



A String of Pearls: Towards Restoration of Wetland Values in the Prut Basin

Dan Badarau, H.Clipa, A. Savin and A. Remelzvaal

ABSTRACT: Prut River is the last main tributary of the Danube River. Situated in the east part of Carpathian Mountains, Prut valley is an important route for migratory birds, three Important Bird Areas being already identified. In the past the area was flooded almost every year and the lower parts of the floodplains remained wet for a long time. In the Prut basin, like everywhere in the world, human activities had a large impact on the natural water system causing severe losses to natural values and biodiversity. Complete restoration of the original ecological conditions is impossible and would destroy the many positive results of the hydro-technical constructions.

The proposed target for ecological restoration is to create a network of small wetlands in the Prut basin, metaphorically named **“string of pearls”**. The basis of this network of wetlands is already present in the existing reservoirs and ponds. The “string of pearls” will restore an important aspect of the river landscape and water dynamics, taking in account the limitations of safety and human use. The “string” will start with the first “pearl” Costuleni wetland – a pilot project. Their ecological value is partly in the fact that “the pearls” are going to be spread all through the river valleys. A network like this offers the migratory birds places to rest and to feed. In this way ecological restoration in the Prut valley has not only regional importance, but (inter)national importance as well.

KEYWORDS: wetland restoration, biodiversity, ecological value, pilot project

Introduction

We are not always very much aware about the consequences of human activities especially in the field of nature. Trying to protect us from floods, trying to use more land for agriculture is some time a too much price to pay not only by us but for the future generation. The awareness of this things oblige us, from moral point of view to pass to the future generation, in terms of environment, at least as much as we’ve received from our ancestors.

Recent studies showed that over 80% of the Danube river basin’s wetlands and floodplain have been destroyed in the 20th century. There are many initiatives for ecological restoration in the Danube basin. All the Danube countries join in the effort of making the Danube and its tributaries “rivers of life”.

Historical background

Prut River is the last main tributary of the Danube River and for 741 km it forms the natural border between Romania, Ukraine and Moldavia Republic. The surface of the Prut river basin is 27,500 km² from which 10, 990 km² are on the Romanian territory. Floods were a constant problem in the area. Hydrometric stations were established since 1923. Estimation on the data registered for 46 years (from 1923 till 1969- since

important hydraulic constructions were built) showed that on 29 years at least one flood occurred in the area. The highest registered flood in the Prut River was in 1969 and had a value of 3740 m³/sec.

The Prut River floodplain, having widths of 3 - 7 km² was flooded very often. On some parts, the Prut River had commune floodplain with the tributaries (e.g. Jijia River). During high floods the whole floodplain was like a lake. When the water level in the river dropped, the lower parts of the floodplains remained wet for a long time. These spots were consisted of reedmarshes, wet forest and extensively used grasslands. On topographical maps from before 1970 large marshy areas are indicated. Due to the mobility of the river bed there were formed a lot of dead branches supplied with water only during high flows on Prut, creating various habitats for plant and animals. The wet areas had a special function for migrating water birds. The North-South direction of the Prut river valley makes it part of the flyway for water birds travelling between wintering areas in the Danube Delta (or even further to the south) and breeding areas in northern Europe. The wet areas were used as feeding and resting places by large groups of birds. In the Prut basin 225 bird species were identified from which 132 species (58.6% from the total) are nesting here. But human activities like everywhere in the 20th century had an important impact on the natural water systems and natural habitats.

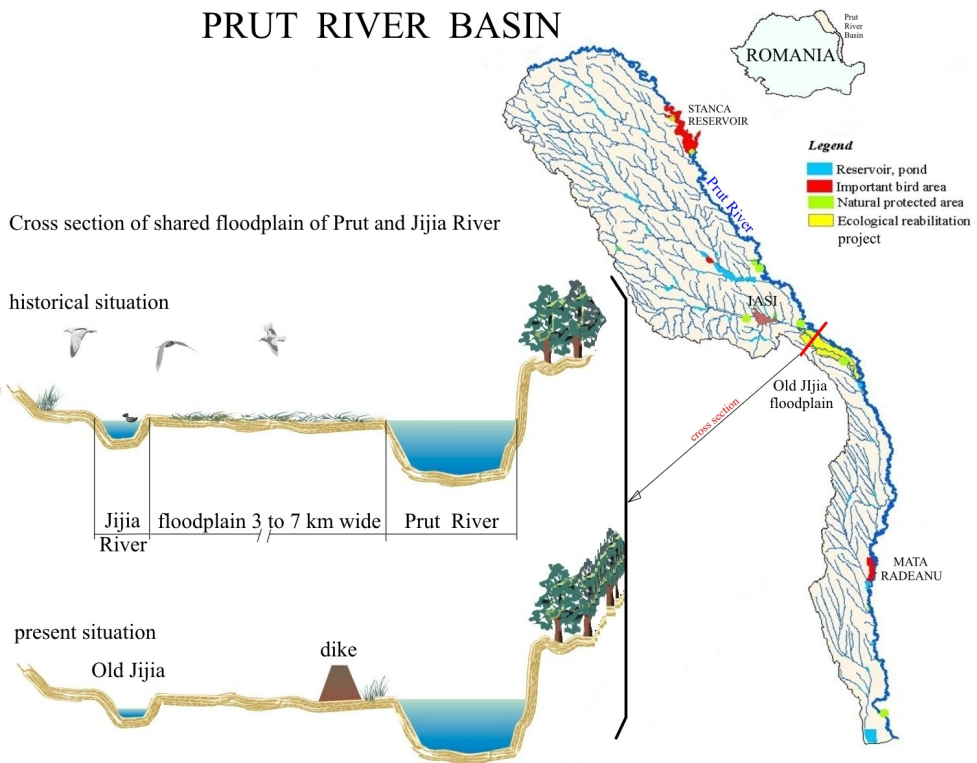


Figure 1 Prut River Basin

The need for safety, guaranteed water supply and better opportunities for agricultural production determinate the building of hydrotechnical constructions. In the Prut River basin there are around 300 fish ponds, 29 reservoirs, 4 calamity polders, 358 km of dikes and 300 km river regulation.

Changes in the Ecology in the Prut River Basin

In Prut River Basin human activity had a large impact on the natural water system as it can be observed from the table no.1.

Human activity		Impacts
Hidrotechnical constructions (dikes, river regulations)	⇒	loss of marshes loss of shallow waters ⇒ loss of species
Drainage of the floodplain	⇒	salinisation ⇒ change in vegetation and less grass production
Changes in hydrology	⇒	loss of dynamics ⇒ loss of biodiversity
Barriers (dams)	⇒	loss of continuity ⇒ loss of valuable migratory fish species (e.g. sturgeon)
Agricultural expansion	⇒	diminishing the natural habitats ⇒ loss of biodiversity
Agricultural use of the hills	⇒	Erosion (increase of sedimentation in the river) ⇒ effects on water species composition
Waste water discharge	⇒	high content of nutrients low content of oxygen ⇒ effect on water species composition loss of rare species as the sturgeon

It has to be underline that human activity has been positive in fields as flood protection and water supply, but also has lead to an enormous loss of ecological values. Only the construction of reservoirs and ponds has been helpful for the conservation of some species. The larger lakes, specially the Stâncea Costeşti reservoir, are used for wintering as well, because they provide open water when smaller waters get frozen. Three locations became Important Bird Area (IBA): Stanca Costesti reservoir (S=5900 ha) and the fishponds from Vladeni (S= 188 ha) and Carja Mata Radeanu (S= 900 ha). (figure no. 1)

Cooperation opportunities

The Dutch Institute for Inland Water Management and Waste Water Treatment (RIZA) cooperates with Romanian partners since 1993. The cooperation has got a formal basis in a memorandum of understanding (MoU) between the governments of Romania and the Netherlands (renewed in 2000). RIZA is cooperating with National Administration Apele Romane - Prut Directorate in the field of integrated water management since 1998. The cooperating is focussed on Apele Romane branch responsible for the management of the Prut River Basin. One of the aspects that of integrated water management addressed in the project is **ecological restoration**.

A “string of pearls” a concept for ecological restoration

Ecology and other functions (irrigation, drinking water supply, fisheries, and safety) have to be managed in an integrated approach. The challenge is to develop ecological restoration measures which can lead to a win-win situation, profitable not only for nature, but also for the population in the area. It is impossible to restore the original large scale flooding of the floodplain and even if it was possible from technical viewpoint, it would be socially unacceptable. Because of the changes in the river system, the decline of agriculture does not automatically result in a recovery of the ecosystem. To restore the wetland values of the Prut River valley specific measures are needed. The values related to the large scale flooding, however, can be restored partly by creating a **network of smaller wetlands** in the river valley metaphorically named “**string of pearls**”. The wetlands will not be directly connected, but still they are related by their location in the valley: they are separate pearls on a string. The wetlands do not have to be very large. Their ecological value is partly in their combined presence in the “string of pearls” all through the river valleys. The basis of this network of wetlands is already present in the existing reservoirs and ponds in the area. What is very scarce at the moment is marshland, shallow open water and pools that dry out during summer. The “string of pearls” restores an important aspect of the river landscape and water dynamics, taking in account the limitations of safety and human use. This network of wetlands can be used by migrating water birds for feeding, resting and breeding. The network of wetlands will contribute to the preserve and improvement of the quality of an important **migratory route** for waterbirds. In this way ecological restoration in the Prut valley has not only regional importance, but **international importance** as well. Of course not only birds profit from these wetlands, but also wetland vegetation, amphibians, reptiles, some fish species and insects like dragonflies, etc.

The vision is simple and realistic. It takes into account the historical situation and preserve and capitalize the remaining natural values, which are most abundant in and around the existing ponds and reservoirs. The high costs investments in ecological restoration are not realistic because to the lack of money due to the economic situation. In the floodplains there are many possibilities to make use of existing dikes, former fishponds, low spots etc., which make possible to keep the costs low.

A special quality in the Prut valley is the quietness and openness of large parts of the floodplains and the absence of roads and buildings. This is a quality that is becoming very scarce in Europe and worth conservation.

The pilot project – Costuleni Wetland

The pilot project has the following objectives:

- A first step in the restoration of wetland values and functions in the Prut valley
- Development of a management plan and the organisational structure needed for the management of the project area
- Building knowledge and experience in the field of interactive planning and stakeholder participation.

Identification of the area

First a screening was made on the Prut catchment and the most promising “search area” has been chosen: a part of the floodplain of Jijia River, the most important tributary of Prut River. (yellow spots on figure no. 1 and figure no. 2)

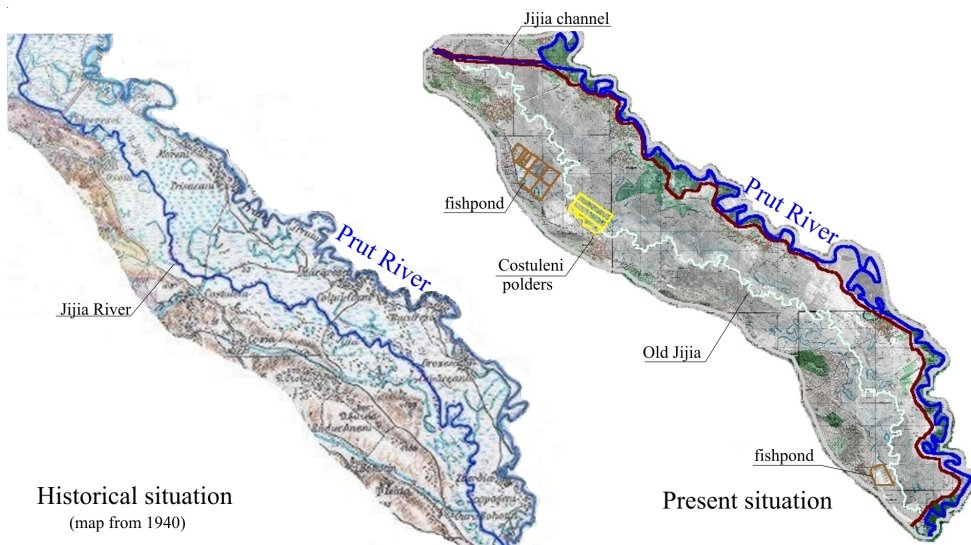


Figure 2 Changes in the shared floodplain of Prut and Jijia Rivers

The area was chosen partly because the changes on the river system were dramatically and also because it presents a real ecological potential. To find a good location for the pilot project an inventory of the Jijia floodplain was made. Information about the area was gathered with the use of maps, satellite images, field visits and discussions with people working and living here. In the meeting organized with the stakeholders from the area, the **flood protection polders near Costuleni** were identified as the most promising location.

Background

The investigated area is situated on a former floodplain of the Jijia River the most important tributary of the Prut River (figure no. 2). On the last 56 km before confluence, Jijia River shares the same flood plain with Prut River. In the historical situation the whole plain was flooded very often, especially in spring when the combination of melting snow with rainfall on a frozen soil could lead to high river discharges. In that time there were a lot of wetlands and wet forest in the area.

In nowadays the area was transformed:

- The rivers has been regulated:
 - The Jijia River is led into the Prut through a 5 km channel approximately 56 km upstream from the former confluence. The remaining part of this river (now called the Old Jijia) is now a small stream, mainly fed by some brooks. In special situations, through an inlet, it is still possible to discharge water from the Jijia into the river bed of the Old Jijia. The maximum flow possible through the inlet is 6 m³/s very small comparing to the natural situation when the river discharge was of 400 m³/s (for one hundred years returned probability);
 - The Prut River is separated from its former floodplain by a dike;

- The former shared floodplain was transformed in the land for arable farming;
- A system with open drainage channels, leading to pumping stations was build;
- An irrigation system was developed;
- On two locations fishpond complexes were build in the floodplain. The water for these ponds was pumped up from the Prut River.
- The polders from Costuleni were built to protect the agricultural land from floods.

Since the political changes in 1989 the agriculture in the floodplain has become less intense. Grazing is replacing arable farming more and more. The irrigation system is not in use anymore and the drainage system functions only partially. Also due to the economic situation most of the fishponds are not in use anymore.

In spite of the described situation the area has high potentials for ecological restoration, due to the possibilities to restore water flow in the Old Jijia, the absence of roads and buildings and the decline of agriculture. Also the habitat is of outstanding biodiversity, as the species numbers illustrate: 15 species of fishes, 8 species of amphibians, 6 species of reptiles, 186 species of birds and 6 species of mammals. Near the Old Jijia area, as summer visitors, were observed vulnerable birds species (*Egretta garzetta*, *Egretta alba*) as well as two endangered species (*Circus aeruginosus*, *Circus pygargus*).

Financing

In February 2003 an application was made for financing of the pilot project costs by PIN-MATRA. The subsidy was granted in June 2003. From this moment the realisation of the project has started. The project will be developed between 2003 and 2006.

The Costuleni Wetland Project is carried out in cooperation between the water board “Hunze en Aa’s”, the Romanian water management administration “Apele Romane” Prut Directorate, the institute RIZA and the foundation “Het Drentse Landschap”.

Development of the Costuleni wetland

The pilot project of Costuleni is an area of 250 ha grassland bought from farmers and developed into a wetland.

The wetland will be created in an area where the Old Jijia flows through an embanked zone -4 polders, close to the village Costuleni (south-east of the city of Iasi in North East Romania). The Old Jijia flows through one of the polders. At this location two small tributaries (the Comarna and the Covasna) enter in the Old Jijia.

The polders were chosen because of the technical possibilities for creating a wetland there. A study of the area was made. The study included the possibilities for water supply, land use and landownership, the creation of an elevation map and discussions with the organisation responsible for the dikes (meant for flood retention). In this study the potentials for wetland development have been brought into a *first plan* for the Costuleni wetland:

- Raising the water level of the embanked area with a regulating water outlet structure.
- Creation of a variety of habitats -from dry land to spots with deep water- by digging.
- Opening up of old river meanders that have been filled up.

The four polders will have different types of wetland that could be found in the area in the natural situation.

The development of the Costuleni Wetland includes:

- The purchase of the land. The purchase is a complex process, because about 425 landowners are involved.
- The development of a design for the area.
- The implementation of the design. Main aspects are the building of a small water outlet structure, for management of the water level and digging to create a variety in abiotic conditions and gradual land-water transitions.
- The development of a management plan.
- The development of an evaluation plan and dissemination of information.

A “stakeholder strategy” that includes communication, agreements between parties involved, land purchasing and public involvement was created in order to ensure a real implementation in the field and to provide good basics to start the project. As a result a Memorandum of Understanding was signed between Romanian Waters Prut Directorate, the Iasi County Council, the Environmental Protection Inspectorate, and two NGOs, to cooperate and to sustain the realisation of the “string of Pearls” and the pilot project in Costuleni.

The purchase process started at the beginning of the year 2004. Before that process issues were raised by the team members in order to cover all the aspects. The main topics were about the effective communication between parties involved but focus on landowners, about the price of the land and ways to deal with reluctant and practical negotiations aspects (regarding the places and persons involved).

Building of mutual trust, getting cooperation and developing options for the people who are reluctant to sell (land swapping, possibilities for future use of the area) were another issues. Assistance from local villagers (trusted representatives) was required. A Romanian specialist in conflict negotiation (together with a Dutch specialist) was involved for assistance.

For the management plan it seems a wise option to involve villagers: villagers could/will be involved in a collaborative manner. In that way they will support the project and will take care of the area better than any fences or guards.

Regarding public involvement a media campaign was started. Articles and presentations at various symposiums were held in order to spread ideas about ecological restoration and to get cooperation, as well as meetings at different levels (for regional and local authorities, landowners and children) and presentations with educational and informational purposes for local children. The dissemination of the experiences and knowledge gained is a valuable part of the project.

The Costuleni wetland will offer a number of **benefits**:

- **For nature:** A resting place for migratory water-birds in spring and autumn. In summer water- and marsh-birds can breed in the area. Specific types of natural vegetation can develop again together with native fish species and other invertebrates.
- **For people living in the area:** The water is important as drinking water for cattle and can be used for small-scale irrigation. In parts of the wetland non commercial fishery can be allowed. Reed and reedmace can be used for traditional production of all kind of practical goods.
- **For biological science and education:** Provide possibilities for students of the universities in Iasi to participate in project planning, monitoring and evaluation, to strengthen the educational possibilities in the field of ecological restoration.

Conclusions

- Prut valley is an important route for migratory birds. Three Important Bird Areas being already identified here.
- Man has had a large impact on watercourses; many of the results lead to the loss of ecological loss; that way an rehabilitation project was started
- A vision called “string of pearls” was created. It consist in a network of wetlands very valuable for wild flora and fauna
- The pilot project Costuleni is the first of its kind in the Prut basin and it’s not a easy task It will building knowledge and experience in the field of ecological restoration within the Prut Directorate and all the people involved.
- Care for nature as part of water management is promoted and also the involvement of stakeholders in complex projects. This is a good preparation for the implementation of the European Water Framework Directive.

Authors:

Dan Badarau, Prut Directorate, Th. Vascauteanu Street, No 10, 700464 IASI, Romania

H.Clipa, Prut Directorate, Th. Vascauteanu Street, No 10, 700464 IASI, Romania

A. Savin, Prut Directorate, Th. Vascauteanu Street, No 10, 700464 IASI, Romania

A. Remelzvaal, RIZA Smedinghuis Zuiderwagenplein 2, P.O.Box 17, 8200 AA Lelystad,
The Netherlands