practical Demonstration of BAP within the Framework of Pilot Projects

Seven countries of the central and lower DRB region (Croatia, Bosnia-Herzegovina, Serbia-Montenegro, Bulgaria, Romania, Moldova and Ukraine) have been identified as a priority for the development and implementation of pilot projects to promote the concept of Best Agricultural Practice.

The pilot projects will be implemented in Phase 2 of the DRP (2004-2006) and it is anticipated that this will involve 18-24 months of practical implementation. The immediate beneficiaries of the pilot projects will be the agricultural extension and advisory services in the selected countries. The ultimate beneficiaries of the results will be the farmers' community (environmental and economic benefits), the consumers (healthy food products) and in the final analysis the society as a whole (healthy environment and unpolluted surface and ground waters).

The specific objectives of the pilot projects will be to: *“demonstrate how improvements can be made in the capacity/effectiveness of agricultural advisers/extension services to provide appropriate information and advice that supports the highest level of pollution control practice by farmers according to local context”*.

Pre-requisites and selection criteria taken into account in identifying pilot projects for demonstration of BAP responding to a specific pollution issue included:

- Coherence with Government policies and/or the political commitment to introduce BAP;
- Existence of a reliable counterpart organisation, credible to the agricultural community;
- Location in a specific geographical area, if possible reinforcing transboundary cooperation with neighbouring communities;
- Response to a specific pollution issue – fertiliser and manure handling, pesticides use and agricultural run-off, as identified by stakeholders;
- Potential for replication at national and/or regional levels;
- Reinforcement of other GEF interventions and promoting cooperation with existing international and bilateral projects in agricultural development.

In the workshop on “Developing Pilot Projects for the Promotion of BAP in the Danube River Basin”, which took place on 19 and 20 January 2004, six pilot projects have been identified, responding to a specific pollution issue and allowing in most of the cases a transboundary approach (except Project Number 5 and 6):

1. Communal Manure Management in the Danube Flood Plains (Bulgaria and Romania)
2. Control of Agricultural Run-off for the Reduction of Nutrient Pollution in the Prut River Basin (Moldova and Romania)
3. Non-chemical Weed Control in the Sava River Basin (Croatia, Bosnia-Herzegovina and Serbia-Montenegro)
4. Upland Manure Management in the Sava and Bosna River Basins (Bosnia-Herzegovina and Serbia-Montenegro)
5. Good Agricultural Practice in the Intensive Agricultural Region of Vojvodina (Serbia-Montenegro)
6. Introduction of Good Agricultural Practices in Odessa Oblast (Ukraine)

Taking into account the limited financial capacities of the UNDP/GEF Danube Regional Project, it is assumed that three Pilot Projects can reasonably be implemented. For the remaining Pilot Projects other sources of financial support have to be identified.

It can be anticipated that priority will be given to trans-boundary projects with the highest effectiveness of agricultural advisers/extension services to achieve the expected results that are:

- raised awareness of pollution risks amongst farmers
- increased avoidance of bad practice – including improved compliance with relevant legislation
- increased adoption of good practice – including utilization of economic incentives.

The finally selected pilot projects for introduction of BAP should demonstrate the practical implementation of revised agricultural policies at the farmers' community level and the technical and economic feasibility of proposed agricultural practices for fertiliser and manure handling, use of

pesticides and run-off control to reduce water pollution from agricultural activities while improving the economic situation of farmers.

For effective project implementation the following points should be considered:

- **Specific concepts and outlines for the implementation of selected pilot projects** should be developed in consultation with the stakeholders concerned (farmers' community) and in cooperation with related Government institutions and extension services. Further, relevant ToR and scope of work for international assistance and national project management should be prepared;
- **Competent extension services** should be identified, having the required experience as service provider and being accepted by the agricultural community as well as by Government;
- **Financial support** should be made available for project implementation in particular to facilitate the work of national extension services and to promote awareness raising in the farmers' community;
- **International assistance** should be contracted to provide technical advice in introducing BAP adapted to the local or regional context and to assure follow-up on project activities that includes (i) regional coordination of pilot project activities, (ii) dissemination of results, (iii) organization of training workshops, and (iv) cooperation with other projects of bilateral, EU and international assistance in related subjects (agri-environmental policy development, introduction of BAP, farm advisory capacity building, and other measures for nutrient reduction from agricultural non-point sources of pollution).

In implementing the BAP pilot projects of the UNDP/GEF Danube Regional Project, particular attention should be paid to assuring effective coordination with other UNDP/GEF project activities (Black Sea) as well as with EU projects in EU accession countries, in the Balkan countries and in NIS countries aiming to reinforce national capacities and to adapt national legislation in line with EU requirements (EU Water Framework Directive and other related directives for nutrient reduction and priority substances) and to create the appropriate mechanisms for compliance.

3.3 Project Implementation Arrangements for Phase II

It is recommended that the project activities for implementation of Phase II of Outputs 1.2 and 1.3 of the DRP should be organised as follows:

- a) Project preparation phase
 - Prepare concept, methodology and scope of work for project implementation
 - Organise consultation meeting (policy review and pilot projects)
 - Prepare inception report
- b) Review of agricultural policies and legislation
 - Prepare methodology and country specific guidelines for the introduction of policy concepts for BAT in national legislation and for related institutional arrangements
 - Instruct (training workshop) and providing initial support to national policy specialists (national consultants)
 - Follow-up on activities and reporting of results
- c) Development of Twinning Projects
 - Prepare concept paper, present concept to national Governments, outline and justification for twinning projects
 - Analyse existing twinning projects (seven middle and lower DRB countries) and define possibilities of cooperation
 - Identify other possible sources for financial and/or technical support

- Negotiate with Governments and donors the implementation of twinning projects for policy review and introduction of BAP concept
 - Follow-up on activities and report on results
- d) Implementing of Pilot Projects
- Select most promising pilot projects (consultation meeting in preparation phase)
 - Select national counterpart institutions
 - Prepare country/subject specific guidelines for project implementation
 - Provide technical assistance during project implementation
 - Assure technical and financial follow-up of project implementation and report on result.

Project Personnel and Tasks

It is assumed that project implementation as a whole will be sub-contracted to a consulting firm or to a consortium of consulting firms. Under the responsibility of the sub-contractor, the following personnel should be provided:

- a) International Experts
- *Project Manager – Agricultural Project Component (CPM)* - in line with TOR prepare concept, methodology and scope of work for project implementation; guide and supervise project activities; assure technical and administrative project management including timely implementation of work programme and adjustment if necessary (with UNDPGEF PM); prepare inception report and other progress reports; report to the UNDP/GEF Project Manager.
 - *Agricultural Policy Specialist (APS)* - in cooperation with PM prepare outlines for national policy reviews and introduction of policy concepts for BAP in national legislation; prepare ToR and guidelines for the practical implementation of BAP in the frame of proposed/selected pilot projects; participate in workshops and consultation meetings, assure coherence between policy development and implementation of Pilot Projects; instruct and provide advice to national consultants; support on an ad-hoc basis the introduction of policy changes in national legislation; follow-up of project activities in relation to policy review and implementation of pilot projects and report on results.
 - *Twinning Specialist (TWS)* - in cooperation with PM, prepare concept paper, present concept to Governments, outline and justification for twinning projects; analyse existing twinning projects; identify possible sources for financial and/or technical support; negotiate with Governments and donors the implementation of the “BAT” twinning projects; follow-up on activities and report on results.
 - *Extension Service Specialist (ESS)* - in cooperation with PM and APS prepare country/subject specific guidelines for project implementation; participate in the selection of most promising pilot projects; participate in identifying national counterpart organisations; provide technical assistance during project implementation; follow-up project implementation activities and report on results.
 - *Technical-Financial Supervisor (TFS)* - in cooperation with PM and ESS follow-up financial and technical implementation of pilot projects; control technical milestones of project implementation; prepare reports on financial situation and propose disbursements in accordance with payment plan; organise inception meeting and other consultation and training workshops; assist in general project implementation tasks and report on results.
 - *Technical Support and Backstopping* - Junior Professionals specialised in agricultural policy and BAT and in agricultural extension and awareness raising concepts shall provide technical support and backstopping to the PM and to other the Specialists to facilitate project implementation.

b) National Counterpart Organizations and Experts

- *National Policy Consultant (NPC)* - in each of the participating countries, national Policy Consultants shall be identified to support the introduction of policy concepts for BAT in national legislation; under the guidance of the APS and the PM he/she will perform the following tasks: assist APS in preparing concepts and outlines for national policy reviews and for the introduction of BAT concepts in national legislation; promote the introduction of proposed policy changes and concepts for BAP in national legislation and assist the Government to review legal and institutional mechanisms; observe coherence between policy development and implementation of Pilot Projects (if applicable); report on results.
- *Extension Service Provider (ESP)* - the selected national extension service provider responsible for the implementation of pilot projects in line with the TOR and with the agreed guidelines referring to specified pollution issues shall provide the following services: delimitation of project area; inventory of participating farmers; preparation of detailed work plan including timeframe with milestones; project execution in line with work plan and agreed timeframe; administrative and financial management of project implementation; regular reporting to the CPM and the TFS on technical achievements and disbursement of funds in line with defined milestones.
- *National Extension Consultant (NEC)* - the selected NEC shall support the activities of the ESP, he/she should be preferably staff member of the ESP and act as a project manager for the implementation of the pilot project; he/she shall fulfil the following tasks: cooperate with the APS and the ESS to prepare the specific guidelines referring to specified pollution issues; participate in preparing delimitation of project area and inventory of participating farmers; participate in preparing a detailed work plan with timeframe and milestones; supervise project execution and administrative and financial management of project implementation; work with farmers' community and assure links with Government institutions; prepare technical reports to the ESS and CPM.

c) Summary of Technical Assistance and Project Implementation Support

- General project preparation, management & supervision (CPM): 140 m/d
- Logistical support, reporting and backstopping (young professionals): 100 m/d
- National policy development (APS): 120 m/d
- Development of ToR and promotion of Twinning Projects (TWS): 120 m/d
- Preparation and follow-up of Pilot Projects (APS and ESS): 120 m/d
- Administrative/financial support for Pilot Projects (TFS): 65 m/d
- Implementation of three pilot projects (ESP and NEC): $3 \times 150.000 = 450.000$ USD
- Travel of international experts: To be determined
- Meetings and workshops: To be determined
- National Policy Consultant (NPC): 200 m/d x 7 countries
- National Extension Consultant (NEC): 200 m/d x 3 countries

4 Lessons Learnt

The beginning of the 1990s was a political and economic milestone for all of the DRB countries. The ensuing decade was accompanied by substantial socio-economic changes that affected agriculture particularly severely. Major changes in farming during the first years of transition led to substantial reductions in both agricultural production and in the input of agrochemicals. This was linked to an extensification of land use, changes in farm structures and farm management practices. These developments have profoundly – if maybe only temporarily - changed the relationship between agriculture and the environment in the region

As far as water pollution is concerned the resultant changes have largely been positive - reductions in fertiliser and pesticide, as well as the significant reduction in livestock numbers and production of animal wastes, has contributed greatly to enhanced water quality.

The future relationship between agriculture and the environment in the central and lower DRB is however now uncertain – further enlargement of the EU into the DRB will inevitably bring environmental and socio-economic benefits to many rural areas, but there is also the risk of increasing agricultural intensification as economic conditions and access to markets improve, as well as the continuation of existing bad practice where farmers have no knowledge or incentive to adopt alternative, more environmentally-friendly practices.

The second phase of the DRP will help to address these issues by supporting the improvement and harmonisation of policy objectives and instruments for agricultural pollution control in the central and lower DRB countries. However, even the best, most well-conceived and funded policy instruments will only work as well as they are understood, absorbed and adopted by the farming community. This is an important issue and major challenge for the DRP/ICPDR in promoting the concept of BAP in the region.

In this respect, a number of key points must be noted:

1. The huge diversity of the 11 central and lower DRB countries must be taken into account when developing and promoting the concept of BAP in the region. Promotion of the concept of BAP by the DRP/ICPDR must therefore be flexible, adaptable and above all – pragmatic!
2. Due to land privatisation and restitution policies, the 1990s witnessed a huge increase in the number of farm holdings in the DRB region creating an extremely diverse set of actors with contrasting farm sizes, degrees of specialisation and levels of education. This represents a major challenge to both agricultural extension/advisory services and to environmental enforcement agencies. Local capacity-building of these services and agencies remains a major challenge and demands the commitment of substantial resources at a national level – political commitment to the provision of these resources must be encouraged and supported.
3. Farmers are economically-motivated and it is important to link the promotion of BAP to economic benefits such as improvements in yield and savings in the cost of agrochemical inputs – the development of appropriate agricultural advisory messages is therefore essential, including well-written and appropriate advisory materials, demonstration plots/farms, training for advisors and other capacity building of agricultural extension services.
4. There should be more emphasis upon a “farming systems” approach to agricultural pollution control rather than the “input reduction” approach encouraged by the methodology advocated in the terms of reference for this project. It is necessary to promote not only the reduced use of agrochemicals etc., but also the re-design of farming systems (e.g. using an ecological systems approach) to make them more environmentally sustainable. A good example of this approach is the promotion of organic farming which involves significant changes in crop rotation, soil management, the storage and management of manure, management of field margins and non-crop habitats etc. as well as prohibiting the use of pesticides and mineral fertilisers

Additionally, there are some specific lessons to be learnt from the three contrasting groups of countries in the central and lower DRB:

4.1 EU Acceding Countries (entering May 2004): Czech Republic, Hungary, Slovakia, Slovenia

There are two key issues noted in the Acceding Countries:

1. Stimulated by a need to adopt the *acquis communautaire*, the late 1990s saw the introduction of a raft of new environmental laws or revisions to existing regulations in the EU acceding countries. Unfortunately although legal harmonisation progressed well, the ability to enforce and monitor new regulations has often lagged behind and the efficacy of much environmental legislation, including that relating to the control of agricultural pollution remains questionable.
2. Questions about the future relationship between agriculture and the environment in the DRB are most pertinent in the EU Acceding Countries where there is already evidence of the growing influence of the market economy upon agriculture and the management decisions taken by farmers.

Some national experts suggested that it will initiate a new period of more polarised land use resulting in highly intensive farming and increased production in the most fertile areas, in contrast to declining output or abandonment in less competitive regions. There is certainly evidence of this beginning to happening in the acceding countries, such as the Czech Republic, where there is a marked increase in fertiliser application to arable crops and pastures in the more productive areas. Other national experts suggested that the influence of EU enlargement, the adoption of the *acquis communautaire* by new Member States and the expansion of the Common Agricultural Policy (CAP) into the region will produce a complex new set of driving forces for agricultural change in the DRB with a diverse set of positive and negative implications on agricultural pollution.

4.1 EU Candidate Countries (entering after May 2004): Bulgaria, Romania, Croatia

Similar to EU Acceding Countries – particularly for Bulgaria and Romania

4.2 Non-EU Accession Countries: Bosnia & Herzegovina, Moldova, Serbia & Montenegro, Ukraine

The major issue regarding agricultural pollution control in the non-EU accession countries is how to develop the appropriate pre-conditions for promoting BAP – notably:

- Existing laws on pollution control and the management of natural resources need to be reformed
- Appropriate legislation is needed to encourage greater land consolidation and the creation of more viable farms with greater potential for improving agricultural practice. Greater co-operation between farmers is also needed to make better use of limited resources to improve farm technologies (e.g. more modern machinery)
- Access to information on the causes of agricultural pollution, plus the practical measures and policy options for controlling agricultural pollution is very poor and needs to be improved – in particular, information on what lessons can be learnt from other DRB countries
- As a critical first step education and training are needed at all levels from farmers and advisers to politicians and policy-makers
- More support for investment in basic manure handling facilities is needed, but the generation of necessary funds remains a problem
- Pilot projects are needed to demonstrate good agricultural practices for the reduction of water pollution by farmers – farmers need to see things for themselves.