IWRM Action Hub

CASE STUDY

Spain: Managing water demand in the upper Guadiana basin

Summary

For centuries the Upper Guadiana Basin has been irrigated with groundwater, resulting in a drop in the water table of more than 20 meters. Actions were taken to address this issue, including regulations restricting aquifer abstraction and economic incentives to encourage farmers to improve irrigation efficiency and plant alternative crops. The key lesson learnt is that surface and underground waters cannot be managed separately.

Background

For centuries the Upper Guadiana Basin has been irrigated with groundwater. In the 1980s the irrigated areas increased more than four fold in ten years, accompanied by socio-economic development. This increase resulted in a drop in the water table of more than 20 meters.

Runoff from the northern rivers, (Cigüela, Riansares and Záncara) and from the southern rivers, (Azuer and Córcoles), drain into the plain, where infiltration and evapotranspiration take place. The natural springs of the infiltrated water are combined with surface flows to create a significant group of wetlands. The drop in the water table led to deterioration of several wetlands areas of high environmental interest. For example, the flooded surface area of the “Tablas de Daimiel” National Park, declined from about 6,000 Ha to less than 1,000 Ha. Others sites, such as the well known source of Los Ojos del Guadiana, stopped providing water to the aquifer for several years, and are now completely dry.

Several curative measures were introduced, including new regulations restricting aquifer abstraction and economic incentives to encourage farmers to improve irrigation efficiency and plant alternative

crops. Between 1995 and 2000 the water table level recovered by more than 10 meters. Understanding of the development of the Basin's water resources, and their relation to the legislative and economic measures introduced in the last decade, demonstrate the value of integrated water management. The changes in the Basin irrigation, forced managers to seek to balance economic growth that implied high irrigation water consumption, with wetlands conservation, of significant national importance to the environment.

Actions taken

To ameliorate these effects, a number of measures were taken such as "The Daimiel Water Table Hydrological Regeneration Plan" was formulated in 1984, and contained a number of measures, including construction of the small Puente Navarro dam in 1985, designed to bring water to the south eastern part of the national park, and to transfer water from the Tajo. The Mancha Occidental and Campos de Montiel aquifers were declared as over exploited allowing Basin Organisation develop

system rules to regulate and limit water abstraction; these have been applied annually since 1991.

An Agrarian Compensation Plan was instituted in the areas of Mancha Occidental and Campos de Moniel in 1992. This Plan introduced economic subsidies for farmers who adopted practices compatible measures with wetland conservation, such as irrigation water savings or the growing of less water consuming crops. The hydrological measures came under the umbrella auspices of the "Confederación Hidrográfica del Guadiana", which was developed with participation of Basin irrigation associations. The economic incentives for water savings were generated by the "Juntade Comunidades de Castilla la Mancha (Regional Administration) and the Ministry of Agriculture, Fisheries and Food (Central Administration) and were largely paid for by European Union funds.

Additionally, multiple legal measures were also put in place such as the National Hydrologic Plan for the Guadiana Basin (approved in 1998) which took into account the complex situation of the Upper basin. The plans allowed the Aquifers linked to natural areas of interest to be declared under special protection. The borders of aquifers, wetlands and others areas of ecological or landscape interest were defined. Furthermore, permissions to use water from protected areas with either limited or suspended while also establishing a ground water police force to enforce the laws, and to penalize violators, who took water from the protected areas. The plan also involved transferring water from another basin, known as the Tajo-Segura scheme.

Outcomes

Since the mid 1990s, the status of the wetland areas has improved significantly; most of its original area has now recovered. This process was assisted by the good rains of the years between 1995 and 2000.

All stakeholders are formally represented in the Patronato de las Tablas de Daimiel, and in various government organizations, including the Confederación Hidrográfica del Guadiana. Although farmers and ecological associations agreed that the 1970s situation was unsustainable, and that it was essential to use less water for irrigation, the measures adopted were nonetheless controversial. Farmers were resistant to changes that might negatively affect their incomes. They also believed that the application of the legal measures would lead to a decrease in regional employment. Some ecological associations questioned the value of the adopted measures; others considered the management of the National Park to be inefficient.

The water transfer proved controversial because it involved dropping the level of the Cigüela River, thereby negatively affecting some river vegetation and wetlands areas. Also, the waters of the rivers

Tajo and Guadiana are of different qualities, and by bringing the Tajo waters to Guadiana, there is a possibility that indigenous species may come with it, altering the ecosystem; these important topics are still under discussion today.

Two things will be decisive in determining the future sustainability of the new measures: better control of new wells, and compatibility between the economic incentives to save water and the European agriculture policy. The “declaration of overexploited aquifers” allowed some control over underground water pumping that had previously been totally under the control of the farmers. However, new illegal wells are still being introduced. Strengthening of the Confederación Hidrográfica would mean better central control, and would give both police and farmers more information. Farmers need to be educated to the need to act not only in the short term, but to take into account the need for long term sustainability of water availability.

The sustainability of the economic incentives to save water depends on their compatibility with the European agriculture policy. There may be contradictions between EU environmental concerns and the economics of the Common Agriculture Policy (CAP). The Guadiana Basin program, for instance, uses EU money to promote the elimination of some crops such as maize or beet that consume high amounts of water, whereas the CAP provides subsidies for these crops.

Lessons Learned

Good water management needs to consider the whole hydrological cycle

Surface and underground waters cannot be managed separately or independently of the ecosystems on which they depend

Good water management requires sustaining a balance between pumping of groundwater and recharging the aquifer. Aquifer management needs planning to accommodate medium and long-term use of the resource

The use of administrative tools helped control and reduce the impact of over-exploitation of the aquifer

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