The role of meteorological information and data for agrometeorological applications

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Agriculture and related food production belong to the most affected sectors by weather and climate conditions. Since agriculture is practiced the observation of weather conditions is believed to help farmers to improve their production and to avoid losses. In more recent times, since measurement methods of meteorological parameters were introduced, numerical data became available to assess and predict agronomic production conditions. Due to further technical developments nowadays data in digital form allow not only vast data generation in various time and spatial scales, but also to reveal and simulate detailed processes in the spheres relevant for agrometeorology and agriculture. Use of meteorological data and information need to be tailored to the user needs in order to be useful for decision making. For famers, it means that not only meteorological data and information itself (such as short-term weather forecasts) are of high relevance, but also information on potential impacts of weather on specific activities (such as harvesting) or assets (such as crop damages and risk prediction). A main further use of meteorological data concerns the optimization of production processes (such as fertilization, crop protection or irrigation planning), where modern technologies allow a near real time transfer of data and information for decision-support of farm activities as well as automatic technological process planning (such as in precision farming). For longer time scales, climatic data such as used for prediction of climatic trends, impacts of climate scenarios or weather and climate related monitoring of diverse agronomic risks support policy or farm strategic planning, which often is related to long-term investments. Meteorological data, observed by weather services or by specific agrometeorological stations or networks as well as simulated derivates (such as weather forecasts and climate scenarios) became therefore an indispensable information source for a highly productive agriculture maintaining food security. They help to reduce production risks as well as undesirable environmental impacts through increasing the efficient and sustainable use of farming inputs and natural resources (fertilizers, chemicals, energy, water, soil etc.) for low to high input farming systems globally.