



ATLAS OF A TERRITORY IN TRANSITION

Views on the Senegal River Delta

Editors: Jérémy Bourgoïn & Djibril Diop



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The French Agricultural Research Center for International Development (CIRAD)
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FOREWORD

The Senegal River valley clearly has an agricultural vocation. It has played this role for decades, benefitting from biophysical conditions that offer significant advantages for the development of hydro-agriculture, fishing, and pastoralism. The Delta—which is the area most influenced by Western development—is unique. Since the 1960s, Senegalese authorities have focused their ambitions on the area's agricultural production, and irrigated agriculture in particular. Water control is obviously strategic in an arid environment, and the proximity of the Senegal River has allowed the expansion of irrigation which shields the agricultural economy from climatic hazards. Agricultural goals have also been aimed at import-substituting production and providing employment for rural populations. These objectives have constituted one of the principal policy guidelines for agricultural development since Senegal's independence. As such, they led to significant investments in the development of intensive irrigated agriculture to secure agricultural production and achieve food self-sufficiency, especially following a wave of droughts in the 1970s.

The enduring political drive to make the Delta into a model of intensive agricultural production has had a strong impact on the dynamics of land use. The region has endured the combined effects of intensification, demographic growth, and diversification along with the changes in land use they generate. In recent years, researchers have identified various issues of land use and land access and their relationship to the region's water resources. Tensions over the common resources of water and land have grown in response to the rapid expansion of irrigation on private and agro-industrial farms (both Senegalese and foreign), as well as from the development of inland fishing activities and the increase in pastoral herds and pressure on their traditional ranges that provide transhumance corridors. Demographic increases and agricultural pressure call into question certain rural activities and practices in terms of the sustainable use of natural resources. This questioning becomes even more important with the continued growth in hydro-agricultural development, which has been encouraged by the incentives from various mechanisms designed to facilitate investments.

This atlas allows us to step back and look at these questions. It is based on solid scientific work and takes advantage of multiple contributions from a framework of partnerships, presenting a collection of knowledge on the spatial dynamics of this territory. The atlas helps us better understand the evolution of land use in the Delta and the Senegal River Valley, as well as the actors and collective challenges highlighted by this evolution. It is fully integrated in the work of the supporting institutions and partners that is aimed at territorial dynamics and the evolution of spaces, societies, and agriculture. To this end, the atlas falls within the framework of knowledge production for territorial development, particularly in rural areas, with the goal of supporting the expansion of public policies that favor inclusive rural development. In this vein, the work seeks to inform readers on the importance of development that is both territorial and rural with a perspective that accounts for all the various activities of production and the complementarity and synergies among the different actors.



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ACRONYMS AND ABBREVIATIONS

3PRD	Projet de promotion des partenariats rizicoles dans le Delta
AFD	Agence Française de Développement
AIDEP	Projet Agriculture irriguée et Développement économique des Territoires
ANSD	Agence nationale de la statistique et de la démographie du Sénégal
APIX	Agence de promotion des investissements au Sénégal
CASL	Compagnie agricole de Saint-Louis
CDI	Charte du domaine irrigué
CIRAD	Centre de coopération Internationale en Recherche Agronomique pour le Développement
CNCAS	Caisse Nationale de Crédit Agricole du Sénégal
CNCR	Conseil National de Concertation et de Coopération des Ruraux
CNRF	Commission nationale de réforme foncière
CRAFS	Cadre de Réflexion et d'Action sur le Foncier au Sénégal
CSS	Compagnie Sucrière Sénégalaise
CTA	Commission technique d'application du POAS
CTFD	Comité technique « Foncier et Développement
CZ	Commission de zone
DELTA	Programme de Développement Economique Local et Transition Agro-écologique dans le Delta du fleuve Sénégal
GDS	Les Grands Domaines du Sénégal
GOANA	Grande offensive agricole pour la nourriture et l'abondance
ISRA-BAME	Institut Sénégalais de Recherche agricoles – Bureau d'Analyses macroéconomiques
LBA	La banque Agricole
LDB	Laiterie Du Berger
LDN	Loi sur le Domaine National

LOASP	Loi d'orientation agrosylvopastorale
MAER	Ministère de l'Agriculture et de l'Equipeement Rural
MCA	Millenium Challenge Account
NASAN	Nouvelle alliance pour la sécurité alimentaire et la nutrition
OMVS	Organisation pour la Mise en Valeur du Fleuve Sénégal
ONGF	Observatoire National de la Gouvernance Foncière
PACR/VFS	Programme d'Appui aux Communautés Rurales de la Vallée du Fleuve Sénégal
PDIDAS	Projet de Développement Inclusif et Durable de l'Agribusiness au Sénégal
PDMAS	Programme de développement des marchés agricoles du Sénégal
POAS	Plan d'Occupation et d'Affectation des Sols
PPZS	Pôle Pastoralisme et Zones Sèches
PRACAS	Programme d'accélération de la cadence de l'agriculture sénégalaise
REVA	Retour vers l'Agriculture
SAED	Société nationale d'Aménagement et d'Exploitation des terres du Delta du fleuve Sénégal et des vallées du fleuve Sénégal et de la Falémé
SCL	Société de Culture Légumière
SIF	Système d'Information Foncière
UGB	Université Gaston Berger de Saint-Louis
VFS	Vallée du fleuve Sénégal
ZAPA	Zone Agropastorale à priorité Agricole
ZAPE	Zone Agropastorale à priorité Elevage
ZP	Zone Pastorale

**THE SENEGAL
RIVER DELTA,
TRAJECTORY
OF A MULTI-
FUNCTIONAL
SPACE**



a. Location and context

The Senegal River Valley (VFS) is situated along the northern border of Senegal. It stretches across more than 650 kilometers, passing through the administrative regions of Saint-Louis and Matam as well as a part of the Tambacounda region that includes the Bakel department (see the following figure). The valley follows the Senegal River as it crosses an alluvial plain that extends from Bakel to Saint-Louis, representing roughly half the length of the river's course and offering the greatest potential for irrigable land in Senegal. The area is characterized by a diversity of landscapes composed of plateaus and plains, alternating between zones that are subject to flooding (the Walo) and others that rest on higher ground (the Diéri). Rainfall varies with altitude, ranging from a yearly average of 600 to 700 mm in Bakel to 200 mm in Podor and falling principally during July, August, and September.

The agro-pedological potential of the VFS makes it one of Senegal's main agricultural regions. Since the end of the 1980s, both the governing authorities and private entrepreneurs have maintained a strong interest in exploiting its agropastoral potential. Accordingly, the construction of the Diama dam (1986) in Senegal and the Manantali dam (1989) in Mali represented significant operational advances for the desire of public authorities to develop VFS lands. The Organization for the development of the Senegal River (OMVS) implemented the construction of the Manantali dam with the objective of promoting the development of irrigated agriculture, navigation, and the production of electricity. The Diama dam was constructed to control the upstream intrusion of saltwater (which reached nearly 200 km from

the river's mouth). These works extended the possibility of irrigation in the VFS to nearly 375,000 ha, including almost 240,000 ha along the river's left bank (SAED, 2014).

In the heart of the VFS, particularly the Delta and Lake Guiers, there are multiple issues relative to the exploitation of land and water resources by agriculture (irrigated, flood recession, rainfed), pastoral livestock, fishing, tourism, and the population (supplying water to Dakar, the capital). The Delta is a unique area with polarizing issues linked to the management and exploitation of these natural resources, especially land (Crousse, et al., 1991; Bélières and Touré, 1999).

From 1965 until the end of the 1980s, The Senegalese government totally funded the development of large and average zones of irrigation and partially funded smaller village zones. These developments were made available to peasant farms set up and supervised by the National society for the development and exploitation of the land of the Senegal River Delta and the valley of the Senegal and Falémé rivers (SAED). At the time, this national organism was in charge of managing the Delta lands that had been classified as a Pioneer Zone on land of the National Domain. However, in 1987, with the advent of more liberal policies and structural adjustments, the Delta's Pioneer Zone was reclassified as part of the Terroir Zones managed by the rural territorial collectives (for more information see the governance framework outlined on page 13). This reclassification favored the establishment of privatized areas allocated by the rural councils. The projects of privatized land use were developed by individual promoters

or organized within an approved familial or collective Group of Economic Interest (GIE). These changes created new dynamics for agriculture and land use.

Until the mid 2000s, the private parcels in the Delta were mainly held by native inhabitants or people from other regions within the country. But after 2006, the emphasis on liberal agricultural policies and the launch of the Great agricultural offensive for food and abundance (GOANA) favored more varied land allocations among both Senegalese entrepreneurs and foreign investors. Many of these land use projects were in drylands previously devoted to livestock pasturing. With the advance of the agricultural front came an increase in land use conflicts between farmers and pastoralists. However, in spite of the large number of allocations, a large majority of these areas were not fully developed. In fact, outside of wintering for livestock, only a small percentage of the zones converted (privately or by the State) have been developed. For example, among the ensemble of left bank parcels, the surface areas actually exploited increased from 47,467 ha in 2005/2006 to 73,844 ha in 2012/2013, after having reached 76,519 ha in 2008/2009 (SAED, 2014).

Socio-spatial disparities in the VFS are widening, and the rapid changes affecting spaces and institutions in the Delta (notably, through successive decentralization efforts) call for new explanatory models of territorial dynamics. These changes give rise to questions about territorial development as a process that involves not only productive changes but also the social and institutional changes that accompany them.

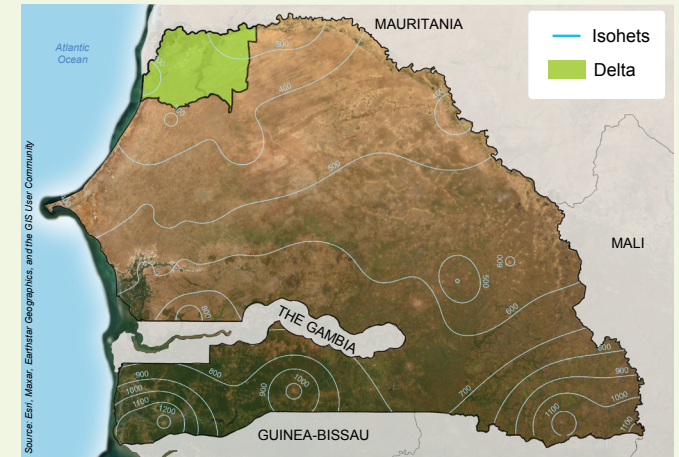
“ The delta is a unique area with polarizing issues linked to the management and exploitation of these natural resources, especially land. ”



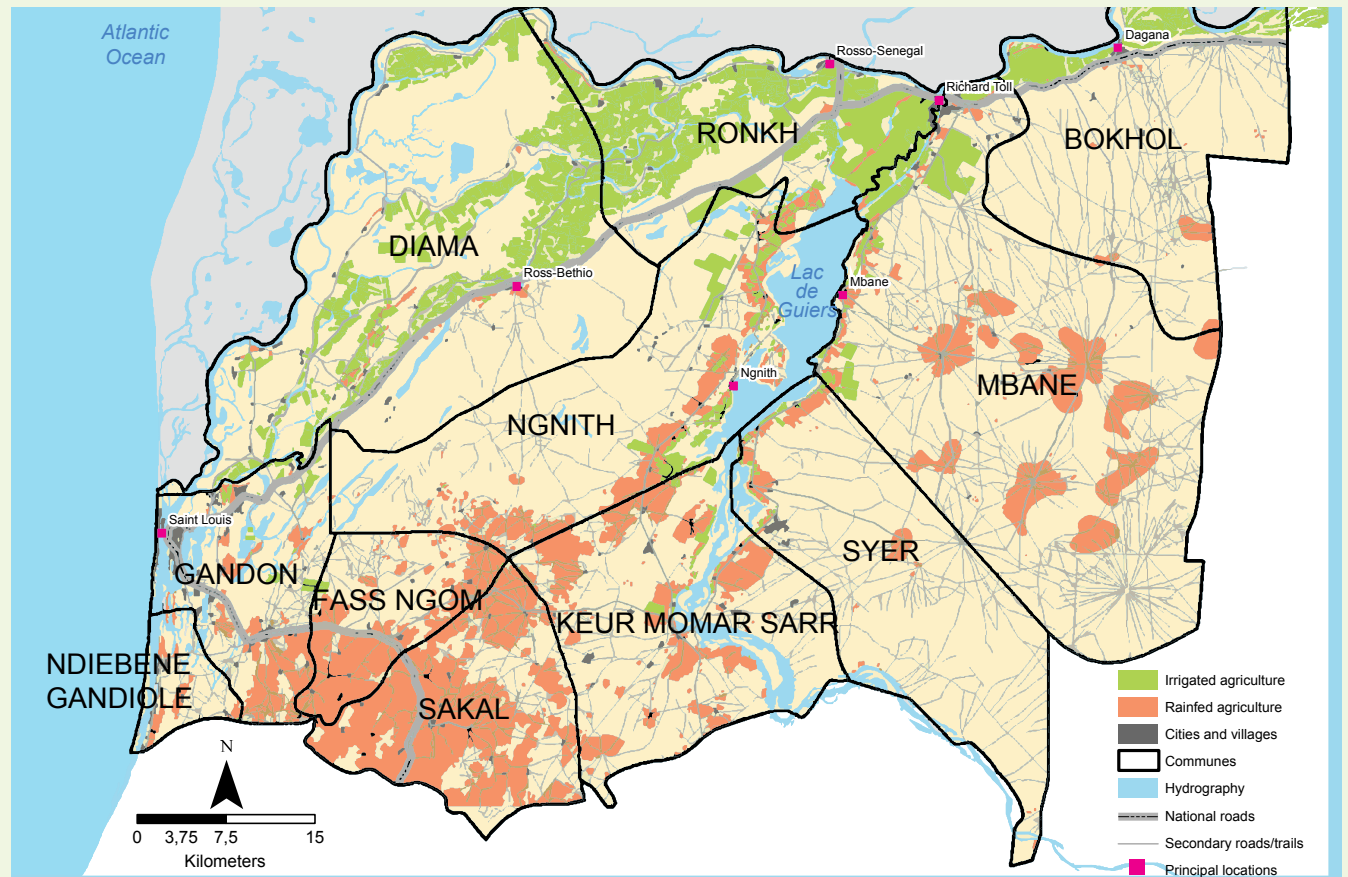
Hydro-agricultural developments in the delta



1. Senegal River basin and dam locations



2. Location of the Senegal River delta



3. Agriculturally developed land

b. From a multifunctional space to an irrigated agricultural territory

The Senegal River Valley has long been developed agriculturally by the local populations and harbors biophysical conditions that offer important potential for hydro-agricultural, halieutic, and pastoral development.

Beginning in the 1930s, hydro-agricultural development of flood zones favored irrigated agriculture, particularly rice, on the left bank (Jamin, 1986; Maïga, 1995). In 1946, the Mission for development in Senegal (MAS) introduced irrigated rice fields on 6,000 ha in the Delta commune of Richard-Toll. With Senegal's independence, this agricultural perspective became part of the main guidelines for promoting import substitution production (particularly rice).

The Delta constitutes a very particular type of area where the decades following independence have seen the crystallization of the public authorities' ambitions to forge planned socio-economic development through the use of available modern technologies (Bélières and Touré, 1999). These goals were advanced by the creation of the SAED in 1965 (law no. 65-001) and by the 1979 extension of its field of intervention to all of the Senegal River's left bank and the Falémé River valley. In 1981, the legal status of SAED evolved from a Public Establishment involved in commercial and industrial issues to that of a National Company given public authority through official three-year missions (law no. 81-57). The significant potential for irrigation resulted in substantial allocations of public land for private agricultural uses in a context characterized by the enthusiasm of various private investors (national and international agro-industry, local populations, religious leaders, peasant organizations, etc.) benefiting from easier access to agricultural financing. The Delta's peasant organizations (OPs) adopted a collective approach based on the creation of large, federated OPs as a way to increase their ability to put pressure on rural councils and play an intermediary role with the Senegalese national agriculture bank (CNCAS). Following these allocations of land use rights, private irrigated parcels of 5 to 100 ha proliferated

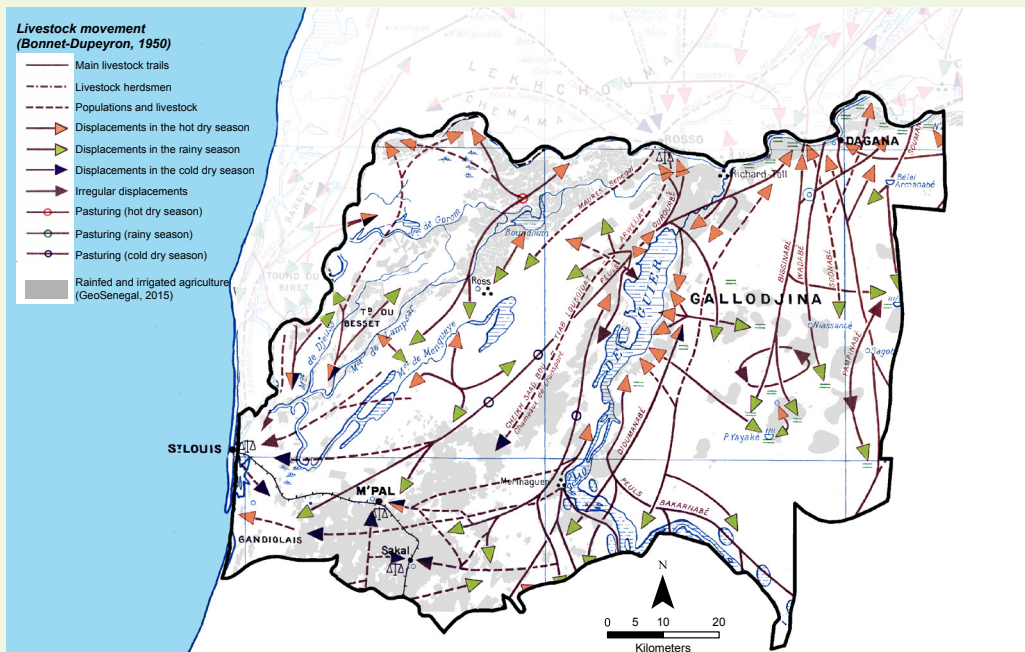
in the Delta, quickly outpacing the expansion of state-funded development projects. In this context, private developments passed from approximately 10,000 ha in 1989 to 38,750 in 2005 (SAED, 2012). At the time, some funders did not hesitate to extol the benefits of privatization, arguing that the private sector had developed more agricultural activities in the Delta in 15 years than the state had in 40 years. The increase in prices of agricultural products that began in 2007-2008 led many countries (such as China, India, Saudi Arabia) and private investors to launch a "veritable offensive on foreign agricultural land" (Brondeau, 2010:3); the available land ceded was often in countries of the Global South, particularly in Africa (Cotula et al., 2009; Bouhey, 2010). For the Delta, this "land rush" meant the arrival of agro-industries seeking access to large extents of land.

Beyond the realization of hydro-agricultural developments with complete control over their water use, innovations supporting and encouraging agricultural intensification aimed at increasing production have focused on particular aspects such as mechanization, supplies of equipment, improvement in fertilization, and the introduction and use of improved, certified seeds. Along with the supervision and agricultural advice provided by the SAED, authorities introduced economic incentives such as the facilitation of access to financing for agricultural operations and equipment. The emergence of practices like ridging for crops such as rice, onion, and tomato also aligned with the perspective on productivity.

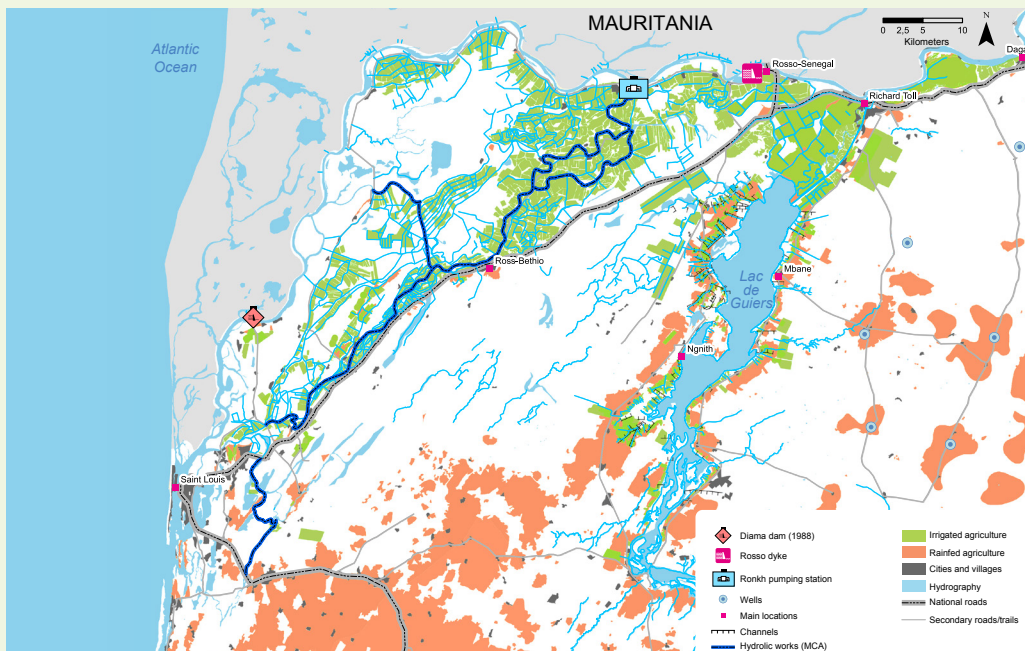
Beyond the promises of productivity and food security/sovereignty linked to the development of irrigated agriculture, the implementation of these intensive-agriculture systems have a cost. Despite the introduction of financing incentives just mentioned, many actors (public authorities as well as other economic actors) ran into the limiting factors imposed by the capital-intensive aspect of these systems that require investments in equipment, inputs, and labor. The resulting gaps in implementation and the desire to fill them have

encouraged public authorities to promote the intervention of "modern" actors in the form of private agents and/or investors, be it foreign or national. Outside of the sugar agro-industry, which has been present in the Delta since the 1970s, familial agriculture has remained the dominant model in the irrigated areas. Today, however, the dynamics of land use allocations is more oriented toward agro-industrial models, with or without agricultural contracts, and small private capitalist businesses. These new arrivals tend to push other activities, such as pastoral livestock, into peripheral areas.

“ Beginning in the 1930s, hydro-agricultural development of flood zones favored irrigated agriculture. ”



4. Historical depiction of seasonal livestock movement in the Delta



5. Locations of investments in hydro-agricultural structures



c. Outline of the land governance framework

Land use in Senegal is regulated by law no. 64-46 of June 17, 1964 regarding National Domain Law (LDN). The decrees, 64-573 of July 30, 1964, and 72-1288 of October 27, 1972, define the management rules for the allocation or appropriation of national domain lands within rural communes (Mbodj, 2008). The national domain system in Senegal is unique in that it is made up of land which belongs neither to the State, nor to local authorities, nor to the users. Grouping nearly 95% of Senegalese land at the moment of the country's independence, these lands are, in principle, inalienable and non-transferable. In other words, these lands cannot be sold, and land-use rights are only transferable through a process of registration, which is exclusively in the private domain of the State. The uniqueness of this law resides in the fact that the Government is only an administrator of these lands which belong to the "nation" (CNRF, 2016; Bourgoin et al., 2020).

The establishment of the LDN introduced several advances, especially in terms of the principle of equitable access to land use. Nevertheless, the application of the law was constrained by several obstacles, including social resistance, which hampered its application (Touré and Seck, 2003). When considering the demands of economic and social development, particularly within the context of the law's further elaboration in 1964, many anachronisms and inadequacies in the legal framework come to light. "The limiting characteristic of belonging to the collectivity, in view of the need to attract and secure investments, the restrictive perception of development reduced to familial scale, which does not favor the intensification of agricultural production, and the non-transferability of rights, which favors neither mobility nor family investment and sustainability, are all shortcomings in view of current requirements for development." (CNRF, 2016:5).

The particularities of land dynamics in Senegal can be explained in part by the fact that the post-independence authorities made the choice of land security without private ownership by removing land from the domain of capitalism

(Loehr, 2012). This would avoid the commodification of land from being a vector of annuity strategies, and in theory it would facilitate access to land for the most vulnerable, notably the communities with traditional land use practices (Burns, 2007). And this would happen outside of any consideration of efficiency or profit (Loehr, 2012). But in reality, the LDN has never been completely implemented because of a lack of resources among local authorities, resistance from customary owners, and weak participation among grassroots communities.

This can be seen in the results of Bourgoin et al. (2020) where more than 80% of land studied (large tracts held by national operators) remains under customary occupation and largely unsupervised by the responsible local authorities. However, these agricultural lands are in constant evolution and have been impacted by public policies inspired by more liberal perspectives. Since the 2000s, these policies have reinforced the dynamic of agricultural intensification through the promotion of private agricultural entrepreneurship and the pursuit of investors for agro-industrial development. For example, the number of agro-industrial companies established with foreign capital rose rapidly thanks to the combination of a stable government and favorable policies with incentives offering fiscal advantages and support by the Agency for the promotion of investments and major works (APIX). Between 2000 and 2015, agricultural land developed by agro-industries based on foreign capital doubled. Although this dynamic of agrarian transition is poorly referenced and ultimately little known (Bourgoin et al., 2016), it is widely criticized in Senegal, particularly by local populations supported by civil society organizations that denounce a form of spoliation and monopolization of land (Faye et al., 2011). The dynamic of land acquisition by foreign investors is also accompanied by the development of an unofficial land market with unofficial practices (e.g., sales) and the circumvention of legal texts under the cover of a provision for "cession of sanctions and care" against undeclared financial compensation (Lavigne Delville, 2017).

“ The particularities of land dynamics in Senegal can be explained in part by the fact that the post-independence authorities made the choice of land security without private ownership by removing land from the domain of capitalism. ”

The professional agriculture organizations highlight the discrepancies that illustrate the shortcomings of the Senegalese land regime.

Civil society actors, and the Framework for dialogue and action on land in Senegal (CRAFS) in particular, support this questioning and strongly advocate for the development of an inclusive land policy that takes account of current issues and challenges linked with land governance. These actors have also begun work aimed at proposing new laws that integrate innovative local practices while taking account of the legitimate needs expressed by local communities regarding land rights and land use: security, fair access and exploitation, transparency in governance, and citizen participation in management (for more information, see IPAR, 2017).

The reform process is ongoing and the political choices that will be made in the coming years will have a strong impact on the evolution of the Senegalese agricultural model. There are multiple trajectories between a modernization of the LDN that affirms a determination to diverge from the liberal dynamic driven by capital and the promotion of land security for the benefit of the market through generalized land registration.

Outside of legal commerce

- Terroir Zones**
(land use rights and allocations)
- Urban Zones** (communal territory and cities and villages)
- Classified Zones**
(forested or protected lands)
- Pioneer Zones**
(other lands)

- National Public Domain**
(inalienable and imprescriptible)
 - natural: hydrography, airspace
 - artificial: infrastructure

Outside of legal commerce

National Domain

- Law no 64-46 of June 17, 1964
- Administration by the **communes** 1972
- Inalienable, property of the **Nation**

Local land practices

Informal land market

Registration
(declassification, withdrawn from public use)

transformations

Private Domain

- (land titles)
- Decree of July 26, 1935

State Domain

- Law no. 76-66 July 2, 1976

Expropriation
(with fair and prior indemnification)

transformations

Migration from lease to title

Formal land market

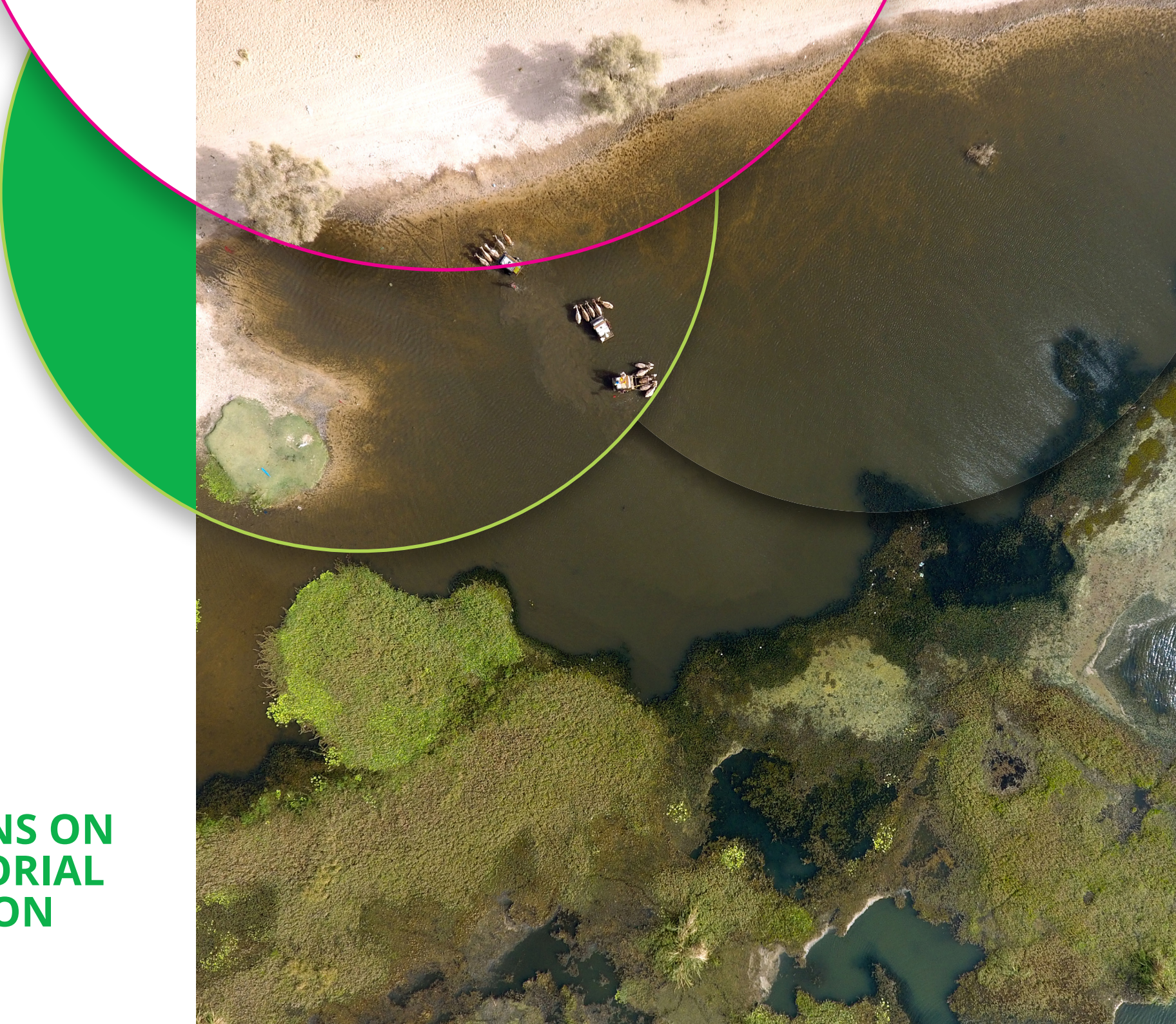
Private State Domain

Land and structure acquired by the State, including leases and use rights (urban zones)

6. Outline of Senegalese land governance

Expansion of Agro-industry in diéri spaces

QUESTIONS ON A TERRITORIAL TRANSITION



a. How has the territory been shaped by the promotion of productivist agricultural models?

For more than 50 years, the arable land in the Senegal River Delta and near Lake Guiers has witnessed steady growth in hydro-agricultural development. Propelled by incentives from the various mechanisms facilitating investment, approximately 25,500 ha have been irrigated between the years 2000 and 2015, including almost 11,000 ha developed by foreign agro-industries (Bourgoin et al., 2016; Bourgoin et al., 2019). This trajectory of rural development is the result of the Senegalese agricultural programs that have favored the development of intensive agriculture (for example, LOASP 2004; REVA, 2006; GOANA, 2008; PRACAS, 2014) and the anticipated returns from the agro-industry's embrace of the logic of liberal and capitalist economics (Pimbert, 2018).

In this logic, Senegalese agriculture policies have favored the development of public-private partnerships to finance agricultural development—arrangements that sometimes have important implication for land governance. This policy orientation arrived in force at the beginning of the 2000s with the end of the socialists' reign and the rise to power of the liberal regime associated with President Abdoulaye Wade (2000-2012). To different degrees, all the economic sectors in Senegal experienced this political liberalization, and agriculture was no exception. The twelve years of the Wade presidency strongly influenced the redefinition of Senegalese agricultural policy in favor of agricultural productivism and were openly favorable to the agro-industry. Beginning in this period, the institutional environment of agricultural financing was reconfigured under the combined efforts of multiple actors and the frequent intermingling of public and private financing. This desire to attract new private operators resulted in the

establishment of financial structures where public funds acted as a powerful lever for development in the projects they helped finance. One example is the Program of Agricultural Market Development in Senegal (PDMAS), financed by the World Bank with the goal of developing a new model based on a public-private partnership. This program was set up so that public funds finance the structural and collective developments while the municipal councils allocate the land to three different types of exploitation: family farms, small and medium companies, and national or foreign firms. Two other examples of this perspective are the project promoting rice farming in the Delta (3PRD) financed by the French Development Agency (AFD) and the Sustainable and Inclusive Agribusiness Development Project of Senegal (PDIDAS) financed by the World Bank. The latter was initiated by the Senegalese government with the objective of promoting growth and employment by attracting investment in the agricultural sectors (particularly agronomic crops) with an emphasis on the northern regions of Louga and Saint-Louis. In addition, the Senegalese authorities were involved in the New Alliance for Food Security and Nutrition (NASAN) which was also dedicated to the strategic perspective of public-private partnerships. For the Senegal River Valley, the vision of NASAN was embraced by the Senegalese Agricultural Acceleration Program (PRACAS) that had already fixed a 2017 production objective of 1.6 million tons of rice (paddy) to contribute to the national needs for rice and 160,000 tons of off-season fruits and vegetables for export (MAER, 2014).

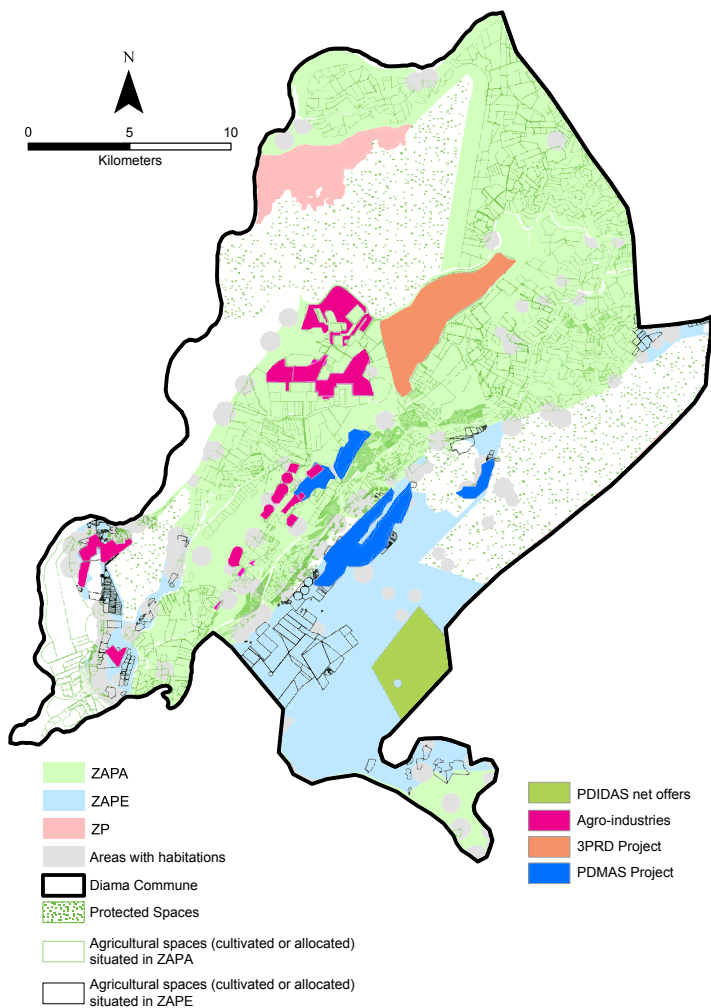
These programs and projects reflected a political option of the public authorities, and thanks to the changes to landuse rights implicated in their implementation, they gave private investors,

both foreign and national, access to developed lands (Touré et al., 2013). In doing so, they also provoked controversies and raised numerous questions, particularly about (i) the challenge of sustainably managing natural resources, especially land, and (ii) creating competition among investors and actors who don't possess the same abilities for negotiation, means of production, or proposals for compensation. Furthermore, fair access to land could be called into question through the involved changes in land governance. Issues of social-spatial recomposition were inevitable, with no means to clearly determine the nature of their impact on family farms.

An analysis of territorial dynamics by Bourgoin et al. (2019) showed that, for the moment, agro-industrial development in the Delta and the area surrounding the Lac de Guiers will continue to impose its mark on the territory in areas already designated as "available for investment." Today, in light of the continuing extension of irrigated land and the diversification of actors and zones involved, these initiatives and advantages deserve to be analyzed and adjusted to promote more effective adoption and use of these tools and more balanced and sustainable development of the territory. In this context of evolving patterns of landuse and tenure, as well as the emergence of new models of agricultural development, strengthening support of local communities in the development of their territory requires an evaluation of the state of the implementation of existing innovations and tools for land management.

“ For more than 50 years, the arable land in the Senegal River Delta and near Lake Guiers has witnessed steady growth in hydro-agricultural development. ”





7. The Diama commune, a territory of projects
 Information on the agro-industries can be found at <https://landmatrix.org/observatory/senegal/>
 The map integrates the following references: #4055, #1796, #1795, #4932

Project name	Time period	Technical partners and funding organisms	Sectoral objectives	Surface areas (hectares)	Budget (USD in millions)
Millennium Challenge Account (MCA)	2011 - 2015	Millennium Challenge Corporation, United States of America	Hydraulic and hydroagricultural installations for rice and agronomic crops	43 500	540
Project promoting rice farming in the Senegal River Delta (3PRD)	2011 - 2015 (+4 years extension)	French Development Agency, West African Development Bank, Senegalese Government, Private operators	Rice crops	2 500	36,8
Program of Agricultural Market Development in Senegal (PDMAS)	2007 - 2014	World Bank and other funding partners, Canadian International Development Agency, French Development Agency, European Union	Agronomy and hydraulic installations	2 500	35
Sustainable and Inclusive Agribusiness Development Project of Senegal (PDIDAS)	2014 - 2020	World Bank, Global Environment Facility	Agronomy	67 467	86
Program of Local Economic Development and Agroecological Transition (DELTA)	2021 - 2026	French Development Agency	Rice crops, Agronomy, Forage crops (agroecology)	6 000	55,3

8. A few of the major projects developed in the territory

b. How have productivist orientations affected the investment dynamics that impact landuse?

When we look at the Senegal River Valley, it is important to emphasize that one of the principal elements of policy guidelines for agricultural development after Senegal's independence has been the control of water resources through the expansion of irrigation, the objective being to shield the agricultural economy from climatic hazards and promote import substitution production. In order to secure agricultural production and attain food self-sufficiency, large investments were approved to develop irrigated agriculture, especially after the wave of droughts in the 1970s (Hecq, 1990:9). Although the presence of agro-industry actors in the VFS is not new, the recent growth in the number of agro-industries in the area has provoked numerous controversies, particularly regarding access to land. As previously mentioned, landuse transactions occur through a pluralism of methods and practices engendered by coexisting formal and informal approaches, weaving between legal and social legitimacies. The allocation of land to an agro-industry mobilizes an ensemble of actors at different levels where compensation or exchanges must be negotiated. Today, the nature of the negotiating process, as well as its substance, plays an important role in the general relationships between local communities, territorial collectives, and agro-industries.

For access to agricultural land, agro-industries rely on different networks (formal and informal) and develop various strategies depending on the local situations and the attitudes within the different communities themselves. Our investigations indicate that the lack of or failure to implement any policies constraining land investments during the food, economic, and energy crises of 2007-2008 resulted in a period of relatively easy access to land. Subsequently, the strong and well publicized global mobilization around the phenomenon of land grabbing and the destruction of land by foreign industries (including the agro-industries) pushed the public authorities and civil society organizations to reconsider the modalities of allocating land and the procedures for supervising those allocations. Indeed, the

steps involved in acquiring access to land have evolved since the arrival of the first agro-industries in 1970 and their leases granted by the State.

At the beginning of the 2000s, the installation of private companies passed directly through the former rural councils (later organized as municipal councils). There were no negotiations with the village chiefs or local populations of the communities themselves to take account of their legitimate land rights before the agreements were formalized at the level of municipal councils. For two of these companies, negotiations at the community level occurred during a period of extensions into other areas, after an initial allocation had already been formalized at the level of the commune. For one of them, land access at the beginning of the 2000s required nothing more than paying a fee for marking the boundaries and a minor installation charge paid to the state land commission. However, in 2014, when the company wanted to extend into a new area of the same commune, it had to undergo negotiations with the local population and sign a contract with their representative (the village chief) before the commune would grant new landuse rights. The case was the same for another investor with an established presence in the Delta area in 2006, who then wanted to expand onto lands within the territory of other municipalities in 2012.

At the end of the 2000s, and following the national mobilization against land grabbing, we can see different methods of access to land in the territory. Village chiefs and the local populations participated in discussion workshops, local concerns were identified, and in some cases, the discussions led to the definition of practical ways to transfer landuse rights based on the difficulties present and the advantages rendered. During this period, one company in the area of Lake Guiers directly negotiated its installation with the local population by promising to construct an irrigation canal and develop 200 ha for the benefit of local farmers, with no financial support from the commune. In

this case a formal contract was signed by the rural council's president before the development of the site began. This type of negotiation preceding the formalization of an agreement can help anchor negotiations and prevent social complications, but it can also pose a number of problems in terms of the negotiation conditions and in the asymmetry of information and power (Lebond, 2019).

The following schematic illustrates an ensemble of approaches and actors implicated during a land transaction in the Delta area. Of course, this generic figure does not represent a standard and many special cases exist. The monitoring and control of land access are not strict, which leaves opportunities for companies to respond to a population's specific needs. Nevertheless, the approach of negotiations with individuals does not often serve the general interest. And a contract made official at the level of the commune is not obligated to integrate the conditions negotiated informally with the village, thereby often failing to completely ensure the company's responsibility.

“ Although the presence of agro-industry actors in the VFS is not new, the recent growth in the number of agro-industries in the area has provoked numerous controversies, particularly regarding access to land. ”

INTERNATIONAL

Technical Partners and Funding Organizations

DIRECTIVES: State help for establishing policies to attract and promote private investment

GUIDELINES: Main principles for managing private investment (e.g. Voluntary Directives)

NATIONAL

STATE

Promotion of private entrepreneurship and attraction of investors (fiscal advantages, exemptions, support)

Policy of attraction

Funding Directives

Funding method guidelines

Search phase

Agro-Industry

Submission of project, demand for landuse allocation

6) Allocation

Approval

Project submission

The regional authority can demand a study of the environmental and social impact on the local community, which will in turn submit the demand to the Agro-Industry

NATIONAL

APIX

Introduction and accompaniment for identification of sites
Exploitation visa provided

VISA APIX

Validation

NATIONAL

Technical services of the government

(Technical directions from the Finance Ministry/DGID Environmental Ministry)

Technical validation

Commune

Local community

3) Deliberation by the municipal council following the report on the prospective transaction

6) Allocation, marking of boundaries (fee) & installation

4) Present the deliberation to regional authority

ARRONDISSEMENT

Decentralized services (regional authority)

5) Administrative validation

1) Examination of submission and prospective transaction

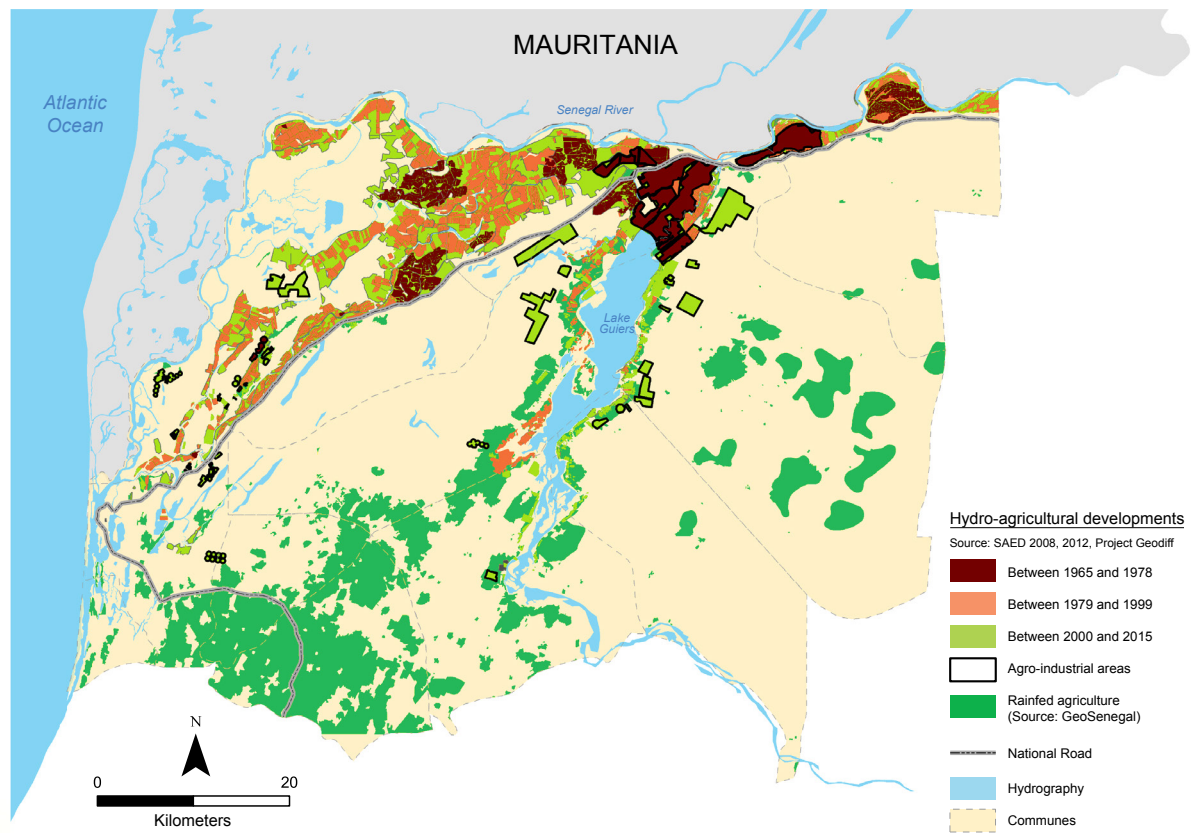
2) Report on prospective transaction

Commune

Commission Domaniale CADL, SAED (au besoin)

Validation technique

9. Schematic of the process of integrating into the territory



10. Spatial extent of hydro-agricultural developments between 1965 and 2015
 Information on the agro-industries can be found on <https://landmatrix.org/observatory/senegal/>



c. To what extent are pastoral activities integrated into territorial planning?

As described previously, the dynamics of land use were strongly impacted by the political desire to make the Delta zone a model of intensive agricultural production. As a consequence, the amount of and access to available land for grazing herds and flood-recession farming had already dropped 70% by the end of the 1980s (Tourrand, 1989). The conjunction of these factors considerably increased conflicts between farmers and herders, particularly when herds crossed onto farmland. The recurring periods of drought that have affected the region since the 1970s compounded the problems, significantly reducing the quantity of winter forage on the large extent of sand dunes (Tourrand, 2000). Certain annual herbaceous species have disappeared, and overgrazing in some areas has led to a reduction in the quality and quantity of pastoral resources (Faye, 2016).

Livestock farming, particularly transhumant pastoralism, has been strongly impacted by these challenges but nevertheless is still present in the area. In fact, pastoral camps are present in all the communes, however, even though they are tolerated near the irrigated areas, most camps are located further away in the Dieri zones. It seems that the proximity of irrigated areas and roads are two parameters that affect pastoral mobility; although there are many camps close to the Mpal and Keur Momar Sarr markets, their herds are mostly sedentary.

The agro-industries offer opportunities for agricultural work (Girard, 2020) and access to crop residues for livestock. The expansion of irrigated areas has also offered sedentary livestock farmers the opportunity to diversify their activity through access to existing hydraulic infrastructure. There are canals next to irrigated areas and deep wells that have been extensively developed in northern Senegal (Rasmussen et al., 2018). Other opportunities have arrived along with the development of specialized markets. For example, a milk processing company in Richard-Toll collects milk from the area's livestock farmers and sells it in the cities (Bourgoin et al., 2018). In addition to the economic opportunities for the livestock farmers, this "sedentary" strategy of reducing the reliance on transhumance responds to the urgent question about the security of animal feed/forage. As rangeland has

disappeared, the agreements between herders and agro-industries for access to crop residue have multiplied, and the negotiations for new agro-industrial installations often include the creation of artificial watering ponds for livestock.

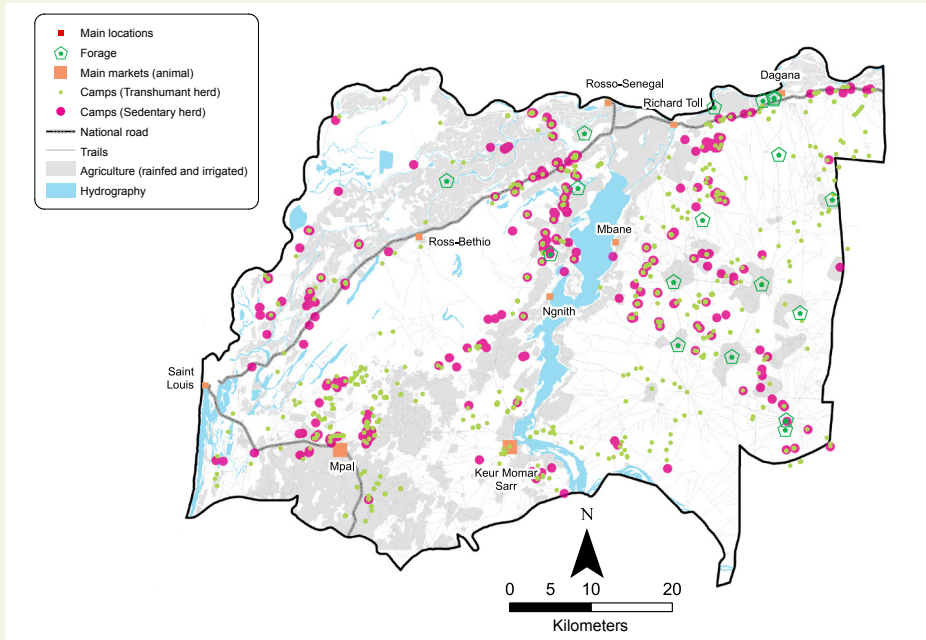
Although these factors have created possibilities for sedentary livestock farming, there continues to be significant herd movement (transhumance) in the Delta itself and also into other areas in the country's interior. Among the 1,187 camps surveyed by Bourgoin et al. (2022), 63% of the respondents claimed that their herd was mobile. The authors indicate more precisely that 15.8% of the displacements take place within the same community, and 22.6% are within the department, but 92% of the livestock farmers with mobile herds also move them through other regions. The study of these camps identified important movements from the Saint-Louis region to the Louga and Linguère departments, which are at the heart of the pastoral space, the Ferlo. These are emblematic spaces of pastoralism that encompass large areas of pastoral forage and institutional mechanisms to facilitate mobility (Wane et al., 2006). Other significant herd movements are directed towards the Peanut Basin and the departments of Thiès, and Kounghoul, where historic relationships have existed between pastoralists and farmers (Ancey and Monas, 2005).

Pastoral activities are often represented as anachronic (Magrin et al., 2011), as they have naturally declined in number and been replaced by more modern forms of agriculture (Ancey and Monas, 2005). This rhetorical construct, supported in the discourse on land resources, tends to ignore the existence of practices that do not correspond to the values of a certain vision of agricultural development. In spite of its lack of visibility in the development policies of the area, livestock farming remains an important economic activity for a substantial, but underestimated, part of the population. Under the influence of driving forces, particularly climatic and demographic politics, land use and agricultural practices have continued to evolve. Sedentary livestock farming seems to be developing near infrastructures, services, and lines of communication as well as the proximity of roads, markets, and hydraulic developments (Bourgoin et al., 2018). The

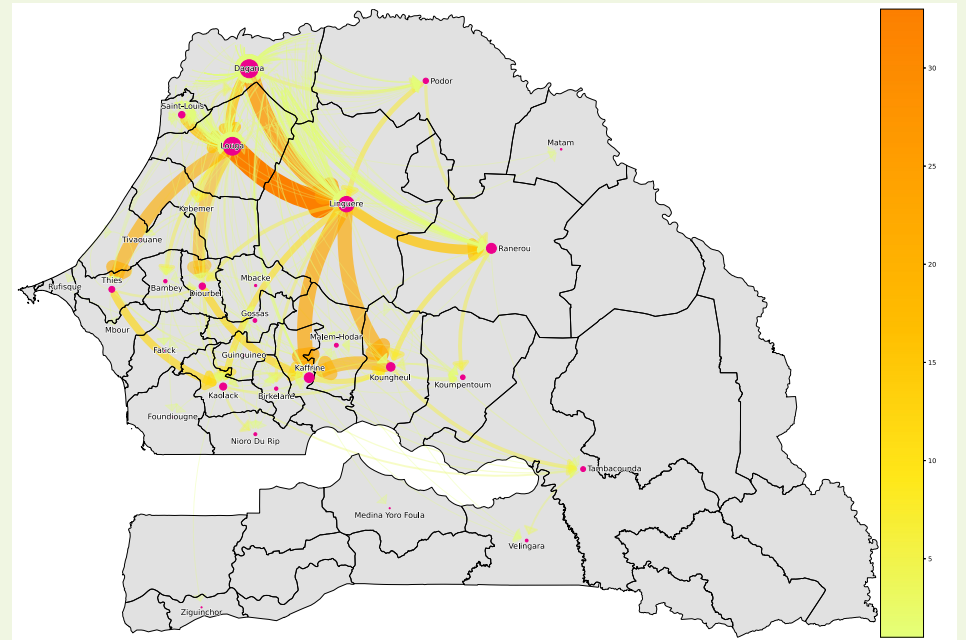
construction of roads for access to irrigable areas of the Delta and the land surrounding Lake Guiers has also benefited the livestock sector by increasing the market opportunities for the animals and their byproducts (Bourgoin et al., 2018).

Livestock farmers seem to have been able to adapt either by evolving toward a more sedentary and intensive model or by diversifying their activities (Tourrand, 2000:63). Numerous authors have referred to this adaptation in the Senegal River Valley, suggesting that the pastoralists who cultivate rice envision abandoning transhumance to some degree (Pouillon, 1990; Tourrand, 1993) in favor of producing milk for the processing companies (Corniaux, 2005; Bourgoin et al., 2019). At the same time, farmers have developed supplementary livestock activities for commercial or self-consumption. The use of agricultural and agro-industrial byproducts has increasingly accompanied this progressive transformation. However, the practice is not systematic in spite of the relative abundance of these new food resources associated with irrigated agriculture.

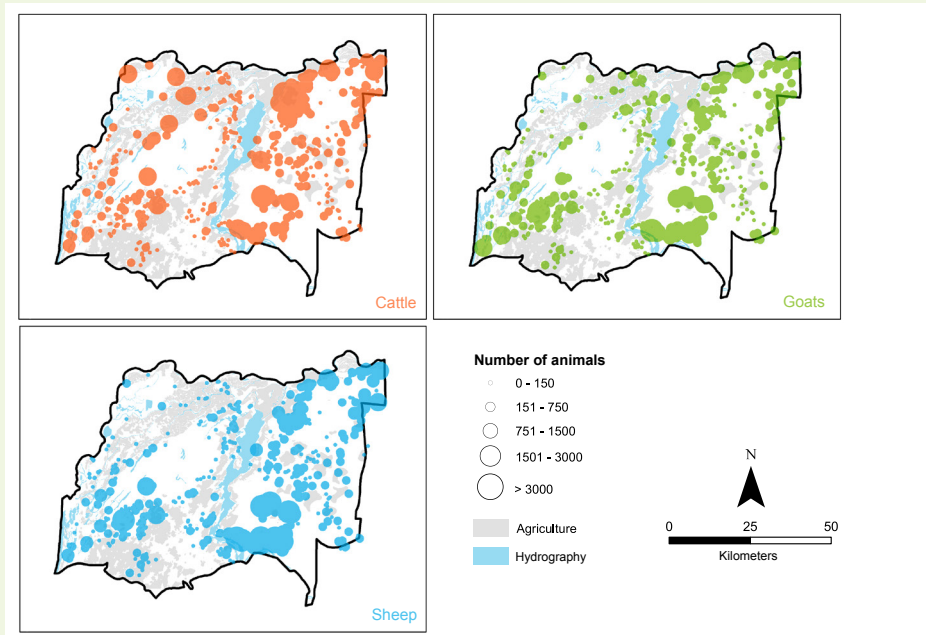
“ In spite of its lack of visibility within the region's development policies, livestock farming remains an important economic activity for a substantial, but underestimated, part of the population. ”



11. Location of camps in the Senegal River Delta



12. Annual movements of herds from Delta camps (thicker and darker lines indicate a greater number of herd movements)



13. Livestock in the Delta camps





d. What place do environmental issues hold in the face of demographic growth?

Because of the physical conditions (seawater intrusion, seasonal flooding), the Delta was initially a sparsely populated area, mainly associated with pastoral activities in the dry season and when flooding receded. But in 1965, the SAED was created and implemented for the development of 30,000 ha in the region. The human resources used to exploit the newly irrigated areas stemmed from migrations organized and supervised by the central authorities (forced migrations during the colonial period and freely undertaken after independence). This dynamic continues today with the arrival of new agro-industrial actors and renewed access to employment opportunities (Girard et al., 2022).

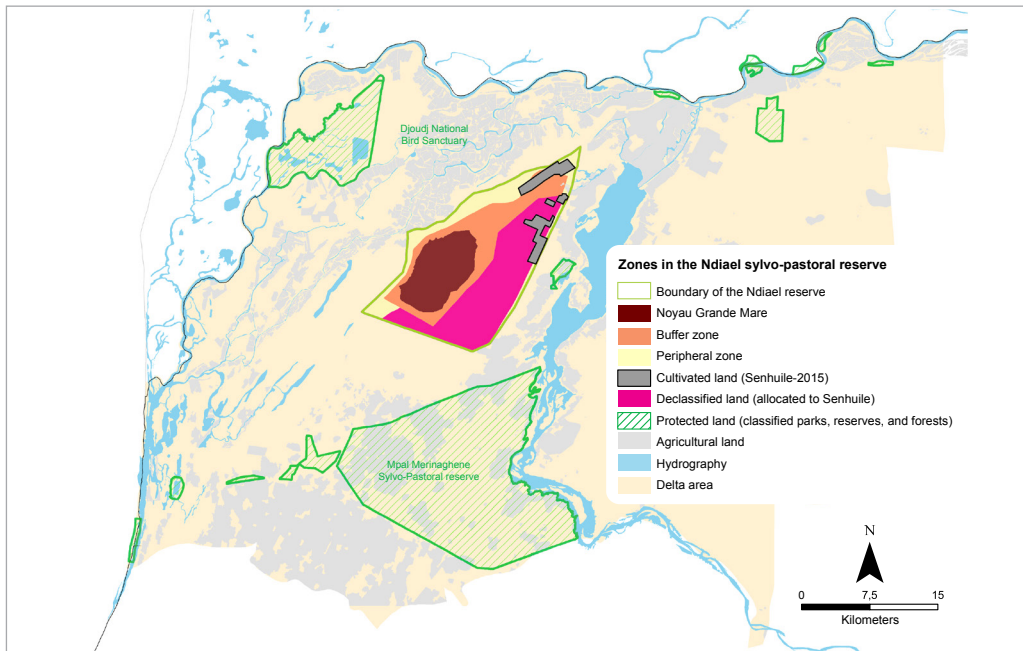
The Senegal River and Lake Guiers are particularly important for the socioeconomic development of Senegal. These surface waters are strategic resources due to their multiple and sometimes competing uses, such as irrigation, watering of animals and support of wetlands (indirect issues of biodiversity preservation and the development of ecotourism), fishing, drinking water for urban centers, and domestic uses. In recent years, researchers have identified various issues related to water use and access in the face of demographic growth, the diversification and intensification of use, and the changes in land use rights. More particularly, these shared water resources have endured mounting pressure from increases in livestock, development of inland fishing activities, rapid extension of irrigated areas magnified by the arrival of Senegalese and foreign agro-industrial investors, and the constriction of traditional rangelands. These dynamics also put pressure on protected lands when intensive agriculture is developed adjacent to parks and reserves. In some cases, the extension of agriculture results in the declassification of protected zones, such as the 2012 presidential decree that declassified part of the Ndiel reserve for the agro-industrial company, Sen-Huil. The 25,000 ha involved were originally exploited collectively (non-timber forest products, pastoral resources, etc.), and for the pastoral herders in the area, the situation generated a strong sense of being marginalized (Bourgoin et al., 2022).

The increasing demographics and pressure from agriculture (extension and intensification) raise questions about the sustainable use of water from the river and lake. In fact, the development of agricultural activities is one of the principal sources of chemical pollution in water from pesticides and chemical fertilizers (Ba et al., 2017). Pollution from agriculture includes the direct discharge of drainage water and runoff from agricultural fields. Ultimately, this pollution from the pesticides, fertilizers, heavy metals, and pathogens alters the water quality of Lake Guiers, which is the largest freshwater reserve in the country. Added to this are other forms of water pollution associated with the absence of a sanitation system for the collection and treatment of domestic wastewater.

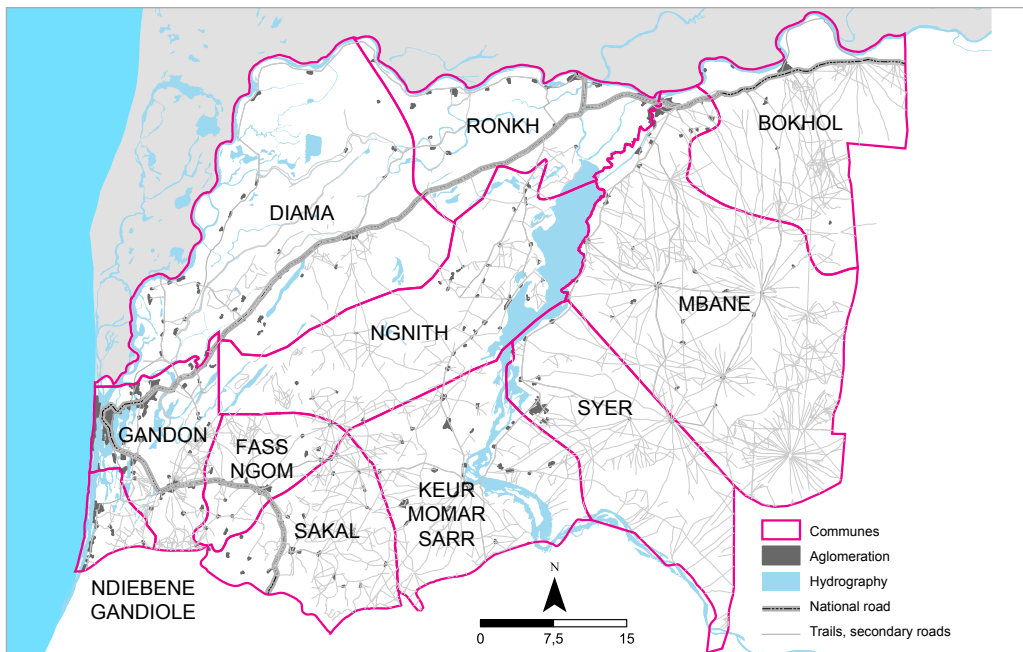
Overall, since the impoundment of the Diama dam, the aquatic vegetation of Lake Guiers has undergone profound changes. Some parts of the river and lake, particularly near the banks, are completely invaded by aquatic vegetation. According to Milic (2022), aquatic plants now occupy more than 50,000 hectares in the Senegal River Delta. Cormier-Salem (2022) claims that more than 100,000 ha (40%) of the surface water behind the Diama dam are covered by Typha. The hydro-agricultural developments do not often conform with standards, and the significant drainage of polluted wastewater into the river and lake have created new hydrological and environmental conditions that favor the growth of invasive aquatic plants. The proliferation of aquatic vegetation, particularly the Typha, has several negative effects on the condition and health of the surrounding environment, most notably the obstruction of irrigation canals and access points for the local population and livestock, as well as the resurgence of water-related diseases and parasite infections (e.g., Bulharzia, liver flukes).

“ The increasing demographics and pressure from agriculture (extension and intensification) raise questions about the sustainable use of water from the river and lake. ”



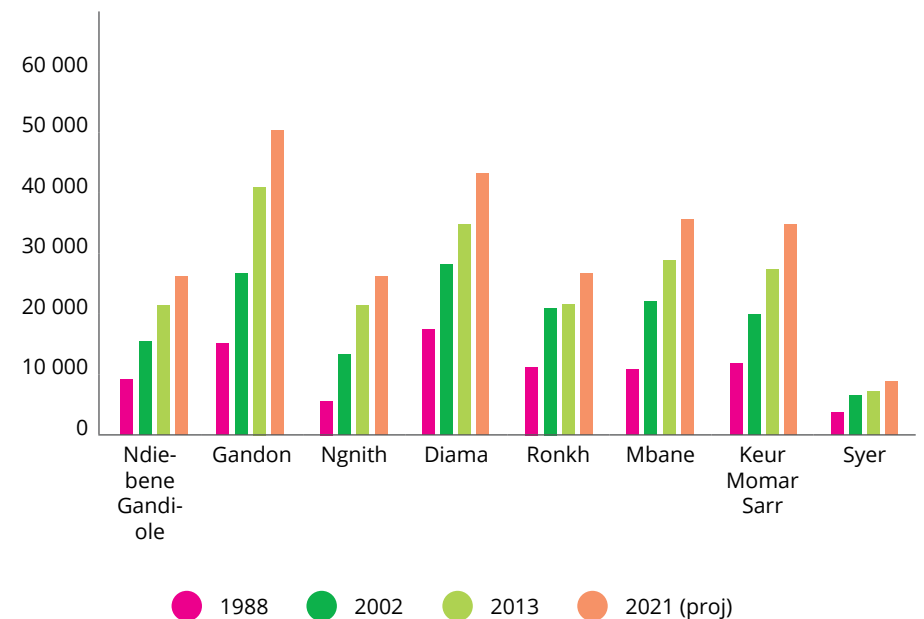


14. Detail of the Ndiel reserve



16. Delineation of rural administrative units (communes)

	Workforce			
	1988	2002	2013	2021 (proj)
Ndiebene Gandiole	9 310	15 506	21 182	26 114
Gandon	15 219	26 471	40 763	50 254
Ngnith	5 772	13 366	21 035	25 933
Diama	17 530	27 946	34 828	42 938
Ronkh	11 289	21 094	21 593	26 621
Mbane	10 588	21 668	28 640	35 309
Keur Momar Sarr	11 914	19 803	27 517	34 350
Syer	3 950	6 726	7 104	8 868
TOTAL	85 572	152 580	202 662	250 387



15. Demographic evolution between 1988 and 2021

**A PREEMINENT
PLACE FOR
PLANNING TOOLS
IN TERRITORIAL
GOVERNANCE**



a. The toolbox for landuse management

Since the end of the 1990s, authorities have launched several experiments and measures for regulating and managing landuse in Senegal. As part of the effort to complete the institutional mechanism initiated by the 1964 legislation on the national domain, experiments implementing tools to secure land and organize the space were conducted in the Senegal River Valley (VFS). These tools were developed with the aim of contributing to territorial development policy, the management of local development projects, and the reinforcement of decentralization (d'Aquino et al., 2011). They took the form of the Senegalese Landuse and Allocation Plan (POAS), the Irrigated Domain Charter (CDI), the land register, and the Land Information System (SIF). The tools were implemented with the support of the SAED and development programs active in the region. Several of these programs are of particular note: the VFS Rural Community Support Program (PACR-FVS) between 2008 and 2012 and funded by the VFS; the Millennium Challenge Account (MCA) between 2011 and 2015, funded by the Millennium Challenge Corporation and the American government; the Sustainable and Inclusive Agribusiness Development Project of Senegal (PDIDAS) funded by the World Bank between 2014 and 2020; the Development Program of Agricultural Markets in Senegal (PDMAS) funded by the World Bank and other financial partners between 2007 and 2014; the Local Economic Development and Agroecological Transition Program (DELTA) currently being implemented by SAED with funding from the AFD.

The design of tools like the POAS marked the emergence of new and original rules, which have sought to take account of local realities and specificities (d'Aquino et al., 2000). However, the issues involved in the success and application of the type of tool are situated on several levels beyond the technical aspects, particularly in terms of the social, institutional, and political conditions of their implementation. These factors determine the capacity of these tools to support the establishment of organized and negotiated management of land rights and related conflicts, as well as their ability to

anticipate potential socio-spatial changes at the local level (d'Aquino et al., 2011).

The POAS

After years of experience in the 1990s in the VFS, the POAS is considered to be a guiding framework for local managers in the analysis, planning, and implementation of organized development at a local scale. With a participative approach, the POAS established rules for managing space and natural resources (d'Aquino et al., 2001). In 1997, a POAS pilot operation was started in the rural community of Ross-Béthio at the request of the local rural Council. The objective of this experiment was to give local collectivities access to an institutional and technical tool capable of assisting them with their collective management dynamics (SAED, 2002). The POAS determines a set of rules for the occupation and use of land in the territory, mapping spatial zoning that delimits several types of landuse.

With its pilot experiments and their general implementation in the ensemble of VFS communes since the 2000s, the POAS acquired a dual legitimacy. The first was legitimacy on the legal level with its anchoring in the laws of decentralization and its validation through deliberations in the municipal council followed by approval from the administrative authority. The second was acquired at the local level by implicating representation from the different socio-professional categories in the collective elaboration of rules for managing space and natural resources.

THE SIF

Since no rural land register really exists in Senegal, the SIF was designed as a system that would allow the registration, storage, and dissemination of cadastral and landuse information in rural areas. It was defined in the framework of the PACR-VRS project in partnership with the SAED between 2008 and 2013. The SIF's objective was to support decision-making and improve transparent management of the territory by favoring the knowledge and regulations for rural land

“ These tools were developed from a perspective of contributing to territorial development policy, managing local development projects, and reinforcing decentralization. ”

access and management. The creation of the SIF was divided into two phases. The first concerned the SIF manual, which archived land data by deploying a land register integrated with plot maps. The second phase addressed the digitization of the SIF manual, in other words, the introduction of an application that would allow computerized management of the textual and spatial land data (SIF digital). Following the experimentation and deployment of these tools by the PACR-VFS, projects like the MCA and the PDIDAS strived to implement them in the communes where they intervene,

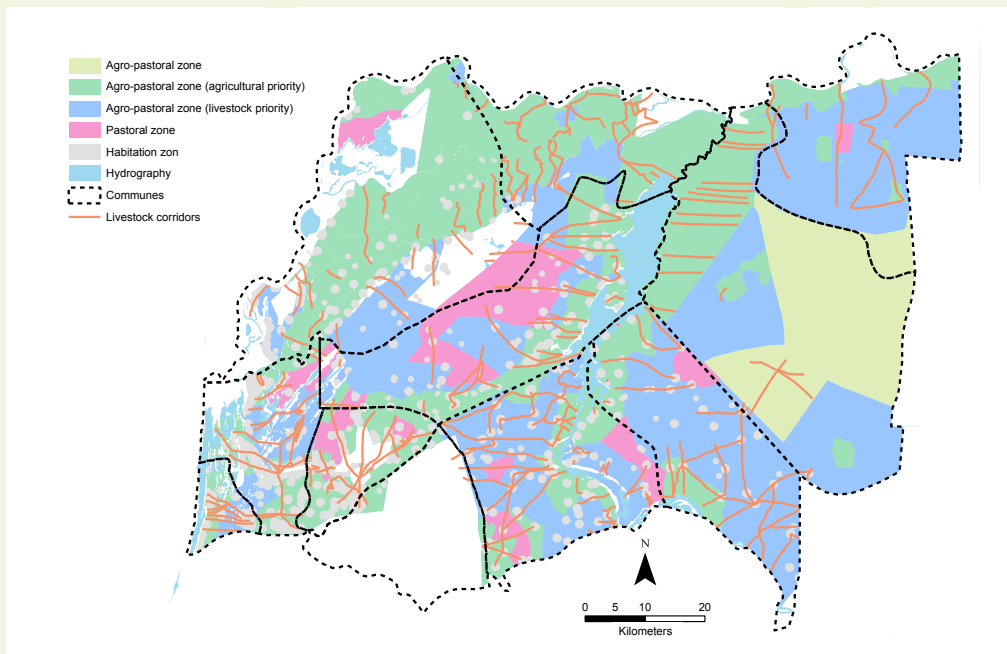
along with other innovations such as the recruitment of a land agent for the daily management of the SIF and the establishment of a land office in each commune covered.

The CDI

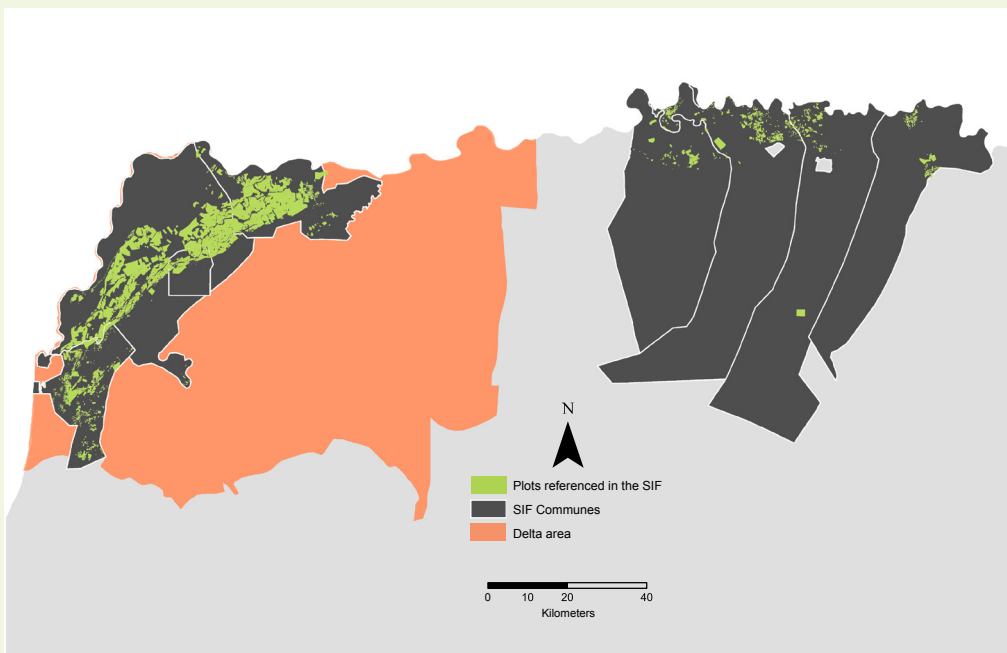
In the realm of the Senegal River Valley's irrigable lands and the law on the national domain, the CDI steps in to fill the void created by the lack of a clear definition for development as imagined by Decree No. 72-1288 (art.10). The text was elaborated in a long participative process conducted by SAED,

and the validated document was the subject of a Primatorial decree (July 25, 2007). This charter defines the contractual conditions of exploitation and development of irrigated domain lands, determining the engagements of the different parties (conditions of exploitation/development, care and maintenance of structural developments, cultural intensity, etc.), including the commune, the State, and the person or entity that receives the landuse rights.





17. Zones in the Land Use and Allocation Plan (POAS)



18. Spatial coverage in 2017 from the Land Information System (SIF)



b. Adoption and application of the planning tools

Given the expansion of irrigation and the diversification of actors and areas involved, the effectiveness and extent of the implementation of land management tools in the Delta deserve to be analyzed. Between 2017 and 2018, a study involving 158 individuals representing different decentralized services in six communes showed that the level of adoption and application of these tools has remained largely insufficient (N.B. this study was conducted in the framework of the scientific program SAED, UGB, CIRAD, and ISRA-BAME).

The POAS: a generalization with mixed effects. Among the individuals surveyed, only 50% declare that they are aware of the POAS. Considering the investments made in establishing this tool, the level of awareness is weak, especially in view of the diversity of the actors questioned. It is also worrisome to note that 78% of the actors outside of the official POAS commissions and 36% of the members of those commissions, as well as 38% of the local elected officials questioned were not aware of the tool, in spite of the fact that they are supposed to be providing support for its implementation. Indeed, one of the four sub-prefects and a land agent surveyed had no idea of the tool's existence. In those particular cases, the sub-prefect had recently been named to the post and the land agent had been recently recruited by the PDIDAS.

More than 69% of the actors who claimed to be aware of POAS had not yet had access to any of the various mediums offering the planning tool. Most of the survey's respondents who had the tool obtained it from SAED agents and the commune. Among the actors aware of the POAS, 30.4% had participated in the process of designing it, and the main reason for choosing to take part in that process was "close proximity to the village chief" (31.4% made the choice on that basis). The availability of support and monitoring for the implementation of the POAS was little known among the various actors surveyed. Only 10.8% of them knew of the existence of a network of facilitators, and only 9.5%

were aware of the POAS's Technical Application Commission (CTA). The Zoning Commission (CZ) was more visible with a recognition rate of 20.3% among the people surveyed.

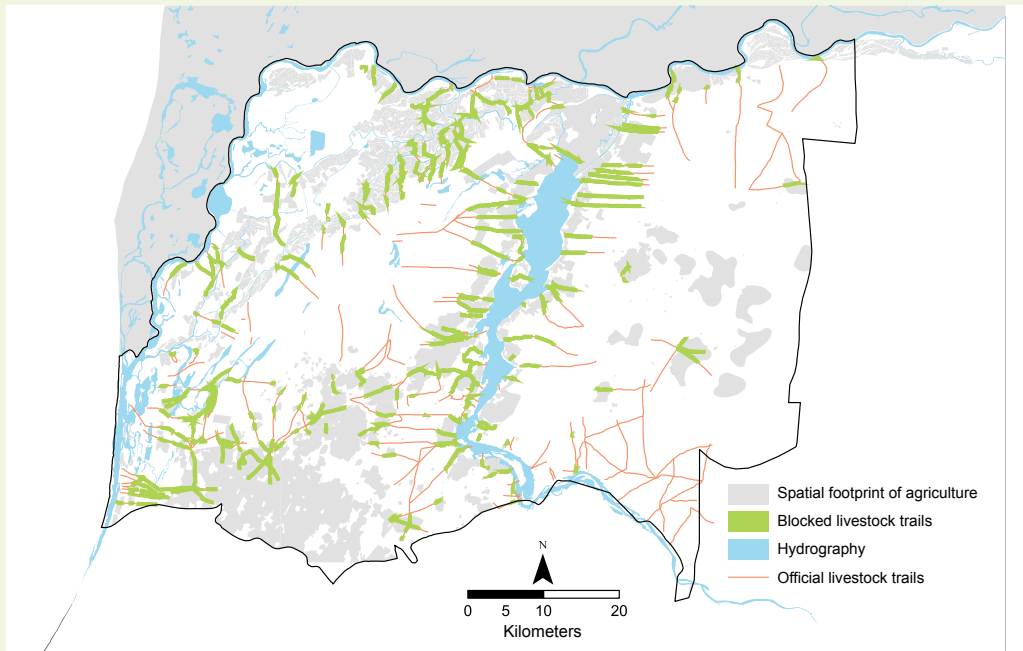
The CDI and the SIF: unpopular tools among the actors in the field. The CDI remains a tool that is rarely mobilized. Among the surveyed actors, only 16% affirm being knowledgeable about it, despite its innovative aspect of interpreting the notion of "development" set out by the Law on the National Domain as organizing the development of irrigated land and boosting production. Only 3% of the surveyed population who were not members of the CZ were aware of the CDI and only 14% of those who were CZ members. When asked if the beneficiaries of land allocation in the different communes, POAS zones, and villages had signed the CDI commitment form, none of the actors surveyed claimed to have done so, or even having heard about it.

The same situation was confirmed for the SIF, which was implemented in the framework of several development projects (PACR, MCA, and PDIDAS); the implementation tools were only known by 24.7% of the surveyed actors. At the time of the survey, the digital version of the SIF was hardly functional in several communes. According to 18.75% of the actors concerned, the main constraints on the tool's implementation came from the lack of commitment by the authorities, problems with the technical mastery, and the lack of financial resources. For 37.5% of the respondents the tool remained too dependent on the projects and did not offer guarantees of sustainability or empowerment.

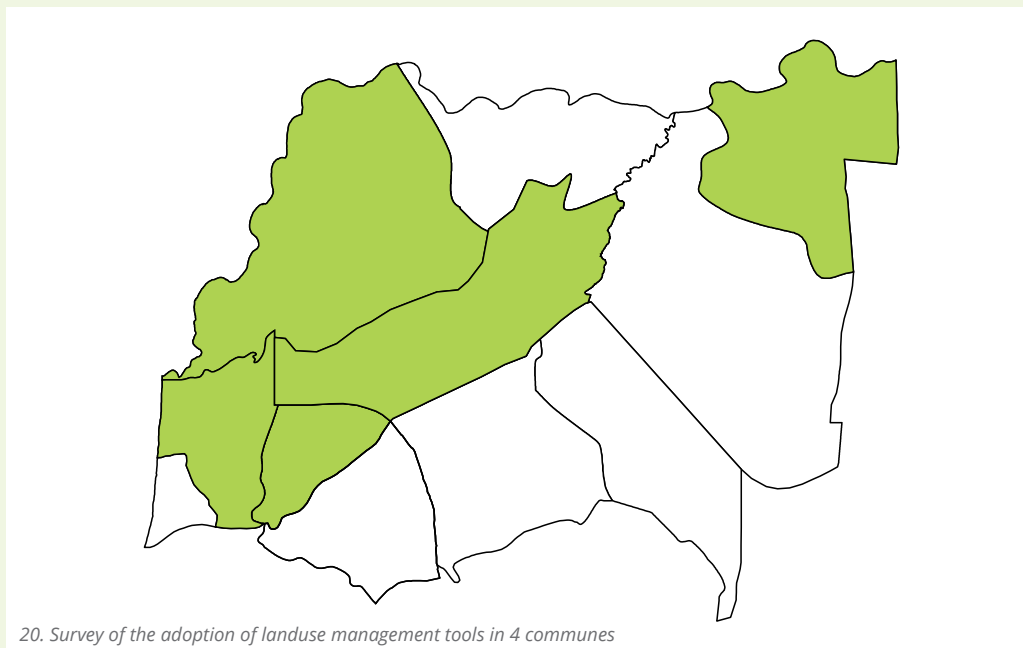
This analysis of the land management tools exposed their limited adoption by local actors despite long-term support from numerous projects that have integrated their use (PACR), have done so successfully (MCA), and have validated them (the PDIDAS even provided land offices in the communes to facilitate their application). According to the

actors surveyed, several steps need to be taken: (i) rethink (or adjust) the approach and the scales of cooperation in the development of planning and management tools; (ii) diversify the networks that disseminate and popularize landuse tools and information; (iii) improve the coordination between the numerous actors involved in landuse issues; and most importantly (iv) create monitoring bodies that are flexible, accessible, functional, and meet the needs of local communities and populations.

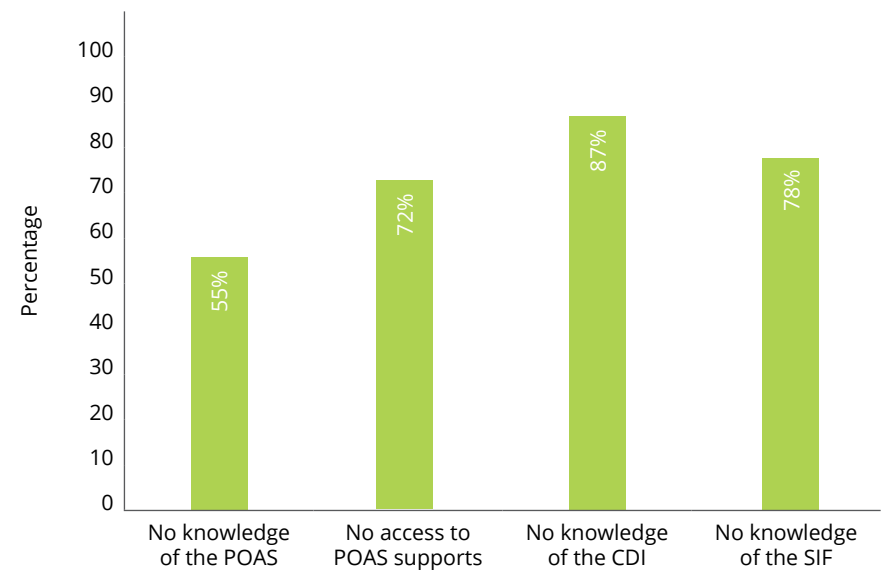
“ The level of adoption and application of these tools has remained largely insufficient. ”



19. Identification of overlapping landuse: livestock trails and cultivated space



20. Survey of the adoption of landuse management tools in 4 communes



c. Examples of the effect of ignoring planning tools, from Mbane to Dodel

Difficulties encountered in the process of designing and applying management tools (land registers, land books, etc.), ineffectiveness and a lack of means in the domain commissions charged with explaining allocation rules in the field, and the frequent failure to materialize parcels with borderline markers have all contributed to the poor traceability of Senegalese land information. The procedures governing land allocation (minimum conditions for development) were never clearly defined in the relevant decrees issued by the authorities. This left an open field for arrangements between concerned actors such as the rural producers, rural councilors, and territorial administrators (CNCR, 2004; Mbodj, 2008; Faye, 2008).

The difficulty of this situation was perfectly illustrated in the case of the Mbane commune. Before 2008, The rural council allocated more land than existed in the commune's territory (notably to political and religious actors), producing overlapping titles on the same parcels, and reallocating parcels of private (leased) or State controlled land. These problems were the result of a series of land allocations executed in an uncontrolled and incoherent fashion—without control of the space managed by the commune—leading to an institutional deadlock within the rural council. The situation was partly encouraged by certain programs initiated by the Senegalese State beginning in 2006, mainly, the Great Agricultural Offensive for Food and Abundance (GOANA). In the framework of GOANA, the President of Senegal sent out a 2008 circular that encouraged each rural community to make

1,000 hectares available for the program. In an application of the circular, the minister in charge of decentralization invited the rural communities to “accelerate the procedure of allocating land to all the Senegalese who would be applying.” These circumstances led to frequent departures from the rules at the level of local communities.

Apart from the implementation problems, the conditions for allocating land that limited access to members of the local community appeared to be anachronistic with respect to the evolution in rural production systems and also to the government's orientation toward agricultural development based on the promotion of private investment.

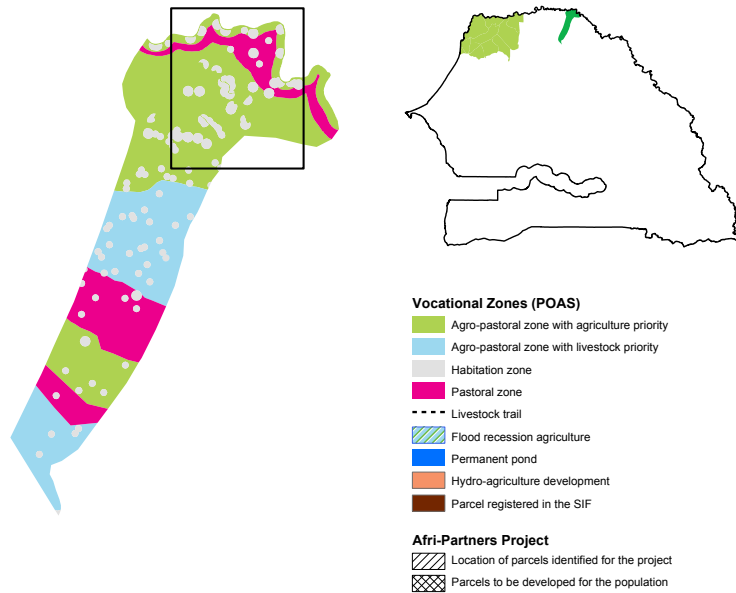
A lack of mobilization and adoption of available tools can also lead to territorial conflicts and have impacts at an international scale. One of the most emblematic cases close to the area of our study concerns the Dodel and Demette communes (Podor department). In 2017, a decree allocated 10,000 hectares straddling the two communes to a Moroccan group for a rice project. The land allocation followed the signing in Dakar of an agreement between the Moroccan corporation and the mayors of the two communes for the sum of 2 billion CFA francs (approximately 3,050,000 Euros). In return, the municipalities made 10,000 hectares available for the realization of an agro-industrial project for a period of 40 years. Subsequently, the local communities, with support from civil society organizations, organized a large mobilization of citizens and political advocacy at all levels of power. They

argued that the project was superimposed on land where existing activities supported nearly 36,000 people in the agriculture, livestock, and fishing sectors. As can be seen in the following maps, the spaces delineated for the project did not respect the zones identified by the POAS as dedicated to pastoral activities and prevented access to pastoral resources (permanent water sources, livestock corridors, etc.)

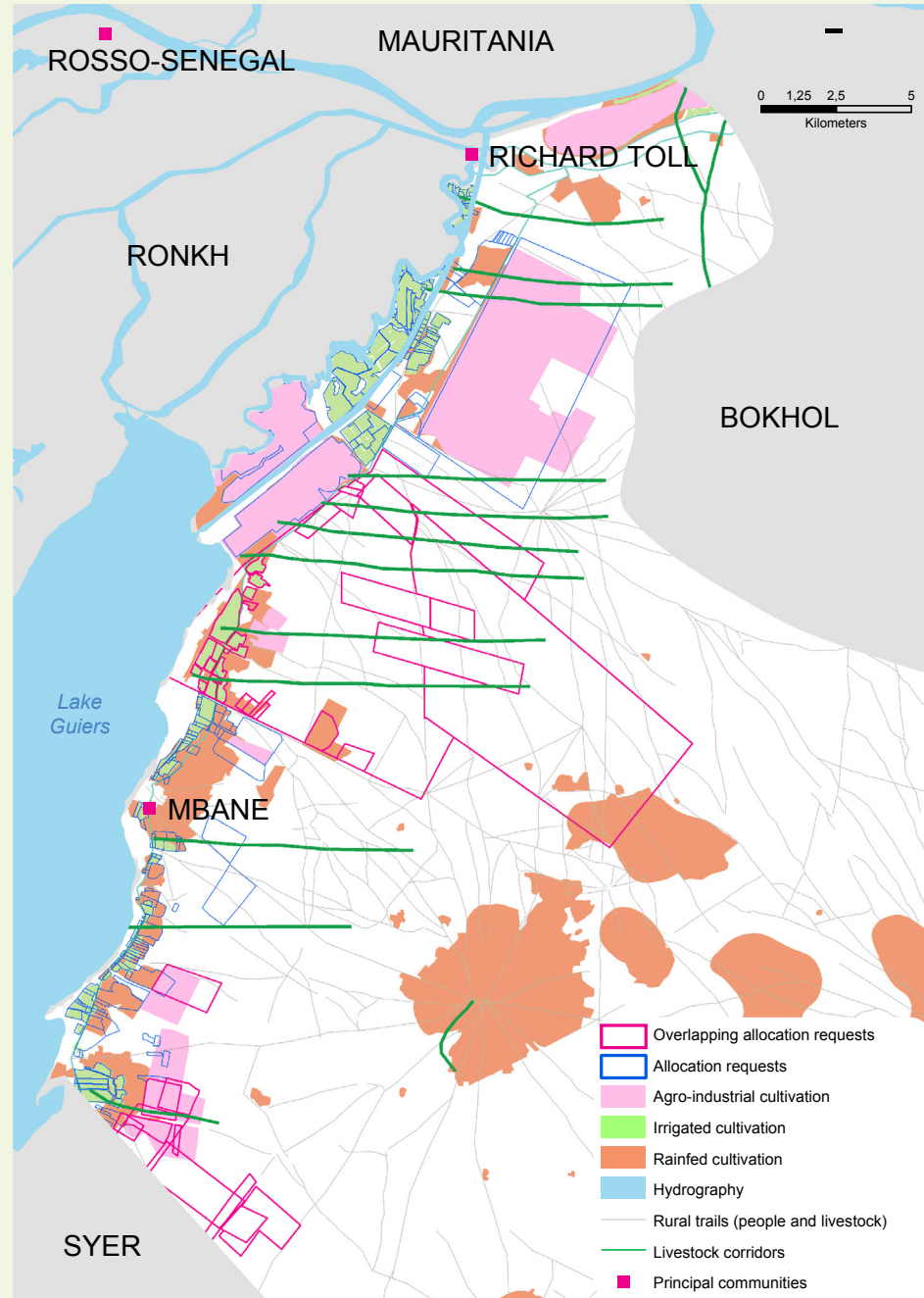
Facing a strong civil mobilization and an appeal for annulment filed with the Senegalese Supreme Court, President Macky Sall decided in 2018 to cancel the lease contract between the government and the company concerned.

Beyond specific incidents, the question arises: what is the administrative role of public structures and establishments that work in and support communities in a peaceful planning process that includes participation and cooperation. During the landuse conflict between the private Moroccan investors' project and the local population, the SAED was simultaneously engaged in the Irrigated Agriculture and Economic Development Project (AIDEP). The magnitude of the agro-industrial projects' local development should have been enough to reposition or redefine it. With proper coordination of government actions and initiatives, the potential overlap of landuse projects should be recognized and dealt with in advance. This issue brings back the question of territorial management, the tangible effects of policy orientations, and the choice of rural and agricultural development models.

“ A lack of mobilization and adoption of available tools can also lead to territorial conflicts and have impacts at an international scale. ”



21. Example of the Dodel commune in the Senegal River Valley



22. Example of the Mbane commune

Information on agro-industries can be found on <https://landmatrix.org/observatory/senegal/>

**RE-EXAMINING
THE MULTI-
FUNCTIONALITY
OF SPACES IN
TERRITORIAL
DEVELOPMENT**



a. Repositioning livestock farming in the territorial complexity

The evolution of the agricultural context and its continuing expansion have brought changes in the living conditions for other territorial actors, particularly those with pastoral livelihoods. Livestock farmers have evolved toward more sedentary practices, drawn to better access to basic socio-economic infrastructures (markets, schools, health services, etc.) and employment opportunities (farm workers, herders). They have also suffered from significant constraints on access to water resources and pasturage. This continues to be the case with the gradual investment and installation of agro-industrial actors in the remaining open spaces situated between irrigated areas. Even though livestock movements are still largely present in the region's activities, their viability is far from assured by the planning, land security, and decision-making tools which remain poorly adopted by municipal councils (Diop et al., 2016). Imprecision in the recognition of livestock farming as a form of land and resource development may have colored the discourse on the availability of land, favoring the development of agrobusiness.

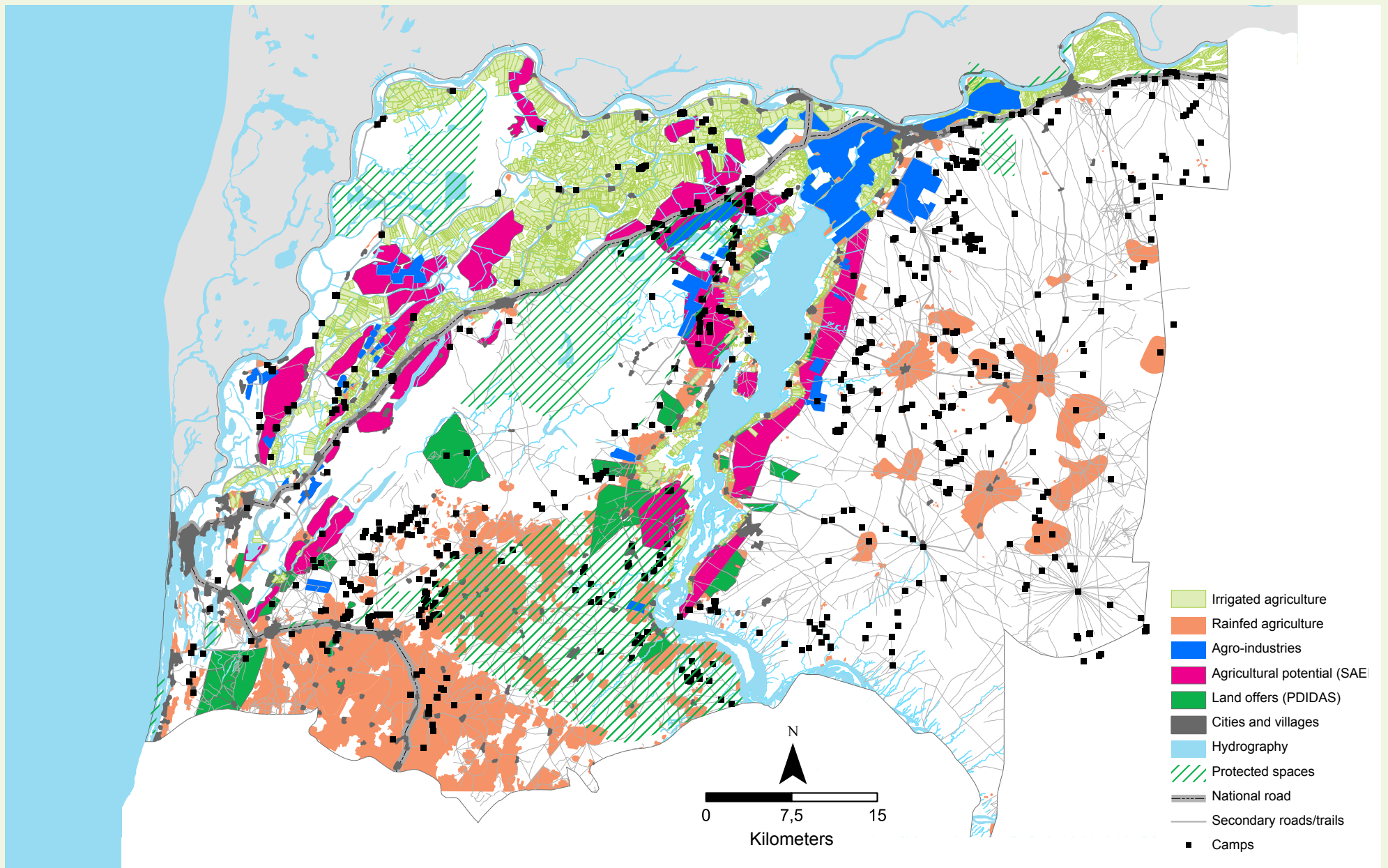
This discourse is linked to a certain vision of agricultural progress and the political positions that favor a productivist orientation through the conversion of so-called "available" land into "valuable" land (Exner et al., 2015). However, history has shown that the pressure exercised on communities by social and spatial exclusion hardly guarantee social peace (Bukari and Keusaana, 2018; Nwankwo, 2020). In effect, Benjaminsen and BA (2018) demonstrated that the expansion of the armed insurrection in Mali had a direct correlation with the loss of pasturage and blocked livestock corridors that were the consequence of national and international development policies and programs. The resulting marginalization fueled a pastoral resistance movement that saw the presence of jihadist groups as an opportunity to apply leverage in power relationships, ultimately leading to the insurrection. In our area of study, the analysis of territorial dynamics by Bourgoin et al., (2019) showed that agro-industrial development will continue to impose its footprint on the territory in zones already designated as "available for investment." The following map shows that the future investments are mainly planned

for dry agro-pastoral zones, which could have an additional impact on livestock movement through pastoral resources. The progression of irrigated agriculture in pastoral areas will continue to affect livestock farming, pushing pastoral activities toward more sedentary forms. As Shettima and Tar (2008:163) describe it, the conflict between farmers and pastoralists is profoundly rooted in the history, ecology, and political economy of the region. The combination of a lack of consideration for livestock farming and the development of capitalistic agriculture can only exacerbate the conflicts between farmers and pastoralists in the Senegal River Delta (Benegiamo, 2020).

Territorial development tools and procedures have followed the political choice and vision for agricultural and rural development, but it is urgent that the tools of land governance take account of territorial complexity to ensure more fairness, equality, peace, and social justice.

“ Imprecision in the recognition of livestock farming as a form of land and resource development may have colored the discourse on the availability of land, favoring the development of agrobusiness. ”





23. Current representation of a multifunctional space
 Information on the agro-industries can be found on <https://landmatrix.org/observatory/senegal/>

b. Planning tools for approaches to territorial development

Territorial planning intended to balance power relationships and guarantee peace and social justice must go beyond a vision of development that is dominated by productivist, sectorial, and “techno-solutionist” perspectives. The first challenge will be to recognize the diversity of interactions between the domains of activities, people, and resources (Suttie and Hussein, 2016). Outside of the rhetoric and good principles, numerous approaches to development lack negotiation and planning processes that are inclusive, participative, and seek the construction of compromise between the development objectives (Sayer et al., 2013). Instead of concentrating on results, we advocate for initiatives that favor processes in which actions are based on facilitating dialogue. The first and fundamental step would be to reclassify development discourses on the basis of a clear and precise evaluation of socio-ecological interactions and existing mechanisms for governance at the territorial level (Nassauer and Opdam, 2008). A second step would entail questioning the current mechanisms of inequality and addressing the asymmetries of power, information, and influence (Reed et al., 2017).

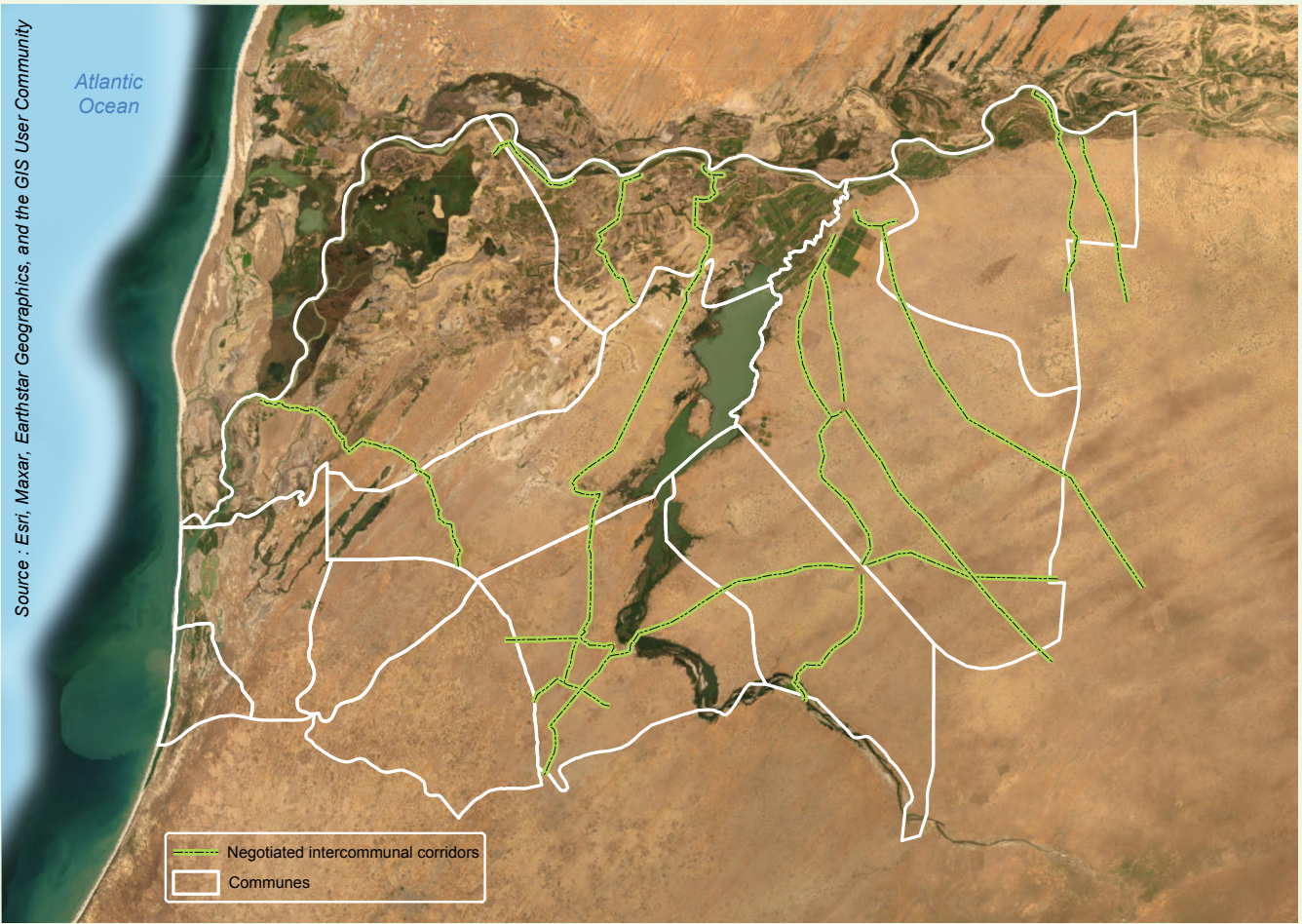
Pragmatic changes, both technical and organizational, should be made to secure the mobility of livestock. The ability to plan future activities and investments could be reinforced by providing communal land managers with access to reliable and dynamic geo-spatial information on landuse. Contrary to previous and current land management projects, this would improve the transparency of land transactions and reinforce the land investors’ responsibility toward the community. Our proposal is consistent with the initial logics of the POAS. At the same time, the lack of adoption of these tools at the local level (Diop et al., 2016) suggests the need to reconsider the way they are implemented and to reinforce the process of updating them beyond the occasional contributions from projects. For example, the ambition of an activity of the project, BRACED X (2017-2018) was to update the maps of livestock corridors and strengthen their institutionalization in order to help safeguard livestock

mobility. The project, which was sponsored by Enda Pronat and the ISRA, partnered with the area’s community groups and local peasant organizations in an effort to co-design the methods for securing livestock trails, corridors, and pastures at an inter-communal scale (Sow, 2018). Their results can be seen in the following maps.

Beyond the socio-technical solutions and promises (Briday, 2019; Joly, 2015), the innovative proposals of data and mapping should be accompanied by changes in organizational structure. This would involve cooperation between local authorities, the decentralized State services, and new external services that do not yet exist but would add important support outside of the partisan and political logics that are not always aligned with the common good. The first steps in this direction were taken with the PDIDAS project and the support of land agents based locally in the study area. Future research should be concentrated on the analysis of their role in supporting inter-sectoral planning for landuse. Because of their current insecure status based on projects that have functional links with the Directorate of Taxes and Domains and the land register in each region, we propose that these land agents be integrated into the official decentralized land administration. Although the POAS suffers sometimes from the weakness of their legal anchoring, it is the subject of deliberation in the municipal council, and its status as a local convention is clearly recognized in several texts, notably the new Forest Code. Therefore, we believe that the system of dynamic land information handled by the land agents is rooted in a solid legal basis. This legal legitimacy will have to be accompanied by a change in orientation and real appropriation to avoid being mired in a techno-optimistic logic. We do not mean to propose a replacement of one tool by another, and we do not seek to reify the socio-technical promise. We do, however, think that these tools can play the role of an intermediary object to mobilize territorial actors around a coordinated plan. For example, since the POAS is understood at the communal level, we propose that the SAED play the role of facilitator for intercommunal land

“ Beyond the socio-technical solutions and promises, the innovative proposals of data and mapping should be accompanied by changes in organizational structure. ”

development and exchanges in the Senegal River Valley. This change in scale would allow the SAED to promote integrated territorial development with a strategic view on the interconnections between different sectors and types of landuse. We believe that the SAED will play an important role in the reinforcement of the participating parties’ ability to (i) handle the updating of a territorial diagnosis, (ii) acquire a more comprehensive understanding of landuse dynamics, and (iii) reinforce the appropriation and mobilization of the approach. We propose that the production of a reliable, shared diagnosis of the territorial dynamics accompanied by public debates on land governance can lead to a more efficient and inclusive construction of development policies at a communal scale.



24. Delineation of livestock corridors by Enda Pronat and the PPZS in the framework of the BRACED project (Acting for Life)



c. Testing a geographic information system on land use in the commune of Diama

Between 2017 and 2019, an experiment testing the “low-tech” compiling of cartographic data was conducted at the commune level in Diama. The objective was to devise a collaborative geographical information system on landuse that would make it possible to develop the collection of existing data that was seldom shared between territorial communes, decentralized services (SAED), and research centers (UGB, ISRA, CIRAD). The experiment was expected to enable commune managers to evaluate the commune’s landuse potential, assess the past dynamics of landuse, and identify spaces for future development. The established database integrated information from GéoSénégal, the national infrastructure of geographical data management that provides current data for the toponomy (villages, urban borders), the road network, and areas of rainfed agriculture. The SAED furnished the layers of protected spaces, irrigated parcels (database of the Geographical Information System’s statistic and geomatic division), and parcels already named in the SIF SAED database. The layer of trails was digitally updated manually using Google Earth and the identification of camps and agro-industries was done by surveys in the field. We also added information from the large development projects, both past (PDMAS, MCA) and current (PDIDAS, 3PRD).

The amassed collection of geographical data makes it possible

to highlight future structuring dynamics. Despite the fact that very few spaces are unexploited in the Diama commune, this part of the Senegal River Delta remains attractive, and certain zones of concern appear when cross-referencing the sources of information. For example, we were able to identify an Indian proposal for investment in the Diama commune on 6,063 hectares, of which 76,25% were already occupied.

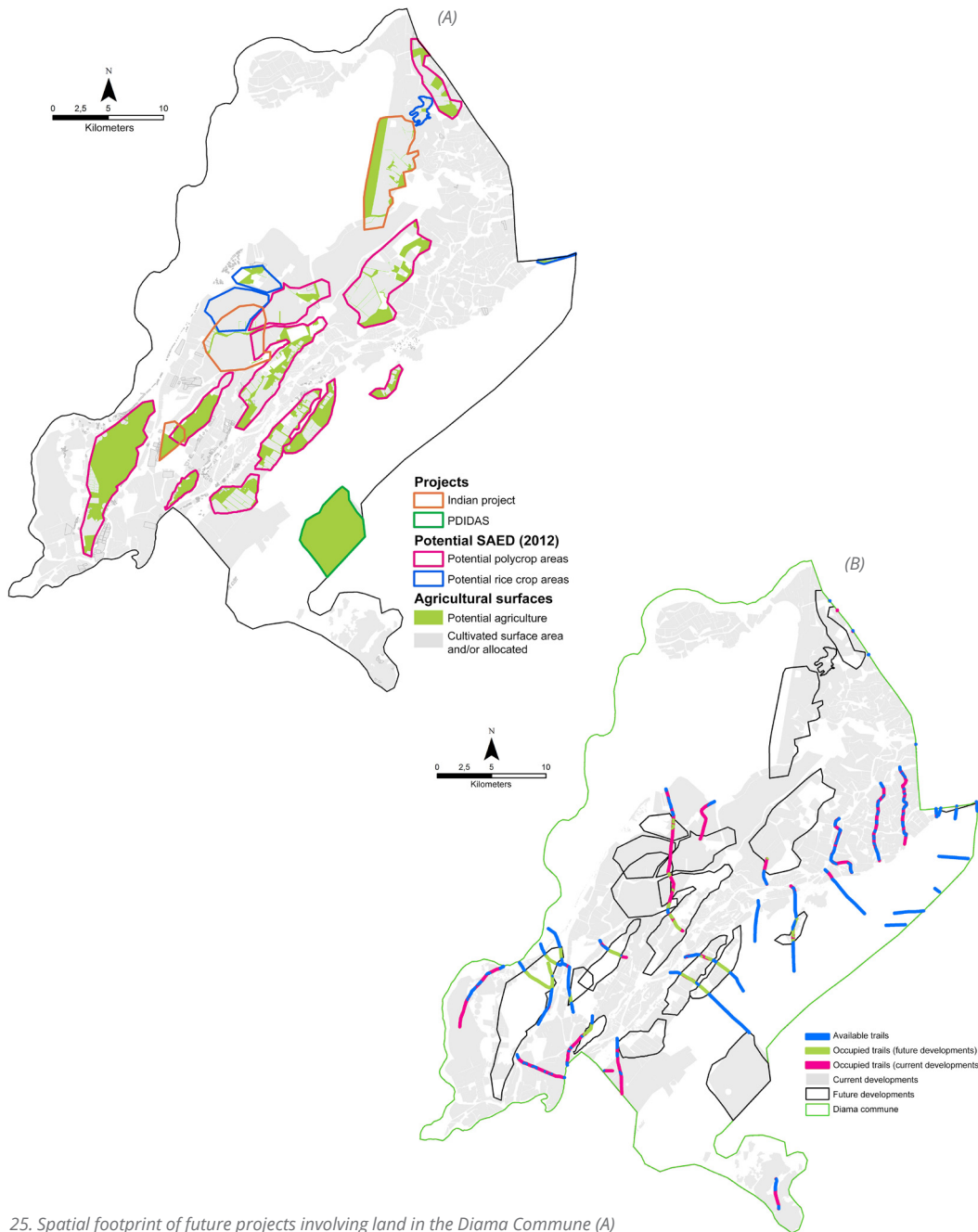
In 2012, the SAED produced a map of potential land development in the Senegal River Valley and identified, in Diama, a potential 2,504.7 hectares for rice cultivation and 17,107.5 hectares for mixed crops. From these estimations, the analysis of the evolution in the Diama commune shows a remaining potential of only 9.4% for rice cultivation and only 45.7% of the potential for mixed crops. The expansion of irrigated agriculture into pastoral livestock areas is illustrated by the PDIDAS project whose objective was to promote growth and employment by adding 10,000 hectares of private investments in agricultural production.

The expansion of irrigated agriculture over the last 50 years combined with increasing demographics and growth in rainfed agriculture mean that pastoral space, historically dependent on this Sahelian area imbued with water and

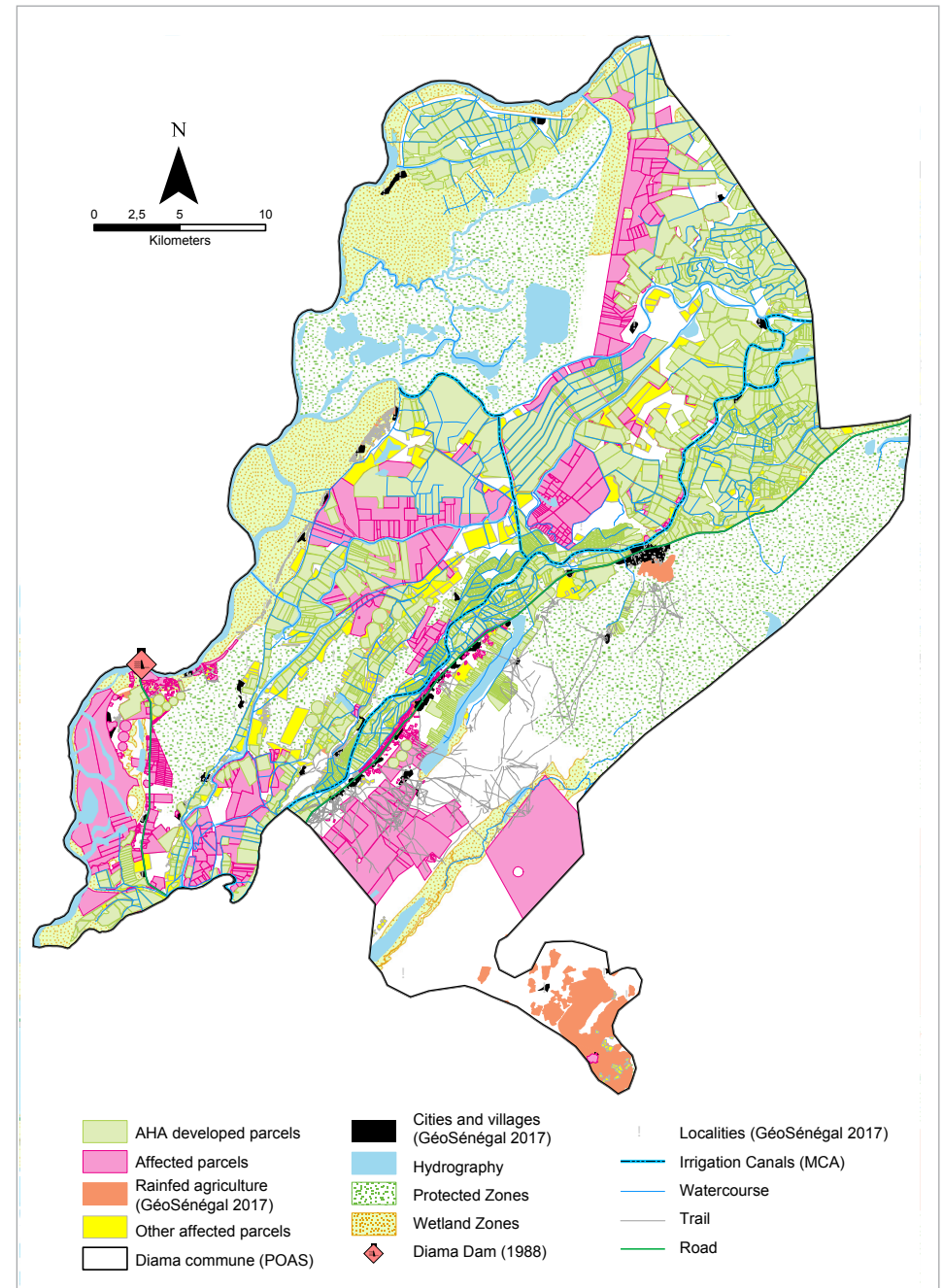
pasturage, has diminished despite the existence of protected zones (POAS). At the time of our study, we discovered that rainfed and irrigated agriculture blocked 41% of the pastoral trails, with obstructions particularly concentrated in areas boasting significant water resources. If the future developments identified by the SAED are carried out, more than 56% of the land used by these trails will be blocked by agricultural installations.

Like observations at the larger scale of the Delta and Lake Guiers, the Diama commune also illustrates the increasing loss of space available for the herd movement. This situation requires pastoral herders to take new trails, less diversified, and again susceptible to encroach on agricultural activities. Will the reorganization of landuse and the actors involved lead to an increase in conflicts? Beyond agricultural potential, a more global question arises, that of the future of the ensemble of agricultural practices. In order to improve their ability to plan future activities, particularly investments, it is evident that land managers at the municipal level need access to reliable and up-to-date geospatial information on land dynamics.

“ The production of reliable and shared diagnoses must accompany the public reflection on the governance of multiple issues. ”



25. Spatial footprint of future projects involving land in the Diama Commune (A) and their impact on livestock corridors (B)



26. Example of a geographical information system revealing the land area of the Diama commune. Information on agro-industries can be found on <https://landmatrix.org/observatory/senegal/>

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ATLAS OF A TERRITORY IN TRANSITION

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