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EXPLORING THE POTENTIAL OF HIGH-RESOLUTION SOIL MOISTURE INDICATORS FOR DECISION-MAKING IN REGIONAL OPERATIONAL WATER MANAGEMENT

Water systems face an increasing pressure due to climate change and socio-economic developments. Soil moisture data may provide rational and reliable information for decision-making in Dutch water management. Although soil moisture is categorized as an Essential Climate Variable (ECV) by the European Space Agency, this variable is currently not applied for decision-making in water management. Since new data sources often fail to reach the decision-makers in a suitable way, indicators might play a role in the translation of soil moisture data into valuable information, which can be used in practice by water managers.

A theoretical framework is constructed to develop new suitable indicators in this study and to select suitable soil moisture indicators found in literature. This framework is based on scientific requirements and practical demands. The practical demands are derived from a survey among water managers from the operational water management crisis teams of Dutch regional water authorities Vechtstromen and Drents Overijsselse Delta. The practical demands are: insight in the storage capacity of the unsaturated zone, availability of water for crops, spatial information that distinguishes (extreme) wet or dry areas and specifications regarding the spatio-temporal resolution. When the practical demands are merged with the scientific requirements from literature, the requirements for indicators consist of data availability, accuracy, reliability, relevance, temporal and spatial resolution and translation of data into information.

The Storage Capacity Indicator (SCI), Soil Water Deficit Index (SWDI) and Soil Water Wetness Index (SWWI) comply with the indicator requirements. The SWDI and SWWI classify the severity of dry and wet conditions, respectively, whereas the SCI depicts the available storage of the soil, see Figure 1. This SCI can be used in combination with precipitation forecasts to predict whether the precipitation amount can be stored in the soil.

These indicators are validated by means of a workshop with employees of regional water authority Vechtstromen. During the workshop, the participants considered the currently used information in operational water management accurate and easily interpretable. However, these information sources do not provide full insight in the water system, hence water managers believe that they do not have all relevant information about the water system at their disposal yet. The participants indicated that the soil moisture indicators show potential for the translation of data into information and may play a role in providing new insights in the water system.

To build upon the positive attitude of the participants of the workshop regarding soil moisture indicators a pilot study can help the water managers gaining experience with the new indicators.

