



Weather based risks and insurances for agricultural production

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Extreme weather events such as frost, drought, heat waves and rain storms can have devastating effects on cropping systems. According to both the agriculture and finance sectors, a risk assessment of extreme weather events and their impact on cropping systems is needed. The principle of return periods or frequencies of natural hazards is adopted in many countries as the basis of eligibility for the compensation of associated losses. For adequate risk management and eligibility, hazard maps for events with a 20-year return period are often used.

Damages due to extreme events are strongly dependent on crop type, crop stage, soil type and soil conditions. The impact of extreme weather events particularly during the sensitive periods of the farming calendar therefore requires a modelling approach to capture the mixture of non-linear interactions between the crop, its environment and the occurrence of the meteorological event in the farming calendar. Physically based crop models such as REGCROP (Gobin, 2010) assist in understanding the links between different factors causing crop damage. Subsequent examination of the frequency, magnitude and impacts of frost, drought, heat stress and soil moisture stress in relation to the cropping season and crop sensitive stages allows for risk profiles to be confronted with yields, yield losses and insurance claims. The methodology is demonstrated for arable food crops, bio-energy crops and fruit.

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. 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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