Adaptation of a Portuguese water supply company (EPAL) to climate change: producing socio-economic and water use scenarios until 2100

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The project **ADAPTACLIMA-EPAL** aims to provide EPAL, a Portuguese Water Supply Company, with an adaptation strategy in the medium and long term to reduce the vulnerabilities of its activities to climate change. The first objective of this project was to produce scenarios of water use in the area of action of EPAL until 2100.

We used the four IPCC (Intergovernmental Panel on Climate Change) scenarios (A1, A2, B1 and B2) (IPCC, 2007) to explore future developments in local water use. We downscaled available population scenarios for Portugal (CIESIN, 2002) using a linear approach (O'Neill et al., 2001; Graffin et. al, 2004).

We produced land use scenarios using the following methodology: 1) characterized the present land use for each municipality of the study area using Corine Land Cover (CLC, 2000) and adapting the CLC classes to those used by the IPCC (2001); 2) identified the recent tendencies in land use change for the study area; 3) identified the tendencies of the IPCC scenarios for land use change in Europe (IPCC, 2007; Schröter et al., 2005; Verburg el al., 2006; Rounsevell et al., 2006); and 4) produced scenarios of land use until 2100 considering all the above.

Water use scenarios were then derived considering both population and land use scenarios as well as scenarios of change in other parameters such as technological developments and increases in efficiency, climate changes, or political and behavioural changes. Scenarios for these parameters were obtained considering available publications (e.g. Seckler et al., 1998; Märker et al., 2003; Flörke, 2005; Alcamo et al., 2007; Bates et al., 2008; Shen et al., 2008; Kok et al., 2009).

The A2 scenario forecasts an increase in population (+16%) in the study area while the other scenarios show a reduction of resident population (-6 to 8%). All scenarios, but especially A1, show a significant reduction in agricultural area and an increase in urban area. Regardless of the scenario, water use will progressively be reduced until 2100. These reductions are mainly due to increased water use efficiency and reduction of irrigated land. Our results agree with several projects that model water use at a regional or global level (e.g. Seckler et al., 1998; Menzel et al., 2007).

However, these results need to be considered carefully as, although water use will be significantly reduced, we need to take into account that climate change models indicate reduced precipitation, increased temperatures and an enlarged dry season for the study area. This means that water stress in the region may in fact increase, especially during the summer months (Kok et al. 2009).

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