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Salinity Development during three Decades in the Oasis of Ktoua, South Morocco

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Abstract

Water scarcity in the Draâ Valley, South Morocco, has led to an excessive increase in the use of groundwater for irrigation in the Draâ Oases, and consequently accelerated the natural soil salinisation process. Combined with water shortage, salinity had major negative impact on yield in the area. To assess the development of soil salinity, three monitoring studies were conducted in one of the six Middle Draâ oases “Ktoua” in 1968, 1981, and 1995. A total of 130 sites were sampled representing a study area of 7 341 ha. Results were originally presented as tables and manually interpolated maps. Data are presented here differently. Measured electrical conductivities were interpolated using geostatistical Ordinary Kriging method. The resulting interpolated surface was classified into 5 salinity classes: non-salinized R1, slightly salinized R1, moderately salinized R3, strongly salinized R4, and severely salinized R5; representing 0–4, 4–8, 8–16, 16–32, and >32 mmoh cm^{-1} respectively. Results showed that Beni-Sbih and Sidi-Saleh in the south and west of Beni-Hayoun were particularly affected from 1968–1981. Approximately 20 % of R1 and R2 classes became R3 during that period. Excessive implementation of groundwater pumps in the 80s and 90s led to further salinisation of 40 % of R1 and R2 classes into R3. Also 11 % of R3 became strongly salinized soils R4. Groundwater salinity and lack of surface water lead to land abandonment since mid 90s, especially on the right side of the Draâ. On the basis of the above results, a smaller sampling campaign was held in October 2009 to update the salinity status in the currently used agricultural lands. Results will be integrated in oasis-scale modelling to test field managements and agro-political scenarios to combat salinity and mitigate its effects.

Keywords: Draâ Vally, epic, Kriging, regional modelling, salinity, Marocco