The Netherlands: The new approach to IWRM in the Veluwe Region (#217)

Description

The Veluwe is the largest nature conservation area of the Netherlands. The area is rich in brooks and springs. Due to the growing build-up area and changing land use the old water management infrastructure no longer copes. In early 1990's, the traditional technical solution was replaced by a new integrated approach, which combines nature and landscape conservancy with modern water management. This brook restoration project primarily focused on the creation of extra water storage capacity in addition to the improvement of water quality, the re-establishment of cultural-historical values and the construction of pools and integration into the natural landscape. Following the construction of retention basins, water no longer drains rapidly but is rather retained longer in the minor tributaries. This process was considered ideal due to the following factors.

- The issue of standard norms for drainage not working well in sloping areas;
- The area is of great natural and scenic value;
- A result of higher government authorities adopting a policy for protection of wet natural areas and prevention of drainage;
- The public resistance to the traditional unilateral approach to flooding.

Actions taken

The Veluwe Water Board introduced an integrated approach for the water system in order to prevent both flooding and dehydration within the basin. An impulse has been given to nature development through the construction of natural banks. Space was created along the brook for extra water storage capacity in the shape of natural, gradual banks which further included retention basins construction. As regards the prevention of dehydration, the infiltration capacity in the area was improved which provided ideal conditions for seepage potential. These actions have resulted to policies that are in support of preventing floods in the basin following the good examples of increased storage capacity. In addition, actions were also taken in several other smaller rivers that drain into Veluwe for instance, the Verloren Beek, one of the basins of the nine rivers that form Veluwe. To achieve a reduction in the peak discharge of the basin as mentioned before, a number of both natural and gradual retention banks were constructed in these basins.

Meanwhile in Epe (another river basin) excess water is temporarily retained in special locations called retention areas. Though the retention areas were initially intended to serve as a measure to correct the water balance in "Wetland Epe", an added value has been given to them by the creation of these areas in the most natural way possible and more important managing them as a new wet nature area. This was achieved by a means of prolonged retention of water in the basin, consequently reducing the peak discharge during periods of extreme precipitation. Six retention basins with a total surface area of 6.2ha have been set up. In combination with the construction of collapsible culverts in the brook, it is now possible to use the various retention basins efficiently and the end result is an increase in the water storage capacity of the system by 30,000 m3. Apart from conserving and developing natural values in the area, the creation of extra storage capacity in the Eperbeken basin was one of the most important aspects of the realization of this initiative.

Lessons learned

- Classical, traditional solutions do not always work in a changing, unique situation;
- Ensure getting support for the measures among the inhabitants is important;
- Combining water management functions with user functions for the inhabitants (skating, swimming, nature, playground) is important;
- Finding solutions in keeping with the scale of the problem, project phasing and clear appointments of tasks can help;
- Use the inhabitants' knowledge / experience for the measures.

Importance of the case for IWRM

This case describes a new approach to an old problem; not solving a local flooding problem in the traditional, sectoral manner but rather with a broad, integrated approach. Conservancy of nature and landscape values and co-operation with the population in order to look at floods not only as a threat but also as an opportunity for broad rural development, nature restoration, recreation, "enrichment" of the habitat and for a new approach to water. Management integration: international/ intergovernmental co-operation, trans-sectoral approach, user involvement, public private partnership, local government involvement, etc.

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Full description

The Veluwe is the largest nature conservation area of the Netherlands. The area is rich in brooks and springs. Due to the growing build-up area and land use changes, the old water management infrastructure no longer copes with the new demands. In early 1990's, the traditional technical solution was replaced by a new, integrated approach, which combines nature and landscape conservancy with modern water management. In addition to the improvement of the water quality, re-establishment of cultural-historical values there was also construction of pools and integration into the natural landscape. The brook restoration project primarily focused on the creation of extra water storage capacity. Meanwhile, following the construction of retention basins, water no longer rapidly drains but is rather retained longer in the minor tributaries.

In the case study area, there are nine basins which drain indirectly into the river IJssel via the Grift from the east side of the Veluwe Nature Reserve. One on the important basin of the Eperbeken consists of a collection of brooks (Vlasbeek, Dorpse beek, Klaarbeek, Paalbeek and Tongerense beek). The natural incline of this area combined with intensified agricultural cultivation has resulted to local flooding. Hence the of course of action has been to increase the discharge capacity of the water system to avoid flooding. However, in view of the integrated approach to water systems, it was also decided that the storage capacity within brook's own basin be increased.

Another river, the Verloren Beek rises on the east side of the Veluwe Nature Reserve, south-west of Epe, and flows eastwards to the Grift. The basin of covers about 850 hectares and comprises of two drainage canals, i.e. Laarstraat and Westendorp. The causes of Verloren Beek floods because the water discharges too rapidly from the area. This rapid discharge is caused by a combination of a steep, natural incline and upgrading works that has been carried out in the past as a result of agricultural activities. To prevent the flooding, the Veluwe Water Board adopted an integrated approach for water systems to prevent flooding in the basin. It links up with the integrated approach to high water problems of the Province of Gelderland as defined in the Master Report entitled "Space for Water in Gelderland".

This project aimed to reduce the lateral influx into the Ijssel and introduce an integrated approach for the water system to prevent both flooding and dehydration within the basin itself. The focus was to improve the water quality, to abolish migration barriers and to strengthen the scenic character. The final result was reduction in the peak discharge of the basin from 3 times the Design Discharge to the Design Discharge. This was achieved by constructing natural, gradual banks as well as a number of retention basins. It helped to maintain a prolonged retention of water in the basin, which as well reduced the peak discharge from this area during periods of extreme precipitation. Space was created along the brook for extra water storage capacity in the shape of natural, gradual banks and the construction of retention basins. As regards the prevention of dehydration, the infiltration capacity in the area was improved and seepage potential given greater opportunity. Moreover, an impulse was also given to nature development through the construction of natural banks.

Actions taken

The project concentrated on the prevention of both floods and dehydration with the aim of providing more space to the water function along the course of the Verloren Beek and Epe. The physical approach makes it possible to handle the problems of both flooding and dehydration the river basins.
Six retention basins with a total surface area of 6.2 ha have been set up. In combination with the construction of collapsible culverts in the brook, it is now possible to use the various retention basins efficiently, resulting in an increase in the water storage capacity of the system by 30,000 m3. The construction of these retention basins has increased the surface area of the water function and the basins can also be used to prevent dehydration. These retention basins have increased the infiltration capacity in the area and thereby improving the water seepage potential.

Natural banks were set up especially along the Verloren Beek within a stretch of 1.5 km. The aim was to provide the area with a more natural image and scenic beauty character. The substantial reduction in the peak discharge from the basin of the Verloren Beek is important in lowering the water levels on the Grift and IJssel, and hence the damage caused by flooding is prevented. The damage caused by agriculture and nature is now reduced through the prevention of dehydration. The banks along the brook were made more natural and gradual and this has created opportunities for nature development as well as extra storage capacity. As a result, private entities have consented to the construction of retention basins on their properties. The implementation of the project purposely meant to reduce the peak discharge into the Grift and subsequently the Ijssel. The idea was to make the area along the water courses more attractive as a location for residents and businesses. In addition, this integrated approach project was purposely designed to improve agricultural conditions with positive which could result to increased yields. The approach for flood prevention in combination with dehydration prevention and proper landscaping has acted as an awareness raising among the residents of the area which is a good example of finding solutions to water systems in a sustainable way.

The substantial reduction in the peak discharge from the basin of the Verloren Beek lowers the water levels on the Grift and IJssel, thereby preventing damage caused by floods and finally reducing damage to agriculture and nature through the prevention of dehydration. This approach of flood prevention in combination with dehydration prevention and landscaping has acted as an awareness raising among the residents of the area providing a positive effects of dealing with water systems in a sustainable way. More important, these retention areas are located and organized in such a way that the water flowing into area slowly discharges or can waterlog the subsoil. This is contributory to combating the groundwater depletion. The project is innovative in its use of collapsible culverts in combination with retention areas. Hence it is possible to regulate the peak discharge from the brook and to use the retention areas efficiently thereby resulting in the reduction in the peak discharge of the basin from 3 times the Design Discharge. The integrated approach of preventing floods and dehydration means that the water system is managed in a sustainable manner.

In the Eperbeken basin a project was also implemented in a similar way as the ones previously discussed. The project comprised of a number of brooks in the sub-basins of Vlasbeek, Dorpse beek, Klaarbeek, Paalbeek and the Tongerense Beek. In this case, the river covers a total area of 1425 ha and rises on the east side of the Veluwe Nature Reserve. The action taken involved part of the Gelderland Cluster which consists of projects set up by the various water boards in control of the areas situated in the province of Gelderland. The cluster was drawn up with the purpose of

achieving a reduction in the lateral influx into the IJssel during extreme precipitation and discharge levels. As a result, the peak discharge from the basin has been reduced and water can now be retained in the basin for a longer period of time as a result of construction of retention basins. Retaining water for prolonged periods and creating more space for water does not only prevent flooding, but makes it possible to also prevent dehydration. The infiltration capacity of the area is also increased hence the seepage potential. As stated before, all the projects are expected to produce a more natural brook with wetland conditions, natural, gradual banks and retention areas situated along the brooks.

As an important domain, exchange of information with other water boards has been set up, whereas an exchange of know-how with foreign authorities is desirable in order to obtain more information about the management of similar water systems. This is important as it is a prerequisites and basic assumptions for upgrading the water management, and identifies the bottlenecks in the various functions of the area. In addition, there is also a need for exchanging experience with similar projects with other water management authorities in other EU member countries

Lessons learned

- Classical, traditional solutions do not always work in a changing, unique situation;
- Ensure support for the measures among the inhabitants;
- Combining water management functions with user functions for the inhabitants (skating, swimming, nature, playground);
- Finding solutions in keeping with the scale of the problem, project phasing and clear appointments of tasks can help;
- Use the inhabitants knowledge / experience for the measures.
- Local governments can play a constructive role in water management planning because they
- The project is innovative in that it combines the construction of retention basins with the construction of collapsible culverts. Due to this, the retention areas can be used effectively and efficiently.

Importance of the case for IWRM

This case describes a new approach to an old problem; not solving a local flooding problem in the traditional, sectoral manner but rather with a broad, integrated approach. Conservancy of nature and landscape values and co-operation with the population in order to regard flooding not only as a threat but also as an opportunity for broad rural development, nature restoration, recreation, “enrichment” of the habitat and for a new approach to water. Management integration: international/ intergovernmental co-operation, trans-sectoral approach, user involvement, public private partnership, local government involvement, etc.

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