THE SOCIO-ECONOMIC IMPACT GENERATED BY THE IMPROVEMENT OF NAVIGATION CONDITION ON THE ROMANIAN - BULGARIAN COMMON SECTOR OF THE DANUBE

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ABSTRACT

The Danube River in Romania and Bulgaria is an important section of the Pan-European Transport Corridor number VII. The river connects the Black Sea with the hinterland from Romania and Bulgaria to Hungary, Austria, Germany, etc. However, in the periods of summer–autumn, the water flows are decreasing considerably on this river section, resulting in difficult navigation conditions. In the main branch of the Danube, the minimum depth for navigation is not met everywhere, resulting in dangerous navigational conditions and economic uncertainty about this transport route. The reasons for this very unfavourable situation for navigation are mainly related to morphological and hydrological phenomena. The project named "Technical Assistance for Improvement of Navigation Conditions on the Romanian – Bulgarian common sector of the Danube and accompanying studies" is part of the more global Danube navigability project in order to improve the Pan-European Corridor no. VII as it aims to improve the navigability of the Danube River in such a way that it will answer to the needs of the national transport policy of Romania as well as the countries’ international commitments. The impact on the socio-economic environment will be analysed for the following section on the Danube River: Iron Gate II to Romanian/Bulgarian border at Calarasi – Silistra, where previous studies have identified a number of specific navigational constraints. After completing the investment works in the sites from critical sectors for navigation, the impact will be positively, both from economic and social point of view. Positive effects begin to occur during the construction period, when the socio-economic environment will be analysed for the following section on the Danube River: Iron Gate II to Romanian/Bulgarian border at Calarasi – Silistra, where previous studies have identified a number of specific navigational constraints; for Section I, the project is carried out with the purpose to ensure the necessary parameters of the navigable channel on the Danube (Fig. 1), especially in zones with islands and alluvial deposition.

Keywords: Pan-European Transport Corridor no. VII, navigation improvement works, the impact on the socio-economic environment

1. INTRODUCTION

The Danube River in Romania and Bulgaria is an important section of the Pan-European Transport Corridor number VII. The river connects the Black Sea with the hinterland from Romania and Bulgaria to Hungary, Austria, Germany, etc. However, in the periods of summer–autumn, the water flows are decreasing considerably on this river section, resulting in difficult navigation conditions. In the main branch of the Danube, the minimum depth for navigation is not met everywhere, resulting in dangerous navigational conditions and economic uncertainty about this transport route. The reasons for this very unfavourable situation for navigation are mainly related to morphological and hydrological phenomena. The project named "Technical Assistance for Improvement of Navigation Conditions on the Romanian – Bulgarian common sector of the Danube and accompanying studies" is part of the more global Danube navigability project in order to improve the Pan-European Corridor no. VII as it aims to improve the navigability of the Danube River in such a way that it will answer to the needs of the national transport policy of Romania as well as the countries’ international commitments. The impact on the socio-economic environment will be analysed for the following section on the Danube River: Iron Gate II to Romanian/Bulgarian border at Calarasi – Silistra, where previous studies have identified a number of specific navigational constraints. After completing the investment works in the sites from critical sectors for navigation, the impact will be positively, both from economic and social point of view. Positive effects begin to occur during the construction period, when the socio-economic environment will be analysed for the following section on the Danube River: Iron Gate II to Romanian/Bulgarian border at Calarasi – Silistra, where previous studies have identified a number of specific navigational constraints; for Section I, the project is carried out with the purpose to ensure the necessary parameters of the navigable channel on the Danube (Fig. 1), especially in zones with islands and alluvial deposition.

Section I: Iron Gate II to Romanian/Bulgarian border at Calarasi – Silistra, where previous studies have identified a number of specific navigational constraints; for Section I, the project is carried out with the purpose to ensure the necessary parameters of the navigable channel on the Danube (Fig. 1), especially in zones with islands and alluvial deposition.

Section II: The port of Tulcea sector between Ceatal Ismail – Braila to Ceatal Sf. Gheorghe – Sulina Channel, where navigation conditions are hampered by sedimentation of the harbour and a curve (R=700m) with limited navigation width.

Section III: Danube – Black Sea Canal and the Port Alba – Midia Navodari Canal, where poor design/construction has resulted in stability and erosion problems of the high embankments / escarpments defining the channels and where canal infrastructure needs improvement.

Section IV: Detail Design, Works Tender Documents and Cohesion Fund Application for the extension of Calafat Port Infrastructure and systematization of the Port rail device.

Timing of the project. The execution period of the planned works is estimated to start in the year 2012. The works will be carried out one by one, during several years. The designer has considered the execution of water constructional works within two stages. Works provided within the second stage are estimated to begin in the year 2018, and will be completed in 2022.

2. SCOPE OF THE PROJECT

The project has the purpose to propose works that are within the category of successively taken measures,
starting from before the year 1900, for maintaining the navigation channel which allows ship access and transport of goods along the Danube between the Black Sea and the Danubian ports, to Central Europe and Western Europe.

The specification of a technical solution within the project is necessary for continuing to provide adequate navigation conditions along the Romanian – Bulgarian common sector of the Danube and access among Danubian riparian countries and the Black Sea. The project contributes to maintain river channel stability on some stretches, which is important for maintaining the necessary conditions in the navigable channel.

Also, the project is in line with European policy to improve navigation on inland waters, as a measure towards sustainable development. Continuing the present activities (zero alternative), without other measures, has negative direct or indirect effects on economic activities.

The cumulated effects of this project with other proposed projects on the Lower Danube, like the project regarding the Calafat port improvement works, the project for improvement of the navigation conditions on the Calarasi - Braila sector (ISPA 1), the project of proposed works for the Danube - Blak Sea Canal, contribute to continue navigation in more adequate conditions.

The proposed project is part of the actions taken for finding common solutions to answer both to requirements of navigation or other uses, and to ecological requirements, taking into account the European Union legislations and the international conventions.

2. POTENTIAL IMPACT ON THE SOCIO-ECONOMICAL ENVIRONMENT AND MEASURES TO REDUCE IT

The critical sectors for navigation are located along the whole common Romanian – Bulgarian sector of the Danube (Section 1 of the project – which means Iron Gate II – Calarasi-Silistra).

Impact prognosis. The impact on the socio-economic environment due to the project works has been assessed on the basis of the following criteria: during construction - impact on the population (socio-economic conditions, environmental conditions), impact on river transport, impact on fishing and recreation, impact on pumping stations (water intake and discharges), impact on other infrastructure - and the socio-economic impact during the operational period.

2.1. Impact during the construction period

The impact during the construction period is temporary and it will be both positive and negative. New working places will be provided for local population during the development of site works. Land potential impact generated by construction activities is insignificant because the works proposed to be carried out are located within the minor channel (groins and bottom sills) or on the banks of Danube River (bank protection works). Negative impact is produced by noise and emissions generated by operation of work equipment, transport vehicles and construction activities.

2.1.1. Potential impact on population

The project creates jobs for execution of works and for supply with a large volume of local construction
materials, and also for activities in building site organizations (placed in harbour zones). This positive impact has a relatively long duration, till the finalization of the capital dredging works and of the constructions. So, it is recommended that the necessary personnel for performing the activities in the sites be employed from the local population in a number as large as possible, and also be qualified if necessary.

Noise and emissions might have an impact on the population that is located within the working front area. Most localities are more than 2 km away from the left Danube bank, thus the impact on population from riparian counties is insignificant.

Industrial areas from Calafat, Turnu Măgurele, Zimnicea and Giurgiu are the closest to the Danube bank, or even in its vicinity. So the impact on these industrial areas can be significant. Dredging activities for the navigable channel will be carried out in vicinity of the industrial areas.

Critical navigation sectors that are closest to localities on the left bank

- Critical navigation sector of Basarabii.

Description of the present situation:

The navigation is on the left branch of the Kutovo Island (on Romanian bank). At this location the navigation channel is between 100-150 m, which makes difficult the crossing of convoys (the recommended width is 180 m). The end of Kutovo Island is having significant erosion at present.

The construction of a new bridge (Calafat – Vidin) started at rkm 796 in 2008. The Port of Calafat is located at rkm 795 and is an important for passing the Danube towards Bulgaria, being the shortest route between West and East; here is a continuous traffic of passengers, vehicles of any type, trucks. The potential impact of works on activities from this area is insignificant because works proposed to be executed occur at the upstream end of Kutovo Island, on the right Danube bank and at aprox. 4 and 5 km distance from the site of the new bridge and of Calafat Port. Impact generated by the execution of works proposed within this critical sector, on population from the town of Calafat, will be insignificant due to the long distance from the town and low dredging volume.

- Critical navigation sector of Corabia – Bălăou branch

Within the critical navigation sector of Corabia – Bălăou branch, the following works are proposed to be executed in the vicinity of industrial area belonging to Corabia town: dredging the navigable channel located on the Romanian bank, in all the study versions, a groin and two arch groins and one groin that are located on the Bulgarian bank of the Danube.

The impact of construction activities on this area will be insignificant, due to distance of these groins from the industrial and residential area of Corabia town. Impact of noise and emissions, generated by dredging activities is insignificant because areas in which dredging works are executed (low amount of dredged material) are located at a high distance from the industrial and residential area of Corabia town.

In Bulgaria, no negative impacts or deterioration of the socio-economic conditions are anticipated in the populated areas around Danube.

2.1.2. Potential impact on river transport

Construction and development activities that are carried out on the joint Romanian-Bulgarian Danube sector, within the working front area, may lead to perturbations on the river transport development.

Danube economic importance has risen lately, after the river has been connected to Main and Rhin by the Rhin – Main – Danube Channel. An arterial shipping thoroughfare of 2 850 km (1075 km through Romania) was created which lays from the North Sea to the Black Sea, at its extremities having two ports of exceptional importance: Rotterdam in the west corridor and Constanta at the eastern extremity. This navigable thoroughfare crosses many European countries: Netherlands, Germany, Austria, Czech Republic, Slovakia, Hungary, Serbia, Romania and Bulgaria.

The Rhine - Main - Danube channel directly promotes the development of trade within the abovementioned countries, in general, and also the international trade, and it substantially reduces the shipping distance; the Rotterdam - Constanta route can be traveled by a motor boat within 10 days, from going, and within 16 days, to returning, and a train of pushed barges can travel on the same route, within 13 and 18 days, respectively.

Potential impact generated by construction and development activities, on river transport is temporary and may be:

- potential impact from insignificant to moderate because groins, bottom sills and bank protection works are not carried out within the navigable channel;
- moderate potential impact due to the transport along the Danube, of construction materials and construction equipment activities within the work area;
- potential impact from moderate to significant generated by dredging activities within the navigable channel.

2.1.3. Potential impact on fishing and recreational areas

Construction and facilities activity can also generate a temporary potential impact on recreational areas, commercial and recreational fishing on the Danube. Fishing has a long tradition in Romania, due to large water areas. The Danube River, together with the overflow meadow and the Danube Delta has determined the fishing to be the most important activity for the inhabitants of these areas, up to the middle of last century. A broad action of embankment works for areas covered by water began in early 1950s, in order to use them for agricultural activities, this leading to the decline of fisheries within inland waters (decrease of captures and jobs).
Commercial fishing within inland waters shall be carried out in natural water basins that represent the national public field: Danube, Danube Delta, the lacustrine complex of Razim-Sinoe, reservoirs, etc. Fishing within inland waters is carried out based on a license and a fishing permit.

According to data provided by the Registry of Ships and Boats that is managed within the National Agency for Fisheries and Aquaculture, a number of 2 256 boats, are present in the Danube delta and Danube (1333 in the Danube area and 923 in the Danube Delta area).

Fishing is practiced with fixed or mobile fishing tools, using small fishing boats, made up of wood. Capture fishing is not mechanized within inland waters. At the end of 2005, the share of people involved in commercial fishing within inland waters, of the total sector, was 37.16 % (2531 persons), out of which, 97.98 % men and 2.02 % women.

While fishing within inland waters is an important activity, landing facilities are old and insufficient in the Danube delta, but particularly along the Danube and reservoirs. Places for fish conditioning and storage up to selling process, have begun to be built and modernized, lately. Fishermen have no transportation means for fish on land and water, these services are mainly provided by the beneficiaries.

Construction, facility and dredging activities may generate a moderate to significant impact on fishery in the critical field under work, due to the increased water turbidity and noise produced by construction or dredging equipment. This impact is temporary (during the work period and up to water turbidity decrease) and it occurs on limited areas (work area and downstream it, where the turbidity is higher). Fishing potential impact might be:

- negligible for the Danube area upstream of sectors in which construction and facility works are executed;
- minor, if the working volume is low and carried out within short time periods;
- moderate in the neighborhood of the sites, even leading to fishing interruption during works execution, if the working volume is important and carried out on a long period of time.

Construction and facility works may also have a temporary potential impact on recreational areas from the Danube bank. Recreation areas are set up within riparian towns of the Danube. Critical navigation sectors in which certain works are proposed are not present within riparian town areas, and the impact on recreational areas might be:

- insignificant, when works are executed at high distance, upstream or downstream of them;
- moderate to significant, when works are executed at small distances, upstream of them, by an increase of water turbidity, equipment noise and discomfort created by the presence of workers.

2.1.4. Potential impact on water intakes and discharges from drainage pumping stations

The Danube River is an important water supply source of certain localities (Calafat, Zimnicea Oltenita) and irrigation systems in the south of Romania. The execution of construction and planning works can have a negative potential impact on water quality due to increased turbidity and eventually due to silting-up of areas downstream of the groins and of the guiding walls. Alluvial deposition can grow in time up to the groin top level along a downstream distance of about twice the groin length. Lower alluvial deposition occur a long a downstream distance of to 6-7 times the groin length. Process evolution and duration depend on the local configuration of the channel, groin top level, hydrological conditions and alluvial transport.

Increased water turbidity during execution of the works can cause disruption of water treatment system for drinking water: an increase of settling period within the treatment plant, high amounts of sediments (sludge) in settlers from this plant, these leading to higher costs of water. Increased water turbidity at the intake outlet may also lead to stopping the treatment plant, therefore, stopping the city water supply.

Potential impact of the dredging and construction works is negligible when the works upstream the water intake or upstream the discharge point from drainage are at a sufficiently long distance so that water turbidity in the area of the respective intake or discharge point and stream pattern are not influenced. Potential impact of bank protection works can be minor if these constructions will be executed so that to not disturb the functioning water intakes or discharges that exists within the bank protection line.

Potential impact of groins can be moderate or major if groins or guiding walls are placed at a small or very small distance upstream of the water intake canals of the pumping stations and of discharges from pumping stations for drainage (removal of excess water). It is expected silting-up of the river channel at the left bank in the respective points due to alluvial deposition in the groin influence zone.

2.1.5. Potential impact on other infrastructure elements

The necessary ship traffic for carrying out dredging and construction works proposed in the project will respect the existing navigation regulations. This way, effects on existing infrastructure elements on the Danube will be avoided and it will not result any impact of the needed traffic during the construction period on infrastructure. The construction works that are proposed within the project are not located in port facilities zones and do not result in negative effect on them.

2.2. Impact during the operational period

After completing the investment works in the sites from critical sectors for navigation, the impact will be positively, both from economic and social point of view. Positive effects begin to occur during the construction
period when the works are finalized in each site. Carrying out the proposed works contribute to fulfil the obligation from the Convention on navigation regime on the Danube, which provides the commitment of the Danube states to maintain their sectors on the Danube, under navigability conditions for inland ships, and to execute the works necessary to ensure and improve the navigation conditions. The following aspects will be obtained by these investment works:

- to improve navigation conditions on the navigable channel of the common Romanian-Bulgarian Danube sector;
- commercial and touristic river traffic, with good conditions for navigation, will have a positive effect on the economic development of the riparian Danube counties and also commercial and touristic river traffic will lead to development of new jobs in port towns of the Danube.

Other important aspects are:

- to improve the access of commercial and touristic ships from Danube riparian countries to the Black Sea, by the Danube-Black Sea Channel or Sulina Channel;
- to improve access connections to Europe, up to Rotterdam, of people from Central and Eastern Europe;
- Create conditions for development of village systems and tourism;
- Increase the information flow towards the population around Danube about the environmental problems related to this region and the solution to these problems;
- New cultural-historical monuments might be discovered and turned into tourist attraction.

3. CONCLUSIONS

The evaluation of the impact on the socio-economic environment can be summarised as follows:

- The impact on the socio-economic conditions of the population during construction can be considered as positive, as jobs will be created both in the construction activities and the supply and transport of materials. The impact will be more positive if more works are carried out. Also, dredging activities are supposed to generate fewer jobs than construction activities;

- The impact on the environmental conditions of the population during construction will likely be very limited, as most construction sites are located far away from major population centers and construction and transportation will as much as possible be done from the water rather than from the land. Potential impacts on the population in the towns of Calafat and Corobia can be expected to be low. Impact on the environmental conditions of the population will likely be less important still for dredging activities than for construction activities;

- The impact on river transport during the construction activities will be insignificant to moderate as far as the engineering construction works are concerned. The river transportation associated with those construction works will also only have a moderate impact. Impact of dredging activities on river transport can however be moderate to significant. As a result, alternatives that require a lot of dredging will potentially have a more important impact on river transport than the other alternatives. Overall, the impact on river navigation is expected to be relatively minor if the mitigation measures are applied;

- The impact on fishing may be moderate to significant as a result of construction, facility and dredging activities, due to the increased water turbidity and noise produced by construction or dredging equipment. The impact on recreational activities (e.g. use of the beaches) will likewise be affected by the construction activities. It can be expected that large-scale construction activities will have a more important impact than dredging activities on both fishing and other forms of recreation;

- The impact of bank protection works on water intakes and discharges can easily be avoided by proper design of the bank protection works taking into account the presence of the intakes or discharges. Groins on the other hand affect downstream sedimentation patterns, which could cause disturbance of intakes and discharges. The problem is obviously less vital for discharges than for intakes. For the latter, sedimentation can affect the quality of the water and hence both the function of the installations and the quality (and thus use) of the water.

As a general conclusion we can say that the investment works will have a clearly positive impact on the socio-economic conditions of the population, as a result of the employment they generate. They do however have a slight negative impact on environmental conditions of the population and on river transportation, and a clear negative impact on fishing, recreation and some pumping stations. This conclusion is reinforced by the observation that the investment works are better at lowering inland navigation costs and thus inducing extra traffic, resulting in more economic benefits for the riparian countries.

4. REFERENCES

[5].*** Geographic Enciclopedy of Romania, Scientific and Enciclopedic Publishing House, Bucharest, 1982
[6].*** Geography of Romania, Publishing House of Romanian Academy, Bucharest, 2005
[7].*** Reports on the state of environment in the year 2007 in the Counties Dolj, Olt, Teleorman, Giurgiu and Calarasi (from Environmental Protection Agencies)
[8].*** Pan-Eurostar. Pan-European Transport Corridors and Areas Status Report, Final Report, HB-
Verkehrsconsult GmbH, Germany, VTT Technical Research Centre of Finland, 31 Jan, 2007


(National Institute of Statistics)