Science for Environment Policy
DG Environment News Alert Service
European Commission

26 April 2012

Farmers evaluate measures to reduce soil erosion and water pollution

Farmers have collaborated with scientists in France to evaluate agri-environmental measures that reduce soil erosion and surface water pollution at a catchment level. The exercise helped the farmers understand the benefits of the measures and provides an example of how policymakers could engage with stakeholders under the Water Framework Directive (WFD).

The EU's Common Agricultural Policy (CAP)[1] has introduced instruments to improve water management on farms, such as set-aside land. Such measures can significantly reduce contaminated soil and water running off fields into streams and rivers, but farmers may not feel ready to implement some of these for fear of reducing yield and income.

In the spirit of the WFD[2], which encourages Member States to discuss management plans with stakeholders, the researchers of this study spoke at length with five farmers from the Lomagne region in south-western France. The farmers were asked for their thoughts on the findings of a hydrology and erosion model, STREAM[3], which simulates the effects of different measures on runoff and sediment yield. The model was applied to two different areas of cropland in the region where most soils are 'silty loam', which is easily sealed, that is, its surface is easily compacted by rain and becomes impenetrable by water. The simulation of runoff and soil erosion was created as if a 2-hour rainy storm in spring had just occurred, producing 25mm of rain.

First, the farmers helped develop realistic scenarios of runoff for the model by drawing on their own experiences and observations in their fields. They then evaluated different measures to reduce runoff. For the first site considered, which had steep hillsides, the model suggested that applying 5-metre-wide grass strips alongside ditches and roads could reduce water runoff by about 46% and soil sediment loss by 26%. French regulations encourage farmers to establish at least 3% permanent plant cover on their cropland, such as grass strips. The farmers were thus already accustomed to these strips, and understood the benefits. They were less familiar with the benefits of 10-metre-wide strips placed at the steepest point or at mid-slope in the fields. The model suggested these could reduce water runoff by about 43% and soil sediment loss by 39%, by slowing down runoff before it becomes erosive. Although more efficient than the narrower ditch/roadside strips, most of the farmers did not support this measure. They felt that the loss of cropland was too great, and the inability to drive tractors over the strips, to prevent compaction, was problematic.

For the second site considered, which had gently sloping hillsides, the model suggested that planting grass strips alongside rivers, in accordance with French regulations, would result in 50% reduction in runoff and sediment loss. This confirmed to the farmers that these strips are useful. The model also indicated that redistributing winter and spring crops so that winter crops are preferentially grown down-slope, next to rivers, could reduce runoff by 22% and soil sediment loss by 46%. This would be as least as efficient as planting grass strips. It is well established that springtime crops, such as maize and sunflowers, lead to more runoff in spring because they cover less than 20% of the soil surface. In contrast, dense winter crops, such as wheat and rape, slow runoff. The farmers were aware that down-slope sites are more fertile, and these are therefore preferred for spring crops which bring more income. They felt that switching sites for winter and spring crops would be difficult as they may need to exchange fields with neighbouring farmers. Exclusively growing winter crops on all land almost completely stopped runoff and erosion, according to the model. It could also significantly reduce income, but the farmers were willing to consider this extreme solution for land where erosion is particularly severe.

The researchers conclude that the STREAM model is a useful tool for discussing different agri-environmental measures with farmers. Although it is time-consuming, findings from selected case studies like this could be scaled up to develop regional management plans for controlling erosive run-off, which would improve soil as well as water quality.

1. http://ec.europa.eu/agriculture/capexplained/index_en.htm
2. http://ec.europa.eu/environment/water/water-framework/index_en.html
3. For further information on STREAM, see: www.prodinra.inra.fr/prodinra/pinra/data/2007/09/PROD2007b5b66bf1_20070907112152331.pdf

Source: Furlan, A., Poussin, J-C., Mailhol, J-C., Le Bissonnais, Y., Gumiere, S.J. (2012) Designing management options to reduce surface runoff and sediment yield with farmers: An experiment in south-western France, *Journal of Environmental Management*. 96(1):74-85.
Contact: poussin@ird.fr **Theme(s):** Agriculture, Environmental information services, Soil, Water