Scenario development for reaching urban and environmental planning integration in the context of climate change*.

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INTRODUCTION

Scientific evidence of global climate change leads to predictions of increases in the recurrence and severity of extreme hydrological events, one of the main causes of flooding and other negative impacts over the territory and the communities. Urban development, especially in coastal cities, faces the challenges of continue growing in a planned way while guaranteeing a certain level of security against future events. Since the level of uncertainty remains high, is possible to find some innovative strategies able to help decision makers to guide future expansion and design adaptation actions? The challenge in developing regions is extensive so:

How to link development perspectives and strategic adaptation to climate change actions?

A search for synergy within planning accords
–risk management + development= dynamic adaptation for developing economies

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i. -The Lower Parana delta within its governance Challenge

0. - Towards a planning adaptation method to phase the governance challenges on development within a recognize climate change assessment at Lower Parana delta.

1. - The context:
-The lower Parana delta and its metropolisation condition
-Scales of the delta system/complexity on diverse governance actors/and developing challenges
-The Physical risks associated to climate change are defined as rising and dynamic, the **societal vulnerability** associated to this need to be consider in an **integral way linking social economic and environment challenges**. There is a clear need to **aligned developmental visions** within a more **scientifically base** but within and **informed and active actors**

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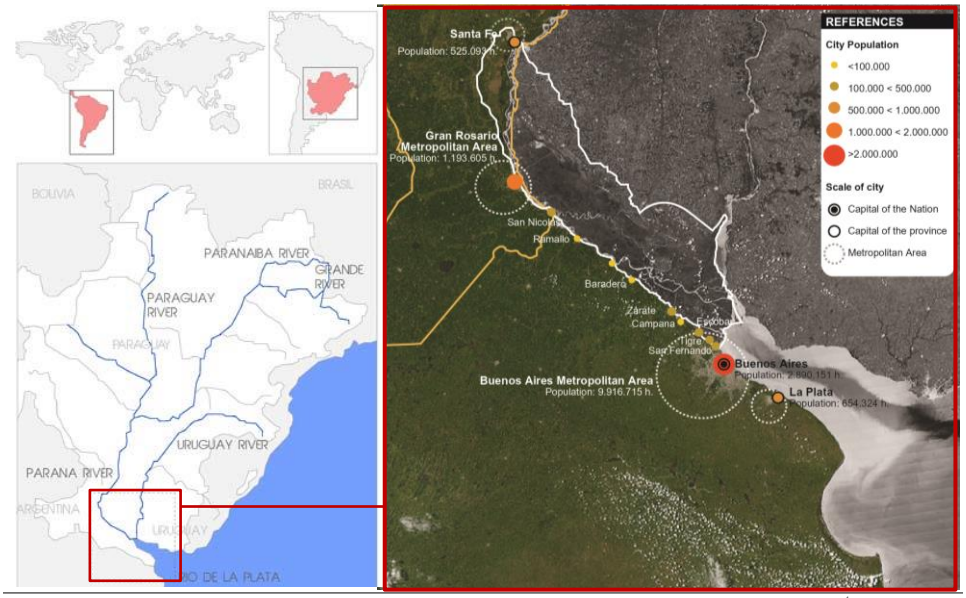
I. THE LOWER PARANA DELTA WITHIN ITS GOVERNANCE CHALLENGE



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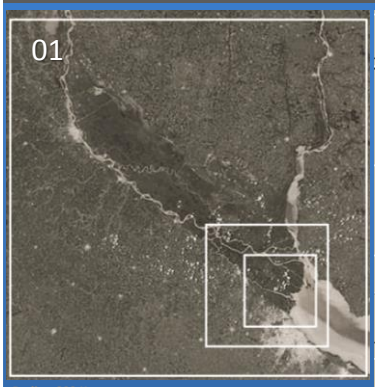
SCALES OF THE PROBLEM



Radius: 200 Km

REGIONAL SCALE:
Complete Delta Area
Complex situations
Diversity of pressures
Diversity of actors involved

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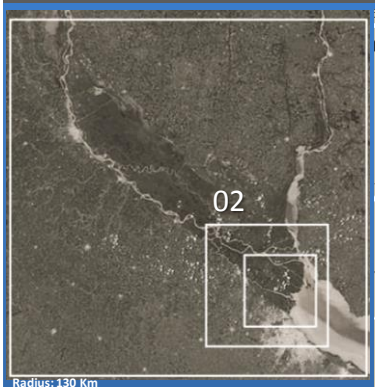
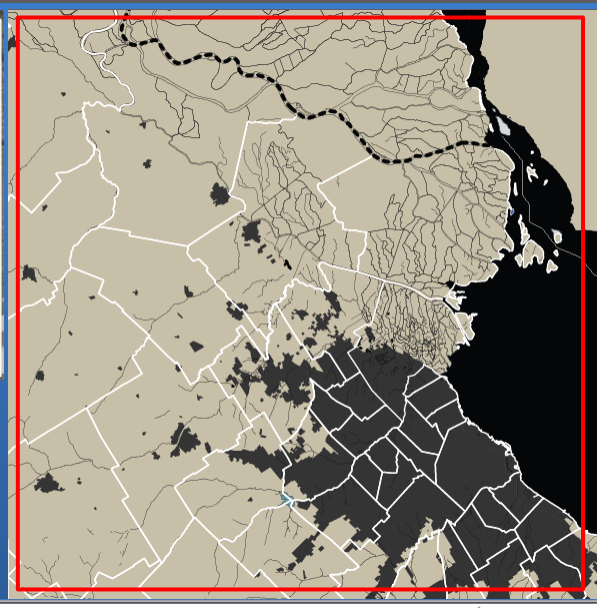
SCALES OF THE PROBLEM





Radius: 130 Km

METROPOLITAN SCALE:
Lower Parana Delta

Pressure on water and land related to Metropolitan expansion and new& old dynamics

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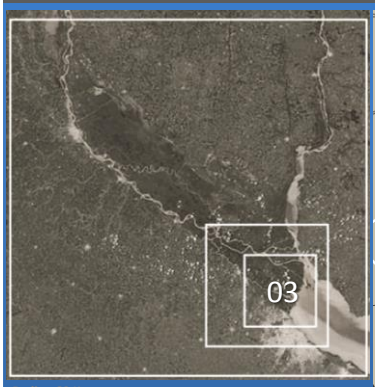
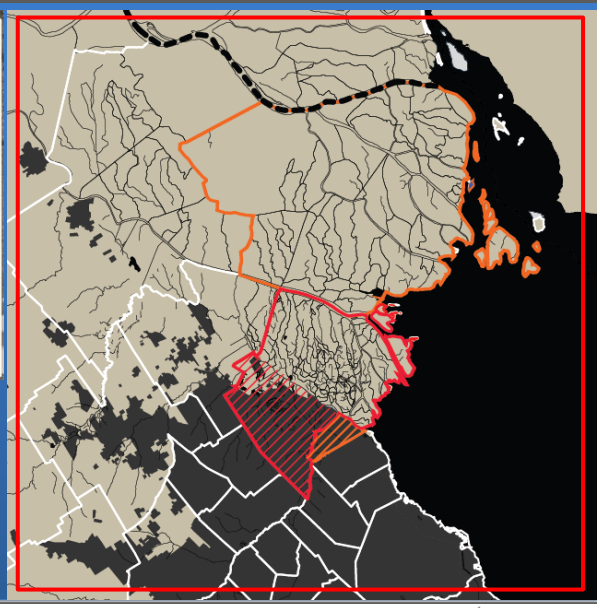


Radius: 80 Km

LOCAL SCALE
Municipalities of Tigre and San Fernando



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LOCAL SCALE – MUNICIPALITIES OF TIGRE AND SAN FERNANDO

Pressure on the Delta related to private urbanizations (mainly in the continental area)

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LOCAL SCALE – MUNICIPALITIES OF TIGRE AND SAN FERNANDO

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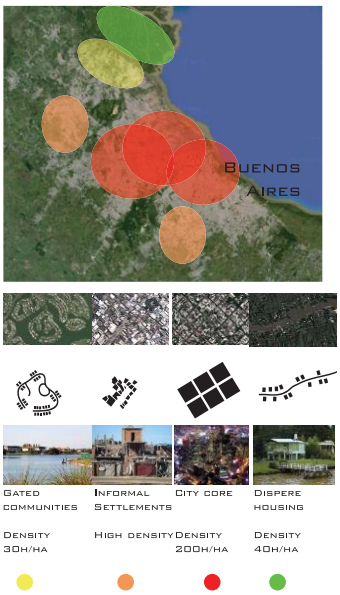

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II.- THE CONTEXT UNDER THE PERSPECTIVE OF ASSESSING DEVELOPMENT AND CLIMATE CHANGE RISK

Box 1: Stakeholder Analysis

Stakeholders are (UN-Habitat, 2001):

1) those whose interests are affected by the issue or those whose activities strongly affect the issue;

2) those who possess information, resources and expertise needed for strategy formulation and implementation;

3) those who control relevant implementation instruments.

They consist of groups, constituencies, social actors or institutions of any size or aggregation that act at various levels (domestic, local, regional, national, international, private and public), have a significant and specific stake in a given set of resources, and can affect or be affected by resource management problems or interventions

(Chevalier, 2001:21, in Cuenya, 2006, p75).

2. - The current state of arts

Some key conflicts- development v/s climate change adaptation

-Non integration on goals-rules and actions at the diverse governance levels-

-The current power deviation to Municipal level, provoke a shift to competitiveness-diminishing the long term action require to phase risk and integrate informal development

-The diverse development pressure for a un balance power and interaction of stakeholder exacerbate the problem and define contradicted actions

So the risk related to climate change and the social vulnerability are exponentially related

III. THEORETICAL FRAMEWORK

The role of planning framework into the adaptation to climate change considerations and strategies as a way to reduce risks and capitalize opportunities associated to the diverse actors and scales(from Global to local)- Fussel 2007

The role of information and knowledge networks are essential to define a more robust decision- making to face the climate change challenge on mitigation and adaptation(Jasanoff 1997)

Planning perspective-Recognizing and linking the complexity of deltaic dynamic processes and inclusive development

- An strategic relational approaches (Jessop2000)
- A actor relational approaches (L Boelens2010)
- Mix scanning approach)Etzioni 1986) vs. rational comprehensive Planning model.

1. THE Proposed apporached and METHODOLOGY

- Through stakeholder interaction, scenarios were designed following a process of strategic foresight, adopting the SAS (Story-and-Simulation) approach to scenario development.
- The participatory process included the preliminary recognition of the main actors according to their role in the system (governmental agencies, NGOs, Universities, producers, inhabitants, etc.),
- The construction of the first scenarios (represented as storylines) and the quantification of the storylines for mapping. The maps were developed using GIS (Geographical Information System) as a flexible and interactive tool for revisiting the possible future progressions in the fields of urban expansion (including changes in typologies and densities), environmental conservation, productive system and socio economic indicators.

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1. THE Proposed apporached and METHODOLOGY

In this paper, a reflection on **participatory processes** is presented to address the potential of **scenario development** as a **tool** for integrating **urban and environmental dimensions** while withstanding the **uncertainty of future climate changes** and **metropolitan growth**.
Through **stakeholder interaction**, scenarios were designed following a process of strategic foresight, adopting the SAS (Story-and-Simulation) approach to scenario development.
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THE METHODOLOGY

STRATEGIC PROSPECTIVE AS A METHOD FOR BUILDING SCENARIOS

•*"Rather than unveil some prefabricated future, it offers an approach that helps us **build** the future."*
(De Jouvenel, 2000)

•**Pluridisciplinary** approach to capture realities in their totality considering the phenomenon regarding all the factors and their interrelations.

•Phases on Strategic prospective:

1. Defining the problem and choosing the horizon.
2. Constructing the system and identifying the key variables.
3. Gathering data and drafting of hypotheses.
4. Exploring possible futures.
5. Outlining strategic choices.

(De Jouvenel, 2000)

•**Strategic simulation tools:** models and **scenarios**.

THE METHODOLOGY – SCENARIOS WITHIN A STRATEGYC PROSPECTIVE PROCESS

EXPLORATIVE	NORMATIVE
Explore a range of possible. Groundwork: ***What would happen?***	Start at a goal in the future as a point of departure travelling backwards to define actions and measures to achieve the objective. ***What could be done?***

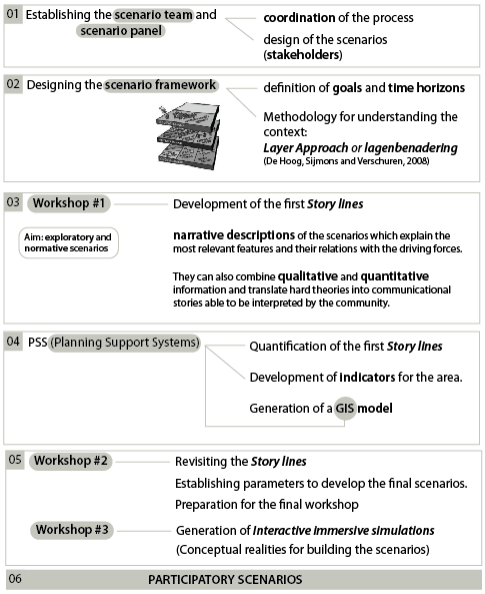
MULTI ACTOR (or MULTI AGENT) APPROACHES

*"Scenarios perform a crucial function as a **bridge between environmental science and policy**. They are effective tools for summarising and synthesising scientific knowledge in a shape that can be used by policy-makers to develop policies."*
(Alcamo, 2001)

Process of JOINT FACT FINDING (JFF)

Diverse stakeholders with different backgrounds, interests and perspectives gather to produce information to facilitate decision-making.
(Pel et al., 2013; Ehrmann and Stinson, 1999).

STAGES OF THE PROCESS. STORY AND SIMULATION APPROACH (SAS)



SAS (STORY AND SIMULATION APPROACH) TO SCENARIO BUILDING

Developed by Alcamo (2001), it provides a general guideline to scenario building rather than a fixed protocol. It was used as a basis for designing the process taking into consideration the local conditions.

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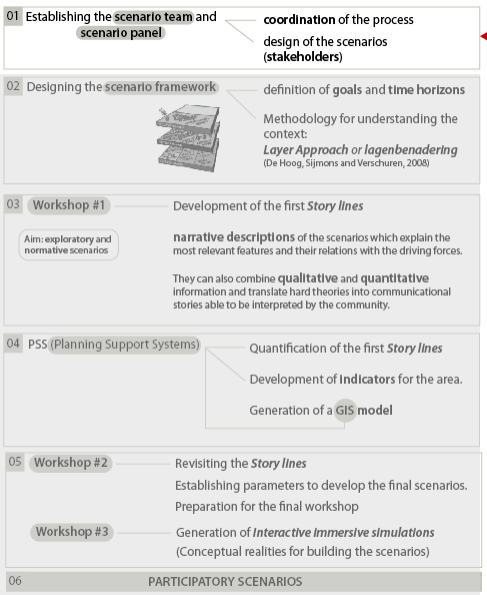

Knowledge-oriented actors + Practice-oriented actors

primary stakeholders:
(i) members of institutions and NGOs which work with the local governments on the development of environmental and urban plans

secondary stakeholders:
(i) academic members of different national and international Universities that are working on the area from the fields of architecture, ecology, politics and urbanism;
(ii) members of associations of professionals from the field of architecture and urbanism who actively participate in assessments for the governments; and
(iii) other independent stakeholders related to production, navigation, and also inhabitants of the islands[1].

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STAGES OF THE PROCESS. STORY AND SIMULATION APPROACH (SAS)

01 Establishing the **scenario team** and **scenario panel**
- **coordination** of the process
- design of the scenarios (**stakeholders**)

02 Designing the **scenario framework**
- definition of **goals** and **time horizons**
- Methodology for understanding the context: ***Layer Approach*** *or* ***lagenbenadering*** (De Hoog, Sijmons and Verschuren, 2008)

03 **Workshop #1** — Development of the first ***Story lines***

Aim: exploratory and normative scenarios

narrative descriptions of the scenarios which explain the most relevant features and their relations with the driving forces.

They can also combine **qualitative** and **quantitative** information and translate hard theories into communicational stories able to be interpreted by the community.

04 PSS (Planning Support Systems)
- Quantification of the first ***Story lines***
- Development of **Indicators** for the area.
- Generation of a GIS **model**

05 **Workshop #2** — Revisiting the ***Story lines***
Establishing parameters to develop the final scenarios.
Preparation for the final workshop

Workshop #3 — Generation of ***Interactive Immersive simulations*** (Conceptual realities for building the scenarios)

06 PARTICIPATORY SCENARIOS

Horizon: 20/30 years

Area of study: Delta Front (Local level, Municipalities of Tigre and San Fernando)

Topics and Layers:

- Conceptual idea of the Delta
- ***Substratum***
- ***Networks***
- ***Occupation***
- Climate Change related impacts and responses
- Planning and policy

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Now

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March-May 2015

06 PARTICIPATORY SCENARIOS

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STAGES OF THE PROCESS. STORY AND SIMULATION APPROACH (SAS)

QUANTIFICATION OF STORY LINES *(example)*
Combination of environmental and urban development variables to build an indicator

Climate Change-related impacts and responses

SL **-** The drainage system of the urban fringe is/ is not capable to respond to regular pulses of droughts and floods coming from the Parana River and also to Extreme Hydrological Events (Sudestadas).

Indicators to combine:
-Recurrence of Extreme Hydrological Events.
-Amount of precipitations.
-Variations on River streamflow.
-Flooded areas.
-Population growth.
-Extension of drainage system.
-

DEVELOPMENT OF GIS INTERACTIVE MODEL
Input of the indicators into a GIS model for the development of the immersive scenarios

2nd and 3rd WORKSHOPS *Developing of immersive simulations with the help of GIS technology*. Stakeholders are aware of the spatial implications of climate variables and urban dynamics.

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3. RESULTS

Development of a **participatory spatial planning exercise** that could be replicated throughout the Delta by replacing the variables according to the pressures of each area (scalar recognition on diverse actors and diverse pressures & Interactions).

Possibility to integrate **environmental and urban developing variables** and develop indicators for the area taking into account the singularities of each zone.

In a context of a not systematic/rational planning system, the experiment with **innovative tools** for supporting decision making process and improving citizen participation arises as a a way to increase governance.

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