

Science for Environment Policy

Comparing water pricing policies for a case study in Greece

A case study in Greece suggests that farmers growing low-value crops such as maize and cotton will suffer most from policies which introduce charges for water. However, this impact can be mitigated if groundwater is priced based on the energy needed for pumping, shifting some of the burden to higher value crops.

As [global warming](#) progresses, [water](#) scarcity has become an increasing concern. Although Europe is not commonly thought of as a drought-prone continent, nearly half of the EU's population already lives in 'water-stressed' countries. Previous research has suggested that water pricing policies might improve the efficiency of water management, as advocated in the Water Framework Directive¹.

In this study, researchers use [economic](#) models to compare two water pricing policies and establish which would provide the most successful management strategy incorporating economic and environmental concerns. The researchers use water management in the Aggitis River Basin in northern Greece to test their technique. The dataset used included information from 2007 on irrigation, livestock, domestic, industrial, and tourism water use.

The first policy, uniform pricing, assumed that all users paid the same amount per unit of water, and groundwater and surface water cost the same amount. This was then compared to a second policy, mixed pricing, under which surface water had a single price per unit, while groundwater price was based on the cost of the energy needed to pump it to the surface.

The analysis then identified the pricing options which optimise 'welfare', or, in other words, the gains made by the water user. For example, the welfare associated with irrigation was assumed to equal the [farmers'](#) revenue, minus the water and other costs. For industrial uses, welfare was the profits minus costs. To ensure that management did not have damaging environmental impacts, the models also accounted for how flow volumes differed from natural flows and the fact that groundwater pumping must not exceed rates of recharge.

The models predicted that the economic effects of water pricing in the Aggitis River Basin were greatest for agriculture, and producers of low-value crops, such as maize and cotton, will be most affected. However, while these crops are not profitable to grow under uniform pricing in this system, it may be profitable to continue irrigating smaller amounts of these crops using groundwater, if it is priced differently.

This is because the low-cost crops grown in the area can be profitable to grow using small amounts of groundwater even if the surface water price is prohibitively expensive, as the use of energy pricing results in low water cost as long as groundwater use is low. However, the cumulative effect of widespread use of small amounts of groundwater at the basin scale would reduce river flows, with possible negative environmental impacts on the river ecosystem.

This reduction in groundwater flow to rivers requires a higher surface water price in order to reduce use, and maintain river flow. Growers of high-value crops would continue to be able to irrigate with surface water even with higher prices. Therefore, the mixed pricing policy would have the effect of shifting some of the costs of providing good river flows from growers of low-value crops to farmers irrigating higher value crops using surface water.

Overall, the researchers conclude that water pricing may be necessary in the face of increasing scarcity; however this may impact farmers growing low-value crops in particular, as in this case study. This study suggests that the negative impact on farmers of low-value crops could be eased by pricing ground and surface water differently.



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1. <http://ec.europa.eu/environment/water/water-framework/>