



A preliminary sketch of the georesources in Niamey city (Niger)

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The present paper is about a preliminary study of the georesources (water and raw materials for construction) of Niamey city (Niger). Such research is part of an UNICOO project (funded by the University of Turin) and connected to the Edulink Cooperation Project (R.U.S.S.A.D.E.), a multidisciplinary project between Italy, Niger, Burkina Faso and Tchad funded on ACP- EU cooperation program in Higher Education.

The main goals are the qualitative and quantitative characterization of the surface water and groundwater, and of aggregates (exploited in sands and gravel quarries). More specifically, at the beginning of the study there was a census of wells and quarries in the Niamey area, with a consequent sampling survey (surface water and groundwater sampling and aggregate sampling). After that, an in situ characterization was set: measure of piezometric levels in wells, water characterization (pH, electrolytic conductivity, temperature, nitrate and ammonia concentration) and an in situ evaluation of the quarrying techniques and quarry exploitation (present and old quarries). The samples were analyzed in Earth Science Dep. (UNITO) to evaluate the content of the main anions and cations (chemical analysis of sampled water) and the size distribution of the materials coming from the investigated quarries.

Schematic reports of wells and quarries (location and features) were produced with the support of a Geodatabase with all available data. Geomatics instruments and methodologies (Geotagged Photos, Digital Mapping, GNSS Survey, Satellite Multitemporal Maps,) were basic starting point for the field data collection and a fundamental aid for data arrangement and final dissemination.

The present study evidenced the actual condition of surface water and groundwater, also highlighting local phenomena of pollution. Nitrate in groundwater, i.e. showed locally concentration up to 5 times the WHO limit (50 mg/L).

Thanks to the local quarry survey it was possible to evaluate how the open quarries works (open air yards, exploited by means of hand shovels and basic sieves) and what is the destination of the closed one (most of time the closed quarries are abandoned, not monitored and used as dumping areas, increasing the possibility of groundwater contamination). The safety condition of workers are very scarce: no protection devices, hard works and not safe yards (narrow tunnels, dug by hand and without protections).

A sustainable management of natural resources and an appropriate environmental recovery are recommended, in order to prevent pollution and environmental deterioration. All the information arising from the present work are useful for local decision makers to enhance Niamey georesources management. At last, the information on water quality and quantity is fundamental in a wider perspective of food security and for life quality improvement. A final GIS project was prepared in order to have a good overview of the data and for dissemination purposes.