Tools and planning to meet water quantity storage and water quality demands (WP 3.1.2; 3.1.3; 3.1.5)

General

The focus is on tools which are relevant to all or most of the pilots/countries but not common practice. Since the conflicting interests are normally production versus environment, efforts were made to identify measures that contribute to both the environment and the economy or other aspects important from the producers' point of view.

Water quantity storage

Increased amount of water available for irrigation or improved efficiency

Constructed wetlands can be used for irrigation, even if the primary purpose is nutrient retention. Other positive effects are improved conditions for biodiversity and hunting.

By using industrial process water for irrigation, agricultural producers gain access to water at a low cost and the discharge problem is solved for the industry. The hygiene aspects are a limiting factor.

Artificial recharge of the groundwater reserves can be achieved through infiltration of surface water or even of treated sewage water. In the case of the latter in particular, the hygiene risk is a critical factor, but on the other hand sewage water in some cases amounts to a large percentage of the total water flow in small water courses used for irrigation.

Wireless soil moisture sensors in combination with a soil survey provide an instrument for efficient irrigation, but there is a risk of total water consumption increasing instead of decreasing.

Controlled drainage by temporary closure of the drainage system above the outflow in large ditches or neighbouring rivers as a way of retaining water in the root zone has been discussed, but there is not much practical experience on a large scale.

Informal water allocation programmes designed for and governed by the agricultural producers and possibly facilitated by the authorities can be more efficient than costly and complicated legal procedures such as applications for water permits.

Adjustment of water flow

Remote control of weirs remote allows them to be lowered or raised more easily and the water storage capacity can be improved. Flow models are needed for more precise water quantity regulation.

Controlled flooding/ natural flood management of selected areas in order to protect other areas where flooding would be costly is included in municipal spatial planning in some areas. Low-lying agricultural land, primarily meadows, can be allowed to be flooded in extreme situations. The farmers need to be compensated for the loss of production, the inconvenience and the risk of land

contamination. The challenge is to identify the best design, the best location and whether to use multiple small sites or few large schemes. There is a need to clarify whether payment for the 'flood function' is compatible with the general agricultural payments. A well-designed natural flood management system can have biodiversity benefits.

Encouraging river meander through lowering artificial dams and establishing water woodland or water meadows can lower the risk of flooding. A key problem arises if river restoration fails and the river begins to move. Another complication is that rivers often form the boundaries between properties.

Water quality demands

The overall goals for water quality are identified in the EU Water Framework Directive, the Nitrate Directive and the Baltic Sea Action Plan and are specified in the national programmes. Common tools for implementation are agricultural advisory programmes, permits/notifiability demands on large animal installations and fertiliser and manure regulations. The tools in the field of water management are not so widespread.

Field experiments have shown that irrigation on sandy soils results in improved utilisation of any fertiliser applied. Sensors and soil sampling in combination with a model and soil survey improve the timing of irrigation and the application rate can adapted to the specific field conditions.

Nature friendly river banks and buffer zones along water courses are intended to be beneficial for water quality, but require a lot of land and are in conflict with production and the need for agricultural land for manure spreading.

Fish management, meaning the removal or lowering of the population of certain species such as bream and carp, can improve the ecological balance of lakes and rivers but often generates a conflict with sport fishing.

There are new, fish-friendly pumps that allow more fish to migrate despite artificial barriers.

Construction of wetlands is an effective measure but for the individual farmer it can be a major obstruction to farm operations.

New spatial planning

Land re-parcelling can be necessary in some areas in order to facilitate large-scale, central or linear irrigation.

If all spatial development plans were to be evaluated from the water management point of view, the effect on water quality and water quantity would be known. This would create a better understanding between water managers on the one hand and spatial planners, architects and project developers on the other.

The national, regional and local adaptation strategies for a changing climate need to identify land use functions from the perspective of water availability and the risk of flooding. There are conflicting interests between land users as well as between different plan owners.