



Contrasting crop responses to extreme weather events

Marijn van der Velde

International Institute for Applied Systems Analysis (IIASA) Ecosystem Services & Management, Laxenburg, Austria
(velde@iiasa.ac.at)

Planning for appropriate adaptation responses requires better knowledge of potential damage. This includes improved crop models that better capture dynamics of extreme events. It is well known that the timing of extreme weather events with respect to the crop development stage, in combination with crop type, and farm management capacity, can lead to variable crop losses. Correctly simulating crop stresses that often occur concurrently, such as drought and heat stress, and water and aeration stress, is still a considerable challenge.

In France, crop yields were greatly influenced by drought and heat stress in 2003 and by extremely wet conditions in 2007. Reported maize and wheat yields were historically low in 2003, in contrast to 2007 when wheat yields were lower and maize yields were higher than long-term averages. Here we investigate in detail simulated pest damage, water stress, aeration stress and heat stress for maize and wheat during 2003 and 2007, with the EPIC crop model implemented for France at a 10 km grid. The analysis of past information can help to better understand impact dynamics on specific crops and events, and test and improve the performance of regional crop growth simulation models against factors and processes influenced by extreme weather events.

—