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Weather based risks and insurances for crop production in Belgium

Anne Gobin
VITO nv, Environmental Modelling, Mol, Belgium (anne.gobin@vito.be)

Extreme weather events such as late frosts, droughts, heat waves and rain storms can have devastating effects on cropping systems. Damages due to extreme events are strongly dependent on crop type, crop stage, soil type and soil conditions. The perspective of rising risk-exposure is exacerbated further by limited aid received for agricultural damage, an overall reduction of direct income support to farmers and projected intensification of weather extremes with climate change. According to both the agriculture and finance sectors, a risk assessment of extreme weather events and their impact on cropping systems is needed.

The impact of extreme weather events particularly during the sensitive periods of the farming calendar requires a modelling approach to capture the mixture of non-linear interactions between the crop, its environment and the occurrence of the meteorological event. The risk of soil moisture deficit increases towards harvesting, such that drought stress occurs in spring and summer. Conversely, waterlogging occurs mostly during early spring and autumn. Risks of temperature stress appear during winter and spring for chilling and during summer for heat. Since crop development is driven by thermal time and photoperiod, the regional crop model REGCROP (Gobin, 2010) enabled to examine the likely frequency, magnitude and impacts of frost, drought, heat stress and waterlogging in relation to the cropping season and crop sensitive stages. The risk profiles were subsequently confronted with yields, yield losses and insurance claims for different crops. Physically based crop models such as REGCROP assist in understanding the links between different factors causing crop damage as demonstrated for cropping systems in Belgium.

Extreme weather events have already precipitated contraction of insurance coverage in some markets (e.g. hail insurance), and the process can be expected to continue if the losses or damages from such events increase in the future. Climate change will stress this further and impacts on crop growth are expected to be twofold, owing to the sensitive stages occurring earlier during the growing season and to the changes in return period of extreme weather events. Though average yields have risen continuously due to technological advances, there is no evidence that relative tolerance to adverse weather events has improved.

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