Meteorological risks, impacts on crop production systems and agricultural insurances in Belgium

A. Gobin (1) and I. Piccard (2)

(1) VITO, Environmental Modelling Unit, Mol, Belgium (anne.gobin@vito.be), (2) VITO, Remote Sensing Unit, Mol, Belgium

Devastating weather-related events recorded in recent years have captured the interest of the general public in Belgium. Extreme weather events such as droughts, heat stress, rain storms and floods are projected to increase both in frequency and magnitude with climate change. Since more than half of the Belgian territory is managed by the agricultural sector, extreme events have significant impacts on agro-ecosystem services and pose severe limitations to sustainable agricultural land management. The perspective of rising risk-exposure is exacerbated further by more limits to aid received for agricultural damage (amendments to EC Regulation 1857/2006) and an overall reduction of direct income support to farmers. Current knowledge gaps related to the occurrence of extreme events and the response of agro-ecosystems need to be addressed in conjunction with their vulnerability, resilience and adaptive possibilities.

A chain of risks approach starts with assessing the likely frequency and magnitude of extreme meteorological events by means of probability density functions. Impacts are subsequently based on physically based models that provide information on the state of the damage at any given time and assist in understanding the links between different factors causing damage and in determining bio-physical vulnerability. The output of regional bio-physical models is compared with remote sensing based algorithms applied on SPOT-VGT temporal data. Crop damage and risk indicators are derived from remote sensing, meteorological records, crop modelling and agricultural statistics and compared to damage statistics obtained from the government-based agricultural disaster funds. Damages due to adverse meteorological events are strongly dependent on crop type, crop stage and soil type. Spatio-temporal indicators of drought during the growing season and waterlogging at harvest showed the highest agreement with damage, followed by hail and frost. In general potatoes, flax and rape seed are the most vulnerable crops, followed by cereals and sugar beets.