

# **EXPERIENCES OF THE CROSS-BORDER COOPERATION BETWEEN GREECE AND BULGARIA: THE CASE OF NESTOS RIVER**

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## **Introduction**

Border regions situated at the heart of Europe can benefit from both internal cooperation and cross-border cooperation. On the other hand, some border regions are situated in countries, which are considered to be «peripheral». Other regions border on third countries whose frontiers are practically sealed. In this later case, only inter-regional cooperation aimed at resolving the problems arising from their remote position can be envisaged initially.

The distance separating border regions from their administrative center limits communication with it. These regions often feel discriminated against compared with the rest of the country. Relationships with other regions can prompt them to establish cooperation structures at inter-regional level, thereby creating cross-border links. Cross-border cooperation enables expansion of a region's communications and exchange network. Outlying regions very often need to develop their potential in a manner, which is complementary to that of the neighboring region. In this context, cross-border cooperation promotes the upgrading of what is frequently called deteriorated infrastructure.

Cross-border cooperation involves particular consideration of civil and social rights, information, culture, training, education etc. Environmental protection is the most obvious example of an issue driving citizens to act together, notably at cross-border level. Environmental pollution is an outstanding example of something that can be solved only at cross-border level, since pollution does not stop at state border. The changes in Eastern Europe during the last decade have physical consequences for the whole Europe. External borders of the EU states have to be open to develop a comprehensive concept of cooperation. Especially due to the two-way growth in the East-West movements, the eastern border regions face growing bottlenecks in their infrastructure.

According to “The State of the Environment in the European Union”, 25% of the rivers and canals in the European Union have water which is not suitable for the production of drinking water. The environmental objective that has to be reached is to maintain water quality where it is already good and ultimately achieve good ecological water quality elsewhere. A body of water is considered to be of good ecological quality when the self-purification of the water body is maintained, the diversity of naturally occurring species is preserved and the structure and quality of the sediments are able to sustain the naturally occurring biological community of the ecosystem. The protection of ground water from pollution is also considered very important. However, protecting the surface water, which may percolate into ground water and may be interconnected to aquifers, from pollution maintains and improves the quality of ground water too.

Even though improvements have been obtained in the quality of some surface waters in recent years, the general quality in the most European countries needs to be improved. Individual countries need to carry out a systematic assessment of water quality and measures need to be taken in order to preserve and improve water quality. The proportion of coastal waters and estuaries damaged by pollution or

eutrophication has risen and is still on the increase. Acidification still poses a problem to inland water bodies. Pollutants unnoticed in the past threaten to become important, particularly pesticides, and more generally, micro-pollutants. Urban, agricultural and industrial pollution is the most common pollution that appears in surface water bodies.

The measures needed to ensure the availability of clean water may, in many waters, not were substantial, but are nevertheless necessary in order to ensure that the water resource will be available for legitimate human, economic and recreational uses. The action, which is necessary in order to reach the operational objectives defined by member states, will vary according to regional conditions. Other EU's water legislation defines the baseline measures to protect surface waters against pollution and to improve ecological quality. These measures include treatment of urban wastewater, prevention of diffuse pollution with nitrates from agricultural sources and the limitation of discharges of certain dangerous substances. Furthermore, baseline measures have to be taken in order to limit discharges of pollution into surface water from the most important industrial sectors. Other measures could be the introduction of environmental friendly practices in certain sectors, e.g. agriculture, fisheries and transportation and the regulation of sources of air pollution which give rise to subsequent water pollution, etc.

In order to protect all surface waters each country will need:

- To define operational quality targets for all surface waters;
- To set up monitoring systems for water quality and an inventory of discharges and of sources of diffuse pollution;
- To draw up integrated programs to meet the operational quality targets;
- To cooperate with neighbor countries in the framework of shared (transboundary) water resources;
- To implement the measures contained in these programs.

Five rivers in the southern Balkans are transboundary rivers. Ardas, Strymon, Nestos and Evros River are flowing through Bulgaria and Greece. Aoos River rises in NorthWest Greece and flows through Greek and Albanian territory before emptying into the Adriatic Sea. River Nestos and its whole ecosystem are considered very important for the development of the sensitive region of North Greece. It is located in the Southern Balkans (Map 1) and Bulgaria and Greece share its water. It is the most important water resource for its region and has been the object of negotiations between Greece and Bulgaria for many years. Unfortunately its famous ecosystem is in danger because of the pollution caused by various human activities and the large-scale hydraulic works (dams) constructed along the

*Map 1. The Nestos River*



river. The protection and management of Nestos waters are of great economic and ecological importance for both countries and should be based on a thorough environmental study carried out on a cross-country level. The next section of the paper discusses the cross-border cooperation between Greece and Bulgaria. Sections 3 and 4 present two case studies, while section 5 offers some conclusions.

## **Cross-Border Cooperation between Greece and Bulgaria - The Case of Nestos River**

Cross-border cooperation has existed since the end of 70s. For the most countries specific institutional structures were created or an enlarged cooperative structure had been set up. Before Interreg programs, initiatives for cross-border cooperation, especially between Greece and East countries were limited in scale and scope. Cooperation between Greece and neighboring countries suffered from weak international relations, contacts were poorly developed and there was little activity in border areas. The political changes, which have taken place in Central Europe, have brought about new perspectives (especially over cooperation with Bulgaria) and the Interreg program for Greece reflects this development.

The situation concerning cross-border cooperation, within the framework of Interreg program, at the external borders of the European Union is extremely diversified and the problems facing the regions, particularly those bordering the former Eastern Block countries, are numerous and complex. Moreover, rapid changes have occurred in these regions since the establishment of the structural funds and Interreg programs.

In order to perform an integrated study and suggest measures for the protection of the most important water resource in the Northern Greece (e.g. Nestos River ecosystem), an initiative was undertaken by the Aristotle University of Thessaloniki in cooperation with the University of Sofia. Two research programs were conducted in the framework of EU's Interreg program (transboundary cooperation). The first project entitled "Study of pollution of transborder river Nestos (Greece - Bulgaria) and impact on the receiver" conducted in the framework of Interreg I program during 1992-1994. In this study data are presented and analyzed concerning the state of water quality and pollution sources of Nestos River (both Greek and Bulgarian part). Nowadays, in the framework of Interreg II program, the Aristotle University of Thessaloniki performs a second project entitled "Training of engineers and transfer of know-how in environmental protection of Nestos (Mesta) river basin in both Greece and Bulgaria" in cooperation with the University of Sofia.

The Nestos<sup>1</sup> (Mesta<sup>2</sup>) River rises in the Rila mountain in Southern Bulgaria and flows some 230 km through Bulgarian and Greek territory before emptying into the North Aegean Sea. About 100 km of the river flow through Bulgaria and about 130 km through Greece (Map 1). The total catchment area of the river is about 5.800 km<sup>2</sup>, of which ~2.800 km<sup>2</sup> (48%) belong to Greece. The morphology of the area is mountainous with the exception of the Delta region, which covers an area of 440 km<sup>2</sup>. The population in the Greek part of Nestos river catchment area is about 42.000 inhabitants and almost the same in the Bulgarian part. The valley of the river in Bulgaria is confined between the Pirin Mountain from the West and the Rila Mountain from the North and the Rhodopi from the East. The Bjala Mesta River and the Cherna Mesta River near the town of Jakoruda is accepted as the origin of the Nestos (Mesta) river. A spring with an altitude of 2.240 m near the Granchar Lake is accepted as the origin of the Bjala Mesta River. The Mesta (Nestos) River has about 25 tributaries from which the Despatis River is the biggest one. It flows into the Nestos River in Greek territory. Other tributaries are the Arkoudorema, the Diavolorema, the Mousdarema etc. The total catchment area of these tributaries is about 1350 Km<sup>2</sup>.

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<sup>1</sup> in Greek

<sup>2</sup> in Bulgarian

According to data of mean monthly flows recorded by the Public Electric Power Corporation (PPC) for the period 1965-1990, only in a very few cases was the maximum discharge over 150 m<sup>3</sup>/s, while the minimum discharge was often lower than 10 m<sup>3</sup>/s. According to data by the Greek Ministry of Agriculture, the mean monthly flows that were recorded (period 1989-2000) at the bridge of Stavroupoli varies between 1 and 400 m<sup>3</sup>/s.

During recent years four dams have been constructed at the Greek section of the river: (a) Thisavros, (b) Platanovrisi, (c) Temenos and (d) Arkoudorema. All these dams will provide hydroelectric power generation and water supply for irrigation networks. There has been concern about the impact of these works downstream, particularly in areas of natural beauty and ecological interest, such as the “Tembi of Nestos” and of course the Delta area which is protected by the RAMSAR Treaty.

The pollutant loads discharged into the river are mainly from:

#### Bulgaria

- ◆ Wastewater (treated – untreated) from various activities such as:
  - small towns (Raslog, Bansko, Jakoruda, Belitza, Gotze Deltchev, Dospat),
  - villages (Banja, Eleshnitsa, Hadjidimovo, Baroutin),
  - tourist bases (Vihren, Banderitza, Shiligarnitza, Damjanitza, Bezbog, Popina Laka),
  - resorts (Semkovo, Dospat Dam),
  - industrial areas (the towns and villages given above plus Uranium mining and the ore enrichment plant at the Eleshnitsa village),
  - drainage ditches.

#### Greece

- ◆ Wastewater (treated – untreated) from small towns and villages discharging into the Nestos River and its tributaries. The Greek part of the catchment area comprises eight municipalities which administratively belong to three prefectures, those of Drama, Kavala and Xanthi as shown below:
  - Prefecture of Drama: Municipalities of: Kato Nevrokopi, Sidironero, Paranesti
  - Prefecture of Kavala: Municipalities of: Orino, Chrisoupoli, Keramoti
  - Prefecture of Xanthi: Municipalities of: Stavroupoli, Topiros
- ◆ Wastewater from the few industries and small handicrafts located in the catchment area.
- ◆ Drainage ditches which receive, along with the storm water, residues of pesticides and fertilizers.

### **Case Study 1: 1<sup>st</sup> Cooperated Cross-Border Interaction (Interreg I, 1992-1994), “Study of Pollution of Transborder River Nestos (Greece - Bulgaria) and Impact on the Receiver”**

In order to determine the water quality conditions of the Nestos River a program of *in situ* measurements, samplings and laboratory analyses was carried out during the period 1992 - 1993. Six sampling points were selected at representative locations along the river at Hadjidimovo, Buckovo, Jakoruda (Bulgarian territory) and Potami, Stavroupoli, Delta area (Greek territory). The sampling point at Potami is only 7 km downstream the Greek-Bulgarian borders and since there are not intermediate pollution sources, water quality at that point reflects the incoming pollution from Bulgaria. Stavroupoli is another station at a distance of 47 km from the borders, near the middle of the Greek part of the river. From this point the river enters the plain area below the mountains. The last of the dams constructed by PPC is located just upstream from this site. Water quality data analysis for this station is significant for establishing a database with historical data useful for future environmental impact assessment of the dams. The last sampling point is located at the Delta, about 0,5 km upstream from the estuary. At this point the river has received all the pollution from Bulgaria and Greece, which is reflected in the water quality of the river as it enters the sea.

During the period of the project sampling sets were collected, at the above mentioned sampling stations, twice a month, and analyzed in Greece and Bulgaria. Temperature, pH, Conductivity and Dissolved Oxygen were measured *in situ*. The rest of the parameters (Suspended Solids, Biochemical Oxygen Demand, Chemical Oxygen Demand, Phosphates, Ammonia, Nitrites, Nitrates, Heavy metals,

Biological indicators, Fertilizers and Pesticides) were determined at the laboratory. The Greek scientific team consisting of different disciplines was responsible for sampling and analyzing the samples collected from the three Greek sampling stations while the Bulgarian scientific team was responsible for sampling and analyzing the samples collected from the three Bulgarian sampling stations.

The results of all these measurements were then evaluated statistically and the conclusions about the water quality parameters were published and announced in some international conferences.

The state of water quality of the Nestos River for the period of research was established. Differences in water quality at different locations on the river have been clearly distinguished indicating that the river is more polluted at the entrance from Bulgaria. Water quality indicated gradual improvement towards Stavroupoli, deteriorating again as the river moves towards the Delta. Different properties of water quality parameters reflect different types of pollution sources e.g. heavy metals concentrations at station Potami were indicative of industrial pollution imported from Bulgaria, while nutrient concentrations at station Delta indicated agricultural pollution. Since pollution can now be attributed to certain geographical areas, other potential causes of pollution may be more easily identified and investigated. Identification of pollution sources may also be made easier by a combination of other tools, such as the use of geographic information systems (GIS).

The results arising from the Bulgarian scientific team concerning the Mesta River (Bulgarian part) water quality showed an improvement of its qualitative indicators. Several reasons for this could be pointed out:

- the drastic reduction of industrial activities in the region,
- the availability of the wastewater treatment plants as the main wastewater flows enters the river, as well as the fact that all of them were underloaded,
- the new environmental policy of the Bulgarian Government with a more precise and strong control over the contamination from domestic and industrial wastewater.

## **Case Study 2: 2<sup>nd</sup> Cooperated Cross-Border Interaction (Interreg II, 2000-2001), “Training of Engineers and Transfer of Know-how in Environmental Protection of Nestos (Mesta) River Basin in both Greece and Bulgaria”**

The philosophy of this interaction was the training of new unemployed engineers in the protection of the environment in general and more specifically in the ecosystem of the Nestos River.

The research program was started with a detailed and complete study on the total catchment area both in Greece and Bulgaria. A good inventory of the pollution sources (urban, agricultural, industrial etc.) of the Nestos river is leading to the concrete measures which need to be taken in order to protect the whole ecosystem. Special scientists, involved in the project, from both neighbor countries are collaborating in the effort for better understanding the current situation and for planing the necessary technical measures for river's water quality stabilization and improvement. They are travelling, sometimes across the border, exchange experiences and discuss the progress of their projects. They have meetings with the local authorities in order to get useful information about the situation in the actual region and the anthropogenic impact on the receiver. They visit libraries reviewing the relevant literature and update their knowledge about new techniques, which can be applicable in the protection of the Nestos river basin. Four workshops have taken place on Bulgarian territory and two on Greek.

The Greek part of the total catchment area was mapped out using G.I.S. (Geographical Information System). The water quality data (chemical) has been supplemented and updated using the Greek Ministry of Agriculture database. The ministry disposes chemical analyzes on the Nestos River for a long period, over 30 years.

The scientists have registered all new information about the development of the population of the actual area, especially after the creation of the new so called “Capodistrian Municipalities” in Greece. Data about irrigated areas have been updated as well. The sewerage system and the final receiver of the wastewater for each municipality are now known. Ground water resources in the basin and drinking water supplying information is also known and registered. Cultivated areas, fit for pasture earth and units producing milk and meat in the Nestos River basin are completed. Industrial activities and small handicraft factories in the region are also registered. Wastewater treatment plants located in the basin are registered. Operation and problems that burst in have been thoroughly studied.

Emphasis was given in order to register the natural ecosystems of the study area and ecosystems protected by international treaties. National parks, historical sites - monuments and traditional settlements considered very important for the development of the region. In small words all the infrastructure of the region has been registered in order to become a helpful tool during the education of the new engineers and by anyone others hand interested in this subject.

All the above mentioned data has been treated in collaboration with both sites and a database including the water quality parameters (chemical analyzes), the development of the population, the rain data and the flows of the river been created.

The legislation (Greek, Bulgarian and European) about the environmental protection of such ecosystems as Nestos river comprises one of the most important parts of the project. There have been efforts to concentrate all the relevant legislation in a special chapter, which will be easy to handle in the future.

In the educational program 20 (10 Greeks and 10 Bulgarians) new unemployed engineers had participated. They were graduated from Universities and Technological Institutions. The duration of the training course was 150 hours totally, which have been divided into theory (90 hours) and practice (60 hours). Lectures held in English by scientific educational staff from the Aristotle University of Thessaloniki, the University of Sofia, several firms and specialists in the subject from the European Union covered a wide range of environmental aspects with emphasis in the construction and operation of wastewater treatment plants.

Visits and excursions to water and wastewater treatment plants were necessary for better survey and conception of the final aim: the best education of our new engineers. At last, the educated participants had to collaborate and write (in teams) their diploma work, which were relevant to the subjects they had been educated.

## **Conclusions**

The most important objective of the Interreg programs is to assist the border regions in solving their specific development problems, which result from their peripheral situation within their national economy and within the EU's economy as a whole. The Interreg programs indicate priorities such as solving environmental problems occurring in particularly rural areas and improvement of quality concerning transboundary water resources. One of the high-priority problem-solving approaches is the reduction of environmental damage and the development of environmental protection through landscape planning. Local development could be built upon the characteristics, needs and potential of border regions. Cross-border cooperation is, in this context, an alternative, around which development can be built.

At the borders with Eastern European countries cross-border cooperation in the framework of Interreg program sets up joint planning and information exchange initiatives. Moreover, sets up coordination mechanisms for EU's programs in those countries. Cross-border cooperation is a priority to facilitate the development of both sides of the border and to create opportunities for enterprise creation and development. Training is also emphasized as one of the most important means of establishing ties

between the border communities and facilitating the successful realization of development projects. Joint training schemes including seminars targeted at specific sectors. The sector chosen depends on the industrial fabric of the area. These seminars facilitate joint solutions/responses to the problems identified, which makes successful implementation more feasible.

The management of transboundary water resources needs close collaboration between transboundary countries with respect to national legislation and international environmental treaties. Planning and management of the water quality in the Nestos River needs to be supported by the collection of updated data on continuous basis. Continuous monitoring of the Nestos river is necessary for this purpose, so that decisions can be taken about compliance with water quality standards and the corrective measures, which may need to be taken.

The registration of the current condition of the basic infrastructure in the region considers very important for the management of the water resources and the use of the water (water supply, sewerage, processing of the soils, etc.). The evaluation and the elaboration of the existing data solve operational problems and services of the water management's system in the region.

The training of new engineers gives them the opportunity to refresh their knowledge in the matters of water management and generally in the environment's protection. They can exchange experiences and know-how during their educational programs. Participation (as spokesmen) of scientists and experts in the field of construction and operation of sewerage systems and wastewater treatment plants considers necessary.

Cross-border cooperation between educational institutes and Universities is very popular, especially during last years, supplying new scientists the opportunity to travel across the border and transfer their experiences and their knowledge to both involved countries.

Informing and sensitization of the public opinion in the subject of the protection of the environment considers very important for both neighbor countries. It is obvious that this project can be the basis of a closer and more effective cooperation between the Authorities and Institutions involved in the two countries with a final aim: the contribution to the protection of the Nestos river basin and the development of the whole region.

This paper has attempted to pinpoint the current framework surrounding cross-border cooperation in a citizen's Europe, in order to draw conclusions, which can be beneficially utilized in the future. It is urgently necessary to reduce as quickly and as effectively as possible the various forms of environmental pollution, which tarnish the image of the border region, and prevent creation of new forms of pollution. Efforts must continue in this field, where only a few steps have been taken. As noted, peripheral regions feature a lack of infrastructure and resources. Cross-border cooperation could help to resolve certain problems, through the pooling of resources and know-how.

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