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“Development on the margin”

Mitigation of Global Climate Change and Water Scarcity Impacts on Agriculture in Draâ Oases, South East Morocco: Methodological Framework

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Abstract

Since 1979, Morocco has experienced a number of extremely dry winter seasons. Anticipated local and global climatic changes will make the water even scarcer. In the Draâ Oases in South-East Morocco rainfall is almost negligible. The agriculture depends on precipitation and snow melting collected behind Mansour Eddahbi Dam. Erratic changes in rain fall in the dam catchment had severe impacts on downstream irrigated agriculture. Crop management options have been seen as possible mitigation measures. The aim is to increase water use efficiency (WUE) of the areas' main crop and staple food, soft wheat (*Triticum aestivum*). A modelling framework is adopted to test crop management efficacy. The approach is based on two scales: field and oasis. At the field scale, irrigation timing and quantity, different rates of inorganic fertiliser, and organic fertiliser were experimentally tested. Experiments were conducted at two sites, Agdez and Tagounite, in two different oases, Mezguita and Ktoua respectively. Later on, the outcome of these experiments will be used to calibrate EPIC model parameters for the middle Draâ Oases conditions. The calibrated model will be used at the oasis scale, adding soil and climate variability in addition to current and recommended crop management. Different timing for surface water release for irrigation from the Mansour Eddhabbi Dam will be modeled as well. Oasis scale modelling results will be validated against own surveyed wheat grain yield statistics for years 2009 and 2010. Two IPCC based climate scenarios downscaled to the oases will be selected to estimate the combined effect of climate change and water management on wheat yield. Difference between estimated yields under current and recommended crop management will give an idea of the mitigation effect. The methodological framework is presented here.

Keywords: Crop models, epic, regional modelling, upscaling, wheat