28/04/2009
Site visit – Ny village and the Naives floodplain – Belgium

The project of concerted and sustainable management of the Naives river basin is one of the pilot investments of the AMICE project. It is carried-out by the Commune de Hotton and sponsored by the *Province du Luxembourg* and the *Région Wallonne*. The INTERREG IV B Programme funds part of the works planned in 2011.

The objective of the visit is to present the location before works are started, to explain the management plan to all Partners and participants, and to improve it through advice and recommendations.

The visit is lead by P.Bouxin, Director of the Watercourses Service (Direction of Technical Services of the *Province du Luxembourg*), and C.Raskin, Advisor in Environment for the *Commune de Hotton*.

Context

On the road to Ny, the bus crosses the Naives floodplain. This alluvial plain, quite narrow, is bordered by steep hillsides. Runoff waters reach the stream with extreme speed, creating overflows nearly every year. The «concentration time » is only 4hours 30.

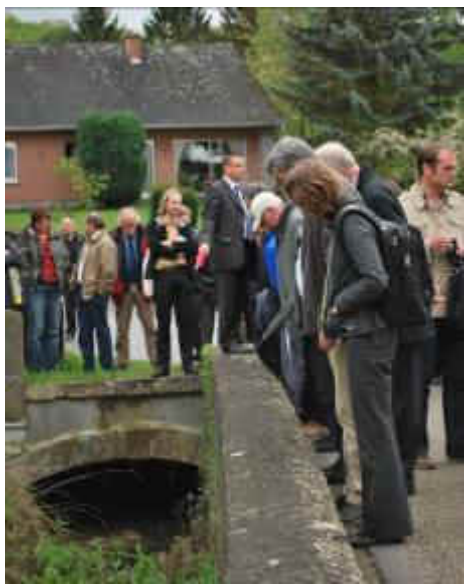
Ny is located in the upstream part of the basin, at the confluence of two channelled and narrow streams that generate major damage during these violent floods.

The village of Melreux is located on the confluence between the Naives stream and the Ourthe river. During flood events, the village is completely under 50 to 80 cm of water. 70 houses are regularly flooded, two national roads and several local roads, are cut in the downstream part.

The objective of the management plan is to stem the flood peak. But the basin's narrow morphology does not allow the creation of a flood control reservoir upstream of Ny. The proposed solution is to increase the evacuation capacity of the underground water network in the village. It will increase the water volume carried downstream with the risk of flooding even more the vulnerable areas. To compensate for this, a controlled washland will be built downstream of Ny in the alluvial plain. Usually, the flood control reservoirs are created upstream of the area to be protected but here the engineers have to deal with the peculiar topography of this basin.

In addition to the flood problem, low-flows and poor water quality at the village exit need also to be considered. The necessary works to solve the water pollution need to be included in the management plan.

Point 1 : the Naives stream entering the Ny village

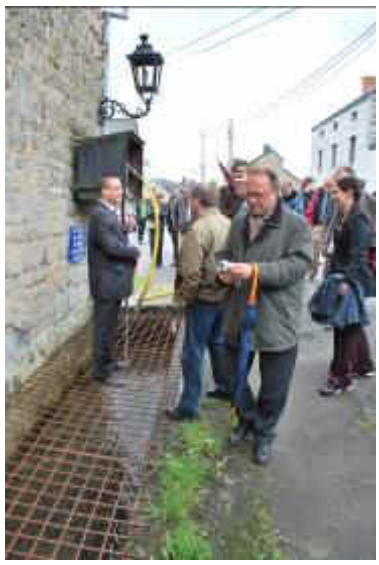


We are in the upstream part of the basin. The Naives stream is channelled from this point and crosses the village underground. The water quality is good here, there is little sediment deposit and no algae.

During flood events, the stream overflows because the channel is too small and its section is uneven (narrowing). Works will improve the water circulation (channel cleaning) and correct the pipes dimensions and slope.

The riverbed has a steep slope in its most upstream part. In consequence, the stream's behaviour in the village looks more like a torrent.

Point 2: the Moulin stream entering the Ny village



The Moulin stream is a tributary of the Naives and also channelled through the village. The river bed has a very steep slope and the stream can be really dangerous during a flood. A grid has been installed on the opened part to avoid more incidents: a child has once been taken away by the flood and could only be taken back, safe and sound, at the end of the pipe at the village exit.

Point 3: the centre of the village

The two streams are channelled over several hundred meters and the underground junction is particularly negative. The combination of low-flow periods and poor network design (slope changes) favours the deposit of agglomerated sediments and leads to the reduction of the channel's capacity. All these elements combined with undersized pipes causes frequent floods (3 floods in the last 2 years).
The road in front of the church is blown-up by the water under.

Measured discharges of the Naives at the confluence with the Ourthe river represent up to 10% of the river discharge during a flood causing damage in the downstream villages. The Ourthe, a direct tributary of the Meuse, is highly urbanised and industrialised in its downstream part and can hardly be modified now. The creation of 10 similar investments on the other tributaries of the Ourthe could significantly reduce its high-flows and those of the Meuse too.

In the climate change context, with an expected increase of the frequency of extreme events, it is urgent to find solutions at the global basin scale.

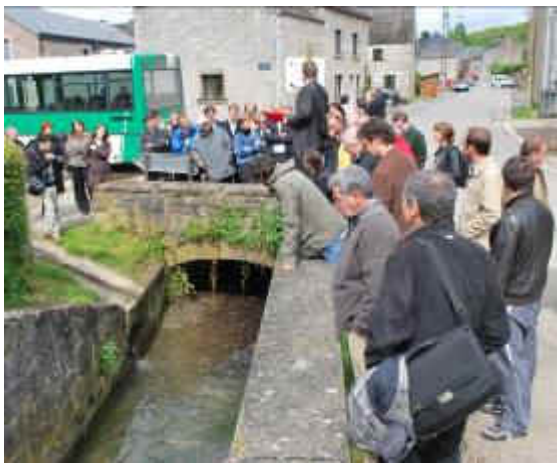
However, it is not possible to open the channelled streams. The road crossing the village must be kept and creating new paths for the watercourses around the village appears to be impossible because of properties and buildings. It is recommended to increase the underground network capacity and clean the river beds.

In addition to the technical difficulties, the local situation presents aesthetic and touristic constraints. Ny belongs to the « Most beautiful villages of Wallonia » network and is a route stage for many bikers.
When the main road is opened for the pipe works, opportunity will be taken to unearth the electric lines and replace the bitumen by cobbles. The sewage system will be separated from the rain water system and the wastewaters will be treated by lagooning in the Ny plain.
An important communication is also organised and aimed at the village inhabitants, in order to explain the reasons for the works and involve them in the village restoration.

Point 4: the stream at the village exit

The water quality of the streams crossing the village is considered poor and prevents the development of a rich fauna and flora. It is to be noted that the riverbed slope decreases after the village of Ny creating zones with very low water velocity, which is worsened by damaged banks levelled-off by cattle. During low-flows, the water heats-up and the pollutants (organic and eutrophication) are concentrated. The process can easily be observed and is increased during the summer season.
Even worse, cyanobacteria (filamentous planktonic algae) have been spotted. The main factors of their development are phosphate (by human activities) and nitrate (by human and cattle presence) as well as the low-velocity zones of the river. The metabolic products of these organisms are organic molecules toxic for mammals, and humans in particular. There is a health risk for the water consumers (cattle) or water sports (kayak on the Ourthe). It is to be noted that these cyanobacteria, by their dynamism, can rapidly colonise the major rivers with slower flows. The problem needs to be studied and treated from its origin (the tributaries).

Point 5: the Natura 2000 zone



The future flood control basin will be located on an area classified as Natura 2000. This imposes constraints for the farmers and managers. On this area, a dike will be built and a flow control system will be installed.

The objective is to use the geomorphologic characteristics of the plain for the hydraulic and biologic control.

Downstream of Ny, an integrated management of the riverine vegetation in the flood zone and on the right bank of the Naives is proposed, as well as a control of cyanobacteria by the management of the weirs.

Furthermore, the mapping of the stream will be made in order to manage better its self-purification capacity and its biodiversity (elimination of the tunnel effect caused by the vegetation, restoration of banks with bioengineering measures, upstream migration of fish…), as well as the dynamic mapping of nesting areas for rare species (conservation of nesting sites by an appropriate management of the flood on the plain).

The plan presented today means to put forward the management of extreme events, especially low-flows.

The objectives of the investment created within the framework of the AMICE project are to:

- **promote the integrated management of catchment basins by combining protection measures, spatial planning, tourism development, improvement of the living environment, and taking into account the agriculture and farm heritage that have been in place for centuries**
- **jointly imagine solutions for floods and low-flows mitigation : in Ny, if the development of the pollution in the stream is not limited in the summer period, the flood protection measures cannot be applied, for they would damage the existing Natura 2000 zone**
- **integrate the effects of climate change by promoting « natural » solutions: self-purification in the flood control reservoir, control of the riverine vegetation development …**
- **place the project in the global context of the Ourthe and the Meuse basins, by participating to the upstream water retention and pollution reduction.**

A second site visit is scheduled in 2012 to present the final result, exchange on communication activities organised for the population and inspire other similar projects on the Meuse basin.