

# Between representations of territories, land uses and development projects. Two case studies in yesterday's and today's sahel: the lake chad basin and the senegal river

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## Introduction

In the Sahel region, water resources management, land use planning and development policies are influenced by actors' perceptions of water. The representations of territory<sup>1</sup> have changed as well as the general context and power relations between the different actors and agencies, since colonial period till nowadays.

Traditionally, water was considered as a grant for "reproductive strategies"<sup>2</sup> characterised by high multi-stability and resilience. Annual floods of rivers and lakes used to regenerate the local environment, and allowed the complementary use of floodplain for agriculture, cattle-breeding and fishing. This territory can be defined as *inclusive*, as it used to *include* several economic activities, reproductive systems and societies (agricultural-sedentary or pastoral-nomadic systems).

Those inclusive, flexible territories were reinterpreted with the arrival of big development projects based on irrigation, which lead to a more rigid conception of modern territoriality<sup>3</sup>. The "project machine" makes a clean sweep of the pre-existing territories; it imposes on the territories the rules of modernity, with its production systems.

Our analysis points out the actions performed by irrigation projects on the Lake Chad basin and on the Senegal River. The same goals, similar territories, short term scheduling, similar actors, the same results: complete failure.

Irrigation projects usually proceed through an initial undervaluation of traditional territories: land is reduced to the *absolute space* of cartography. The micro-shapes of the land are accurately described through climate data series, pedological

1. We call *territory* the result of the interaction between man and the environment in a specific zone. The process leading to the constitution of a territory is named *territorialisation*.
2. The set of strategies performed by a society to assure its own survival and durability.
3. *Territoriality*: a particular articulation of territory, authority and rights (Sassen, 2008). It can be defined as a geographical strategy to assure the control of people and things through the control of the space. It is the result of the purposes of a strong actor and a display of a power. It is the will of an individual or a social group who want to affect/control people, phenomena and relations through the delimitation of a geographical space (Sack, 1986).

analysis, descriptions of water bodies (e.g.: rivers and lakes) and detailed cartography. Preliminary reports consider demographical data and provide a classification of available resources; then they define the terms and conditions for the start-up of the project. But in those reports the territory, local actors' territory, does not exist. And whenever it exists, either it is described as a land of "primitives" seen by the curious civilized man, or it is only considered for those aspects which might disturb the project (e.g.: lack of labour, poor inclination to work in highly organised agricultural systems, resistance of traditional agencies). This happens even when feasibility reports acknowledge the existence of a "functional territory", fit for the "self-reproduction" of peoples, or when (e.g.: the case of SCIP, as we will see further below) there is a breaking off between such acknowledgements and the intentions of the project. In fact, the project cancels any previous existing reality and value; it imposes the new value, that is the value of performing agriculture. The "white space" of cartography is a homogeneous, empty space which can bear the weight of any kind of project: that is the starting point for modern land use planning.

Planning does not include the role of long-terms structures inside the territory; so, planning is not able to give them an adequate representation (Magnaghi, 2000). In order to build a new, artificial nature – unrelated to the environment and history – the first step is to reduce the land to a "white page" (Magnaghi, 2000: 24). Local "non-existent" history of people and territories can easily be cancelled; but it is more difficult to make physical factors fit in. Feasibility reports seem to accord quite an important place to natural, physical features. But actually, they focus on the identification of the "material conditions" necessary to implement the project; then, natural processes have to fit in. Modern territory is essentially artificial, committed to human action and land use planning: smoothing the micro relief, embanking the rivers, moving away the dam basin, irrigating or draining according to cultivation needs.

But in front of the failure of big projects, traditional logics of *territorialisation* start to be re-validated: they are flexible, resilient; they impose themselves over a multitude of usages and customs in the territory. For example, the multistability of traditional land uses in sahelian wetlands.

The first step was to make the pre-existent territory empty, to reduce it to a white page; now, the second step is to fill it, to get it completely filled. Reports and papers include every particular building, every working mechanism of the future modern agriculture. Everything has to be planned: the shapes of buildings and channels, building materials and methods, the respect of scheduling. Reports also indicate: the number of the allottees, the dimensions of land parcels, the way parcels will be allocated, the kind of speculations to make and how long will agricultural performances last, the number of functionaries, the tasks, the offices, the storehouses...

The white page has to be completely covered; each small detail has to be listed, in the exact description of the perfect territorial machine. Every element has to be checked, in order to avoid any kind of doubts concerning the actions performed on the territory and their effectiveness. And whenever this "writing on the white page" does not work well (that is quite often the case), then you just have to empty the page again. Here is the corollary: loosen clay soils, traces of channels for irrigations, ruins of offices and buildings, abandoned engines. When the project fails, it leaves a kind of empty space behind; this space offers people poor opportunities to restore a living territorial structure.

After the interval created by the project, a re-appropriation process comes out from the marginal parts of the territory. This process gives the land back to its history and nature, which had been excluded by the territoriality of the big project.

This approach makes us consider the situation of the territory before the modern project: that is the territorialities and the historical context of traditional territories. We identify an important feature about traditional territories remaining beneath/beside the projects: flexibility, adaptation to environmental perturbations, to social unrest and to innovations in the relationship between man and the environment.

We do not mean either to oppose *tradition* and *modernity*, nor to look for some hypothetical "true territory" located far away, in a mythical past. Rather, we will observe how tradition evolves in its relation with the modernity.

### 1. Coastal plains of Bornou, the SCIP and the "dégrue"<sup>4</sup> de canal<sup>5</sup>

South of the Lake Chad, behind the coastal zone, there is a wide sandy plain marked by the signs of the *kanouri*, through habitation and land use. The *kulo-késa* is mostly common around the villages: during the rainy season, pluvial cultivation of millet is practiced in the fields, surrounded with prickly hedges. In the low grounds, the *kulo-firgidi* (*dégrue* fields) is practiced replanting sorghum grains; this is quite an unusual case. Cattle-breeding (bovine, goat and sheep farming) is quite important; each village has its own specialised farmers who look after the flocks. Nomadic shepherds (especially *foulbé*) move across the plain, usually following the north/south direction, from Komadougou to central Bornou (Bouquet, 1990 II: 184-186).

Floodplains of Yedseram are characterized by clay soils (vertisols and hydromorph soils), with a prevalence of the *kulo-firgidi*, the lands of *kaval* where the *dégrue* agriculture is practiced (Bouquet, 1990 II: 190-192). Land parcels are separated by small dikes made of clay (30 to 40 cm high). The grains of sorghum are firstly seeded in nurseries; then in September/October they are transplanted. Across the plain, some sand stripes create different landscapes, related to different land uses (millet and red sorghum cultivation on the *kulo-késa*).

The *kulo-sadié*, the stripe of the lake *dégrue*, arouses lively interests: land parcels are requested even from villages up to 15 km far, like Marte (in the zone which will be later involved in the SCIP). On the *kulo-sadié*, the main cultivation is maize (*masar*) with a double-culture system: during the fall of the lake's water and during the wet season.

In the riverbanks of the lake, the main activities are fishing and agriculture, as well as in the whole south bank of the lake basin.

Fishing and drying fish are the pillars of local economy. Nevertheless, since the 1970s those activities have significantly decreased, due to the overexploitation of the resources and to the drought effects reducing the surface area of the lake. In the last years, the refilling of the lakes lead to the restoration of fish stock and the renewal of connected activities.

4. Rivers in the Sahel region have seasonal flooding. The French word *dégrue* refers to the fall in level of the river; agriculture is practiced on seasonally flooded lands (*culture de dégrue*).

There is a strong relationship between the fluctuations of the lake surface area and the qualitative/quantitative increasing of human activities. Low water level since the 1970s reduced fishing activities, but at the same time it encouraged a quick development of *décrué* agriculture in this sector, as soon as the water began to withdraw.

In this floodplain, at the beginning of the 1970s, a big irrigation project is created: the SCIP (South Chad Irrigation Project) (Ogunbameru, 1986; Kalawole, 1987, 1988; Adams, 1991; Ijere, 1994; Adam, 2004).

In 1972, the project aimed at increasing agricultural surface on all the suitable lands inside the perimeter, and to harvest twice a year, using Lake Chad water resources for irrigation. The strength of the project lies on two factors: firstly, transformation and distribution of goods are managed by the allottees; secondly, mechanical agriculture technologies are adopted. In fact, SCIP intended to be an integrated project between agriculture, electrification of the countryside and agro-alimentary industry. That is why, besides agricultural reification and equipments for the transformation of goods, they also planned several facilities and infrastructures to fit the internal cohesion of the territory, without losing the relations with the capital city. The leading model was a kind of "region-town" extended on a length of 75km. This "agro town" would develop its agro-industrial characterisation, whereas the administration and services would be located in the town of Maidougouri (the capital city of the Bornou). This separation had to balance the fast and massive urbanisation (huge flows of people came into the capital city, even from the lands of the project); the capital city was growing with no urban and economic facilities.

The coast land of the lake was chosen as the target of the project. It is quite interesting to read the feasibility reports. About 28.000 acres of land were used for traditional agriculture, especially replanted sorghum (*musakwa*). Traditional technologies for building dikes and maintaining the water on the soil, show that local peasants used to be clever irrigators. They performed mill, okra, onions and peanuts cultivation on the sandy micro-relief. Livestock was the main form of investment. There was a perfect integration between fishing, agriculture and cattle-breeding activities. The intensively cultured plain looked like a tree plantation: for the creators of the project, the plain was a symbol of a harmonious integration between human activities and natural resources. They even used to speak of environmental "sensitivity" referring to the relations between man and the nature. The region was considered as "well developed" and "self-sufficient" about foodstuff and basic manufactured products. Those peculiarities had to be maintained at all costs.

At least, that is what they said in the papers. Actually, the project is placed upon traditional territories and territorialities, and it cancels them. Modernity proceeds by the cancellation of previous contents; its glance makes the land empty, and then it fills it up with the big project. When the SCIP was conceived, it was the most ambitious irrigation project ever undertaken in Nigeria. But the problems begun even before the beginning of the works. In fact, the exceptional low water level during summer 1973 was under the minimal threshold for the intake channel to work, as it is written in one of the feasibility reports. So, they had to follow the shrinking lake: to bring the water into the irrigated perimeter, the channel had to be lengthened up to 39 km (instead of 29 km, as initially planned). On 22.000 acres fitted out during the first phase of the project, 18.000 were prepared to be sown. The works begun in 1975 and the first

harvest of rice took place in 1979. During the second phase, since 1978, the main infrastructures were carried out on 27.000 ha. But only 4.000 ha were really prepared and ready to be sown. The third phase just remained on the papers, as an unachieved project. From 1979 till 1984, the production increased. The peak of 10.000 ha was reached during the season 1983-84 when 3145 production units were employed. The inexorable withdrawal of the lake ended the intakes of water. In the following season, 14.000 ha were sown, as if the circumstances just could be avoided: there was no harvest. This situation made the project stop. When in 1988 the water returned in the lake, the structures, which had been inactive for a long time, were no more able to work. Most of the imported technology, certainly too sophisticated, could not bear the long period of inactivity. The restart of the productive machine would have asked for big investments, which did not arrive.

Today, the SCIP is like the black clay cracked by the drought, poorly marked by the infrastructures of the project. But the 30 megawatts of power that provided the energy to pump the water in the main channel, to over 10m high elevation, seem just waiting for someone to turn the key which is still hanged to the machines. In the lower plains, within the channels of the project, some farmers have returned to cultivate musakwa, the out-of-season sorghum. Many peasants emigrated elsewhere. Other peasants remained and waited for the machines to be restarted. But during this time, productive activity has moved outside the perimeter, with a radical transgression in relation to the logics of project. Along the adductor canal, the farmers have positioned small pumps to irrigate land parcels of various dimensions. Nowadays ... "the yield of the land only depends on the amount of work that you can do there" says Cokies Edwin Madu (a farmer of Ibo ethnic group who migrated from the south to the land of the SCIP), while observing the cultures in front of him. During the Harmattan season, up to the kilometre 22 of the intake channel the pumps run at full speed to deliver water in the fields across the banks. This area is seasonally reached by the lake. When the water flows down, and before the water enters the intake, farmers cultivate the flooded ground: we define this model as the "décrué de canal" ("channel *décrué*"). With some success, they use supplementary irrigation systems.

The old and the new knowledge about farming skills, together with abundant labour supply, are suitable conditions for traditional or semi-modern production activities. The extension of cultivated areas is carried out according to the availability, and especially to the means of the farmers; agriculture is not their only activity, that also has to be taken into account. All these conditions are then compared to the opportunities – market demand, especially for vegetables – and with the available resources – some plots of land in the territories outside the project and some water transported by the adductor channels of the project. Water is a fluctuating resource, which can be an impediment; but its "natural" permanence can be integrated with the use of pumps. Once all these elements have been considered, farmers decide on the areas to be sown. So, despite the difficult situation in this "no man's land", the geography of social ferment is in turmoil.

This is a new "resource" that tries to promote changes from within, through knowledge, skills and self-consciousness of obstacles and opportunities. Such "changes from within", are in fact some kind of "fighting territorialities", as in the case of the *décrué de canal*: they restore some pieces of projects, combining tradition and modernity.

## 2. Senegal river: from source of well-being to an issue of exclusion?

The Senegal River valley (between two semi-arid regions: Ferlo in the south and Mauritania in the north) is characterised by a huge variety of ecological and "human" features. Nevertheless, in the past the valley used to have a well defined regional identity, based on the river and the agro-pastoral and halicuitical production (Boutillier, Schmitz, 1987).

Traditional production systems tried to "hold a dialogue" with natural hazards (flood and rain). Risk was minimized through a diversified set of human activities, in a complex integrated system including pluvial agriculture, livestock and inland fishing. The river was seen by people as the source of their well-being: its annual flood was "the natural grant" for the restoration of natural resources and for the dialogue between human societies and the territory.

Since the independence, the State of Senegal wanted to transform the valley into "the granary of the country" through the promotion of irrigated rice culture; the purpose was to secure the supply of rice, especially for urban population. Since 1972, irrigation was gradually extended throughout the Valley, in the context of state policies aiming at food self-sufficiency, in order to face the great drought which began in the late 1960s.

In those times, Senegal and the other riparian states (Mali and Mauritania) grouped in the Organization for the Development of the Senegal River (Organisation pour la Mise en Valeur du fleuve Sénégal - OMVS), project to build two dams to regulate the flow of the river. The Diama Dam, in the delta area, prevents access of salt water into the inner country during the dry season. The upriver dam, Manantali, provides a large freshwater reservoir for hydroelectric power, irrigation, and freshwater supply. The dams would allow the total control of water flow; at the same time, they would give visibility to the dream of carrying out the radical transformation of the territory, through innovation and modernization (Engelhard, Ben Abdallah, 1986; Maiga, 1995). The goals are ambitious: the irrigation of 375,000 acres of land (240,000 in Senegal), navigation from St. Louis to Kayes and a hydroelectric power plant (800 GWh). The river is thus seen as a kind of "production machine" for the economic take off of the Senegal River basin. In the intention of OMVS, as written in the plans, the artificial flood would be maintained during 20 year, for a transition period; the purpose was to gradually deliver the people of the Valley from traditional *décrué* agriculture, which should be totally replaced by irrigation. After this period, the dams will operate to maximize hydroelectric power production and irrigation.

Irrigation projects upset and shape the territory, in relation with its material aspects (the construction of dams, hydro-agricultural infrastructures, new villages, tracks...) but also for immaterial features, as they transform the territorial, relational and identity organization of local societies. At the same time, the environment was deeply affected (soil depletion, deforestation, desertification...). The new hydro-agricultural mesh, with its rigid and static features, replaced the mobile and seasonal mesh of agro-pastoral and halicuitical systems: "The new system of boundaries shapes the new territorial mesh on which, whether he likes it or not, a new territoriality is established" (Raffestin, 1981: 48). But since its installation, irrigation gets disappointing results compared to the

forecasts: high costs of the irrigated perimeters; low yields and rates of intensification; poor ability of the producers to invest in equipments and labour; water pumps breaking down; problems in the transformation and distribution of paddy rice; debts, and so on. All these difficulties increased with the structural adjustment plans imposed by the International Monetary Fund (IMF) and the World Bank, and with the disengagement from the State, the devaluation of local currency (in 1994), the charge of maintaining hydro-agricultural infrastructure.

When the Manantali dam is achieved in 1988, many farmers hope to rely on the artificial floods for *décrué* practices. A good rainy season, accompanied by the seasonal flooding, allows cultivating more than 197,000 ha. But these traditional practices are in competition with the priority given to irrigation and hydropower: so, cultures are often damaged by the lack of water. Senegal choose (with the adoption of Development Plan of the Rive Gauche in 1994) to keep the artificial annual flooding, to ensure traditional production systems and to reduce environmental hazard. But these promises, until now, have not been held: the artificial flood is irregular and inadequate.

The implementation and management of irrigated perimeters and dams point out the priorities for water resources (power generation and irrigation) and land uses (intensive agriculture on irrigated perimeters). These priorities are more favourable to some reproductive practices and to some actors (even if they are sometimes *foreign* actors). The former integration between agriculture, fisheries and livestock has been transformed into prevarication, opposition and conflict over resource use.

In order to defend the right to the annual flood, the Movement of the Actors of the Valley (MAV) is created in 1992. The members of the Movement affirm that land and water resources in the Valley are enough to ensure food self-sufficiency to its inhabitants. So the MAV proposes the creation of a framework for the coordination of the agro-sylvo-pastoral zone, in order to discuss the problems that prevent achieving the goal of self-sufficiency. It launches a call, named the "Call of the Valley", to all those who rely on the river for their life (farmers, ranchers, fishermen ...), inviting them to join and to ask the authorities to respect their way of life. Their point of view is quite the opposite of the one of the institutional players: according to the MAV, traditional reproductive practices do not belong to past. They belong to the present of the people who practice (or would like to keep practicing, today as well as yesterday) traditional land uses such as *décrué* agriculture, cattle-breeding, fishing, forestry, hunting...

The Movement proposes himself as a spokesman of local actors, for a re-appropriation of the land affected by transformations and different land uses. MAV is a reaction to the crisis caused by the implementation of irrigation and the "disappearing" of the seasonal flood; it is an attempt to find an "endogenous way" to development.

In September 1997 in Ndioum (Department of Podor), during a seminar for the presentation of a study on the agricultural situation of the Valley, peasants and farmers of the MAV express their point of view on the development of the valley and the problems experienced by the people: "The dams and hydro-agricultural equipments brought great changes in the lives of people. But today we see that these changes have created many difficulties related to the irregular floods, to the indebtedness of farmers, the loss of rangeland for livestock, the intensive deforestation, the pollution of water, the spread of endemic diseases, the scarcity of fish, the exodus... Major investments have been made (dams, developments). But the people of the Valley had no benefit from

those investments. People were never consulted" (MAV, 1997). They therefore call for: the restoration of a regular flood allowing agriculture, cattle-breeding and fisheries; the reorganization of irrigated agriculture, to make it more accessible for peasants; adequate health policies; the participation of people in decisions concerning local development, not only in the rural community, but also at regional and national levels (*ibid*).

The answer of the government is hard. A common front is created against those who dared to question the choice of irrigation in the Valley: "The option of water control is not reversible. Well developed agricultural countries have at least 25% of irrigated surface area. Some crafty persons flourish in the Valley and make considerable profits there" (Adams, 2000: 90). The dialogue is interrupted. There is a huge distance between the rationality of the stakeholders of the project and the rationality of the local territory; the difference between the codes used by the actors, is also strong. It is not only a problem of language (although language plays a key role in the disparity of forces) but also a problem of perception and representation of territory and territoriality.

In front of the logic of competition, opposition and exclusion, the MAV claims more symmetrical power relations, based on sustainability and equity. But discussing the dams system also means discussing the planning developed by OMVS, and finally discussing OMVS itself. This meant primarily to confront a wide range of actors, sometimes very influent actors: especially, the promoters of hydro-electrical power plants and irrigation. Surely those stakeholders are not as numerous as the people of the valley, but they are more powerful and persuasive (Salem-Murdock *et al.*, 1994). With the development of irrigation, the river and the valley have become an artificial system (at different scales, from the small irrigated perimeters to the big dams). An activity of constant maintenance is necessary to ensure the durability of irrigated agriculture. The investors and the providers of funds urge to focus on energy production (which is more profitable in the short term) and export-oriented agriculture, able to generate economic surplus (Quatrìda, 2009). Most likely, the biggest concern for the investors and the Senegalese State is to secure their own investments. These interests are not necessarily in accord with the objectives of food security and reduction of poverty. Once more, the logics of separation and exclusion seem to dominate the relations between the "project" and the "territory". The goal of *growth* and *economic competitiveness* are going more and more remote from the goal of *rural development*.

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# Control and Management of Water in Arid and Semi-arid Zones

2<sup>nd</sup> International Conference WATARID

sous la direction de  
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## Présentation

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Cet ouvrage rassemble un ensemble de contributions présentées lors de la Conférence internationale *Eau, Ecosystèmes et Développement Durable en Zones aride et semi-aride* qui s'est tenue à Yazd en Iran en mai 2009. Organisée conjointement par l'École Pratique des Hautes Études et les Universités du Xinjiang et de Téhéran, son objectif est de renforcer une réflexion interdisciplinaire sur la maîtrise et la gestion de l'eau, réflexion devenue essentielle pour mieux envisager l'avenir et proposer des actions adaptées.

La maîtrise de l'eau est indissociable de l'histoire de l'homme. En témoigne l'éclosion, dans les régions arides, des plus grandes civilisations. C'est en milieu sec que les systèmes hydrauliques anciens ont atteint leurs développements les plus sophistiqués et monumentaux. L'héritage et l'expérience acquise par l'Iran et la Chine permettent de faire le lien entre l'histoire de l'utilisation et de la gestion de l'eau et les problèmes actuels. Ainsi les dimensions historiques, environnementales, géopolitiques, économiques, sociales et culturelles sont mobilisées pour répondre à la question : Quel avenir pour l'eau et l'irrigation en zones aride et semi-aride ? Plus largement la dimension mondiale de l'eau ne doit pas nous échapper, tous les savoirs et toutes les compétences sont nécessaires pour aborder de front le problème de l'eau et de son accès. Répondre à cette question nécessite le dialogue entre les sciences exactes et les sciences humaines pour comprendre, modéliser, reproduire et comparer les objets complexes qui nous préoccupent, la connaissance de la continuité des outils scientifiques nous est indispensable.

Même si les articles s'organisent autour de quatre grands thèmes : *L'eau et l'environnement* ; *Demande en eau et gestion de la consommation* ; *L'eau et le patrimoine culturel et naturel* ; *Gestion future de l'eau*, nous avons choisi de ne pas les cantonner dans des parties trop sectorielles afin de garder le caractère d'un tout pluridisciplinaire.

This book contains a series of contributions that were presented at the International Conference on *Water, Ecosystems and sustainable Development in arid and semi-arid Lands* in Yazd in Iran in May 2009. Jointly organized by the École Pratique des Hautes Études EPHE and the Universities of Xinjiang and Tehran, aims to open up interdisciplinary thinking on the control and the management of water, a deliberation that has become essential to optimal planning and to proposing initiatives for the future. The history of man is inseparably linked to controlling water, as is evident from the blooming of some of the greatest civilisations in arid zones. It is in dry environments that ancient