



## **Assessment of land-use change and water allocation in the Tafilalt Oasis, Morocco**

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Pressure of land-use change on water resources is a global phenomenon and also emerges in the Tafilalt oasis region in the southeast of Morocco. From multi-temporal satellite images, small scale fluctuations of the agricultural land and slowly growing settlements could be observed from 1964 on. From the late 1990's the changes accelerated and were larger in scale. During the last decade, the settlements have been growing quickly and activities of desert tourism have been further expanded. At the same time, an increase in agriculturally used land in some areas and abandonment of arable land in others is evident. This shift is due to a tremendous growth of large plantations applying modern agricultural methods and is occurring at the expense of traditionally cultivated land. The dynamic development in the Tafilalt region puts pressure on the local natural resources, above all on water. As precipitation is low (20 – 250 mm yr<sup>-1</sup>) irrigation water derives from a reservoir lake upstream of the oasis at the foot of the High Atlas and from an increasingly large number of wells.

In an integrative approach applying the socio-ecological interaction model, we try to analyze the multifold natural and socio-economic drivers of the observed land-use change patterns under restrictions of poor data availability. Among the natural drivers, we focus our analysis on soil properties and fertility on the one hand (soil sampling and analyses) and on the quantity and quality of water resources used for irrigation on the other hand (compiling climatic data, water sampling, mapping of wells). The empirical work to study the socio-economic drivers like water allocation, demands of tourism, subsidies, traditions or religion is carried out by means of a questionnaire among local farmers and interviews with stakeholders.

We present results from field campaigns in 2017 and from a participative field campaign with Moroccan students in February 2018. Preliminary results point to a complex network of drivers. Water pumping from wells is extremely important for local farmers; however, the number and position of the (partly illegal, but tolerated) wells is widely unknown to the authorities. Complex hydrogeology leads to salinization downstream of certain wells. National investors receive subsidies for deep wells and large-scale irrigation at the edges of the oasis. The influence of these activities on groundwater depth and water quality of shallow traditional wells, as well as on social issues, is currently unknown.