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WATER MANAGEMENT FOR THE REHABILITATION OF THE ECOLOGICAL FUNCTIONS OF THE SENEGAL RIVER DELTA

Aliou Mamadou DIA

PhD student

University of Dakar

ABSTRACT

The Senegal River Delta has traditionally been a rich source of fisheries, grazing land, forests, wildlife, drinking water and fertile agricultural soil. Reminiscent of the Nile, the floodwaters of the Senegal would irrigate a wide expanse of land, and deposit silt in the delta. The flood would benefit some species of fish, which used the low-salinity, high water level to spawn in. The wide expanse of flooded land would also serve as nursery grounds to juvenile fish and shrimp. The fertile floodplain would support vast expanses of herbaceous and ligneous growth, on which the local herdsmen would graze their cattle, collect firewood and building material, and in which certain bird species would nest. In the less accessible areas wildlife (antelopes, carnivores, warthogs, crocodiles, manatees, hippopotami and even elephants) would find refuge. The floodwaters would slowly permeate into the subsoil, recharging the underlying aquifers.

However, over the years, the natural ecology of the delta was disrupted. It is currently degraded because of lack of water. The cause of this demise is primarily roads and dams that have obstructed natural water routes. Dams were built to store fresh water, cutting the water routes from the ecosystem. The construction of roads also acted as barriers to the passage of water. Lastly, the development of agriculture, fields, irrigation canals and contaminated runoff also contributed to the disturbance of the natural functioning of the delta.

One of the areas that was hardest hit was the “cuvette”, or natural depression, of the Ndiaël. It has four water routes leading to it: from the northeast (Niety Yone), a marine connection, from the southwest (Trois Marigots), and north (Tellel). The northeastern route was cut when the Compagnie Sucrière Sénégalaise (CSS) closed off the Niety Yone for two reasons: to maintain a sufficient level of water in the Lac de Guiers and for one of their managers to settle in the (now dry) riverbed. This was done without regard to the downstream inhabitants, who suddenly saw their water supply cut off. The marine connection and southwestern routes were barred very early on (1866) when a channel was dammed to act as a water reservoir for Saint Louis. The northern route (Tellel) was closed off by the construction of the Route Nationale 2 (RN2), and subsequently rehabilitated to accommodate agricultural runoff, which now drains into the Ndiaël. Although degraded, the area received some water over the years, from the creeks, as well as from rainwater. After the floods, water can stay in the cuvette 5 - 8 months depending on the floods (until February or May).

More recently, as a result of the extended drought of the 1970s and early 1980s, the annual flood decreased in volume and saline water from the Atlantic Ocean penetrated deeper inland. This posed a threat to the drinking water supply of the riverine towns, and prevented agricultural use of the water during the dry season. Moreover, it was thought that if fresh water could be had year-round, two crops could be cultivated per year. This prompted the development of the

OMVS, which reacted by building two dams: the Manantali, in the upper reaches of the Bafing, a high dam with a holding capacity of 12 billion m³, and Diama, a salt dam 55 km from the mouth, with a capacity of 300 million m³. A controlled release of water from Manantali throughout the year maintains the required water level for agriculture in Diama and its associated water bodies (Lac de Guiers, the marigots). Diama is managed at a preferred water level of 1.5 - 2.0 m ASL.

Although this system is carefully managed as far as the river and main irrigated “perimeters” go, there have been considerable environmental impacts (e.g. proliferation of aquatic weeds, human health, drying up of the areas that were cut off from the system). It is in this context that the Ndiaël, which has been greatly impacted, is to be rehabilitated.

The environmental degradation has severely endangered the natural resources of the region (disappearance of vegetation cover, soil erosion, drying up of natural waterways, reduction in fauna, reduction in primary production). This has resulted in people migrating out of the area. All the villages have moved out of the zone, and have settled nearer to the road. The village of Bountou Dieugue, on the Niety Yone, is a typical example.

Rehabilitation is primarily in the form of re-inundation. A re-inundation would benefit:

- Marine and continental fisheries
- Vegetation and tree growth for firewood and fodder
- Recession agriculture
- Biodiversity, including birdlife
- Tourism
- Hunting
- Halt desertification

Furthermore, allowing water into the Ndiaël will help relieve the floods in Saint Louis. During the natural flood of the Senegal River, there is an excess of water. Normal flood prevention measures worldwide include diverting some of the flow to available lowlands, which is what this project aims to achieve. The cumulative economic effects of allowing pastoralists, fishermen, farmers, tourists and hunters back into the zone are considerable. A precise economic study of the benefits of rehabilitating the Ndiaël is not done in this study. Rather, a technical assessment of the water routes to get water back into the Ndiaël is made. In addition, the constraints on each of these routes are elaborated, as well as the stakeholders identified.

Lastly water, a scarce resource in Senegal, is over-abundant during the flood months, and needs to be diverted away from where it damages infrastructure. Fortunately this concept has been pioneered and accepted in the Diawling, Mauritania. However, bigger institutions in Senegal will need to be convinced that the project is feasible, inexpensive and will have mostly beneficiaries. No particular group stands to suffer from a re-inundation of the Ndiaël.