BENELUX: WATER CONSERVATION AND FARMER PARTICIPATION CASE # 29

The present case study describes a process for improving water use efficiency in an agricultural region by involving farmers and market gardeners in implementing technical and management solutions. It also illustrates how a water resources problem affecting two countries can be solved using transboundary co-operation.

ABSTRACT

Description

In the Netherlands and Belgium good quality water has become increasingly scarce. Groundwater tables have fallen and competition among water users is increasing. In 1998 a project was set up with the objectives of:

- Conserving water quality.
- Increasing water use efficiency in agriculture.

The stakeholders include farmers, provincial authorities in Belgium and The Netherlands, water boards, and drinking water companies. The involvement of farmers and other water users has been of great importance. Improved water use efficiency and water conservation have been achieved by implementing measures at the farm level. Some examples of this include installing small weirs, and measuring groundwater levels and soil moisture content. Farmers have been involved in the design and implementation, and are responsible for the operation of the system. Farmers have been educated in water management and in assessing the implications of their measurements.

Lessons learned

Communication and stakeholder participation were crucial in the development of the project and have meant that:

- Farmers have been willing to install and operate weirs effectively, which was essential for the success of the project.
- There has been greater mutual trust between Dutch and Flemish partners.
- Transboundary knowledge transfer has led to greater insight into the opportunities and techniques of applying water saving measures.
- Farmers and market gardeners have a greater awareness of the importance of water and are willing to take part in future water management activities.

Importance for IWRM

The present case illustrates the importance of involving farmers and other water users initially, so that they feel a sense of responsibility and motivation to introduce new approaches.
The programme “Water management in the Central Benelux area” focuses on practical measures that can be applied by farmers and market gardeners. It is based on sound technical and scientific knowledge of water conservation and water management at the farm level.

Main tools used

B2.1 Participatory capacity and empowerment in civil society
C3.1 Improved efficiency of use
C4.2 Communication with stakeholders
C8.2 Sharing data for IWRM

MAIN TEXT

1 Background and problems

In large parts of The Netherlands and Belgium, as a result of improved drainage systems and increasing groundwater use, groundwater levels are falling, especially during dry periods.

2 Decisions and actions taken

Establishing a cross-border sub-catchment programme

Since 1998 water management organisations, farmers and drinking water companies in the Central Benelux area have been working together to optimise agricultural water management. The Central Benelux area covers a sub-catchment of the River Maas, including 140,000 hectares of agricultural land. An integrated approach to water management has been adopted, with farmers playing a more prominent role in the operations. Monitoring and communication have also played an important part.

The programme has been carried out in close co-operation with many stakeholders. Key partners are the farmers and market gardeners. Other parties actively involved include the province of Antwerpen (Belgium), North Brabant (The Netherlands) and the provinces of Limburg (The Netherlands and Belgium), water boards and drinking water companies. All these parties play a role in strategic planning or operational water management in the project area. The soil science survey of Belgium and the water board Peel en Maasvallei in The Netherlands play an advising role.

Objectives

The objectives are:

- *Water conservation* – to reduce the frequency and amount of sprinkler irrigation required by storing more water in aquifers during wet periods, thus making it available during dry periods.
- *Water management* – to lead to a more efficient use of water at the farm level, through the adoption of sound water management methods such as the cultivation of water-efficient crops and the use of water-efficient methods of cultivation.

One outcome of the programme should be higher groundwater levels during dry periods while maintaining excellent drainage during wet periods. A higher groundwater level in dry periods reduces the need for sprinkler irrigation, which leads to financial benefits for farmers. The farmers and market gardeners are responsible for maintaining the groundwater at an optimum level. In addition, practical measures are being investigated that could help farmers and market gardeners to reduce their water use and groundwater abstractions.

The programme was funded by the EU, the governments of Belgium and The Netherlands, water boards, drinking water companies and organisations for farmers' and market gardeners'.

3 Outcomes

Communication and stakeholder participation

Communication and stakeholder participation has been a key component in this project. Without farmers willingness to install and properly operate weirs, the project could not have been a success. It could take at least a year for the effects of the project to be known, and it is therefore crucial that everyone involved is aware of this. A range of activities have been developed to ensure good communication between stakeholders and to involve everyone concerned. Several meetings (94) have been held in the pilot areas. A water conservation and management video was developed for the project. Local radio and television have given

broadcasts. Project descriptions have been published in farm magazines. An informative internet site has been set up, and information signs have been put up at participating farms.

Technical support

The "Rules of Thumb" for agricultural weir control:

1. Try to retain as much water as possible during wet periods so that it can be used during dry spells.
2. The groundwater level is not necessarily equal to the surface water level.
3. The optimal groundwater level is not fixed and has a certain range. The actual level should be maintained within this range, with the goal of keeping the level in the high range to store as much water as possible.
4. The upper limit for the groundwater level is arbitrary. For short periods the level may be higher.
5. The lower limit for the groundwater level is arbitrary. For certain (clayey) soils the level may even be lower without any risk of drought damage.
6. Where each side of a ditch has different land uses, maintain the lowest groundwater level where crops are grown (as these are the most sensitive to wet periods) and the highest groundwater level where there is grassland (the most drought sensitive).
7. The water level measured in a well is a point measurement. How representative this measurement is for the plot of land depends on the relief and soil type.
8. When height differences exist within plots and between plots, the groundwater level does not necessarily have to be adjusted to suit the lowest part to get the optimum total yield.
9. There is no need to lower the weir height when considerable amounts of precipitation are expected during periods of relatively low groundwater levels.
10. When considerable amounts of precipitation are expected during periods when the groundwater level is near the maximum, the weir level should be dropped one step.
11. High groundwater levels do not necessarily cause very wet topsoil.
12. When questions arise concerning this handbook, it is important for farmers to contact a member of the water conservation taskforce in their nearest agricultural organisation.

The project is supported by a handbook[1] which provides rules (listed below) and technical support to farmers. The rules are explained in detail in the manual while further support can be acquired from local experts. By including monitoring instructions for water levels and weir settings, it is expected that farmers can maximise the effect of the weirs (using data already available). In addition, the controlling agencies can gain a good overview of the results of the water conservation practices.

A second handbook, "Whole Crop Silage," describes the use of Triticale, a drought resistant crop that is suitable for whole crop silage. It describes how and where it can be used to maximise long-term economic benefits. Individual farmers can use the handbook to assess the applicability of this method in his/her particular situation. If the method can be used, the handbook provides guidelines for implementation.

Computer support

Based on the experiences acquired during the project, a computer programme has been developed. This programme helps the weir controllers (farmers, water managers, and conservation managers) to collect and manage data, such as groundwater and surface water levels. The programme includes a newly developed hydrological database of the area, and highlights those areas, which have a good potential for water conservation.

The inputs to the model consist of precipitation and evaporation figures and base data on the location and dimensions of weirs. The programme calculates the effects of different parameters on groundwater levels and the soil moisture deficit. These parameters include: soil composition, permeability of the subsoil, density of ditches, surface water slope, slope of the ditches, seepage and infiltration rates and climate. By changing input parameters, users are able to calculate the effects of different scenarios themselves. The aim of this project is that, with the aid of the model, users will be better able to control the water in their plots of land. The programme is a useful tool at meetings and courses for weir controllers. One outcome of the study was the idea that wet soil is not necessarily a result of having a high water level in ditches and is more likely to be caused by excessive rainfall.

[1] The handbook and accompanying registration forms are available on the internet (in Dutch): http://www.watermanagement.be

Analysing the project

Hydrological changes were monitored in addition to participants' reactions to the project.

Hydrological monitoring: In the Central Benelux area, six pilot ditches were selected, all differing in hydrological and hydrogeological conditions. The water level in the ditches was altered and the response of groundwater levels, at different distances from the ditches, was measured.

Participants' reactions to the project: The research and advice agency Streekwijzer studied the reactions of the participating farmers. The study showed that large differences exist in farmers' motivation for participation (Table 1). The highest percentage of farmers (35%) expected the project to reduce the effects of soils drying out. Other reasons for participating included to improve the image of agriculture and market gardening and to contribute to regional water management.

Farmers can be convinced of the benefits of water conservation as part of on-farm water management. Education, stakeholder participation and communication are the proper tools to achieve this.

Table 1: Participants' main reasons for taking part in the water conservation project

Participants' main reasons for taking part in the water conservation project	Percentage
To reduce excessive drying out of soils	35%
To generate knowledge	14%
To improve the image of agriculture and market gardening	12%
To contribute to regional water management	9%
To contribute to nature and the environment	3%

Effect on water use

Almost 2000 weirs have been installed; these are often accompanied by wells to monitor groundwater levels. Aditionaly, 5000 weirs have been planned for the Limburg area alone.

The actual performance of the water conservation measures, as well as to what extent farmers and market gardeners will continue to use water conservation in the long run, is not yet known. Locally, however, significant successes have been reported. The weirs have enabled farmers to increase their control of groundwater levels thus reducing the drying out of soil and avoiding damage to crops as a result of high groundwater levels.

Participating farmers and organisations consider the project to be a success. Farmers have found that they can actually manage the water at the farm level and improve conditions for agriculture and horticulture. Water management organisations benefit as a result of improved water management and increased stakeholder participation. New projects in the same area are being developed and most participants are more than willing to take part in these projects.

4 Lessons learned

In spite of differences in culture, motivation and operational practices, farmers and market gardeners have worked with great enthusiasm on water management at the farm level. The number of weirs installed is twice the original target number. Furthermore, participants are interested in taking part in similar water management projects. As a result of the project, farmers and market gardeners now have a greater awareness of the importance of water. Transboundary knowledge transfer has led to greater insight into the opportunities and techniques for applying water saving measures. Furthermore, there is now mutual trust between Dutch and Flemish partners.

The project is about to begin its second stage of development. This will include water conservation in agriculture, water retention (the storage of water during peak discharges) and

water quality. For the next water conservation project, starting in spring 2001 in the Dutch provinces of Limburg and Noord-Brabant, measures will be taken in both agricultural and conservation areas.

Replicability

The technical aspects of the project have not been replicated in other areas as the conditions, both natural as well as social, are unique to the project and the area. However, the knowledge gathered and developed in this project could be applied elsewhere. The awareness that stakeholder participation is a key element to the success of the project is of great importance.

5 References

Organisations and people

Author:
A.G. Segeren,
Association of Waterboards,
P.O. Box 80200,
2508GE,
Den Haag,
The Netherlands
Email: toon.segeren@wldelft.nl

ZLTO
PO box 91 NL-5000 MA Tilburg
tel ++ 31 13 583 62 10
fax ++ 31 13 583 62 67

Websites

Waterschrift, eindrapport interregproject watermanagement in het Benelux Middengebied (in Dutch) http://www.watermanagement.be (in Dutch)