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Increasing Efficiency of Water Use in Agriculture through Management of Soil Water Repellency to Optimize Soil and Water Productivity

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Water's ability to infiltrate and disperse in soils, and soil's ability to receive, transport, retain, filter and release water are important factors in the efficient use of water in agriculture. Deteriorating soil conditions, including development of soil water repellency, negatively impact hydrological processes and, consequently, the efficiency of rainfall and irrigation. Soil water repellency is increasingly being identified in diverse soils and cropping systems. Recently research has been conducted on the use of novel soil surfactants (co-formulations of alkyl polyglycoside and block copolymer surfactants) to avoid or overcome soil water repellency and enhance water distribution in soils. Results indicate that this is an effective and affordable approach to maintaining or restoring soil and water productivity in irrigated cropping systems. Results from studies conducted in Australia and the United States to determine how this technology modifies soil hydrological behavior and crop yields will be presented. A range of soils and various crops, including potatoes, corn, apples and grapes, were included. Several rates were compared to controls for effect on soil moisture levels, soil water distribution, and crop yield. An economic analysis was also conducted in some trials. Treatments improved rootzone water status, significantly increased crop yield and quality, and in some cases allowed significant reductions in water requirements. Where assessed, a positive economic return was generated. This technology holds promise as a strategy for increasing efficiency of water use in agriculture.