

## Standard Project Fiche for Phare 2005

### 1. Basic Information

- 1.1 CRIS Number: 2005/017-453.01.01
- 1.2 Title: Capacity Improvement for Flood Forecasting in the BG-TR CBC Region
- 1.3 Sector: Environment
- 1.4 Location: Bulgarian-Turkish Border Region
- 1.5 Duration: **22 months**

### 2 Objectives

#### 2.1 Overall Objective

To improve the management of flood hazards in border region, increase the effectiveness of flood mitigation measures, and improve security and quality of life.

#### 2.2 Project purpose

To strengthen the capacity for monitoring, timely detection and early warning of flood phenomena, and implement flood protection measures in the BG/TR border area.

#### 2.3 Accession Partnership and NPAA priority

With reference to the Accession Partnership, this project aims to support an integrated approach for addressing regional disparities in the border region. By strengthening and development of joint initiatives across the border, the project stimulates real cross-border co-operation in the regions.

The project falls to a different extent within several NPAA priorities:

- Chapter 17: Science and research
- Chapter 18: Education and training of staff.
- Chapter 21: Regional policy and coordination of structural instruments: the project falls within the NPAA priority for institutional strengthening, interdepartmental coordination and the improvement of the administrative capacities on the national, regional and local levels.
- Chapter 22: Environment, and in particular - integrated water management (part 6.1).

#### 2.4 Contribution to National Development Plan

The Bulgarian Government has planned to actively support and complement the EU initiatives and programmes for cross-border cooperation, while seeking to incorporate the latter into the national framework for regional development planning and programming. The NDP aims at achieving sustainable development of the entire border region rather than of some individual border areas. The main goal pursued under the above mentioned priority area refers to opening up new horizons, fostering the socio-economic development of the border areas and gradually overcoming the problems resulting from their isolated position at the country's periphery.

The project will contribute for the achievement of the following objectives goals identified in the NDP

- Attainment of balanced and sustainable development of Bulgaria's regions;
- Establishment of appropriate environment for economic growth and high employment on the basis of a more efficient use of the regions' development potential;
- Strengthening the socio-economic cohesion of the regions in the process of the country's European integration.
- Integrating the principles of sustainable development into the production landscape and the evolving market economy.

The proposed project fully complies with the objectives defined in the NDP, which classifies CBC regions in a separate target group. In addition, the project is in compliance with the priority defined in the Sector "Environment" of the NDP, and with strategic priority defined in the Bulgarian National Economic Development Plan "Strategic aims and priorities until 2006", part 4.3 "Development of the basic infrastructure and Environmental protection".

## 2.5 Cross Border Impact

The project will be implemented in the cross-border region between Bulgaria and Turkey and has direct cross-border impact. It is in compliance with Measure 2.1, "Integrated management and protection of waters" and Measure 2.3: "Co-operation in case of natural calamities", aiming at strengthening and developing regional co-operation for improving the management of flood hazards in border region and thus improving security and quality of life.

It should be emphasised that the flooding load on the Turkish territory entirely depends on hydrological events in the upper drainage area situated mainly on Bulgarian territory. Setting up the Flood Forecasting System and harmonisation of the data exchange practices between the Bulgarian and the Turkish relevant institutions will be of crucial importance for a timely dissemination of information and early warnings and thus reduce risk of floods on both territories.

## 3 Description

### 3.1 Background and justification:

The Maritsa/Meric River is the biggest river on the Balkan peninsular with a catchment area more than 53 000 km<sup>2</sup>, 21 084 of which are on the Bulgarian territory. The river's length on the Bulgarian territory is 321 km. The territory of Maritsa basin is quite densely populated (more than 2 million people on the Bulgarian territory), highly industrialized and with intensive agriculture. The biggest towns are Plovdiv on the Bulgarian territory, with 650000 citizens, and the town of Edirne on the Turkish territory, with 230 908 citizens. The basin area at the upper course of the river has predominantly high-mountain character while the character in the middle and lower river course is plain. The Maritsa River has more than 100 tributaries which are symmetrically situated on both sides of the main stream. The biggest tributaries are Tundja and Arda Rivers. While Arda River does not belong to the Bulgarian-Turkish border area, the Tundja River crosses the border region and marks the border between the two countries for about 9 km.

Tundja River catchment area is about 7884 km<sup>2</sup> and length on the Bulgarian territory is 350 km. Three nature parks are situated along the river. In addition, the River Basin comprises a range of ecologically valuable, but also vulnerable ecosystems and important habitat areas, including wetland habitats (such as nature reserves with riparian flood dense forests). Both Arda and Tundja Rivers join the main stream of Maritsa river on Turkish territory, south of the Bulgarian – Turkish border near the town of Edirne.

The climatic and geographical characteristics of Maritsa and Tundja River Basins lead to specific run-off conditions: flash floods, high inter-annual variability, heavy soil erosion reducing the reservoirs' capacities through sedimentation, etc. The destructive forces of climatic hazards manifesting themselves in the form of rainstorms, severe thunderstorms, intensive snowmelt, floods and droughts, appear to increase during recent years. Whether the climate change is also a causative element is still a controversial issue, but it must be considered. Despite of the significant number of reservoirs and cascades having total capacity for Maritsa and Tundja about  $2.2 \cdot 10^6 \text{ m}^3$ , their retention possibilities are not sufficient to reduce the floods downstream. Apparently, the increased exposure to hazards caused by the present intensive development in meeting the needs of the rapidly increasing population is another considerable reason for the high level of damage in the river basins.

### **The problem**

Flood hazards cause damages in the border area having often devastating consequences. The main problem blocking an effective mitigation of those consequences is the lack of a modern system for forecasting and early warning of flood events. Here are some examples:

Floods in the Maritsa river basin occur in the autumn-winter-spring period. They are mainly caused by heavy rainfalls and intensive snowmelt. The oldest flood known in the valley occurred in 1712. That flood has devastated the river valley. During the flood happened in 1856, river waters flooded the settlements situated near the main stream and caused heavy damages. At the old town bridge in Plovdiv the depth of the river has reached 4,5 meters. During the flood in June 1957 the maximum discharge in Plovdiv was 1265 m<sup>3</sup>/s. Till 1981 seven high waves in Plovdiv occurred with flow rates more than 700 m<sup>3</sup>/s, and higher downstream. Two critical situations occurred in 1996 (according to the monthly bulletins of the Bulgarian National Institute of Hydrology and Meteorology). Heavy rainfalls and intensive snow melting stroke local parts of the Southeast Bulgaria, causing floods, material damage and victims. Water levels of rivers Maritsa and Tundja have raised by more than 1,5 m. Disastrous situation was proclaimed in some settlements and the population was evacuated. Bridge failures and land slides broke many roads.

The Tundja River has three main tributaries: Mochuritsa, Popovska and Kalnitsa rivers. They are characterized by snow-rain rate, autumn-winter high-water and sharply defined maximum in February. Under the influence of essential spring-summer rainfalls the winter high-water transfers into secondary spring high-water. So in the Tundja River the rate forms one common abounding-in-water phase from November till April, through which flows 80 – 90 % from the annual water volume. On its critical level the waters dam the sewerage collectors and flood agriculture, forests and urban areas. Since 1997 the river has caused three major floods with significant damages. There is a permanent danger of new and larger floods that would provoke swamping of the region and will misbalance the existing ecosystem of the border region, and mainly within nature parks. At the present the Tundja River is regulated by two large dams on the Bulgarian territory, many small barrages, different artificial canals and dykes.

In February and May 1998 there were critical situations in the Maritsa, Arda and Tundja river basins due to intensive snow melting and continuous heavy rainfall. According to the Civil Protection Agency and the Municipal authorities 500 houses, property and more than 3000 hectares with crop were flooded in the Plovdiv region. Some dams were overtopped, the communications and the traffic were cut. There were victims, as well. Similar types of floods were observed in January 2003 and February 2005: a lot of losses in agriculture occurred, mainly along the lower part of Tundja, and more than 650 ha agricultural area were heavily affected downstream at the town of Edirne.

### **The solution**

Setting up the Flood Forecasting and Early Warning System is foreseen as a necessary step for a sustainable and efficient solution of problems with flood events in the Maritsa and Tundja river basins. The project is oriented towards establishment of such System, including suitable tools for hydro-meteorological observations, data tele-transmissions, proper flood forecasting facilities, and implementation of measures mitigating floods' impact. Set up of a Flood Forecasting and Early Warning System requires clarification of hydro-meteorological conditions, assessment of data/information needs, data sources, modernisation of the measuring system, and finally - establishment of the forecasting/warning system.

The project comprises three components: Technical Assistance, Supply and Works

#### 3.2 Sector rationale

N/A

#### 3.3 Results

The overall result of the project will be a fully operational flood warning and water information system as well as works oriented to the local and regional stakeholders, solving the most urgent problems to decrease the negative consequences of floods, such as soil erosion, infrastructure damages and others. The following results are expected:

- Monitoring of flood phenomena generation and development improved;
- Compatibility of flood prevention and control on BG and TR territory ensured;
- Flood hazard and endangered areas clarified;
- Necessary equipment for data treatment and flood forecasting model and tools delivered;
- Necessary equipment for data treatment and flood forecasting equipment delivered;
- Works promoting the most urgent measures for prevention and rehabilitation of impacted implemented.

Indirect results are also expected, such as: effective water information system supporting integrated water management and decision making, consolidated sustainability of the eco-systems along the rivers, decreased risk of floods and erosion of the riversides, creation of conditions for eco-tourism, increased capacity for information exchange and early warning about disaster events.

### 3.4 Activities

#### ***Component 1: TA for Flood Forecasting and Early Warning System for the BG/TR cross-border rivers***

##### 1. Improving the monitoring and the information system with respect to generation of floods events and their development in real time:

- Establishing an Inventory of hydro-meteorological data sets in the rivers basins and assessment of data compatibility, including levelling, standards for discharge measurements and translation of river levels into discharges.
- Making recommendations on the implementation of hydrological cycle parameters monitoring, relevant for flood forecasting and warning purposes, including observation frequencies and data transmission characteristics compatible with the Turkish ones. Assistance in the establishment of Bulgarian-Turkish Joint Working Group, presenting the draft recommendations for discussion by the Group.
- Establishing river bed and flood plains cross-sections downstream the significant reservoirs according to their selection made under Phare project *BG 2003/005-632.03 Technical Assistance for Multi Annual Programming and Implementation of future cross border neighbourhood programmes with Serbia & Montenegro, FYROM and Turkey*, needed for the hydraulic routing of flood waves.
- Harmonization of TR- BG cross-border rivers GIS data, setting-up GIS database, and preparation of data sets for flood forecasting model calibration.
- Design/improvement of an effective monitoring/measuring and data exchange plan, including observation and data transmission frequency.

##### 2. Determining the level of vulnerability of rivers sections to flood hazards.

The beneficiaries should collect the following data and provide them to the Consultant with respect to:

- Clarification of the rivers network and sub-basin's characteristics, identification of existing significant reservoirs, and clarifying their influence on the flood hydrograph.
- Clarification of the hydro-meteorological conditions and their spatial and temporal variation patterns related to the floods generation processes; analysis of the frequency of flood events, spatial distribution of flood hazard, and identification of vulnerable zones.
- Tracing out the flood thresholds with respect to river levels and discharges at rivers' sections in the floods vulnerable zones. Establishing alarm criteria.

##### 3. Setting up flood forecasting and early warning system:

- Elaborating recommendations for the use of the existing reservoir cascades in real flood events.
- Elaborating recommendations for the local authorities, regarding land use and urbanism based on the identification of vulnerable zones
- Determining requirements of the flood forecasting model, taking into account the regional particularities, available data, accuracy and lead time of the forecast required for effective decision making. Proposing the most appropriate forecasting model and software. Providing, adopting and customising the model/software.
- Installing, calibrating and testing the flood forecasting model, defining the warning procedures and information flows, information dissemination procedures. Ensuring the possibility to use numerical weather forecasts as forecasting model input to produce pre-warning with longer lead time.

- Ensuring the compatibility of the model/software with the real time information flows produced by the newly installed within the Supply component automatic telemetric monitoring stations and satellite precipitation intensity and snow cover data receiving stations, elaborating interface procedures wherever needed.
- Carrying out short training, including exercises for the staff in the use of forecasting software and issuing flood warnings.
- Presenting the final results for discussion and approval by the Joint Working group with respect to their relevance for the decision making in the border region.

### **Component 2: Supply**

The supply of equipment and software will be implemented according to detailed technical specifications to be prepared under Phare project *BG 2003/005-632.03 Technical Assistance for Multi Annual Programming and Implementation of future cross border neighbourhood programmes with Serbia & Montenegro, FYROM and Turkey.*

The necessary equipment may include:

- Automatic hydro-meteorological stations with real-time data transmission facilities including maintenance tools;
- Data pre-processing and storage software, operational database hardware and software, data archiving facility for conventional and satellite long term data storage, GIS layers including 1:5000 geo-referenced maps of the significant river courses where the river bed and flood planes cross-sections will be established, software and hardware;
- Satellite snow cover water content and high intensity precipitation data receiving station - software and hardware;
- Regional Internet based hydrologic information system for public awareness and decision support purposes, incl. software and hardware.

### **Component 3: Works**

The Works will include the following main activities:

- River-banks protection measures; implementation of hydraulic structures to reduce or eliminate flood phenomena and consequences;
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- Small infrastructure measures combating banks' erosion and cleaning of rivers-beds, creating small scale retention volumes, weirs, etc.

The Works will be implemented in two stages:

**1<sup>st</sup> stage: Call for selection of projects** to be carried out by the Ministry of Regional Development and Public Works;

**2<sup>nd</sup> stage: Construction of selected projects** through work and supervision contracts.

The implementation of the awarded projects will be organised **via one or several Works Contracts**. Where possible, development of **several projects** with similar activities **may be combined and contracted** to one contractor. This will foster the overall projects implementation. **One Works Supervision Contract** will cover the above Works Contracts.

The Phare contribution for the preparation of eligible project will cannot exceed 75% of the project budget. The necessary minimum 25 % co-financing will be provided from the Bulgarian national budget.

The selection of projects will be carried out based on the following main criteria:

- The cross-border regions: Bourgas, Yambol and Haskovo in Bulgaria are eligible;
- Local authorities, , ,; local communities, within the above border region can submit project proposals.
- Full project readiness, i.e. design completed.

The proposed project activities have to comply with the following main eligible activities:

- River-banks protection measures; implementation of hydraulic structures to reduce or eliminate flood phenomena and consequences;
- Small infrastructure measures combating banks' erosion and cleaning of rivers-beds, creating small scale retention volumes, weirs, etc

The maximum project duration is **18 months**.

#### ***Component 4 : Works Supervision Services***

- preparation of Tender Dossier for Works Contract (no additional funding will be required);
- works supervision.

### **3.5 Linked Activities**

Phare project **2003/005-632.03** - *Technical Assistance for Multi Annual Programming and Implementation of future cross border neighbourhood programmes with Serbia & Montenegro, FYROM and Turkey.*

### **3.6 Lessons learned**

The project is the first of this type to be implemented between the two neighbouring countries. In regard to that, no specific lessons could be reported to be closely linked with the present project. However, the previous experience of both countries under various other programmes could provide enough evidence for the achieved up to now. Experience obtained from past and ongoing projects, especially experience from implementation of cross-border actions will be applied as much as possible

## **4. Institutional Framework**

The Ministry of Regional Development and Public Works will be acting as a **Contracting Authority** with the overall responsibility for the programme implementation, administrative, technical and financial management. MRDPW as a co-ordinator for CBC programme is obliged to monitor physical and financial implementation of this project including Phare and co-financing payments, and report to the EC in regularly reports.

The MRDPW will ensure necessary human resources for the technical management of the Works and may delegate specific tasks to a **Secretariat** to be established for the Works implementation in accordance with PRAG rules. This Secretariat will be established following a mutual Bulgarian-Turkish agreement reached after relevant negotiations.

The **Steering Committee** of the Works will be composed of representatives from the following institutions:

- The Ministry of Regional Development and Public works will manage this project.
- National Nature Protection Service, Ministry of Environment and Water;
- National Forestry Board, Ministry of Agriculture and Forestry;
- District Governors' administrations;
- EC Delegation as observer.
- Local municipalities and NGOs.

Beneficiaries for the project are:

- local authorities – Component 3 – Works;
- The National Institute of Meteorology and Hydrology and its regional branches with respect to the project Component 1 – TA, and specified items from Component 2 – Supply;
- Ministry of Environment and Water and its River Basin Directorate in Plovdiv, with respect to Component 1 real time information flows and forecasting/warning information, and the remaining items from Component 2 – Supply.

Indirect beneficiaries include different governmental and other institutions and stakeholders in Turkey involved in the process of sharing river data and information and responsible for flood prevention.

## 5. Detailed Budget

		Co-financing			Total Cost
€M	Phare support	National Public Funds (*)	Other Sources (**)	Total Co-financing	
<b>Year 2005 Institution Building support</b>					
Component 1: TA	0.500				0.500
<b>IB support total</b>	<b>0.500</b>				<b>0.500</b>

<b>Year 2005 Investment support jointly co-funded</b>					
Component 2: Supply	<b>0.450</b>	0.150		0.150	<b>0.600</b>
Component 3: Works	<b>0.840</b>	0.280		0.280	<b>1.120</b>
Component 4: Works Supervision	<b>0.210</b>	0.070		0.070	<b>0.280</b>
<b>Investment support - total</b>	<b>1.500</b>	0.500		0.500	<b>2.500</b>
<b>% of total public funds</b>	75 %	25 %			

<b>Total project 2005</b>	<b>2.000</b>	0.500		<b>0.500</b>	<b>2.500</b>
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(\*) contributions from National, Regional, Local, Municipal authorities, FIs loans to public entities, funds from public enterprises. Minimum 25 % co-financing of investment components is provided from the Bulgarian national budget through the Ministry of Finance.

(\*\*) private funds, FIs loans to private entities



## 6. Implementation Arrangements

### Implementing Agency

The Implementing Agency will be the Ministry of Regional Development and Public Works, through its Directorate IA Programme Phare (Cross Border Co-operation Department), which will retain overall responsibility for the implementation of the programme, including: approval of tender documents, evaluation criteria, evaluation of offers, signature of contracts, authorisation of invoices. The Payments Directorate within the same ministry will make the payments of invoices.

Ministry of Regional Development and Public Works

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### Twinning

N / A

### Non-standard aspects

There are no non-standard contracts or tender procedures envisaged within this project.

### Contracts

Service contract (Technical Assistance)	0.500 MEUR
Supply	0.600 MEUR <i>(including 0.450 EU support and 0.150 national co-financing)</i>
Works	1.120 MEUR <i>(including 0.840 EU support and 0.280 national co-financing)</i>
Works Supervision	0.280 MEUR <i>(including 0.210 EU support and 0.070 national co-financing)</i>

## 7. Implementation Schedule

	Service contract	Works	Works Supervision	Supply
7.1. Start of tendering/call for proposals	04.2006	06.2006	06.2006	04.2006
7.2. Start of project activity	01.2007	02.2007	01.2007	07.2006
7.3. Project completion	12.2007	09.2009	09.2009	09.2006

The duration of the Supervision Contract/s is expected to be 22 months:

1 month - mobilisation, 18 – supervision during construction, 3 months – Final Payment

The duration of the Works Contract/s is expected to be 21 months:

18 months - construction, -, 3 months – Final Payment.

## 8. Equal Opportunity

The project will stimulate the process building the partnership between the national, regional and local partners in terms of responsibilities taken, decision making and priorities setting and will be in no way discriminatory in terms of gender, life-style, religion or politics. Equal opportunity principles in relation to participation in the project will be guaranteed.

## **9. Environment**

The project activities emphasise on management of flood hazards and mitigation of the flood risk in the CBC region. Thus it will have a positive impact on long-term sustainable development of the region.

## **10. Rates of return** N / A

## **11. Investment criteria** (applicable to all investments)

### 11.1. Catalytic effect

The following catalytic effects are foreseen:

- Improvement of nature status and flood prevention efficiency in the region;
- Inflow of know-how through project co-operations;
- Strengthening cross-border links between institutions dealing with river management;
- Creation of job opportunities and improving social welfare.

The implementation of projects will stimulate and create a positive business environment for further cooperation.

### 11.2. Co-financing

The National co-financing amounting to minimum 25% of the investment components will be provided by the Bulgarian National Budget through the National Fund Directorate in the Ministry of Finance.

### 11.3. Additionality

The grants awarded under this scheme will not displace any other financial sources. Supported investments and programmes will not displace private financial sources, as they do not generate financial profit.

### 11.4. Project readiness and size

Full project readiness is required for the project proposals.

### 11.5. Sustainability

Long-term sustainability will be one of the selection criteria for projects. Only organizations being able to prove the sustainability of results achieved will be supported.

### 11.6. Compliance with state aids provisions

## **12. Conditionality and sequencing** N/A.

### **ANNEXES TO PROJECT FICHE**

1. Log-frame in standard format
2. Detailed implementation chart
3. Contracting and disbursement schedule

## LOGFRAME PLANNING MATRIX

<b>LOGFRAME PLANNING MATRIX FOR PROJECT:</b> Capacity Improvement for Flood Forecasting in the BG-TR CBC Region		Project number: 2005/017-453.01.01	PHARE – CBC BG-TR
		Contracting period expires: 30/11/2007	Disbursement period expires: 30/11/2009
		Total budget: 2.5 MEUR	Phare budget: 2.0 MEUR
<b>Overall objective</b>	<b>Objectively verifiable indicators</b>	<b>Sources of Verification</b>	
To improve the management of flood hazards in border region increase the effectiveness of flood mitigation measures, and improve security and quality of life.	A working partnership between Bulgarian and Turkish authorities responsible for flood prevention and control		
<b>Project purpose</b>	<b>Objectively verifiable indicators</b>	<b>Sources of Verification</b>	<b>Assumptions</b>
To strengthen the capacity for monitoring, timely detection and early warning of flood phenomena, and implement flood protection measures in the BG/TR border area.	<ul style="list-style-type: none"> <li>• Harmonised flood forecasting and control;</li> <li>• Relevant flood warning tools created;</li> <li>• Cross-border river run-off under control;</li> </ul>	<ul style="list-style-type: none"> <li>• Protocols and other documents containing decisions / agreement on harmonized objectives, methods, characteristics to be measured, and other components of the flood protection management of the basin;</li> <li>• A number (minimum 3) of erosion protected sites/areas developed;</li> <li>• Final MRDPW report;</li> </ul>	<ul style="list-style-type: none"> <li>• Relevant stakeholders (municipalities, NGOs, etc.) from the cross-border rivers area to be involved in the process of implementation of the project</li> </ul>
<b>Results</b>	<b>Objectively verifiable indicators</b>	<b>Sources of Verification</b>	<b>Assumptions</b>
<ul style="list-style-type: none"> <li>• Monitoring of flood phenomena generation and development improved;</li> <li>• Compatibility of flood prevention and control on BG and TR territory ensured;</li> <li>• Flood hazard and endangered areas clarified;</li> <li>• Necessary equipment for data treatment and flood forecasting model and tools delivered;</li> <li>• Necessary equipment for data treatment and flood forecasting equipment delivered;</li> <li>• A Works projects promoting the most urgent measures for prevention and rehabilitation of impacted implemented.</li> </ul>	<ul style="list-style-type: none"> <li>• Compatible BG and TR flood forecasting/control systems;</li> <li>• Number of projects (minimum 7) prepared for implementation;</li> <li>• Equipment delivered;</li> <li>• Number of information products prepared</li> </ul>	<ul style="list-style-type: none"> <li>• Reports on monitoring and implementation of Works projects on monthly basis;</li> <li>• NGO reports,</li> <li>• Articles in newspapers, spots on TV, Internet advertisement,</li> <li>• Regional and national statistics</li> <li>• Additional reports on compliance with the flood prevention activities – audit, supervision, evaluation</li> </ul>	
<b>Activities</b>	<b>Means</b>		<b>Assumptions</b>

<p><i>Component 1: TA for Flood Forecasting and Early Warning System for the BG/TR cross-border rivers</i></p> <p><u>1. Improving the monitoring and the information system with respect to generation of floods events and their development in real time:</u></p> <ul style="list-style-type: none"> <li>• Inventory of hydro-meteorological data sets in the rivers basins and assessment of data compatibility, including levelling, standards for discharge measurements and translation of river levels into discharges.</li> <li>• Making recommendations on the implementation of hydrological cycle parameters monitoring, relevant for flood forecasting and warning purposes, including observation frequencies and data transmission characteristics compatible with the Turkish ones. Assistance in the establishment of Bulgarian-Turkish Joint Working Group, presenting the draft recommendations for discussion by the Group.</li> <li>• Establishing river bed and flood plains cross-sections downstream the significant reservoirs according to their selection made under Phare project <i>BG 2003/005-632.03 Technical Assistance for Multi Annual Programming and Implementation of future cross border neighbourhood programmes with Serbia &amp; Montenegro, FYROM and Turkey</i>, needed for the hydraulic routing of flood waves.</li> <li>• Harmonization of TR- BG cross-border rivers GIS data, setting-up GIS database, and preparation of data sets for flood forecasting model calibration.</li> <li>• Design/improve an effective monitoring/measuring and data exchange plan, including observation and data transmission frequency.</li> </ul> <p><u>2. Determining the level of vulnerability of rivers sections to flood hazards, including:</u></p> <p>The beneficiaries should collect data and provide them to the consultant.</p> <ul style="list-style-type: none"> <li>• Clarification of the rivers network and sub-basin's characteristics, identification of existing significant reservoirs, and clarifying their influence on the flood hydrograph.</li> </ul>	<p>Component 1 - Service Contract – 0.50 MEUR Phare contribution;</p> <p>Component 2 – Supply Contract – 0.60 MEUR (0.45 MEUR Phare contribution + 0.15 MEUR national co-financing);</p> <p>Component 3 – Works – 1.05 MEUR (0.84 MEUR Phare contribution + 0.21 MEUR national co-financing);</p> <p>Component 4 – Works Supervision – 0.28 MEUR (0.21 MEUR Phare contribution + 0.07 MEUR national co-financing).</p>	<ul style="list-style-type: none"> <li>• Contracts for the different activities;</li> <li>• Approve – deliver protocols for the equipment;</li> <li>• Project achievement reports and financial reports;</li> <li>• Information in media</li> </ul>	<ul style="list-style-type: none"> <li>• Co-ordination between the activities of the respective authorities in the implementation of the planned activities;</li> <li>• The methodology to assure the sustainability of the project results to be described and provided by the applicants of the Works projects</li> </ul>
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<ul style="list-style-type: none"> <li>• Clarification of the hydro-meteorological conditions and their spatial and temporal variation patterns related to the floods generation processes; analysis of the frequency of flood events, spatial distribution of flood hazard, and identification of vulnerable zones.</li> <li>• Trace out the flood thresholds with respect to river levels and discharges at rivers' sections in the floods vulnerable zones. Establishing alarm criteria.</li> </ul> <p><u>3. Setting up flood forecasting and early warning system:</u></p> <ul style="list-style-type: none"> <li>• Elaborating recommendations for the use of the existing reservoir cascades in real flood events.</li> <li>• Determining requirements of the flood forecasting model, taking into account the regional particularities, available data, accuracy and lead time of the forecast required for effective decision making. Propose the most appropriate forecasting model and software. Provide, adopt and customise the model/software.</li> <li>• Installation, calibration and testing the flood forecasting model, defining the warning procedures and information flows, information dissemination procedures. Ensuring the possibility to use numerical weather forecasts as forecasting model input to produce pre-warning with longer lead time.</li> <li>• Ensuring the compatibility of the model/software with the real time information flows produced by the newly installed within the Supply component automatic telemetric monitoring stations and satellite precipitation intensity and snow cover data receiving stations, elaborate interface procedures wherever needed.</li> <li>• Carry out short training, including exercises for the staff in the use of forecasting software and issuing flood warnings.</li> <li>• Presenting the final results for discussion and approval by the Joint Working group with respect to their relevance for the decision making in the border region.</li> </ul> <p><i>Component 2: Supply:</i> The supply of equipment and software will be implemented according to detailed technical specifications to be prepared</p>			
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under Phare project *BG 2003/005-632.03 Technical Assistance for Multi Annual Programming and Implementation of future cross border neighbourhood programmes with Serbia & Montenegro, FYROM and Turkey.*

The necessary equipment may include:

- Automatic hydro-meteorological stations with real-time data transmission facilities including maintenance tools;
- Data pre-processing and storage software, operational database hardware and software, data archiving facility for conventional and satellite long term data storage, GIS layers including 1:5000 geo-referenced maps of the significant river courses where the river bed and flood planes cross-sections will be established, software and hardware;
- Satellite snow cover water content and high intensity precipitation data receiving station - software and hardware;
- Regional Internet based hydrologic information system for public awareness and decision support purposes, incl. software and hardware.

*Component 3: Works projects:*

The Works projects will include the following main activities:

- River-banks protection measures; implementation of hydraulic structures to reduce or eliminate flood phenomena and consequences;
- ;
- Small infrastructure measures combating banks' erosion and cleaning of rivers-beds, creating small scale retention volumes, weirs, etc.

The Works projects will be implemented in two stages:

**1<sup>st</sup> stage:** Call for selection of projects to be carried out by the Ministry of Regional Development and Public Works;  
**2<sup>nd</sup> stage:** Full preparation of selected projects through

<p>works contracts.</p> <p>The implementation of the awarded projects will be organised <b>via one or several Works Contracts</b>. Where possible, development of <b>several projects</b> with similar activities <b>may be combined and contracted</b> to one contractor. This will foster the overall projects implementation. <b>One Works Supervision Contract</b> will cover the above Works Contracts.</p> <p>The maximum project duration is <b>18 months</b>.</p> <p><i>Component 4 : Works Supervision Services</i></p> <ul style="list-style-type: none"> <li>▪ preparation of Tender Dossier for Service Contracts (no additional funding will be required);</li> <li>▪ tender procedure;</li> <li>▪ contract monitoring and management during project implementation.</li> </ul>			
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**ANNEX 2:** Detailed implementation chart

Contracting		2006								2007												2008												2009															
		A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D			
1	Service Contract (Technical Assistance)	T	T	T	T	T	T	T	T	C	I	I	I	I	I	I	I	I	I	I	I	I																											
2	Works Contract			T	T	T	T	T	T	C	C/I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	R	R	R		
3	Works Supervision Contract			T	T	T	T	T	T	C	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	R	R	R		
4	Supply contract	T	T	C	I	I	I																																										

T = Tender preparation/design; C = Contracting; I = Implementation/works; R – Review/evaluation



### ANNEX 3: Contracting and disbursement schedule by quarter

Project title: Capacity Improvement for Flood Forecasting in the BG-TR CBC Region															
Contracting	Cumulative contracting schedule by quarter in MEUR (provisional)														Total
	2006		2007				2008				2009				
	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	
PHARE contribution															
			0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	
Works			0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840
Works Supervision			0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
Supply contract	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450
Total PHARE	0.450	0.450	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
National contribution															
Works - National co-financing			0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280
Works Supervision - National co-financing			0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
Supply contract - National co-financing	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
Total National co-financing	0.150	0.150	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Total Service contract (Technical Assistance)			0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
Total Works							1.120	1.120	1.120	1.120	1.120	1.120	1.120	1.120	1.120
Total Works Supervision							0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280
Total Supply contract					0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Total contracting:					0.600	0.600	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500

Disbursement	Cumulative disbursement schedule by quarter in MEUR (provisional)														Total
	2006		2007				2008				2009				
	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	
<b>PHARE contribution</b>															
Service contract (Technical Assistance)			0.300	0.450	0.450	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	<b>0.500</b>
Works			0.144	0.280	0.430	0.550	0.700	0.840	0.840	0.840	0.840	0.840	0.840	0.840	<b>0.840</b>
Works Supervision			0.053	0.088	0.122	0.158	0.192	0.210	0.210	0.210	0.210	0.210	0.210	0.210	<b>0.210</b>
Supply contract	0.270	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	0.450	<b>0.450</b>
<b>Total PHARE</b>	<b>0.270</b>	<b>0.450</b>	<b>0.947</b>	<b>1.268</b>	<b>1.452</b>	<b>1.658</b>	<b>1.842</b>	<b>2.000</b>	<b>2.000</b>	<b>2.000</b>	<b>2.000</b>	<b>2.000</b>	<b>2.000</b>	<b>2.000</b>	<b>2.000</b>
<b>National contribution</b>															
Works - National co-financing			0.054	0.100	0.144	0.190	0.234	0.280	0.280	0.280	0.280	0.280	0.280	0.280	<b>0.280</b>
Works Supervision - National co-financing			0.018	0.028	0.039	0.049	0.058	0.070	0.070	0.070	0.070	0.070	0.070	0.070	<b>0.070</b>
Supply contract - National co-financing	0.090	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	<b>0.150</b>
<b>Total National co-financing</b>	<b>0.090</b>	<b>0.150</b>	<b>0.222</b>	<b>0.278</b>	<b>0.332</b>	<b>0.389</b>	<b>0.442</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>
<b>Total Service contract (Technical Assistance)</b>			<b>0.300</b>	<b>0.450</b>	<b>0.450</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>
<b>Total Works</b>			<b>0.198</b>	<b>0.380</b>	<b>0.574</b>	<b>0.740</b>	<b>0.934</b>	<b>1.120</b>	<b>1.120</b>	<b>1.120</b>	<b>1.120</b>	<b>1.120</b>	<b>1.120</b>	<b>1.120</b>	<b>1.120</b>
<b>Total Works Supervision</b>			<b>0.071</b>	<b>0.116</b>	<b>0.160</b>	<b>0.207</b>	<b>0.250</b>	<b>0.280</b>	<b>0.280</b>	<b>0.280</b>	<b>0.280</b>	<b>0.280</b>	<b>0.280</b>	<b>0.280</b>	<b>0.280</b>
<b>Total Supply contract</b>	<b>0.360</b>	<b>0.600</b>	<b>0.600</b>	<b>0.600</b>	<b>0.600</b>	<b>0.600</b>	<b>0.600</b>	<b>0.600</b>	<b>0.600</b>	<b>0.600</b>	<b>0.600</b>	<b>0.600</b>	<b>0.600</b>	<b>0.600</b>	<b>0.600</b>
<b>Total disbursement:</b>	<b>0.360</b>	<b>0.600</b>	<b>1.169</b>	<b>1.546</b>	<b>1.784</b>	<b>2.047</b>	<b>2.284</b>	<b>2.500</b>	<b>2.500</b>	<b>2.500</b>	<b>2.500</b>	<b>2.500</b>	<b>2.500</b>	<b>2.500</b>	<b>2.500</b>