

Management of groundwater and its salinity among stakeholders in deltas : application to Sine Saloum, Senegal

B. BONTE et L. LUQUOT
G-Eau and Géosciences Montpellier
(bruno.bonte@inrae.fr, linda.luquot@umontpellier.fr)

INTRODUCTION

The Inter-Quali-Gov project is led by an interdisciplinary Franco-Senegalese collective. It proposes participatory and physico-chemical approaches to build an integrated vision of the issues related to groundwater management and salinity among stakeholders in deltas. It is implemented in the Living Lab of Fimela in the Sine Saloum region of Senegal.

The Inter-Quali-Gov project is based on reflections linking the challenges of local governance with the Sustainable Development Goals (SDGs) in Africa, specifically in the Fimela district of Senegal.

A previous project has identified, among the challenges of the Sustainable Development Goals, two main issues to be addressed by the Living Lab in collaboration with researchers: 'access to safe and sufficient drinking water' and 'the problem of soil salinization.' For each of these issues, a Role-Playing Game (RPG) model was co-constructed (Abrami & Bécu, 2021) in collaboration between local stakeholders, researchers, and the NGO GAIA.



These RPGs represent the dynamics of the territory and the actors affected by and impacting these issues, allowing for projection and testing of water governance scenarios by 2040. These RPGs facilitate discussions on actor strategies and institutional dynamics related to the studied issues, but they give little consideration to the physicochemical processes associated with soil and groundwater salinization, despite their identified importance for the issue of access to drinking water and freshwater in this region, located at the mouth of the Sine River, which is part of the inverse estuary of the Sine Saloum.

MASTER OBJECTIVES

The expected outcomes are: i. an integrated Role-Playing Game that represents the issue of salinity in the Sine Saloum estuary, ii. an action plan to ensure the sustainable monitoring of the extent and dynamics of intrusion (locations and timing of sampling, individuals responsible for sampling, associated costs and financing, ...).

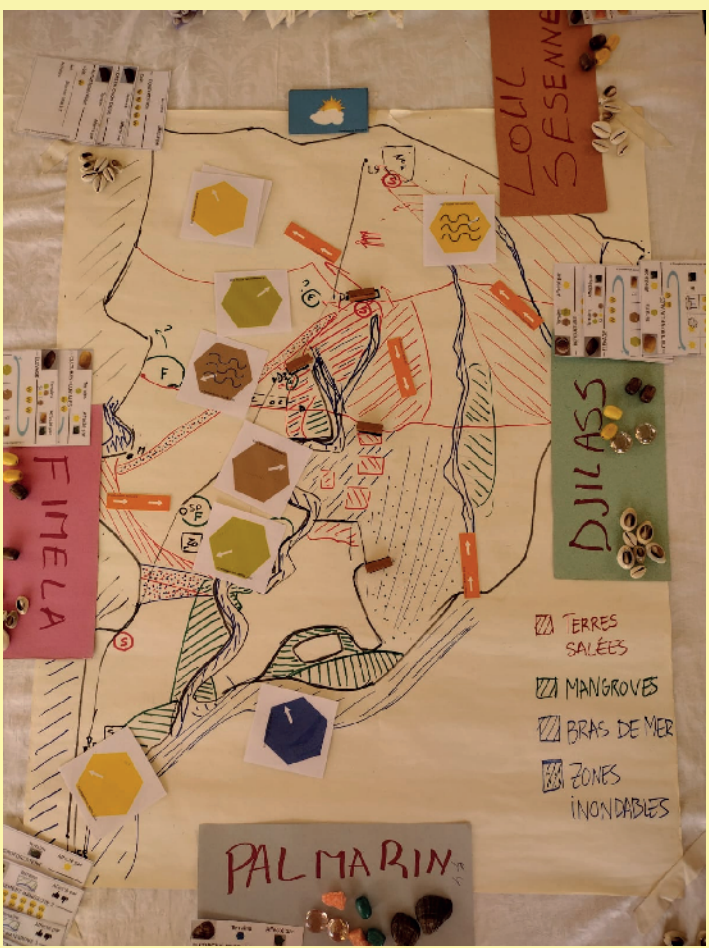
DETAILED OBJECTIVES

The overall objective of the Inter-Quali-Gov project is to integrate the physico-chemical dimension of soil salinity and groundwater into the ongoing reflection on participatory water governance in the Fimela district of Senegal. This objective translates into two sub-objectives.

The first sub-objective is to understand the dynamics related to groundwater salinization. This will be based on a literature review conducted by our Senegalese colleagues from the doctoral school EDEQUE (Water, Quality, and Water Uses) at UCAD, who are specialists in the Sine Saloum region. They will co-supervise a master's internship on the project alongside us. This study will be combined with a coordinated field study between our partners at UCAD and Linda LUQUOT from Geosciences Montpellier. The 18-month project duration will allow us to conduct fieldwork based on the season (dry and rainy). The field study will consist of two parts.

The first part will involve conducting soil profiles, ideally reaching the water table, and collecting soil and water samples for each layer. The second part will provide an overview of the groundwater condition at a given moment, based on electrical conductivity values and the analysis of major ions and some trace elements. This will contribute to a better understanding and interpretation of salinity at different points in the territory (pre-identified zones during the previous project). It is worth noting that our UCAD partners have a hydrochemistry laboratory in the Department of Geology, where the analyses will be conducted.

The second part could be continued by the Living Lab after the project, as monitoring salinity in the territory emerged as an important action in the participatory workshops conducted in the field. One of the objectives of this sub-objective is to propose a realistic plan for the sustainable implementation of these observations.



The second sub-objective is to establish a link between soil salinity dynamics and groundwater salinity dynamics, and to integrate these simplified dynamics into a new Role-Playing Game (RPG) that realistically represents the salinization processes (such as seawater intrusion and re-dissolution of saline soils during rainy episodes). This game will build upon the two games, FimWaagaSel and FimWaagaEau, co-designed by G-EAU and GAIA with the members of the Fimela Living Lab during the previous project. Inter-Quali-Gov will allow for a better representation of salinity dynamics in simulations based on players' action choices, in order to explore different scenarios of development and governance. The achievement of this objective will be organized through the co-supervision of a second Master's internship, which will work in collaboration with the first intern focusing on the first sub-objective.

METHODOLOGY

