



## **Inter-relationships among water, governance, human development variables in developing countries: a database coherence analysis**

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The international community adopted, in the early 90's, the integrated water resources management (IWRM) approach, considering water as a resource that should be holistically managed. The effective management of the resource was acknowledged as central in order to provide sustainable Water and Sanitation Services (WSS) shifting away the main focus of the sector from the infrastructure development. In fact, the level of efficiency and development of water and sanitation services can be considered as the result of other factors. These includes the capacity of the country to manage the available water resources and its various uses at all scales (from local to national), as well as in general the socio-economic development of the country.

Applying this cross analyse approach, this work aims at identifying the key elements explaining the various observed levels of access to WSS. Using the standard MDG indicators (the percentages of the population having access to improved water supply and sanitation), the objective is to map the variables impacting and/or influenced by the WSS level.

Data, collected on a worldwide basis from international providers, were chosen considering all the variables that can both result in and influence (double-way relationships) the WSS levels. These variables have been clustered under four main areas or pillars: i) Environment ii) Human pressure iii) Governance iv) Human development v) Official development. The database ends with 48 variables. Missing values have been treated using the Expectation Maximization (EM) algorithm and hot deck imputation methods. Statistical analysis was performed using Principal Component Analysis to test and validate the methodology as well as verifying the coherence and robustness of the dataset.

We are building a coherent database covering African countries and performing an analysis on interaction between selected variables. Preliminary results will be presented during the conference.