

## NEGATIVE IMPACTS OF THE JULY 2005 HIGHFLOOD IN ROMANIAN PLAIN BETWEEN OLT AND ARGEŞ

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**ABSTRACT.** The July 2005 highfloodaffected the whole Romanian Plain between Olt and Arges rivers, with major economical, social, ecological impact. It also modified the chemical and biological composition of the water. The main cause of huge damages was the heavy rainfall from the beginning of the month which generated the floods and dam destroying. It led to 2 losses of lives and affected 196 villages with total material losses of 180,640,500 lei.

**Key words:** highflood, damages, economic, social and ecological impact

### 1. Introduction

Romanian Plain between Olt and Arges rivers is located in the central part of the Romanian Plain and covers three hydrographical basin: Călmăţui, Vedeia, Neajlov. Administratively, the region covers totally Teleorman County and partially Olt, Arges, Giurgiu and Ilfov counties.

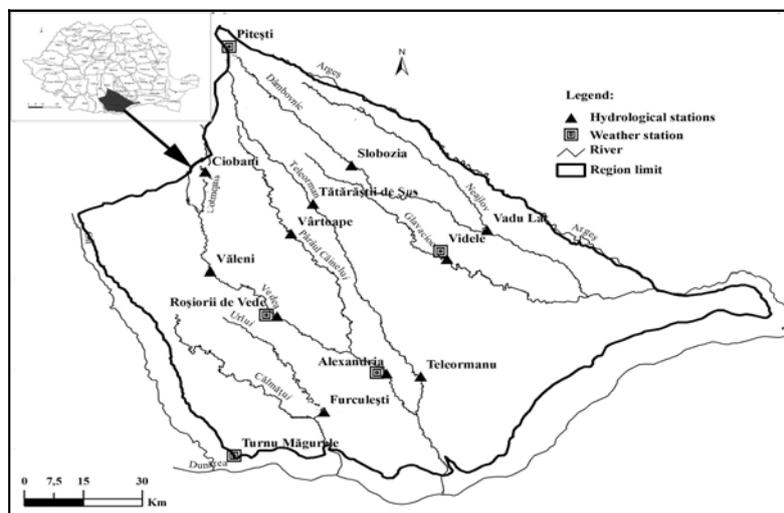


Figure 1. Romania Plain between Olt and Argeş.

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Flood generated damages may be divided into two major groups: *direct* damages, which may be also divided into touchable (occurred as a consequence of the loss, devastation or degradation of goods after fields and houses flood) and untouchable (human losses); *indirect* damages include losses occurred the hazard stopped generated by the imbalances, especially in the economical field.

The size of the damages depends on the association of different factors acting together: the density of the population in the exposed area, the density of the objectives and their total value; the highfloods wave features and the suddenness of specialized authorities intervention. The detailed evaluation of the damages is very difficult to be made because it has to be based on the detailed information on costs of the intervention and of the building-up operations due to affected channels of communications, to loss supported by the people and companies in the area.

## **2. Effects generated by the July 2005 highflood**

Quantification of the direct damages of the July 2005 flood in the Romanian Plain between Olt and Arges rivers, led to a total amount of 180.640.500 RON. This huge value is mainly due to the high density of the settlements in the area.

### **2.1. Social effects**

Social effects are direct that may be human losses due to direct action of the rivers water, and indirect that may generate diseases and epidemics. Usually in the Romanian Plain, floods led to a low number of human loss, but the illness risk is high.

Considering data released by Administration and Home Ministry, the July 2005 flood affected the rivers Vedea, Teleorman, Neajlov, Glavacioc, Olt and generated in the studied area, a total number of three human losses. Two of them were in Teleorman County and one loss was reported for Olt County.

The causes of death were: house destroying as a consequence of the high level of the river waters; the challenge to cross by different vehicles of the rivers under the flood.

The up-mentioned high flood induced the increasing in gastrointestinal diseases cases, especially those of diarrhea. They were more frequent in the case of babies, of old people and also of less resistant persons. The main cause was the contamination of drinking water.

In the same category of social effects are considered the costs and the stress generated by the population evacuation, by the interrupting the educational activities, by the degradation or devastation of the socio-cultural, religious or medical institutions.

Thus, in the studied region, 4.682 persons were evacuated, the Dobreni village was 90 % covered by water; 292 houses were completely destroyed, 5.114

houses were damaged and 40 houses were isolated. Also, 3.936 household annexes and 32 public buildings were affected (two secondary schools, one library building, two dispensaries, one church, and 10 general shops) (table 1, figure 2).

**Table 1.** Effects of the July 2005 high floods in the Romania Plain between Olt and Arges rivers.

(After the Informative Bulletin of the Administration and House Affairs Ministry)

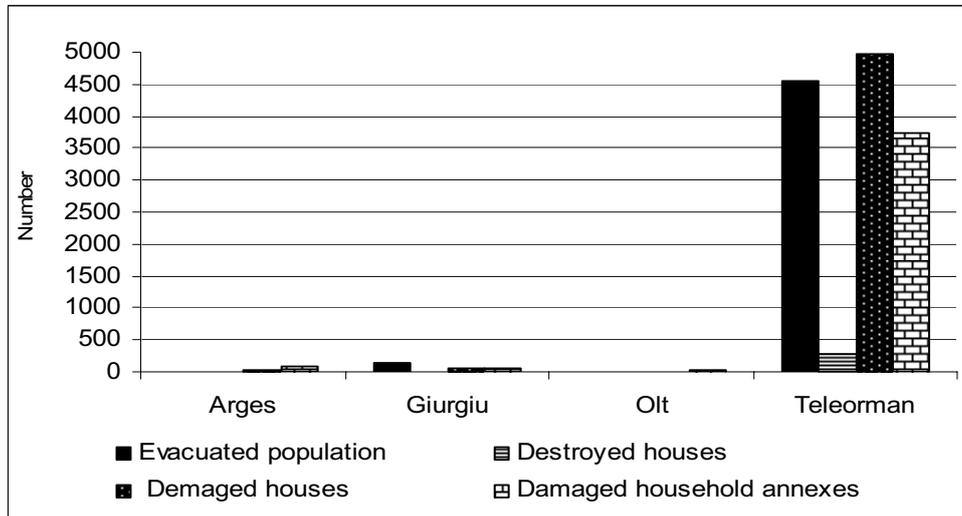
| Nr. crt. | County                                | Argeş | Giurgiu | Olt   | Teleorman | Total         |
|----------|---------------------------------------|-------|---------|-------|-----------|---------------|
|          | Affected objectives                   |       |         |       |           |               |
| 1.       | Settlements                           | 10    | 7       | 9     | 33        | <b>59</b>     |
| 2.       | Human loss                            | 0     | 0       | 1     | 2         | <b>3</b>      |
| 3.       | Evacuated population                  | 0     | 137     | 0     | 4545      | <b>4682</b>   |
| 4.       | Destroyed houses                      | 0     | 1       | 0     | 291       | <b>292</b>    |
| 5.       | Damaged houses                        | 78    | 47      | 9     | 4983      | <b>5.114</b>  |
| 6.       | Isolated houses                       | 0     | 0       | 0     | 40        | <b>40</b>     |
| 7.       | Damaged household annexes             | 95    | 65      | 31    | 3.746     | <b>3936</b>   |
| 8.       | Public institutions buildings damaged | 0     | 1       | 0     | 31        | <b>32</b>     |
| 9.       | Destroyed dams                        | 2     | 0       | 0     | 19        | <b>21</b>     |
| 10.      | Destroyed bridges                     | 13    | 4       | 0     | 66        | <b>83</b>     |
| 11.      | Damaged roads (km)                    | 19    | 30      | 30    | 418       | <b>494</b>    |
| 12.      | Water supplying network damaged (km)  | 0     | 0       | 0     | 1         | <b>1</b>      |
| 13.      | Agricultural surface (ha)             | 1871  | 0       | 1.910 | 831       | <b>4612</b>   |
| 14.      | Dead animals                          | 0     | 138     | 0     | 10,306    | <b>10,442</b> |
| 15.      | Affected wills                        | 52    | 47      | 43    | 490       | <b>632</b>    |

People of the affected villages (Talpa, Găleteni, Frăsinet, Băbăița, Țigănești, Brînceni, Frumoasa, Smârdioasa, Cervenii, Ștorobăneasa și Vârtoape) were evacuated and hosted in school, hospitals and cultural homes buildings.

Many people were suffered by different diseases as a consequence of the contamination of drinking water in the 632 wills affected (490 of them were reported in Teleorman County).

Some villages, like Merenii de Jos or Dobreni were 80% or 90% covered by water.

The damages became more important if we consider that the great part of the affected families are poor families, with houses of yellow soil and the houses had not been insured



**Figure 2.** Social damages generated by July 2005 high floods in the Romanian Plain between Olt and Arges rivers.

## 2.2. Economical loss

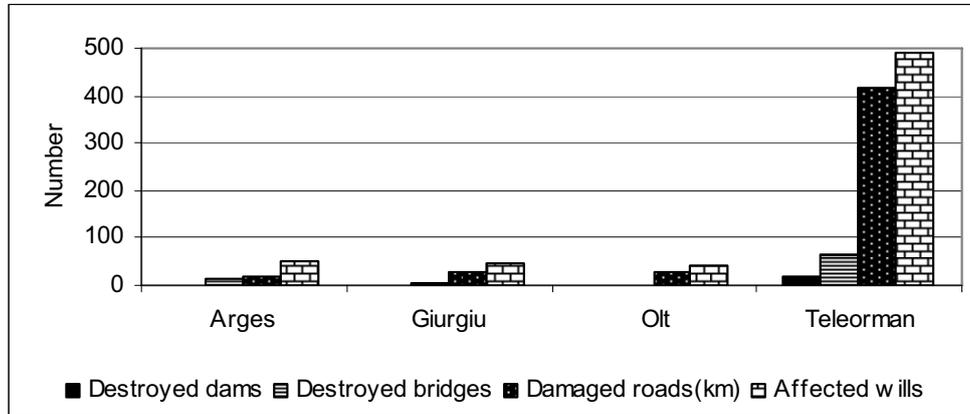
Some of the settlements are protected by the dams. One such situation is specific for Alexandria, the second important city in the area: between 1955-1956, a dam was built on the right bank of the Vedeia river because that was lowest bank and even for little increase in the river level caused floods in the city.

But this is not the situation for the great majority of the settlements. Because the analyzed region is densely populated, the economical losses generated by the 2005 flood were very important. The most important damages happened in Teleorman County which, manly lies over the Vedeia hydrographical basin. The Vedeia river is the most important river in the area (table 1).

In eight villages (Săceni, Scurtu, Talpa, Negrileşti, Frăsinet, Băbăița, Drăcșaneii, Bîscovenii) different kinds of water works were damaged while 21 dams were destroyed. Among them, two were located in Arges County and the rest of 19 were located in Teleorman County (figure 3).

Usually, over the little tributaries of Vedeia river, there are a lot of bridges or footbridges that make connection between different villages or between different part of the same village. The July 2005 flood 83 bridges and footbridges were completely destroyed (66 in Teleorman County, 13 in Arges County and 4 in Giurgiu County). As a consequence, 40 farms became isolated.

Also 500 km of national and regional roads were damaged, making impossible the connection between different vilages and made very difficult the intervention of special forces to the isolated settlements and to homeless persons.



**Figure 3.** July 2005 flood economical losses in Romanian Plain between Olt and Arges rivers.

The floods of July 2005 also affected many fish ponds with major consequences to the ecosystems. Thus, in Olt County, at fish pond dam from Mioveni, located near Doroftei River, because of very high flows, the spurs of the basin were partially damaged while high level of erosion determined the 80% obstruction of the bottom drainage. In Teleorman County, many dams were also affected: fish ponds of Mozaceni, Dobrotesti, Valea Zimbreasca (on Zimbreasca Valley), Beuca (on Dracsenei river), Negrilesti (on Clanita), Talpa Ograzii, Bascoveni I, II, III and Soricesti (on Clanita), Frasinet I and II (on Calnisteia river), Ciuperceni I, Blejesti and Cosmesti (on Sericiu Valley), Botoroaga.

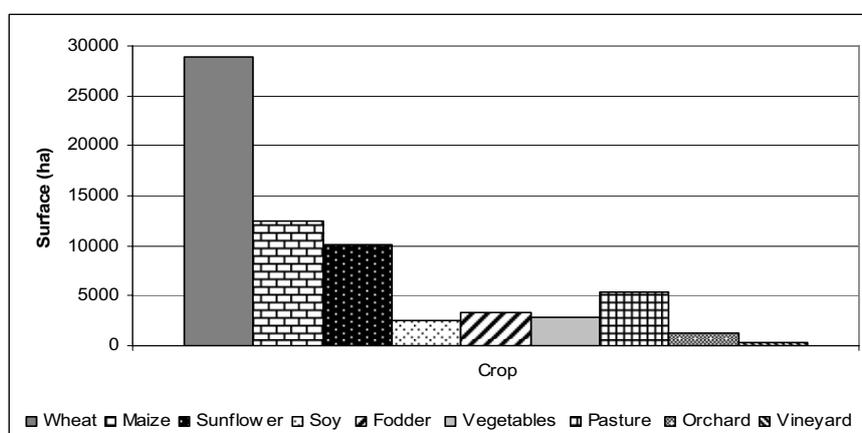
In the analysed area the most developed agricultural branch is crop. The July 2005 floods damaged more than 50 % of the total cultivated area (figure 4).

In the analyzed area, a surface of almost 67,000 ha was affected more than 50 % by the flood (table 2). The main crops which suffered most were wheat, maize, sunflower and soy. The largest area under disaster was in Teleorman County with a total surface affected of 45,260 ha. It was followed by Giurgiu and Arges Counties with 18,727 and 2,660 ha respectively (table 2).

The main source of income of villages' inhabitants is growing vegetables. They developed this agricultural branch by building greenhouses in their own gardens, while on the outside village terrain they developed vegetables farms. The largest areas cultivated with vegetables destroyed by the floods were in Plosca, Peretu, Ţigăneşti, Poroschia, Tufeni, Mihaeşti, Slatioara, Gogoşari, Vărăşti, Săbăreni, Comana.

**Table 2.** Surfaces of the crop areas damaged more than 50% in Romanian Plain between Olt and Argeş.

| County       | Wheat        | Maize        | Sunflower    | Soy         | Fodder      | Vegetables  | Pasture     | Orchard     | Vineyard   | Total        |
|--------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|-------------|------------|--------------|
| Teleorman    | 19400        | 8560         | 7450         | 300         | 3000        | 2750        | 3500        | 0           | 300        | 45260        |
| Giurgiu      | 8922         | 3249         | 2133         | 2269        | 266         | 61          | 1814        | 12.76       | 0          | 18727        |
| Argeş        | 1500         | 610          | 550          | 0           | 0           | 0           | 0           | 0           | 0          | 2660         |
| <b>Total</b> | <b>28822</b> | <b>12419</b> | <b>10133</b> | <b>2569</b> | <b>3266</b> | <b>2811</b> | <b>5314</b> | <b>1276</b> | <b>300</b> | <b>66910</b> |



**Figure 4.** Crop surfaces affected by the flood in July 2005.

### 2.3. Ecological impacts

The power water and of the sediments transported may generate huge disasters in the rivers ecosystems. The damaging of the valleys and of the river banks are the result of the erosion and accumulation processes. The degradation is greatly influenced by the nature and type of the rocks, by the existence and the quality of the river regulations, by the presence of the vegetation and also by the flood features (speed, level, duration).



**Figure 5.** Crops damaged in Plosca village, Teleorman County

During July 2005 flood, the violent action of water from rivers valleys generated the degradation of the banks. The process had as main consequence, the deposition of mud and gravel, but also a strong erosion of the river bed. Sometimes, the collapse of the river banks may occur.

The change in the physical, chemical and biological characteristics of the water may occur during the flood wave and after, because of increasing solid discharge flow as a consequence of the river banks and bed.

In the upper region of the studied area, the erosion processes were very intense, while in the middle and lower areas, the sedimentation processes prevailed (figure 6).

The increasing turbidity generates the decreasing transparency and also the decreasing amount of dissolved oxygen. At the same time, the drinking quality of water may be greatly influenced (figure 7).

In July 2005, because of the floods affected the area, the groundwater leveled increased and was infested with toxic substances. In this situation, population of Țigănești, Brânceni, Plosca, Merenii de Jos, Drăgănești Vlasca, Bârla villages needed special protection measures. The quality of water in 632 wells was affected.

Negative effects are generated by the bacteriologic and chemical contamination of water when ground and underground waters wash some contaminated areas with household waste or with 10,400 dead animals. Different pathogens can lead to serious diseases.



**Figure 7.** Increasing turbidity of Vedeia River water.



**Figure 6.** Sediments accumulation in the Vedeia River at Alexandria.

Interventions teams sent to the area acted in the Dracsanei Valley to fill a break accidentally occurred and made two controlled breaks on local roads in Olteni and Tatarastii de Jos to evacuate the water. At the same time, the dams in Țigănești, Brânceni, Cervenia, Bujoru, Ștorobăneasa have been raised.

According to the Administration and Home Affairs Ministry reports, in Teleorman County, 33 settlements have been affected by flood, 4545 persons have been evacuated, almost 5000 houses have been damaged and 40 houses were isolated. Because the total destroys of their houses, 291 families became houseless.

Inhabitants and animals of few desasters villages (Talpa, Găleteni, Frăsinet, Băbăița, Țigănești, Brînceni, Frumoasa, Smârdioasa, Cervenia, Ștorobăneasa și Vârtoape) have been evaluated by the Emergency situations Inspectorate actions. The people have been accommodating in schools, hospitals and cultural houses buildings.

### Conclusions

In the analysed area, the most important damages caused by the July 2005 floods were recorded in Teleorman County (Vedea and Calmatui Hydrographic basins). Agricultural fields, family farms, roads, wills have been affected, while fish ponds dams have been broken. All the damages recorded in the area were estimated to 180,640,500 lei.

As a consequence of the extremely serious damages occurred in some little dams in Olt and Teleorman counties (Movileni, Băbăița, Ciuperceni, Ciurari, Săceni, Zâmbreasca) an Emergency Ordinance has ben adopted (OU 138/October 2005) regarding the safe operation of the fishery uses, entertainment ad local water bodies in the category C and D. According to this act, the little dams may operate only with the authorization of water management and will be operated by qualified and certified staff in the hydrotechnical field.

At the same time, the Implementation and the financing program of the National plan to prevent, to protect and to mitigate the floods effects have been presented and adopted as Government Decision no. 1309/October 2005. It referes to the complex improvement of the hydrographic basins, by correlation between the water works in the rivers bed and slope stabilization.

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