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Participatory Geographic Information Systems (P-GIS) for natural resource management and food security in Africa

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Water in Africa: the paradoxes of a highly-coveted resource

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The programme

The overall objective of this pan-african programme of research is to contribute to making available good quality, reliable and accessible information systems through the application of the P-GIS approach to improve natural resource management (water, land and forest in particular) and promote food security. The programme will also support social change in study countries (Benin, Kenya, Malawi, Rwanda, Senegal, Tunisia) by developing P-GIS as methodological tools for participation and to inform decision-making.

Water is obviously a natural need: everyone needs water and there are few economic activities that do not depend on it, in one way or another. As noted, H Dupriez and P De Leener (1990, p2) (1), "without it nothing grows, without it life is not possible". This is the reason why man has always learned to readjust his behavior, depending on the availability of water resources. What is precisely the status of the resource in Africa?

This paper presents some thoughts on the status of fresh water in Africa; this is to say water for drinking, irrigation and to meet the need for increased resources in cereals in a context of growth and densification of populations. It addresses some important issues which concern: the water situation in relation to the issue of climate change; the challenge of people's access to water in sufficient quantity and of good quality; issues raised by the privatization of access to water (dilemma between solvency and solidarity).

Between scarcity and abundance, a paradoxical situation.

While it is primarily seen as the continent of drought and shortages in all its forms, Africa actually has a fairly large hydro potential. Indeed, water is abundant since the continent has got seventeen major rivers, about a hundred lakes, plus sizeable ground waters. Annual rainfall in Africa totals about 20,360 cu km; or, across the continent an average 678 mm (AQUASTAT 2005). However, this resource is unevenly distributed between North Africa with potential shortages, Saharan Africa and sub-Saharan Africa which lacks water, and an equatorial zone with a surplus of water. A quick look reveals both water-scarce areas, like northern Kenya, Niger or Somalia, and others where water resources are abundant, like Gabon and Sierra Leone.

According to a recent FAO study, with 3,931 cu km of renewable water resources, the Central Region is the best endowed with 48% of the continent's resources for only 18% of its surface area. The Gulf of Guinea claims 24% of the water potential of the continent. In contrast, the region of North Africa is the most disadvantaged with less than 1% of renewable resources while it represents 19% of the surface area of the region. Regarding various countries, the Democratic Republic of Congo holds 900 cu km of internal renewable water resources, or 23% of African's water potential, against only 0.01% in Libya.

In addition to this very uneven distribution, there are many cases of discrepancy at local (floods and droughts) and global levels (reduced

flow of rivers, changes to large water expanses inland, at Lake Chad, for instance) which are the main threat to the future of fresh water from an economic and social development perspective, regarding African countries.

Studies including those of AMMA in 2002 (4), show a growing scarcity of water resources. The reasons given are many. Climate change is one among others such as increasing water requirements (irrigation, domestic use) to cope with population growth and the challenges of food security. A series of droughts caused a reduction of wetlands in several African countries and a deficit of water supply. There is also a high rate of evaporation of surface waters, ground waters turning saline, the disruption of hydrological cycles, etc. Water shortages are legion, and according to IPCC experts, most African countries are located in areas where a little reduction in rainfall can cause significant reductions in the overall availability of water. These same experts argue that, by 2020, it is expected that "between 75 and 250 million Africans will be exposed to crises related to water availability of water."

The consequences arising from the scarcity of water resources provide certain groups with the opportunity to develop strategies for capturing external funding. These actors take advantage of the international environment which has become more favorable, with the mobilization of the North around the issue of climate change.

Beyond the availability of the resource, there is the challenge of access

The other major challenge of the continent is linked to people's access to drinking water. Indeed, it is now accepted that, across Africa, access to water of sufficient quality and of good quantity is a major constraint to development. Therefore, efficient use of water resources is critical to advancing economic progress and environmental quality. Access to water is essential since it allows for the achievement of several goals: (i) to improve hygiene and human health, (ii) to promote agricultural production through the expansion of irrigated lands, (iii) to promote industrial production etc.

Regarding the supply of drinking water for the populations, many African countries are faced with difficulties whose magnitude is related to physical, demographic, economic and political variables. Even in areas where water is plentiful, as is the case in Guinea called “the water tower of West Africa” (6), much of the population in the capital (Conakry) has no access to clean water.

Concerning the whole of sub-Saharan Africa, more than half the population (about 300 million people or nearly 51% of the population) lacked access to drinking water in the early 2000s. Even in countries with a large water potential, access to water, especially for those living in big cities, is limited. Therefore, rivers, lakes and temporary ponds are used as sources for drinking. This contributes to the proliferation of diseases and is one of the major killers in Africa.

According to the World Health Organization, 80% of diseases are waterborne. Every day, 650 people in Africa, mostly children under five years, die of diarrhea. The annual loss of human life associated with the consumption of unsafe water is estimated at 30million people. It thus appears that, for lack of proper access to the resource, water has become directly or indirectly the first cause of death in Africa. It is true that considerable efforts have been made to improve people's access to drinking water as part of the 'Water for Life (2005-2015)” program. If access rates to drinking water have increased substantially, however, the issue of sanitation is the soft underbelly of the political management of water in most Southern cities.

Water: a public good or an economic resource?

In view of the impacts of climate change, population growth, diversification of economic activities and the current deterioration of the environment, the control and exploitation of water resources in both rural and urban areas have become strategic issues. In most cases, the lack of appropriate institutional arrangements, that is to say governance structures that ensure a sound and sustainable management of water resources, has led, under pressure from financial institutions, to the implementation of privatization policies concerning water. As a result, it is the major European multinational companies such as Vivendi, Suez, Bouygues, BiWater and Saur that control virtually all of the water market.

It can be noted that the option for the privatization of access to water has limitations related to the fact that multinational companies have concentrated on the logic of a quest for maximum profit. In the view of Brunel (2003), "they have concentrated their efforts on profitable markets and thus ousted the poorer ones ... The result: a “two-speed” Africa; the bigger companies have gone for the "jackpot " (urban consumers who buy) at the expense of the "empty pot" (those who cannot afford it)." The law of profit is clearly inconsistent with the requirement of respect for human rights that guarantees everyone access to safe drinking water. Currently, the cost of connection to the mains supply is the greatest obstacle to access to water. In the absence of “social” (subsidized) connections, families with low income can not get access to water.

Third-world activists have rallied to make sure water is considered a public good. Building on the momentum generated by the Millennium Development Goals (MDGs), they are trying to convince African governments and their development partners of the need to counterbalance the effects of structural adjustment programs. The implementation of these programs has resulted in an exacerbation of inequalities in both rural and urban areas.

Conclusion

We can say that, all in all, the African continent does not really lack water resources, but rather presents contrasting situations. With the exception of arid and semi arid regions, Africa is very rich in water. Optimal use of this resource must be based on two key levers: (i) the development of much needed infrastructure (including water infrastructure to supply water for people and livestock and irrigation schemes to help fight against food insecurity); (ii) the establishment of appropriate institutional arrangements. These largely determine the effectiveness of resource protection and equity in its allocation to the various actors.

Taking into account the multiplicity of actors and their visions continually encourages the development of original policy. At international level, cooperation dynamics are already at work. Locally, adaptation techniques and collective management of the resource are favored, as part of community groups and associations regarding water management proliferating, especially in cities and in the countryside. This is particularly true of current research in Benin within the framework of the ICT4D program, with the approach to community management of water through Participatory Geographic Information Systems (P-GIS).

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