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Scaling problems and institutional levels in Guadiana river basin: lessons for water governance

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Water management (*WM*) is increasingly becoming a global issue. However, WM must be handled at local and regional level. Water systems are permanently changing and exposed to human pressures. Regulation mechanisms may fail at local or regional levels, leading to a *crisis* affecting the environment or the social systems of larger regions.

The incapacity to control water pressures may uncover institutional inadequacies in the management of water systems and insufficient public participation in decision making. An appropriate methodology for *integrated water management (IWM)* encompasses therefore not only technological tools but also governance strategies. IWM reflects the broadening scope of water resources management. The term "integrated" implies that this approach goes far beyond traditional co-ordination and planning activities.

The analysis will focus on Guadiana River Basin, Alentejo, characterized by an historical water shortage. This fact has inspired the Alqueva Project, in the fifties. The large-scale multi-purpose Dam is now operating and in spite of the direct benefits (irrigation, water supply and hydropower), environmental and social impacts are quite significant (loss of vast areas of endangered species habitats, loss of archaeological and cultural heritage, modification of river flows and estuary dynamics and life changes to local communities).

From an analytical and operational point of view, a first main challenge to be addressed is the definition of the temporal and spatial boards of the operational system on which the analysis will focus. Water management has to consider a series of different spatial and temporal scales simultaneously. Working just at a coarse level is not a realistic way forward to understand problems related with the ecologic and socio-economic

dimensions of vulnerability.

Usually the main task of WM (matching water availability and water needs) must be evaluated and addressed at local level, taking into account regional or global scale factors and principles for action. Indeed, local water availability and needs also depend on non-local resources, such as the global water cycle and climate, demography, as well as land use, technical infrastructures and biological assets at basins level, and – last but not least – on the competences of management institutions. Institutions regulate the articulation between the different subsystems of water management at different levels; therefore, the institutional framework in which water management is embedded is one main issue to be addresses under this topic.