

Training, participatory research and water resources management in the Lake Chad Basin: The experience of the University of Diffa (Niger)

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## **ABSTRACT**

Located in the far east of Niger, at the heart of the Lake Chad Basin, the University of Diffa operates in a context of multidimensional fragility marked by intense climate variability, accelerated ecosystem degradation, growing demographic pressure and recurrent security challenges. The region depends heavily on its surface and groundwater resources, including the Komadougou Yobé River, Lake Chad, the oasis depressions tapping the Manga water table, and residual ponds, which form the foundation of a local economy based on fishing, recession agriculture and transhumant livestock farming. Faced with the scarcity of these resources and the increasing risks of floods, pollution and conflicts over water use, training a youth capable of understanding, managing and innovating in the water sector has become a strategic priority.

This paper presents the strategy developed by the University of Diffa to make training and research drivers of territorial resilience. For several years, the institution has implemented an integrated approach combining professional training, participatory research and science-society interface. Through its bachelor's and master's programs in Water, Hygiene and Sanitation, Pastoral and Water Management, Ecology and Environment, and Environmental Assessment and Sustainable Development, the university trains dozens of young people each year in water-related professions, sanitation and ecosystem management. Concurrently, the work of our students, whether at undergraduate or graduate level, is systematically grounded in local realities. It addresses concrete issues such as the physico-chemical and bacteriological quality of drinking water from boreholes, wells and packaged water, groundwater dynamics, management of urban and riverine floods, the impact of pastoral water points on community livelihoods, and environmental monitoring of infrastructure. This research is co-constructed with local stakeholders including technical services, local authorities and community organizations, thereby contributing to a collective reflection on water governance and risk prevention.

A recent compilation of student theses and dissertations produced between 2020 and 2024 reveals several key findings. Groundwater in the region generally shows acceptable physico-chemical quality, but suffers from recurrent bacteriological vulnerability due to inadequate protection of water points and hygiene practices. Flooding, amplified by increasing occupation of risk-prone areas and siltation of watercourses, has severe impacts on household livelihoods, affecting crops, housing and health. Pastoral infrastructure such as pumping stations and wells plays a key role in social cohesion and access to water, but its sustainability depends on genuine community involvement in management. Finally, training youth on these issues produces a twofold benefit: it prepares a skilled next generation for water and environmental professions, and it generates local scientific data essential for decision-making.

The experience of the University of Diffa demonstrates that a Sahelian university can play a driving role in promoting a resilient blue economy. By training young people equipped to observe, analyze and act on their environment, and by producing science rooted in territorial realities, it contributes directly to the Sustainable Development Goals, particularly SDGs 6, 13 and 15. This paper advocates for greater recognition of the role of universities in climate change adaptation strategies and in building sustainable peace through integrated water resource management. It also seeks to contribute to the reflections of the Rabat Declaration by proposing that youth training and the strengthening of local university capacities be established as priorities for the future of African rivers.

**Keywords:** Lake Chad Basin; Blue Economy; Participatory Research; Vocational Training; Climate Resilience