# Executive Summary:
## Irrigated Agriculture Report

### THE BACKGROUND TO THE IRRIGITATED AGRICULTURE REPORT


*WssTP's Irrigated Agriculture Scientific Report was published in September 2010 and involved the contribution of 11 countries, from both inside and outside of Europe.*

With the effects of climate change, it is very likely that water availability will limit irrigation in many parts of Europe, such as the Mediterranean region. Many attempts have already been made to improve the effective use of water in agricultural crop production. It is imperative that irrigation efficiency is improved further, and it has been recognised that a great deal of water can still be saved in irrigation systems.

Agricultural irrigation uses a large quantity of water; accounting for 24% of water abstractions in Europe. Together, Spain, Italy, France, Greece and Portugal account for 84% of the irrigated area in the EU-27. Irrigation is either carried out throughout the year (permanently), is used to supplement rainfall during the dry season, or is only used as a temporary measure in years when precipitation is not sufficient.

While gravity systems using basin or furrow irrigation have the longest tradition and are still widespread in Europe, today, pressure systems for sprinkler or drip irrigation are becoming more common as, in general, the way they deliver water to crops is more efficient.

However, irrigation technology differs significantly between countries and regions according to history, environmental and economic conditions and agricultural practices. Although some irrigation water returns directly to the local water cycle via percolation, there is typically also significant consumption through plant growth and evapotranspiration. Therefore, efforts to increase productive water use by the plant and to minimise evapotranspiration and run-off are essential.

Water abstraction for irrigation which exceeds natural recharge can lead to lowered water tables, reduced flow into wetlands and rivers, and an increased risk of salt water intrusion into groundwater. Faster drainage from arable land and less or no capillary rise are consequences of lowered ground water tables negatively affecting crop production.

The Water Framework Directive sets specific deadlines for EU Member States by which they must achieve or maintain a good status for all European water bodies. This is the key piece of legislation as regards both water quality and quantity.

### THE PURPOSE OF THE IRRIGATED AGRICULTURE SCIENTIFIC REPORT

Less than 10% of agricultural land in Europe is irrigable. However, this land makes a significant contribution to food security, food quality and to people's livelihoods in rural areas. The identification of water-saving options is the focus of this report. One particular challenge is how to bring into practice new technology, as well as improved irrigation management and adapted cropping practices and how to adapt existing technology to local situations.

Climate change will lead to lower levels of precipitation in many regions of Europe, a change in seasonal rainfall resulting in decreased precipitation during vegetation periods, an increase in heavy rainfall causing lower infiltration rates, and higher temperatures leading to an increase in the evapotranspiration rate.

This will place additional pressure on regions where water scarcity is already observed today and will become apparent in increased competition for fresh water between the different very water-demanding sectors. In the future, it will become even more important that water-use efficiency is improved, and that crop water productivity under irrigation is increased. Therefore, it is essential that new technology and innovative approaches are found in order to allow farmers to produce crops while using water in a sustainable manner.

TURN OVER TO SEE THE MAIN FINDINGS & FUTURE RESEARCH NEEDS

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## MAIN FINDINGS AND FUTURE RESEARCH NEEDS

While there is a great deal of new and improved irrigation technology, this is not, or is only very slowly, being sufficiently put into practice by farmers. There are many reasons for this. There is the issue of scale: in many cases, farmers are dependent on large-scale irrigation infrastructure, the modernisation, replacement or maintenance of which is outside their capabilities.

There are economic reasons: investing in irrigation systems is expensive, regularly reaching 10 000 €/ha for modern drip irrigation. There is the need for specific skills: irrigated farming requires a basic understanding of engineering as well as knowledge of cropping and plant physiology. Farmers must obtain the necessary technical and organisational know-how in order to secure their yields and to assure the quality of their produce while using as little irrigation water as possible without incurring losses of income when changing practices.

Water-saving options depend on the choice of irrigation technique. In addition to improving water-use efficiency, modern pressure systems offer the possibility of coupling them with fertilisation technology which leads to improved fertiliser use and minimises nutrient loss. Improvements in water management, in particular in irrigation timing, the uniformity of water application and the application rate, could significantly reduce the amount of water needed. Modifications in crop management practices, e.g. using drought-tolerant crops, adapting the cropping calendar and improving soil management, can contribute to reducing the amount of water needed for irrigation. Deficit irrigation might be a solution in those regions where water is especially scarce.

Applied irrigation research should go hand-in-hand with encouraging farmers to adopt new practices through technology transfers together with the promotion of improved water management. Improved management of water resources, sustainable storage of water, and delivery infrastructure must be developed alongside irrigation improvements. The development of modern multipurpose irrigation systems which use low-pressure irrigation could help to reduce farmers' costs. Combining improved monitoring systems (e.g. real time sensoring) to drip and sprinkler irrigation would contribute to better matching the application of irrigation water with plant needs. A consistent quality policy for irrigation equipment and its adaptation to local conditions (soil strength and depth,
infiltration rate and crop tolerance to application method) could help to reduce the risk of wasting water.

Adding nutrients and plant protection products to irrigation water could help to better match plant needs and to reduce the amount of inputs used while also reducing the risk of leakage. This approach is already practiced in glasshouse production, but it is rarely used in open-air production. There is a significant need for better communication with users through better advisory services and education, which take advantage of farmers' improved accessibility to information and communication technology. Practical demonstrations and transferring knowledge from one European region to another could contribute to accelerating the uptake of new technology and the spread of innovative practices.

Changes in irrigation always affect local ecosystems. Therefore, it is crucial that we learn more about this. More research into the interaction between drainage and irrigation can also help minimise such environmental impacts.
Groundwater recharge, as well as the reuse of discharge from wastewater treatment plants in irrigation, could contribute to reducing the amount of ground water used in agriculture. However, additional research is required before this can be put into practice on a larger scale in Europe.

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