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Precision Irrigation: New Strategy for Irrigation Water Management

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Abstract

Agricultural cropping systems depend on the use of water resources for survival, and water needs vary spatially in fields because of spatial soil variability (texture, topography, water holding capacity and infiltration and drainage rate), therefore, the need for irrigation may differ between different zones of a particular field. While moving irrigation systems apply water at constant rates, some areas of the field may receive too much water and others not enough. Precision irrigation, an existing aspect of precision farming just beginning to be explored, means applying water in the right place at the right amount. The use of precision agriculture for irrigation water management is still in the development stage and requires a lot of investigation and experimental work to determine its feasibility and applicability.

The availability of some low-cost data gathering methods, positioning systems and the development in computer programming will help in regulating the depth of water within a field. So the next generation in irrigation scheduling is not just when-how much but when, where and how much to irrigate. A precision irrigation system expected to have the ability to apply the right amount of water directly where it is needed, therefore is saving water through preventing excessive water runoff and leaching. So the suitable technology to control varying amounts of water in direction of travelling and crosswise has to be developed.

Federal Agriculture Research Center (FAL), Institute of Production Engineering and Building Research, Braunschweig, Germany in cooperation with the Department of Agricultural Engineering at the University of Kassel starts a research activity aimed to review the state of precision irrigation, to add necessary background information and to develop a strategy for its application. The future challenge is to build a rich database in order to formulate a complete decision support system for precision agriculture, including all field activities i.e. irrigation, fertilisation, tillage, plant protection and weed control. The presented project contributes to reduce the use of scarce water resources.

Keywords: EM38, irrigation scheduling, precision agriculture, precision irrigation, spatial variability, water holding capacity, water saving