ANTHROPIC MODIFICATIONS OF THE RIVERBEDS OF IALOMIŢA AND IALOMICIOARA UPSTREAM FROM THEIR CONFLUENCE IN FIENI

Key words: Ialomiţa, Ialomicioara, confluence, riverbed modifications, Fieni

Abstract: The riverbeds of Ialomiţa and Ialomicioara, upstream from their confluence in the area of Fieni locality, recorded important modifications during the period 1970-2011, both longitudinally and transversally. They occurred following the high floods of 1970 and 1975, and especially through the arrangement works related to the water supply provided to the industrial platform (on Ialomiţa) and to the defense against flooding (on Ialomicioara). We have highlighted the respective modifications by making observations out in the field during the interval under analysis and by comparing certain cartographic and photographic documents.

1. Introduction

The riverbeds of Ialomiţa and Ialomicioara, upstream from the confluence of these two rivers in Fieni, were significantly modified by the hydrotechnical works carried out after 1970: the dam on Ialomiţa, built to assure the water supply for the two plants situated within the town area (S.C. Carpartcement Holding S.A. and S.C. Steaua electrică S.A., as they are known today), the correction of the course of Ialomiţei downstream from the dam, the damming of Ialomicioara River upstream from the road bridge DN 71, a hazardous sector for the cement plant and the Pârvuleşti neighborhood. To these, one can add the numerous bridges, large and small, sand and gravel extractions, and waste dumps. This changed not just the riverbeds’ geometry, but also the dynamics of the water flow in the riverbed and the fluvial processes. A few natural riverbed sectors can nevertheless be identified. They are sectors in which the risk of flooding and that of undermining the terrace functions remains present (especially on Ialomicioara, upstream from the dammed sector) (fig. 1, fig. 2).

2. Methods

In order to highlight the changes recorded by the riverbeds of Ialomiţa and Ialomicioara in their confluence sector from Fieni, we have used the following methods:
- observations carried out in the field during a long period of time: 1970 – 2011;

2. Modifications of the Ialomiţa riverbed in the Fieni sector (the confluence with Valea Caselor – the confluence with Ialomicioara)

On a length of just 2 km, the riverbed of Ialomiţa in the sector of Fieni town presents different aspects, so that it can be divided into two sections: 1) the confluence Valea Caselor (Valea Băcanului) – the Fieni dam; 2) the Fieni dam – the confluence with Ialomicioara.

In the section Valea Caselor – the dam, the riverbed of Ialomiţa largely conserves its natural features. It developed in a transversal profile, due to the rather gentle talweg slope
(under 6.5 m/km), a value diminished as well by the material deposited by torrents behind the dam (fig. 3).
The course, with an alluvial bed (boulders, gravel, sand), presents repeated separations and reunifications, a configuration that changes nevertheless when the water level is high. The meadow is large, being made up of islets and tops of bank ridges, which change with each more significant high flood.

The storage of alluvial deposits was favored by the dam built in order to install a feed pipe supplying industrial water (S.C. Steaua Electrică S.A.; S.C. Catpatcement Holding S.A; S.C. Carmeuse Holding S.R.L.). This dam, which is about 3 m high, operates like a local ground level. It has generated the moving up of the longitudinal profile of the Ialomitea River through the storage of alluvial deposits upstream (fig. 3).

As the meadow is in contact with the basis of the left slope, when the water level is high, there occur imbalances in the its profile, as it is dug underneath; this results in landslides and landfalls triggered during the respective flow stages, and especially during the high water level corresponding to the spring period.

In the section from the dam to the confluence with Ialomicioara, the riverbed of Ialomita River is completely modified by anthropic interventions, which have resulted in the modification of the natural geomorphological processes, both riverbed processes and slope processes, which condition each other (Loghin, 2009).

At a certain time, technical works were realized in order to move away the former course, which had undermined the basis of the left slope and of the low terrace front (the 3 m terrace) in the area of Berivoiești. These works comprised the creation of a new riverbed, under the form of a canal, meant to assure the stabilization of the slope and of the respective terrace front, and also to protect the industrial platform of the town, situated on the lower terrace, against flooding (fig. 4, fig. 5). These works were carried out in 1999 and 2000.
Fig. 4. Deviation of the course of Ialomiţa River (comparison 1975-2011). The 1975 photographic document is taken from the doctoral thesis “Corelaţii geografice în studiul degradărilor de teren cu privire specială la bazinul Ialomiţei” (Geographic correlations in the study of land degradations with special reference to the basin of the Ialomiţa River), elaborated by V. Loghin in 1977: 1. old riverbed; 2. present riverbed; 3. Industrial waste dump situated in the meadow.

Fig. 5. Modification of the course of Ialomiţa during the period 1979 – 2006.
The artificial riverbed is cut through the layer of industrial waste, through the alluvial layer and then goes down to the bedrock, which consists of marls and grit stones belonging to the Paleocene flysch.

The slope of the longitudinal profile of the artificial riverbed is amplified. Moreover, it presents irregularities generated by the layer ends cut off by the riverbed. For this reason, the dominant geomorphological process is in-depth erosion. It is the process connected to the risk of undermining the pillars of certain bridges (Berivoiești) and foot bridges built in the respective section (fig. 6).

Fig. 6. The Fieni sector riverbed of Ialomița River. One can notice the weakening of a foot bridge by in-depth erosion, which is very strong during high floods

2. Modifications of the riverbed of Ialomicioara River in the Fieni sector

In the area of Fieni Town, Ialomicioara has a length of about 2.5 km. The riverbed is arranged on a distance of 0.5 km upstream from the bridge situated at the entrance in Fieni, on DN71 Târgoviște – Sinaia (concrete dams, extended upwards).

These works protect the Pârvulești neighborhood from floods, as this neighborhood is partially situated on the low terrace (2.5m), just like the industrial platform.

Until recently, the dominant geomorphological process in this section of the riverbed was the storage of alluvial deposits. So, the riverbed was continually growing, and so the risk of flooding during high flood was growing incessantly. That is why hydrotechnical damming works were needed (fig. 7). The subsequent upward extension of the dams was imposed by the fact that the waters overflew the banks during the most significant high floods.

The alluvial deposit from the dammed riverbed has continued to grow bigger and bigger, both because of the gentle slope of corrected longitudinal profile, and also because of the difficulty to evacuate the alluvial material from the end of the riverbed, which was significantly narrowed by the pillars of the road bridge (National Road DN 71). These features, plus the steeper slope, have taken away the bottom alluvial deposits from the last section of the Ialomicioara riverbed.
In the future, it will be necessary to continue the riverbed arrangement works and the protection of the riverside.

Fig. 7. The Ialomizaoara riverbed upstream from the confluence with Ialomita. One can notice the dams and the over-raised alluvial bed.

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