The investigation involves two components:

- Ground water exploration, in the Sahel area, production of a high-resolution DEM from ALOS data.
- In the irrigated area, SPOT data is used to produce maps of Crop Water requirement (CWR) using the FAO-56 model. Two parameters are required to produce maps of CWR: the crop coefficient (Kc) and crop evapotranspiration (Etc). The use of multidate SPOT images on a monthly scale (November 2000, March 2001 and July 2001) and on an annual basis (November 2000, November 2005 and November 2008) allows us to track the evolution of the various parameters. In a first step, this approach is applied to a pilot agricultural area of 182 km² (district of Sidi Bennour). Subsequently the approach is generalized to the entire irrigated perimeter of Doukkala choosing a drought year (2004-2005), normal year (2005-2006) and wet year (2008-2009).

Results and further steps

The comparison between the CWR and water allocation given by ORMVAD to farmers shows that the water allocations are much higher than the CWR on a monthly basis while the irrigation efficiency does not exceed 50%. This is due to the loss of water via evaporation from the soil related to the use of the gravitational technique of irrigation in a semi-arid climate. This large amount of lost water could be saved by the judicious choice of irrigation technique (drip for example). On the scale of the entire irrigated area of Doukkala the establishment of CWR for each center of agricultural development (CDA) served by a given pumping station and its comparison with the water allocations, constitute a good performance indicator.

In the future, we will continue our investigations in the following ways:

- Use another model (analytical approach) and another classification. We have already started to apply the analytical approach with the aim to map the crop coefficient Kc from the parameters of vegetation cover (LAI, albedo, and crop height) and meteorological parameters.
- Up-scaling; in the agricultural parcel high-resolution data (Kompsat) is used and this has to be extended to the entire basin of Oum Er-Rabia by the use of low-resolution data (MERIS).