

Dichotomous Delta: Between the Natural and the Metropolitan: The Case of the Parana Delta, Argentina

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The Parana Delta remains within the wild condition of its islands and the growing urbanization of its edges. These contrasts intensified in the Lower Delta due to the proximity to Buenos Aires Metropolitan Area, the major conurbation of the country. As in other Latin American cities, the metropolitan expansion of Buenos Aires was characterized by an acceleration of the economic and territorial processes leading to spaces of instability and increasing the historical socio-spatial polarization. In contrast to years of low intervention of the State and legal voids at the metropolitan level, private capital has shaped the territory overwhelming any local capacity of regulation and impacting the environment in a negative way. The result was an increase in social and spatial segregation together with an unsustainable use of the land and an unplanned advance over the delta. In this paper, the dichotomies within this case will be presented in order to transcend a mere ecological-demographic perspective of the metropolitan growth in relation to the natural environment. Finally, a discussion will be set to analyse the possibilities of spatial planning strategies as an integral approach to the management of the system taking into account the specificities of the context.

The Parana Delta (figure 1) is a large territory which struggles with conflicting conditions along its 320 km related to the nature of its landscapes and to the patterns of occupation. Several cities are located on the edges of the delta, which are not considered *part of the delta* from a geographical point of view. This restricted view is reflected in the legislation,¹ so the natural processes under their spatial delimitations are not considered related to the dynamics of urbanization that take place on the coasts. In the Lower Delta, especially in the *Delta Front*, the contrasts increase due to the proximity to Buenos Aires Metropolitan Area, the most important conurbation in Argentina. Although it is true that the main dichotomy of this delta is related to the

coexistence of natural and urban processes, the conflicts go further than that.

In this article, the natural conditions of the delta are described together with an analysis of the processes of occupation of the space, principally in the area of the Delta Front (Municipalities of Tigre and San Fernando), which is already considered part of the metropolitan area (figure 2). These contrasting conditions provide the background for a discussion of integrated planning as a tool to understand the management of the conflicts the delta faces. This is a special case and the management system must respond with a more integrated notion of the delta in relation to the cities and the development processes that are taking place around them.

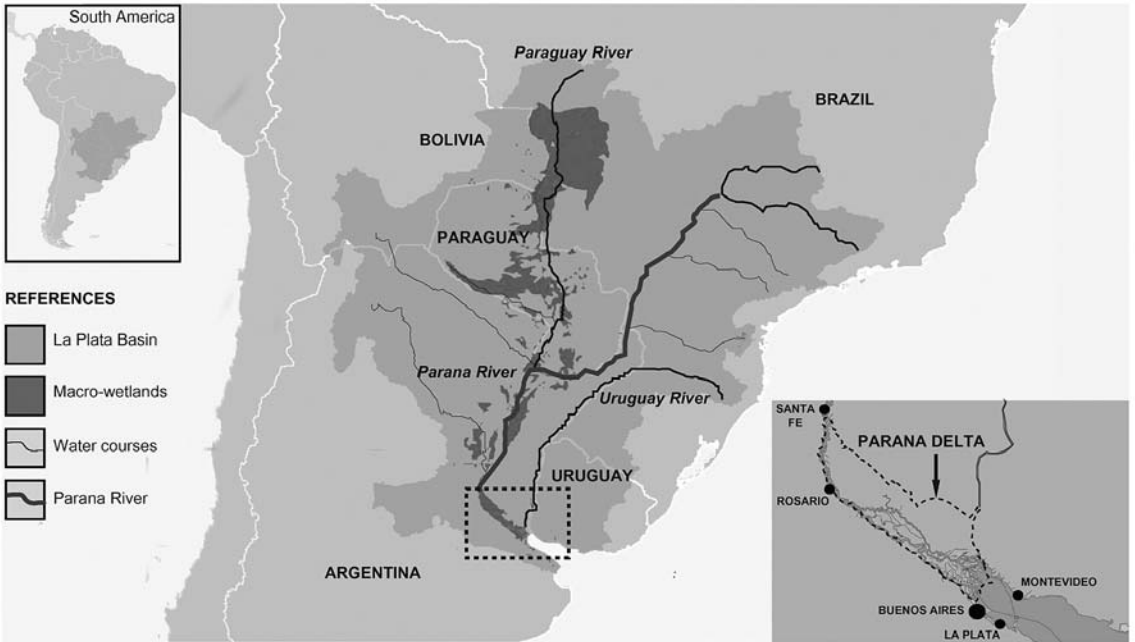


Figure 1. Geographical location of Parana Delta. (Source: Elaborated from the basis of Kandus and Minotti (2010), PIECAS-DP (2008) and Google Earth)

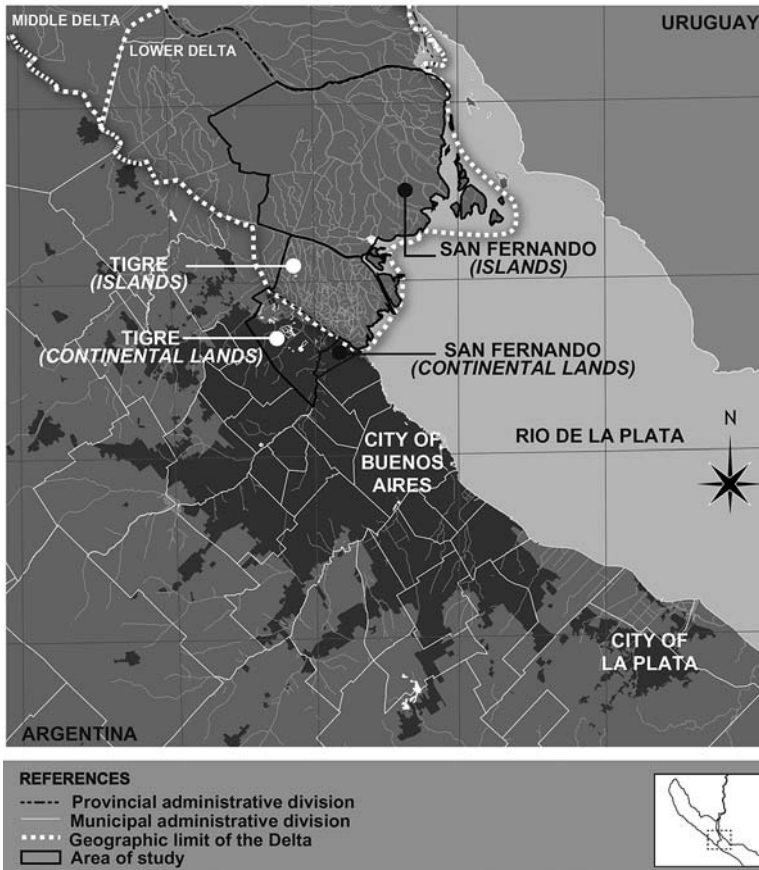


Figure 2. Area of Study.

The Natural Delta

Geophysical Development of the Delta

The Parana River is the third largest river in the American continent after the Mississippi in the United States and the Amazonas in Brazil. It runs through Brazil, Paraguay and Argentina, where it flows into the Rio de la Plata, a wide estuary with a maximum width of 230 km. The length of the Parana is 2,570 km and its basin surface is around 1.5 million km² (CIC). The funnel-shaped transition between the Parana River and the estuary of the Rio de la Plata is the Parana Delta, one of the largest coastal wetlands systems in Argentina, covering a surface area of 15,000 km² (Silva Busso *et al.*, 2004). It is a young area dealing with erosion and sedimentation processes, influenced mostly by freshwater tides and southeast winds (also called *Sudestadas*). The subaerial width of the Delta presents varies between 18 km and 100 km (Pittau *et al.*, 2004), while the subaqua area of the delta overlaps with Rio de la Plata's riverbed.

On the one hand, the classic definition of delta is associated with the processes of accumulation of sediments related in time and space to the river which transports them. On the other hand, the concept of estuary refers to the freshwater–seawater interface rather than the sedimentation processes. In this case, both units maintain their specific conditions but interact within a complex estuarine delta system (Parker and Marcolini, 1992) which creates special conditions for the creation of cities.

From a geological point of view, the edges of the delta are ancient lands, while the delta itself is a young territory formed over time by the accumulation of sediments coming from Parana's tributaries (mostly from the Bermejo river), which are transported by the Parana river and deposited on the coasts under the influence of the Uruguay river's currents. As the sediment transportation rate of the Parana River is high (1.6 million tons per year, see Pittau *et al.*, 2004), the area

has been characterized by a rapid territorial growth over the years, especially in the Delta front, where the islands of the municipalities of Tigre and San Fernando are located. In fact, during the period 1750–2010, the delta has increased its surface by an average of 617 km²/year (Medina and Codignotto, 2011) and in spite of a slight decrease of the rate during recent decades, the delta front will continue advancing and is expected to reach Buenos Aires city's coast in about 110 years (Sarubbi and Menendez, 2007). This phenomenon will change the entire territory due to the alteration of the relations between the cities – and their existing coasts – with the river, and also due to the generation of a new waterfront (figure 3).

Ecological Factors

In addressing the ecological relevance of the system it is necessary to understand the

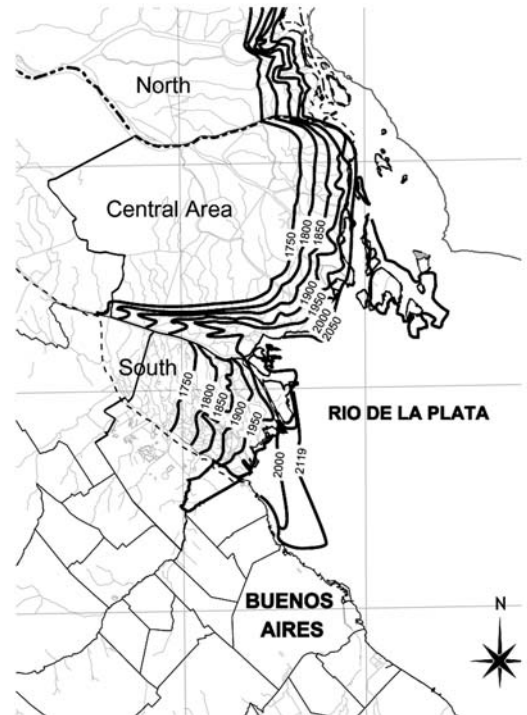


Figure 3. Advance of the Delta Front due to the sedimentation processes. (Source: Elaborated from the basis of Sarubbi (2007) and Pittau *et al.* (2004))

dynamics that take place within it, related to the concepts of delta, wetland and estuary.

The system as a delta: according to Wright (1985), deltas are coastal accumulations shaped by interacting fluvial and marine forces. The main issue is about the regime of the river that transports sediments, the coastal processes that take place in the river mouth and climate factors (Morgan, 1970). The formation of deltas is related to the capacity of the rivers to deposit sediments faster than they can be removed by the receptor's quiet waters regimes (Kandus and Malvárez, 2002).

The system as a wetland: wetlands are permanently flooded systems or soils that are saturated with water during long periods (Mitsch and Gosselink, 1993). The water usually comes from different sources such as sea, rivers, rains or groundwater, and their hydrological regime is diverse (Kandus and Malvárez, 2002).

The system as an estuary: an estuary is coastal water partially confined that presents a free connection with open sea, being the seawater diluted by fresh water. Parker and Marcolini (1992) consider that it is possible to restrict the term estuary to the study of the dynamics between both types of water.

The Lower Parana Delta is important for groundwater replenishment and flood control: 0.4 hectares of wetland can store 6000 m³ of floodwater without needing engineered structures (Davis, 1993). The biodiversity held in the area helps to retain nutrients and sediments, purify water by removing nitrogen, phosphorous and other chemicals and retain carbon dioxide. It also contributes to shoreline stabilization, protecting the land from storms surges, winds, waves and other climatic events. The Lower Delta absorbs the variations of Parana's river flow (coming from the north), and also protects the Lower Delta's lands from the *Sudestadas*. The strong

winds usually have severe consequences causing floods due to the increase in the Rio de la Plata water level, the loss of the delta's buffer capacity and the blockage of the cities' drainage systems. Furthermore, the delta is a suitable environment for the production of food, energy, construction materials, oil, and other products. It is also a key-factor for the development of tourism and recreation, especially in the Lower Delta, where the activities have a high impact on the area's economy. Finally, the delta also represents a robust cultural, historic and artistic identity which has been maintained over the years and needs to be perpetuated in the future. In other words, the delta not only provides services for communities to settle and develop economically, but also regulates the natural dynamics of the system and represents a high value in terms of cultural identity.

The Metropolitan Delta

Along the waterfront of the Parana Delta there is a network of cities with different scales of importance as well as diverse specializations. From ports to industrial poles or recreation, all the cities impact the delta in different ways. At a metropolitan level, four urban agglomerations can be distinguished: Buenos Aires Metropolitan Area – the largest conurbation of the country, with a population of around 13 million inhabitants; Gran Rosario Metropolitan Area – the third largest urbanized area in the country, with more than 1.2 million inhabitants; La Plata city – capital of the Province of Buenos Aires, with a population of 0.7 million inhabitants; and Santa Fe – capital of the homonymous Province, with almost 0.5 million inhabitants. The regional importance of the delta is related to its strategic location, along the most important economic corridor of the country, which is also part of the commercial route connecting Santiago de Chile (Chile) and Sao Paulo (Brazil) under the Mercosur economic agreement. The Lower Delta is mainly influenced

by the Buenos Aires Metropolitan Area due to increasing urbanization. The municipalities of Vicente Lopez, San Isidro, San Fernando, Tigre and Escobar, located in the area, are already considered part of the Metropolitan Area (INDEC) and pressurized both because of their coastal land and metropolitan expansion.

The Buenos Aires Metropolitan Area is home to 31 per cent of the Argentine population and provides 53 per cent of the GDP (Gross Domestic Product), but covers less the 0.15 per cent of the total area of the country (Atlas Ambiental de Buenos Aires, 2010). While agricultural activities are relevant, the importance of the region is also linked to industry and services encouraged by the proximity to Buenos Aires city and to the ports of Parana River and Rio de la Plata. From the beginning, the metropolitan area of Buenos Aires grew from the centre of the city to the periphery along the railways. Since

1940s, due to industrialization, new centralities appeared offering commercial spaces, banks, and health and education services, relatively close to the city centre – from 5 to 20 km (Ciccolella, 2002).

In the last quarter of the twentieth century, the area was influenced by a new model of urban growth characterized by spatial dispersion and also global integration, leading to a social, economic and urban restructuring (Ciccolella *et al.*, 2006). During the 1990s, economic liberalization led to the expansion of new centralities further away from the city centre, establishing a complex network and creating new spatial relations along highways. The urban sprawl grew considerably in what Ciccolella (2002) calls a 'Transition of the Urbanization Process' (TPU), a process that generates new territorial formations resulting from changes in the spatial and temporal conditions of production, circulation and consumption (Zagare, 2012) (figure 4).

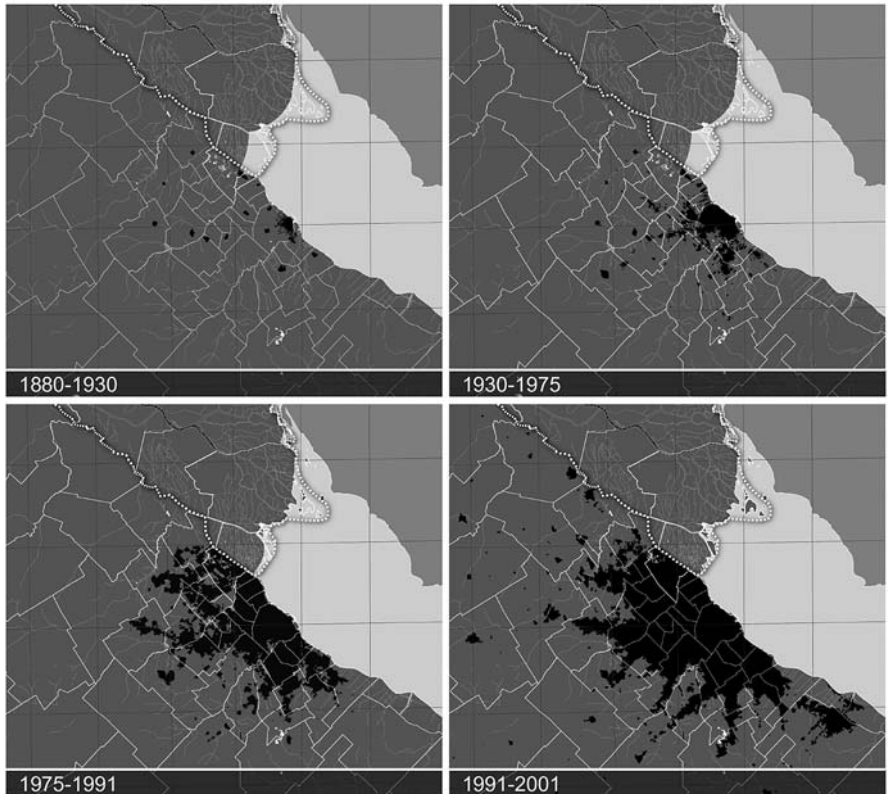


Figure 4. Growth of Buenos Aires Metropolitan Area. (Source: Elaborated from the basis of: Vapñarsky (2000))

The political and economic context of 1990s was characterized by structural changes such as State reform, economic deregulation, decrease of the inflation rate and monetary stabilization (*convertibility*), privatization of public services, construction of mobility infrastructure and new urban laws (Ciccolella, 2002; Ciccolella *et al.*, 2006; AABA, 2010). In light of this scenario, the withdrawal of the role of the State encouraged Foreign Direct Inversions (FDI) to finance and shape the morphology of the urban growth, leading to a new configuration in the expansion pattern. Large plots were appropriated by private brokers near the river, especially in the lower part of the delta, which encouraged the development of private gated communities (neighbourhoods with a closed peri-

meter, isolated from the rest of the urban fabric). Focused on the upper-middle and higher income groups, the success of these developments produced an exodus of population from the city of Buenos Aires. The number of private urbanizations increased from 100 to 350 in the period 1995–2000 and today it is more than 400. According to Ciccolella (2002) and Cohen (2007), the area occupied by private urbanizations is nearly 500 km² (larger than Buenos Aires city).

In 2001, due to the breaking of *convertibility*, a national political and socio-economic crisis occurred. Some of the effects were increases in the unemployment rate and of informal settlements (usually called *villas* and *asentamientos*), which are land without infrastructure or services illegally occupied by the

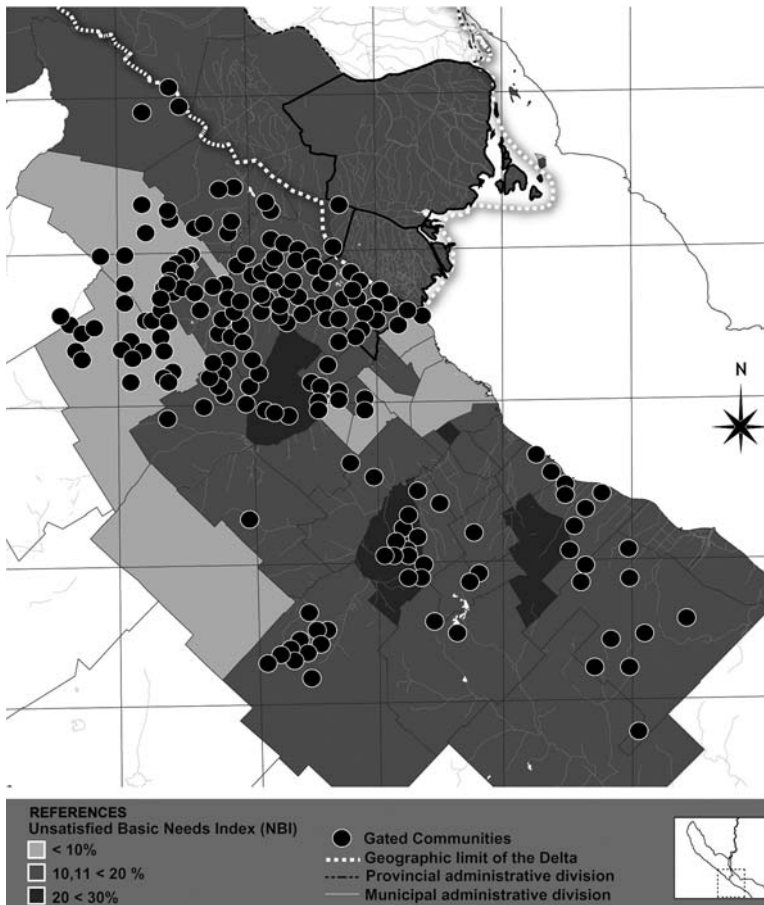


Figure 5. Contrast between the location of gated communities and the Municipalities with more unsatisfied needs (indicative of poverty). (Source: Ciccolella *et al.* (2006))

lower social groups to fulfil the demand for residential space. It is estimated that from the period of 2001–2005, 60 per cent of the new inhabitants settled informally, forced to do so by the economic crisis (Cravino *et al.*, 2009). The result was a polarized scenario full of social inequities: exclusive gated communities and informal settlements located on lands sensitive to flooding. The incorporation of new residential typologies on the edges of the delta without any background planning entails problems related to insecurity and social segregation, among other issues (figure 5).

The Process of Occupation of the Islands

The settlement process on the Delta's islands differed from the continental area. Historically, before the colonization, aboriginal communities inhabited the delta. After the arrival of the Spanish, the islands were occupied by foreign travellers who cultivated fruit and logged the forest (Galafassi, 1996; Sierra, 1967). The unplanned settlements were precarious, dispersed and inaccessible due to the lack of infrastructure. The possession and distribution of the land was not regulated by the State and at first, it was considered a non-productive natural beauty. In 1856, a decree granted land to the Municipalities of Tigre (originally called 'Las Conchas'), San Fernando and others to exploit and cultivate it. In 1888 Law No. 2072, *Ley de Islas*, was enacted; this focused on the measurement and distribution of Parana Delta land, establishing procedures to sell it. Accordingly, 55 per cent of the land was transferred to private domain (Galafassi, 1996).

After that, without any clear planning strategy, in 1934 the Law No. 4207 allowed the sale of coastal land with access to navigable waterways to private investors who shaped the delta and privatized the access to some areas of the coast. In this decade, the islands of the entire delta had a population of some 40,000, which was the highest in the history of the area, and the productive system was based on small-scale production units

(family economy) of less than 50 hectares. After that period, and due to the appearance of other places to cultivate fruit around the country, the area lost competitively and also population. From the 1950s, the small size of fruit productive units remained unprofitable and in order to be worthwhile they had to increase to three times their average size to reach at least 150 hectares. Consequently, the productive system had to focus on forestry but this change implied new typologies of producers, new types of technologies and different working processes.

The new actors involved in the delta were large companies or wealthy entrepreneurs who bought the plots from the past owners, who migrated to the continent, producing a change in the type of inhabitants (Galafassi, 1996). Within this context, during the last three decades, the islands of Tigre and San Fernando have taken different paths. On one hand, Tigre has gained popularity due to short-term tourism and recreation activities, becoming famous for weekend visits. New small-scale tourist developments were settled on the islands, which increased the population by around 240 per cent during weekends (reaching 11,900 inhabitants) (Municipio de Tigre, 2012 and 2013). On the other hand, the islands of San Fernando faced a different scenario: the population has decreased in recent years due to the loss of productivity and accessibility from the continent. In this negative context, in 2000 the government promoted the initiative to declare the area as a biosphere reserve, which was accepted by the UNESCO (Municipalidad de San Fernando, 2000). Through these actions, the authorities tried to find a sustainable solution to recover the productivity of the area and contribute to environmental and social conservation.

The Dichotomous Delta

Although the main dichotomy of this system lies in the coexistence of a rich environment with rapid on-going metropolitan processes,

the contrasts extend beyond this. They are related to other internal issues that need to be addressed and recognized in order to achieve an integrated approach.

Continent vs Islands; Environment vs Urban

The limited conception of the delta in terms of its management is related to the lack of an interdisciplinary insight from the government and other institutions. Although from a geographical point of view, the delta can be restricted only to the *islands*, the contiguous coast of the so-called *continental* land is also part of the system. In terms of management, the delta and its surroundings must be seen as an integrated territory which has its own internal conflicts which need to be balanced. One of the main limitations is the fragmented legal context. First, the vast territory of the entire delta makes the design and implementation of policies a difficult task due to the multiplicity of jurisdictional authorities with different goals and lack of coordination (Zagare, 2012). Argentina is a federal country which is organized in three levels: the State, the provinces and the municipalities (local level). Considering this scenario, the Parana Delta is under one State jurisdiction, three provincial governments and eighteen municipalities. It is clear that the high level of inter-governmental coordination needed between the governments is an obstacle to reaching integrated strategies.

Second, there is also fragmentation in addressing environmental and planning legislation. There is a great deal of legislation concerning each individual issue but all too few governing interactions between them. On one hand, according to the Article No. 41 of the National Constitution, the State sanctions the laws to ensure a healthy environment, and the provinces (which have the domain of the natural resources) to abide by those laws. In this context, the National Plan for the Sustainable Management and Conservation of the Delta, the *PIECAS-DP* (*Plan Integral Estrategico para la Conservacion*

y Aprovechamiento Sostenible del Delta del Parana) was developed in 2008 through a coordinated effort between the State and the provinces. It lays down the principles for the protection and development of the entire delta without addressing any regulation of the interventions on the coasts, outside of the islands. In spite of being limited on certain issues, unfortunately the Plan is not yet being fully implemented.

On the other hand, urban planning legislation is not integrated with the environmental laws. National Law No. 8912 of 1977 establishes minimum parameters for settlements, division of habitable plots, uses and infrastructure and gives to each municipality the responsibility for local urban planning. When local authorities are responsible for their own urban development and planning policies, they can act according to people's needs because they are aware of local problems. Nevertheless, the restriction of the legislation on the limits of the jurisdictions prevents the recognition of regional dynamics, environmental and socio-economic processes, making it necessary to broaden the scope of the policies and highlighting the need for a regional authority. In other words, local authorities have the power to complement the other levels of government in terms of environmental legislation, and are entrusted with their own urban development and planning, so they are a key to the integration and coordination within the system. Regarding this, the Plan for the Management of the Islands of Tigre, (developed by the Municipality of Tigre) could be an example of intention to coordinate environment and planning (Municipio de Tigre, 2012). Unfortunately it concentrates on the islands and not on the edges or the urban core, so again in spite of the good intention to integrate both issues, it restricts the view to one part of the territory not considering the continental land where the main pressures of metropolitan growth take place.

*Flood as a Natural Characteristic vs
Flood as a Threat*

Although the recurrent floods typical of the Lower Parana Delta are mainly caused by Rio de la Plata's currents and southeast winds (Bonfils, 1962) they are made worse by unsustainable land practices for housing and industry. Accordingly, there are two different realities: the islands and the continental area. On the islands, the natural flood regime determines the species that inhabit the area and also the kind of occupation suitable for it. Settling there implies being aware of the possible risks associated with floods, so native constructions are specially designed on stilts to deal with that. There is basically no flood-proof infrastructure developed by the government on the islands; on the contrary, all the actions are taken by the individuals, and they are mostly focused on protecting small-scale production from water level variability. The islands of this section of the Delta are characterized by a depressed centre surrounded by an *albardón*, an elevated natural dike. The houses and production areas are commonly settled on the *albardón* and the main infrastructures developed to prevent flooding are the *atajarrepuntes* and dikes. Both elements are embankments usually formed by natural sediments of the river (mostly sand and mud), their main difference being their size. While the dikes can reach a height of 4.8 to 5 m, the level of the *atajarrepuntes* varies from 3.5 to 3.8 m (Alvarez, 2011). The choice of constructing one or the other (and also the design of the section) is based on the cost-benefit analysis of the productive activity. It is important to note that apart from the infrastructure works for productive purposes, some other land movements have been carried out for the construction of residential developments. The topography of the affected islands has been modified to create marinas, clubs and large-scale residential areas, even reaching a level of 5 m. These works are a clear consequence of the introduction of the concepts of gated

community and consumption areas on the islands, as a product of the metropolitan model of urban growth.

Conversely, on the continental lands, flooding is a threat for the consolidated urban core so the government must provide the necessary infrastructure to reduce vulnerability. The eastern part of the continental land (the waterfront) usually floods as a result of the *Sudestadas*, while the western part is affected by precipitation and increases in the flow of other rivers, such as the Reconquista and Luján.² When both events coincide in time and space, the situation is disastrous. The drainage system of the urban fringe collapses due to the drainage blocking caused by the southeastern currents, leading to floods and their negative consequences. Although it is true that the area should not have been urbanized in the first place (at least not in the traditional way) because it is a floodplain, the reality is that it is already urbanized and so the governmental authorities must provide infrastructure to reduce vulnerability. The urban fringe of Tigre and San Fernando are located between the original ravine and the right bank of the Parana River in what Bonfils (1962) defined as a Halo-Hidro-morphic terrain. This land is flat and highly susceptible to flooding (Salvia, 2010), and it is occupied by the city cores of the municipalities, which are the most densely populated areas. The main infrastructure developed by the governmental authorities for dealing with this problem is focused on the improvement of the system by the construction of drainage channels and river channelling.

Yet another problem arises due to the unplanned urban growth and the prevalence of the private interests in the urban decision-making. As the land is sensitive to flooding, the gated communities are constructed by diking the area and generating changes in the topography, modifying its ecological characteristics (Daniele *et al.*, 2005). The result is a mosaic of large private (protected?) elevated areas and public (vulnerable) de-

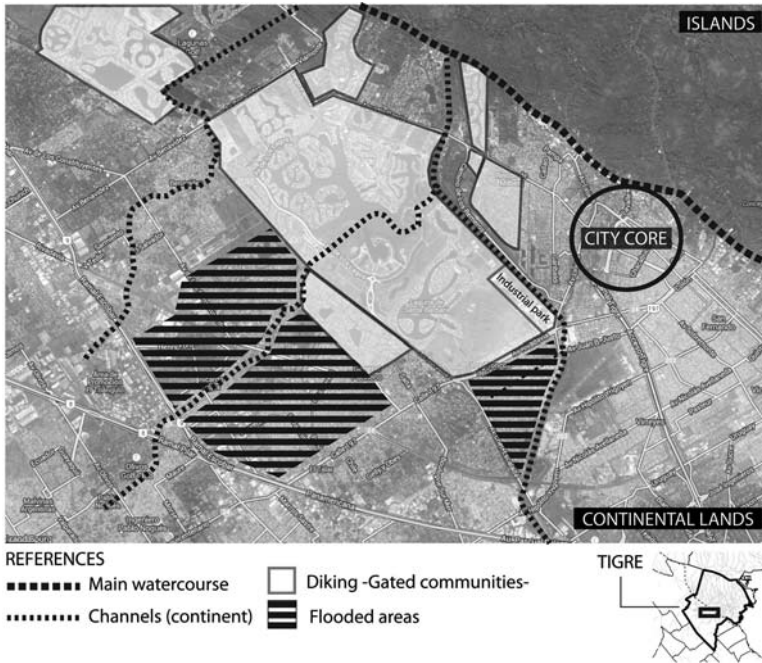


Figure 6. Contrast between elevated (protected?) and depressed (flooded) areas. (Source: Elaborated from the basis of Kandus and Minotti (2010) and Google Maps)

pressed zones (figure 6). The first ones block the natural drainage of the land increasing the vulnerability of the rest of the city inhabited not only by the middle-class but also by the poorest sectors of the society, who are the less able to face a disaster and recover from the loses.

*Inside the Market (the Formal) vs
Outside the Market (the Informal)*

The absence of public guidelines encouraged a metropolitan expansion based on two contrasting processes. One process was oriented to fulfilling the needs of the upper-middle and higher income groups, and the other consisted of satisfying the necessities of the low-income groups, generally outside the formal market (Pirez, 2002). The previously described context of liberalization and urban expansion of Buenos Aires Metropolitan Area undermined local governments, which showed inability to deal with the specific pressures of the mega developers and meet the demands of the rest of the society at the same time. In this context, social exclusion of

low-income sectors seemed hard to avoid, as well as the related social problems derived from marginalization and poverty. Other issues, such as the privatization of services, the construction of large consumption areas, and other large urban projects mostly developed with Foreign Direct Inversions (Ciccolella *et al.*, 2006) helped to build a scenario of inequities and misconnections. Needing a metropolitan spatial planning strategy, the contrasting territories followed different rules in their simultaneous development and acted in the parallel markets of formality and informality. On one hand, gated communities shaped the private expansion, creating their own internal rules and, in order to justify their existence, pretending to ignore the need to be part of the rest of the city. On the other hand, *the city* remains isolated in a certain *limbo*, losing its spatial and social connections (Pirez, 2002).

Navigation vs Environment

Port activities generate negative and positive externalities. It is true that historically the

ports of Buenos Aires and the other municipalities along the Parana River have cut off the city from the water and this issue is directly related to urban planning. Nevertheless, ports are a key element in economic regional development and they need to be linked to the areas of production, industry and services. The Argentine port system has always been deeply integrated with the terrestrial transport network of railways and roads (Basadonna, 2002). In this context, the port system of Rio de la Plata-Parana River is the most important fluvial network in the country. While the greatest amount of movement in the province is concentrated in the port of Dock Sud (Buenos Aires), the largest amount of grain is transported from the ports of Rosario and San Lorenzo/San Martín, which are located near Rosario and 650 km from the Delta Front (Subsecretaría de actividades portuarias, Buenos Aires). The question remains: is it possible to diversify the movements of the Buenos Aires ports (Dock Sud and Puerto Nuevo) and move some of the activities to the other ports along the Parana Delta (Zarate, Campana, San Nicolás, Ramallo, etc.)? Would this decrease congestion on Buenos Aires city's coast and on the roads and access to the city? Would it benefit other small ports and cities helping them to develop? Would it reduce costs of transportation and improve articulation with the terrestrial transport system?

As the Rio de la Plata is shallow, it needs major infrastructure works to make it navigable. In consequence, it would be possible to consider moving some of the activities being developed in the port of Buenos Aires to other ports, either to the south of the province or to the north, along the Parana River. Although the southern ports (La Plata, Mar del Plata, Quequen, Rosales and Bahia Blanca) have advantages in terms of their depths and specialization, they are a long way from the industrial zones (except from La Plata). The Parana, on the contrary, is close to the industrial and agriculture corridor, and is also reasonably deep: 9.8 metres

from the river mouth up to San Lorenzo/San Martín ports, and 6.7 metres from there to Santa Fe (Salvatori, 2002), meaning that it is navigable for large ships. The ports of the Parana's coasts also have several advantages such as their large areas, which would allow expansion in the future, and their strategic location, which makes them useful for the activities developed in each area of the delta (production, industry, etc.), linking them nationally and internationally. They are also located along the Parana-Paraguay waterway or ship channel (*Hidrovia Parana-Paraguay*), an arrangement between the countries of the La Plata Basin whose aim is to improve the capacity and quality of the channel that goes from Nueva Palmira port in Uruguay to Caceres Port, Brazil (Salvatori, 2002).

Among the advantages of the decentralization of the port activity would be the integration of a multimodal transport system, the decrease in congestion in the city of Buenos Aires, and the local growth of some municipalities along the delta. But, what would be the possible consequences of a major development of fluvial transportation along the Parana River in terms of environmental harm? There is a considerable discussion among institutions and authors about the real damage that an increase of transportation and the subsequent dredging works would produce in the environment and social dimensions of the delta. One of the main issues concerning navigation and its effects is coastal erosion. While some studies reveal that the harm caused by dredging is not significant and that the erosion is related to natural processes of the river (FICH- UNL, 2006), other scientists argue that the works could cause serious problems and that more specific studies should be developed to measure the real damage because dredging could also cause a severe change in the flow of internal channels (Stancich, 2007; Moiraghi de Pérez, 2001). Apart from dredging, the erosion is also related to the waves that the ships generate as they travel along the river. This movement of water affects the shores

altering the native ecosystem and causing the disappearance of coastal vegetation and animal species (Moiraghi de Pérez, 2001). It also represents a danger in terms of contamination and dissemination of diseases along the river.

In consequence, resolving the conflict between port development and natural environment lies in finding agreements between different stakeholders and the government authorities in order to reach to a balance between economic development (at regional and local scales) and environmental sustainability. It should be possible to diversify port functions in such a way that the impacts of each type of port are coherent to the specificity of each city (passenger's terminals, cargo ports, etc.).

Lots of Nature vs Lack of Green Spaces

In spite of the presence of a large natural territory and a privileged waterfront, the relation between the cities and the river is not fluid, nor indeed are the relations within the city. As described above, the privatization of the coasts hinders the use of the space by the people, which is only able to reach the water in a few places. Port activities and industries block the access to the coast isolating the city from the river and *vice versa*. This situation contributes to the misconception of the delta as separated from the dynamics of the continent. The issues related to the prevalence of private interests over public benefit already addressed, social polarization and fragmentation of the space, and vulnerability to flooding increase due to the lack of spatial connections or a park system that could balance and provide flexibility to the area. A regional park could organize and provide the missing spatial links through *green corridors* associated with other systems, such as transportation or recreation areas. The lack of these kinds of urban elements must be seen as an opportunity to think about the potential relations that are needed across the spectrum of the conflicts discussed.

Towards an Integrated Environmental and Urban Spatial Planning

When analyzing the conflicts within the system of the Lower Parana Delta, many questions become apparent. Is it possible to address Parana Delta management from an integrated perspective? In what way is an integrated approach able to contribute to a better understanding and balance of the internal dichotomies of the system? Is it possible to consider integrated strategies in the Latin American context? What are the issues that need to be integrated and in what terms?

It is true that the European integrated approach is attractive enough to tempt any Latin American planner in the search for solutions whose effects have already been tested. Nevertheless, it is also a fact that the differences between both societies need to be recognized before suggesting any implementation of foreign strategies in the Latin American context. The dilemma lies between the theoretical need for developing a Latin American planning approach and the necessity to base it on hypotheses raised from the specific conditions of the territory. This is a challenge to achieve, considering that the level of integration in Latin America is lower than in the European societies.

Therefore, in a context of social inequity, polarization and socio-economic crisis, any transformation in the space or in the processes of production could have a great impact on society, even increasing social instability and decreasing productivity. In fact, over the years, the rise of informality has been one of the effects of the unplanned market-based urban growth and the spatial changes in production and communications; it remains a very difficult problem to solve due to the impossibility of achieving its integration into the formal structure. Another pending issue, especially in this case study, is sustainability. The unplanned urban expansion over the coastal natural areas of the delta has produced radical land-use change together with

an unsustainable development of the economic activities.

Although decentralization strengthened local governments in terms of political, administrative and fiscal power, the spatial polarization of the economic resources with the fragmentation of the planning instruments make it difficult to counterbalance market pressures over the metropolitan space. The situation is especially aggravated when local authorities have to fulfil the demand for urban land, decrease the impact over natural resources and reduce vulnerability to strong climatic events. In that case, even though decentralization is a good starting point to deal with these pressures, an integrated vision of the planning issue must be undertaken. It has been clearly shown, in the context of the case study, that an integrated notion of delta management is not yet embedded in the political agenda. At the present, planning within the delta is fragmented, a fact that is related to the large extension of the territory, the multiplicity of jurisdictions involved in the decision-making process, but most of all, to the low level of intergovernmental cooperation and citizen participation. These conditions clearly are not conducive to policy integration (Halpert, 1982). Environmental policies and urban planning strategies are not being developed in a complementary way, so the implementation and success of the measures are difficult to achieve.

In this context, a strategy of integrated spatial planning based on the Latin American condition could be a wise cross-sectoral approach to deal with the conflicts through an understanding of the changing landscape and urban condition as well as the driving forces of their development (Hartz and Kestermann, 2004). This approach provides a guiding framework for spatial use, producing a shift from earlier views on the subject (Gee *et al.*, 2006). Therefore, it helps to identify the development potential of the area according to the specificities of the context and not applying a random foreign model over the

territory which would surely lead to negative results. Beyond developing projects to change physical urban (or natural) forms, this approach seeks to organize existing functional relations and manage the social, economic and political processes through a governance structure (Hartz and Kestermann, 2004), turning from separate to collaboration agreements (Meyer, 2009).

The Integrated Approach

In words of Underdal (1980), 'to integrate means to unify' and in terms of policies, the concept of integration suggests bringing elements together around a unique conception. While the general purpose of policy integration goes beyond that, it also seeks to improve the outcomes of policies and to consider the consequences of policies transcending their specific sectors and boundaries (Stead and Meijers, 2009; Underdal, 1980). Integration needs to be undertaken in both directions: horizontally, across policy sectors, and vertically, across actors and levels of governance (Counsell *et al.*, 2006). Underdal (1980) suggests two approaches for reaching integration: direct and indirect. The former consists of the setting of goals and general guidelines which would be followed by all the offices. The limitation of this approach is that the principles must be delineated by a single committee or council, and sometimes it is difficult to define common criteria. The second refers to intellectual and institutional strategies. The intellectual process encourages research, training and socialization, promotion of social participation and knowledge generation and communication. The main positive effects of this strategy, apart from social cohesion, lie in making authorities aware of the interrelated consequences of the policies across other governance and social sectors. The institutional strategy concerns the interaction within the offices through a detailed analysis of the internal structure and competences.

The first obstacle to the application of

an integrated planning strategy in the case study is the strong division between governmental offices and their lack of will to collaborate across the different levels. The second hindrance is the strong dependence of municipal offices on the incumbent government which affects their duration and the development and implementation of long-term policy. There is also a lack of citizen participation, though this process has shown an improvement during recent years. Therefore, far from being considered a weakness, an understanding of the obstacles mentioned is a valuable tool in finding an alternate solution which involves the development of a scheme of integration according to the context. As shown in the diagram (figure 7), an integrated approach in this case could be based on the relations between the dichotomies (problems to be solved), the levels of governance (based on their competences)

and the stakeholders (introducing them as a relevant part of the system). This strategy is able to work independently from the unstable context, generating spaces of communication and collaboration such as agreements on specific subjects. This type of strategy does not imply any action beyond people working together to solve or debate a specific problem. According to each dichotomy or conflict, spaces of interchange can be developed to generate knowledge through the development of assessments and studies and through the debate about possible scenarios which might lead to the design of policies for the future.

The integrated approach broadens the traditional system of land-use planning, which regulates the actions over the territory through the designation of areas of development and protection without considering socio-economic, environmental or other consequences. These

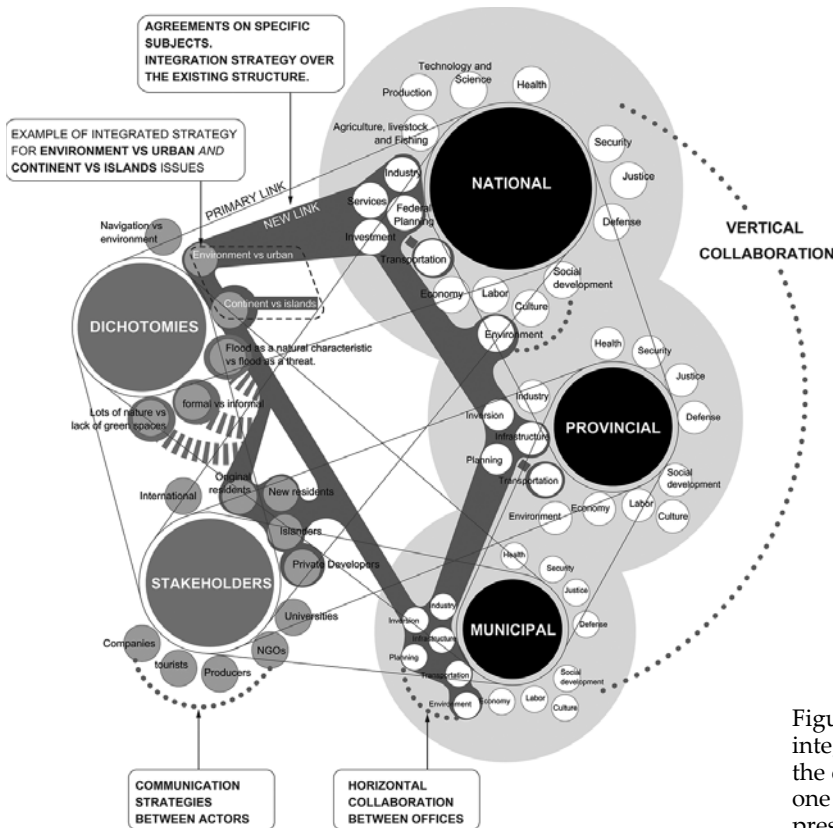


Figure 7. Diagram of an integrated scheme for the case study based on one of the dichotomies presented in this paper.

designations have been mapped by governmental authorities in order to provide guidance to other professionals who want to intervene in the territory (Nadin, 2006). Integrated spatial planning, on the contrary, is not a fixed document determined by the governmental institutions but a corporate document developed by the local authority together with different stakeholders through a process of dialogue and participation. Instead of determining areas of contrasting levels of development, a spatial planning strategy identifies critical spatial issues through the definition and visualization of spatial objectives (Nadin, 2006). In other words, spatial planning addresses the issues of *what should happen?* and *where should it happen?* It concerns the interaction of policies and practices going beyond traditional thinking and considering the spatial impacts of the decision-making sectors. This approach represents a key strategy for the interaction between the different stakeholders and so becomes a tool for understanding and communicating in a way for opening the decision-making process.

Concluding Remarks

In the Parana Delta fragmentation is to some extent deeply rooted, so a radical change in planning methods may be difficult. As a solution, a spatial planning approach could complement the existing planning process, contributing to adjusting existing practices and involving planning in other sectors (for example, environment, education, etc.). Nevertheless, such approach would only help if it is based on the context and designed according to the geographical, socio-economic and political framework. Up to the present, planning has played a minor role in the area so strategies for integrating it into other sectors of the decision-making process would give each policy a spatial dimension. Also, the participatory strategy would be a relevant tool for integration and for encouragement of working across the levels of governance. Intellectual and institutional strategies for

integrating policies could help to address the dichotomies of the system and to understand the depth and breadth of their complexity.

NOTES

1. The legislation includes the National Development Plan for the Parana Delta, PIECAS-DP (*Plan Integral Estrategico para la Conservacion y Aprovechamiento Sostenible del Delta del Parana*), the National Environment Law (No. 25.675), and the local planning codes of the municipalities located on the Delta, in this case, strictly in the area of the Province of Buenos Aires.
2. Other areas vulnerable to flooding due to the combination of lack of drainage system and Sudestadas are the area of the City of Buenos Aires (mostly influenced by the basins of the Riachuelo, Maldonado, and Vega), and the city of La Plata (which has suffered from an incommensurable flood in May 2013 with loss of life and material damage).

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