

Building Resilience in a Tropical Highland City

Urban productivity and resilience: a case for Global Sustainable Development Goals (SDGs)

Jardín Botánico de Bogotá “José Celestino Mutis”

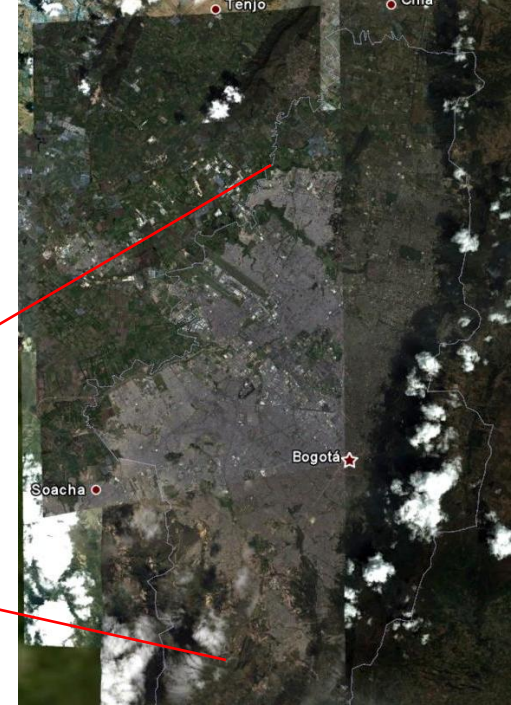
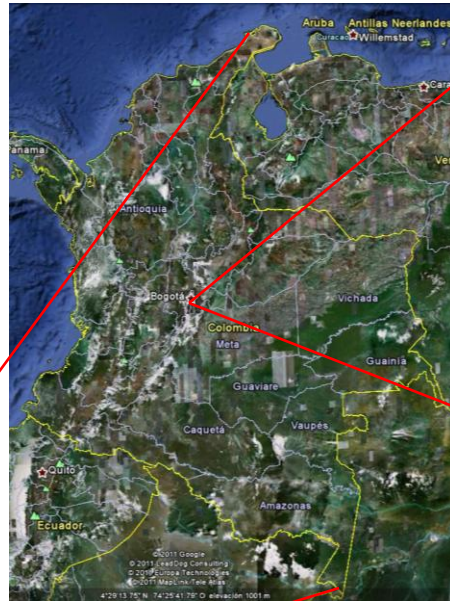
Potsdam , October 2013

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1. Context
2. Climate change: a central issue in current governmental policy
3. Bogota's policies and national context
4. The Botanical Garden. Bogotá's Green Heart



1. Context Bogotá, D.C.

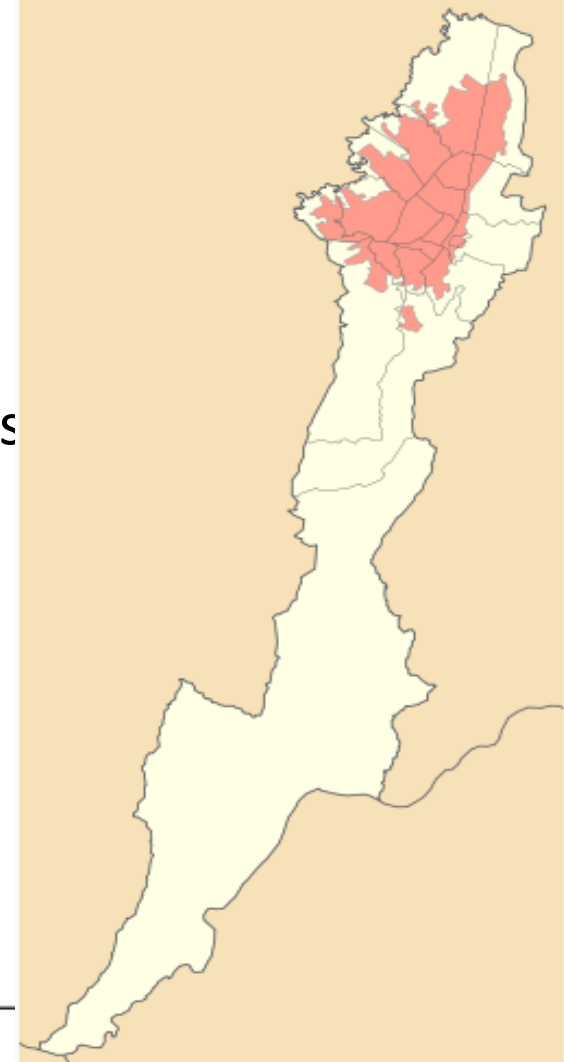


Bogota in the national context

- 16% of Colombian's population
- GDP (gross domestic product) Bogotá: 140,9 millions USD (Dec 2012)
- Bogotá's GDP 25% of National GDP (24,5%)
- Positive economic tendencies: driver of national economy.
- Distribution of 80% of economic activity: finance sector 35%; social services (education, health) 19%; and trade 15%.
- GDP is larger than of second and third provinces (Antioquia and Valle) together.



Bogotá District



- Total area: 163.660 ha
 - Urban 30.736,
 - Sub-urban: 17.045,
 - Rural: 129.815 ha (75%)
- Population (2013) 7.7 millones,
- Projected population: 2050: 9.5 millions
- 25th largest city in the world (2011)
- Among the largest, the highest
- 13.9° C
- 1.013 mm Precipitation
- 51% protected area



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Rural Bogotá

- Almost 75% of Bogotá's territory, less than 1% of its population
- Five localities with rural lore and peasant culture
- One protected "parámo" (Sumapaz National Park) ca. 75% of Bogotá's rural area.
- Areas defined for agriculture production: 6,103 ha, 5,071 Ton/yr.
- Environmental enhancement of agricultural lands overlapped with protected areas: (ca 1,000 ha)



- 1,306 land holdings, out of which 50% have property titlings; 66% are small between 0 and 5 ha
- Mining operations: sand and clay for housing and building industries.



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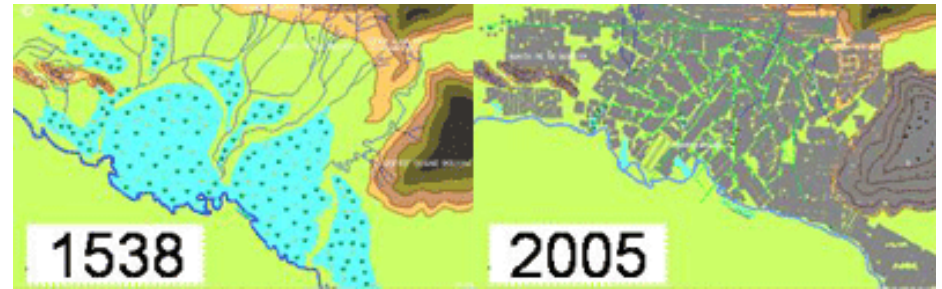
Urban Bogotá

- 25% of Bogotá's total area, 99% of its population
- 15 local governmental units (localities)
- Seven times more imports than exports (high dependency)
- 99% educational coverage
- 98% water supply coverage
- 96% sewerage coverage educational coverageeducational coverage



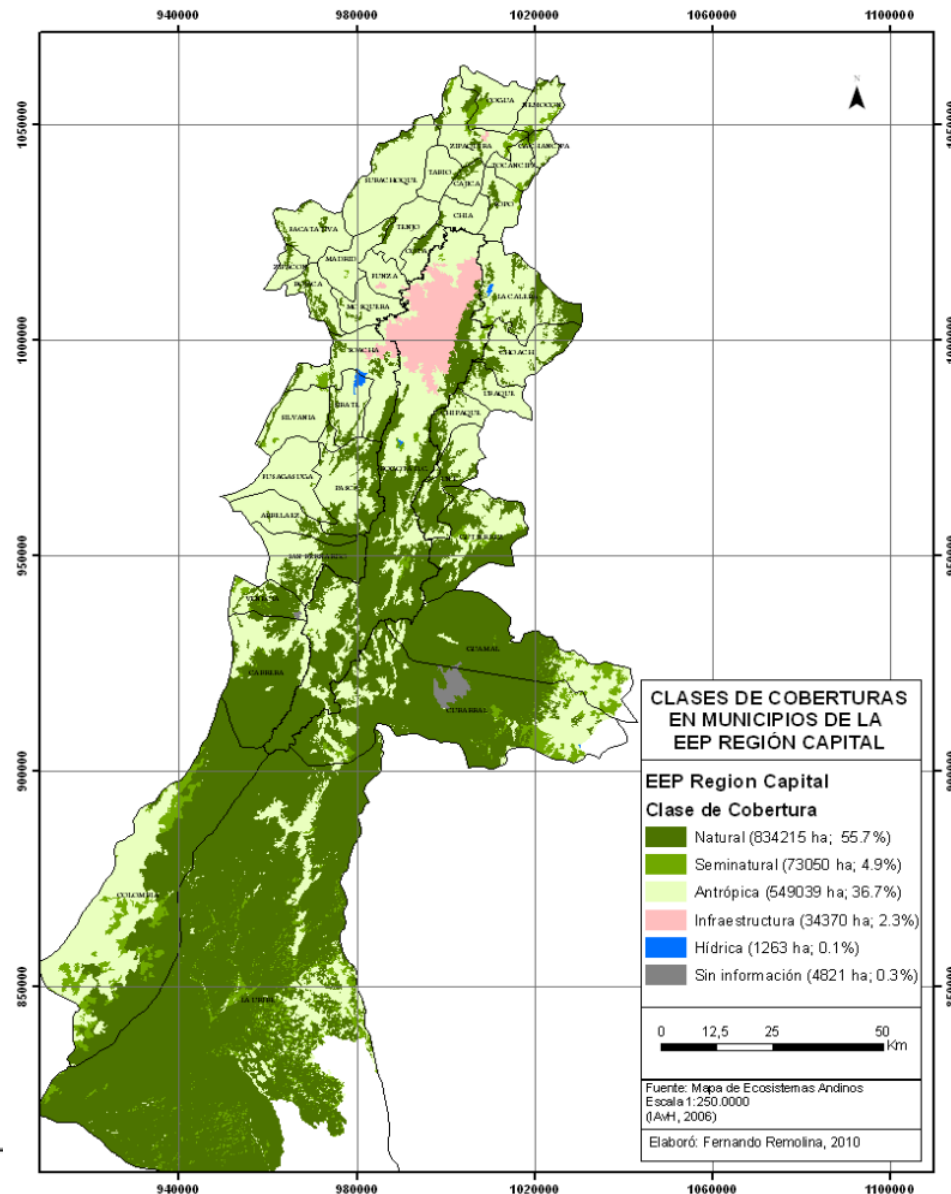
- 4.1 m² green area / inhabitant (vs 9m² – OMS)
- 4 water basins
- 15 legally defined wetlands

A city built between mountains and wetlands



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Natural ecosystems within Bogota District



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Bogotá's middle river basin



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Paramo de Sumapaz (lagunas de Bocagrande)



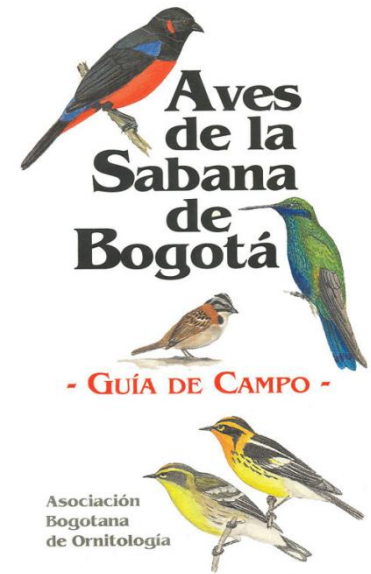
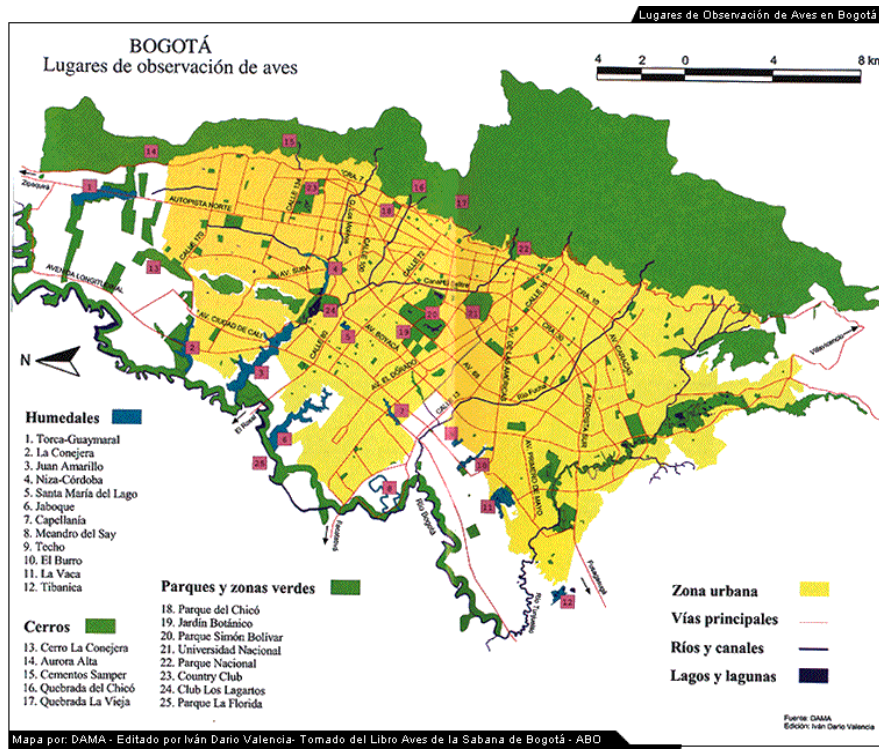
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Eastern Mountain Forest Reserve (Cerros Orientales)

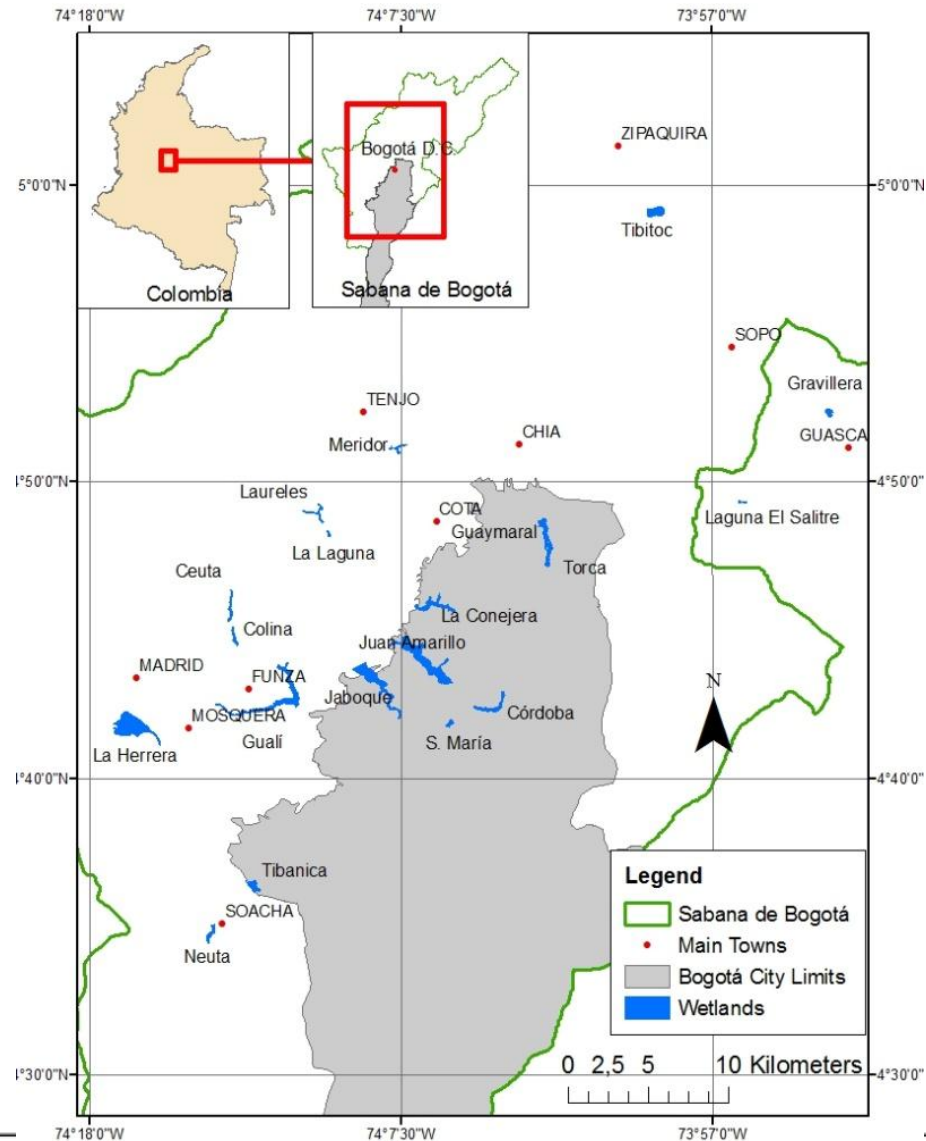


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Urban Biodiversity



Wetlands within the city and in the region



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Components of Main Ecological Structure

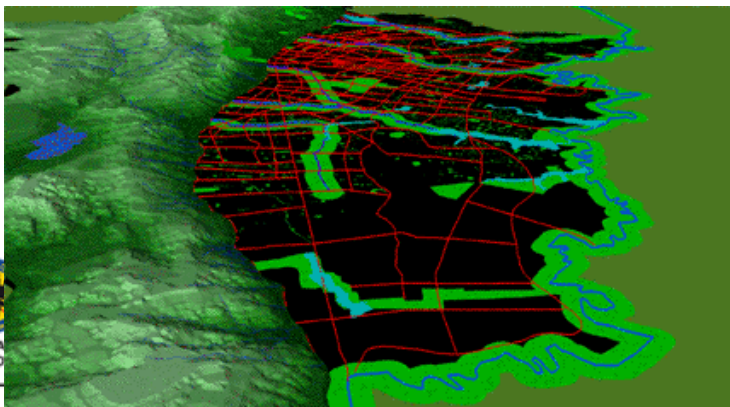
Urban
Natural
Park
(wetland)



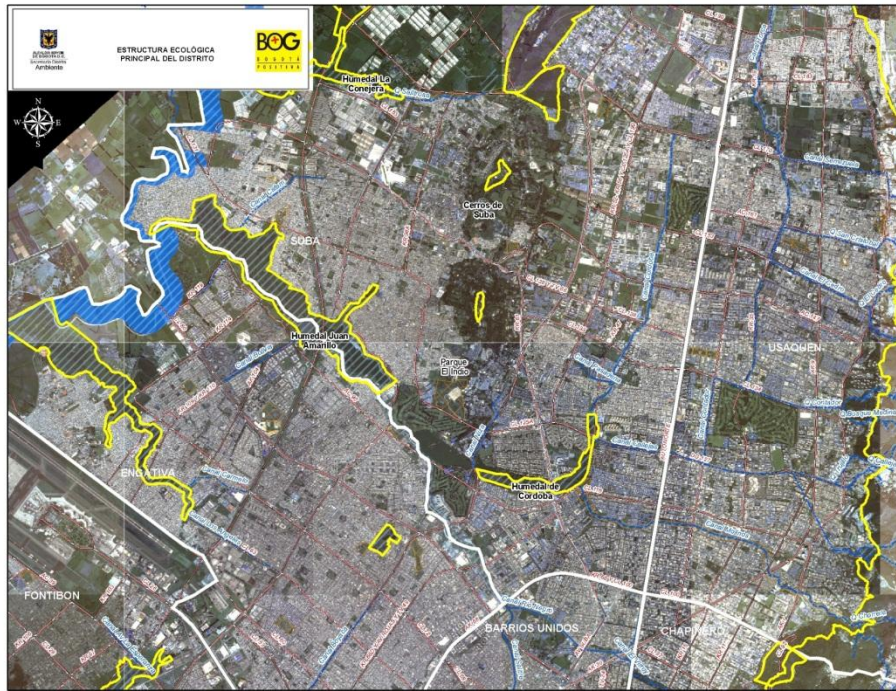
Forest
Reserve

Urban
natural
park

Drainage
system



Building biological connectivity within the city: drainage system and wetlands



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“Main Ecological Structure”: evolution of green spaces

Le Corbusier's proposal for green spaces in 1950

Current Main Ecological Structure

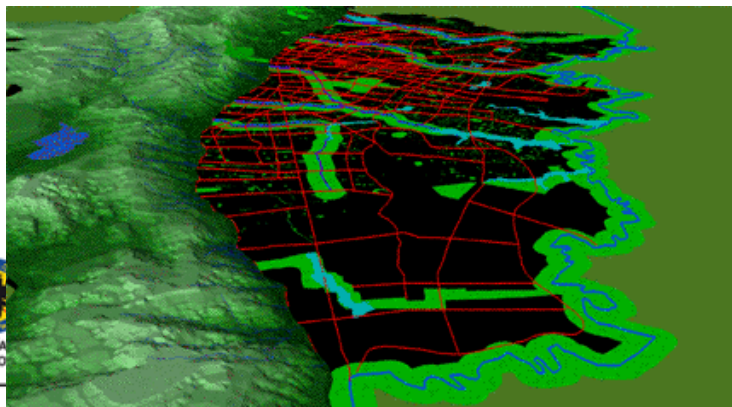
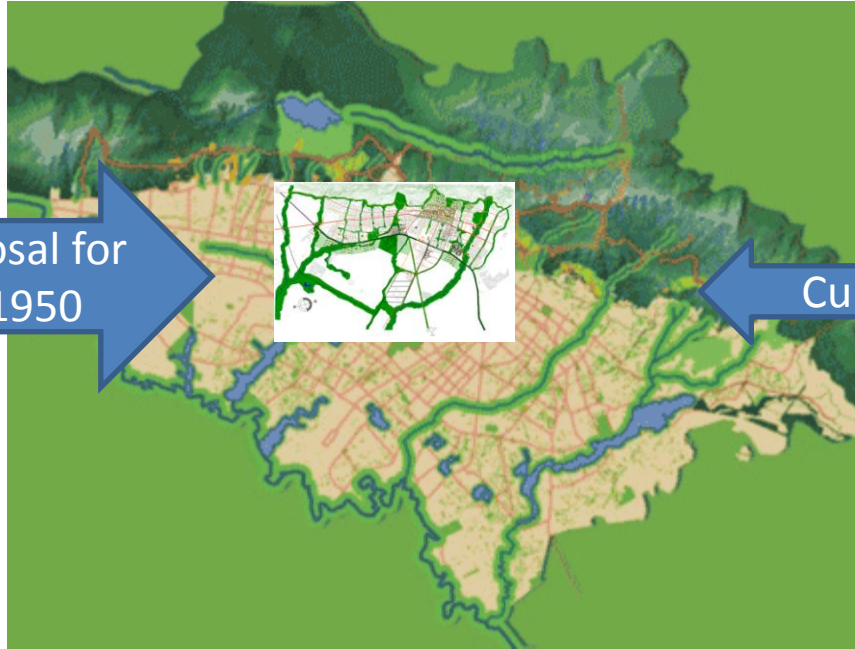


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2. Climate change: a central issue in current governmental policy

- Mitigation
 - Urbanism: densification, creation of multiple-use zones.
 - Change in Public Transport Systems:
 - Implementation of the integrated public transportation system.
 - Bike routes and bikes for public use.
 - Energy efficiency.
 - Waste management and recycling: empowerment local recycling initiatives.



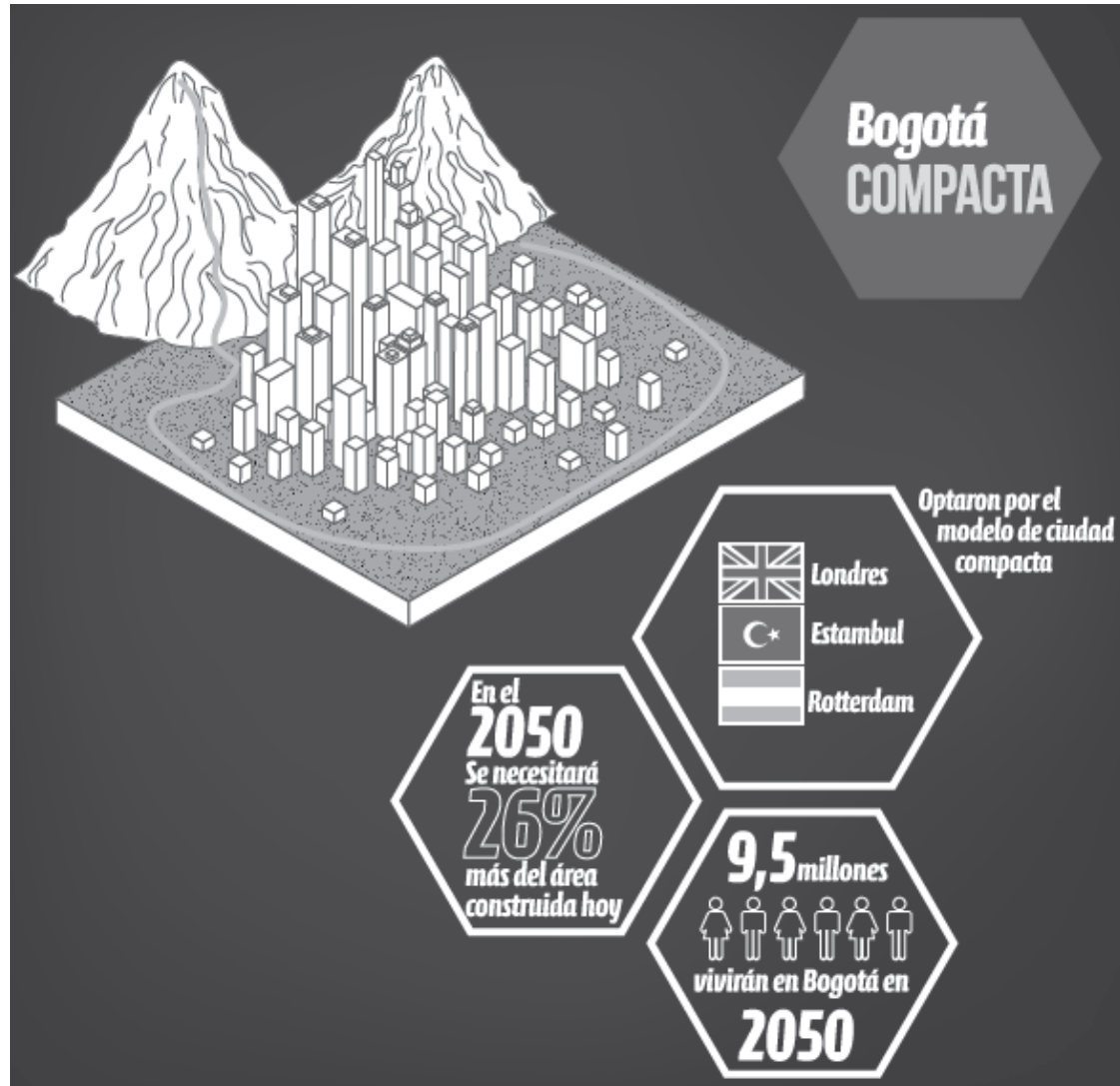
2. Climate change: a central issue in current governmental policy

- Adaptation
 - Urban Resilience: vulnerability, adaptability to extreme climate events. Lesson learnt from past 2010-2011 big-flooding-year.
 - Control of urbanization in risk prone areas.
 - Liberation of hydrological spaces.
 - Re - Naturalization of green spaces
 - Exclusion of mining within the District's territory.



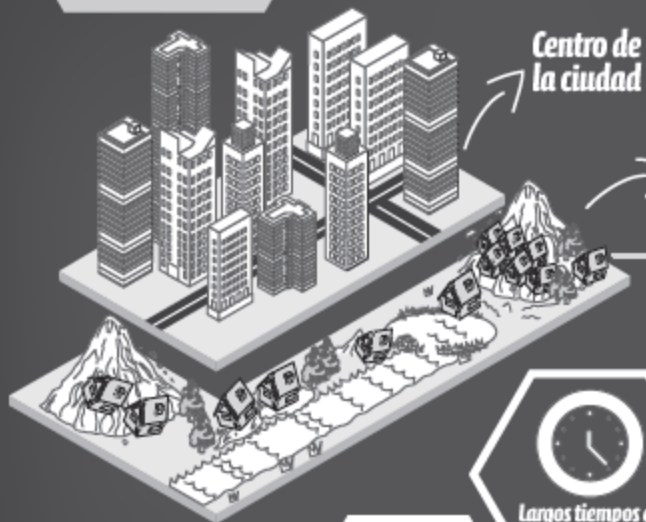
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The proposed city model: a compact city



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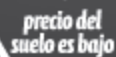
Bogotá CIUDAD INCLUYENTE



La población con menores ingresos se ve obligada a vivir en sectores periféricos

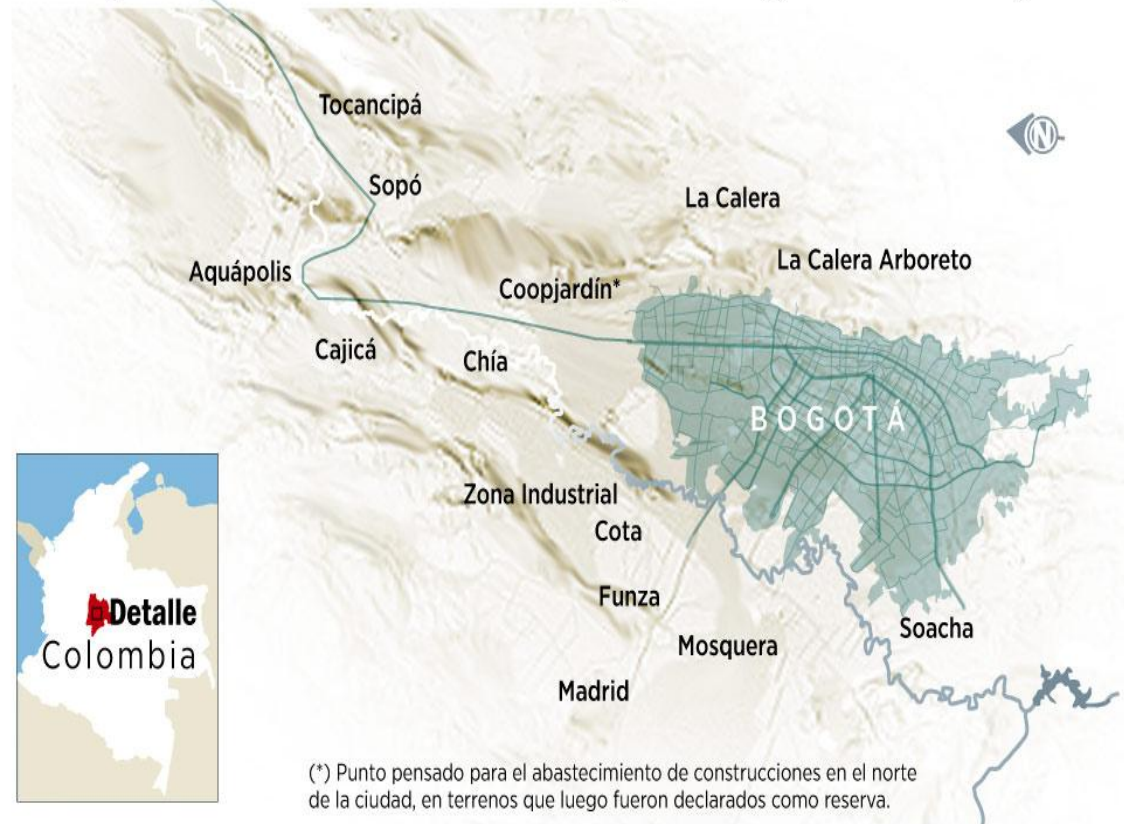
Viviendas de Interés Prioritario

VIP



Limit Water Supply outside the city to Control Urban Sprawl

¿A quiénes les vende la capital agua en bloque?



Fuente: Empresa de Acueducto de Bogotá

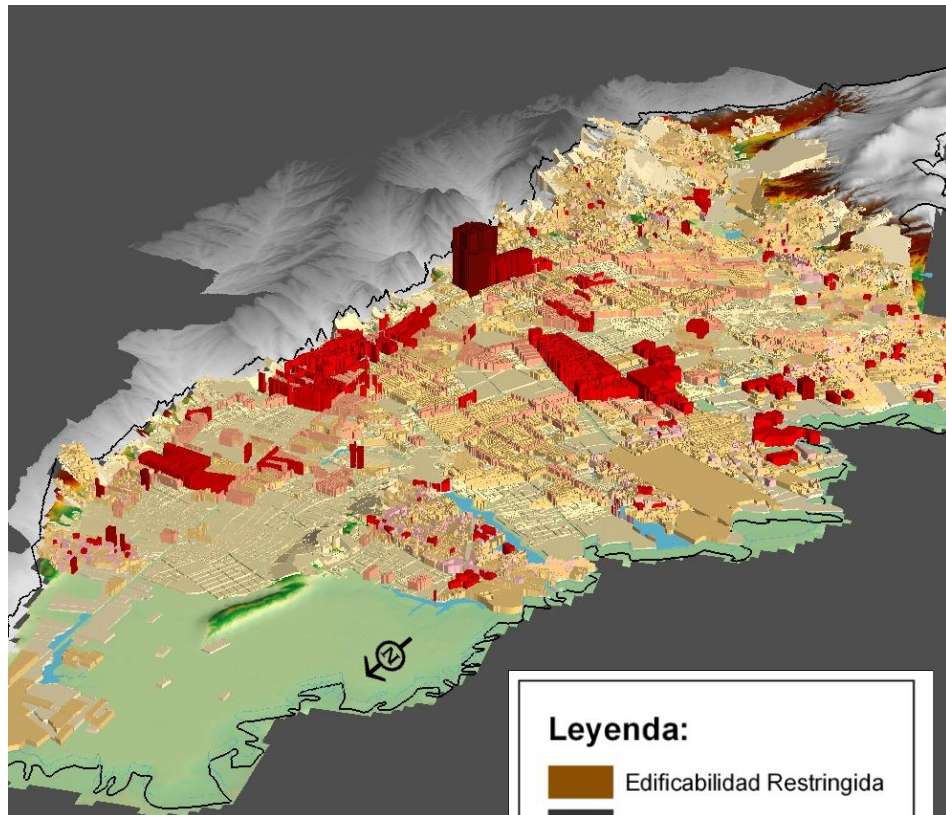


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Urban Densification

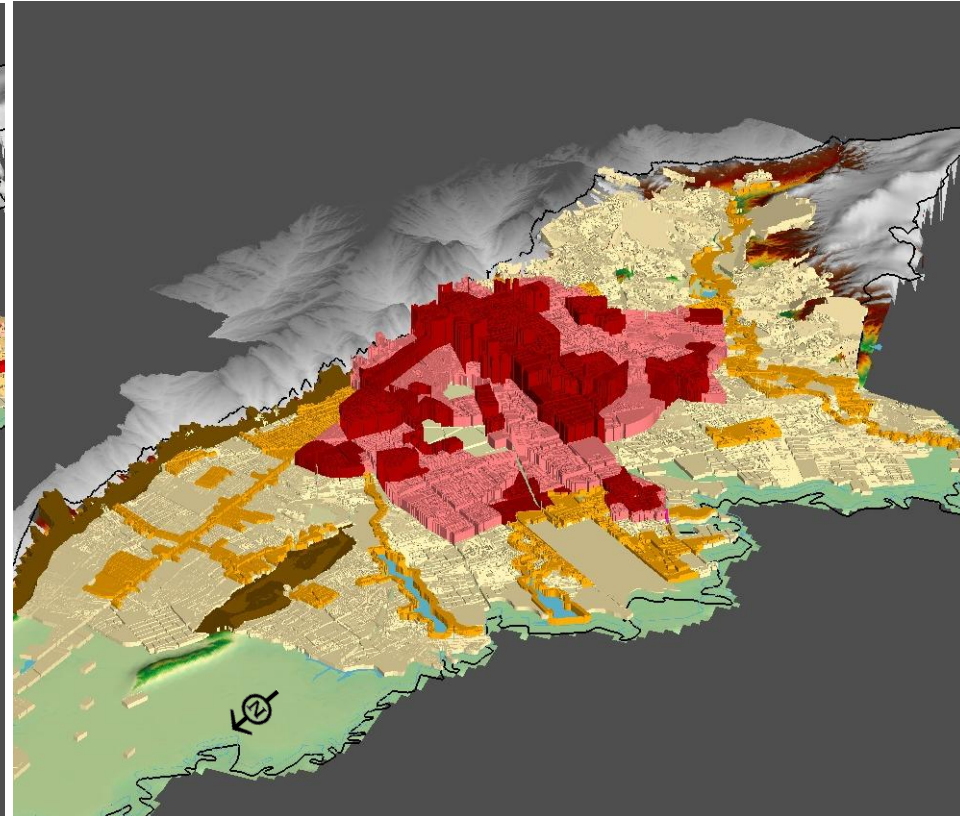
Current

Approved 2013

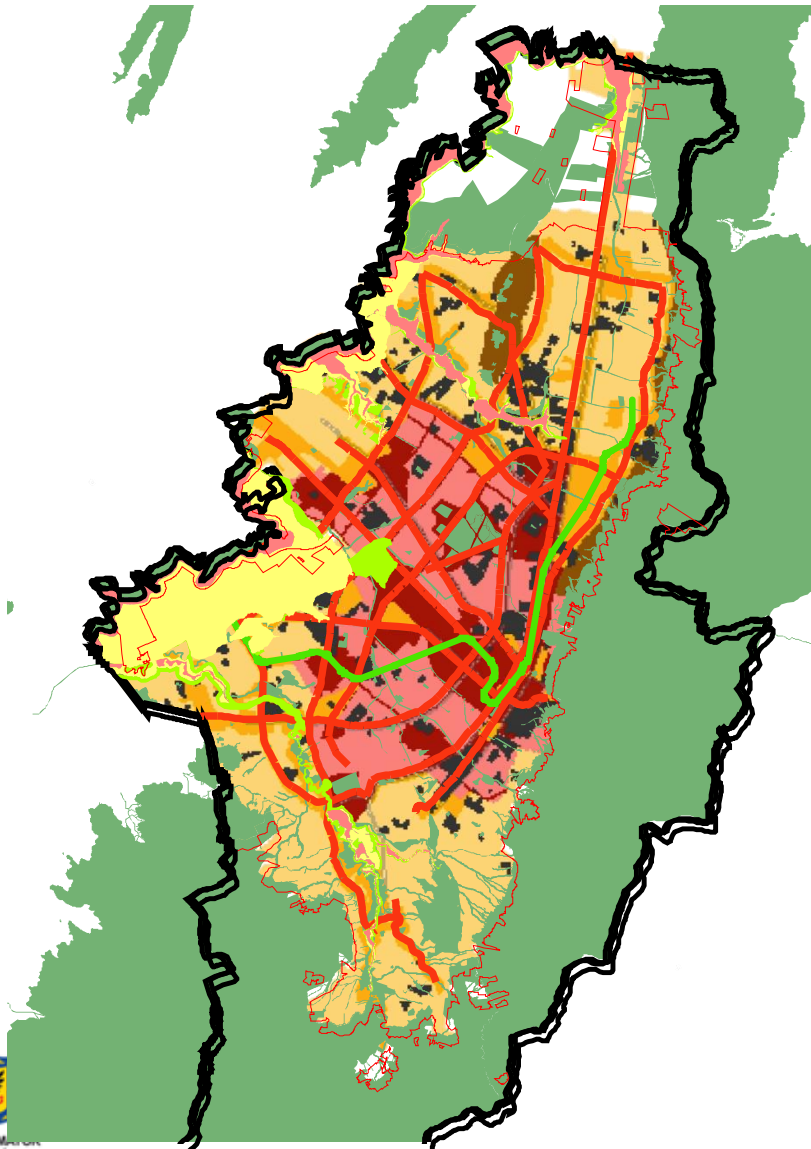


Leyenda:

- Edificabilidad Restringida
- Edificabilidad Moda
- Edificabilidad 2
- Edificabilidad 3
- Edificabilidad 5
- Edificabilidad Libre



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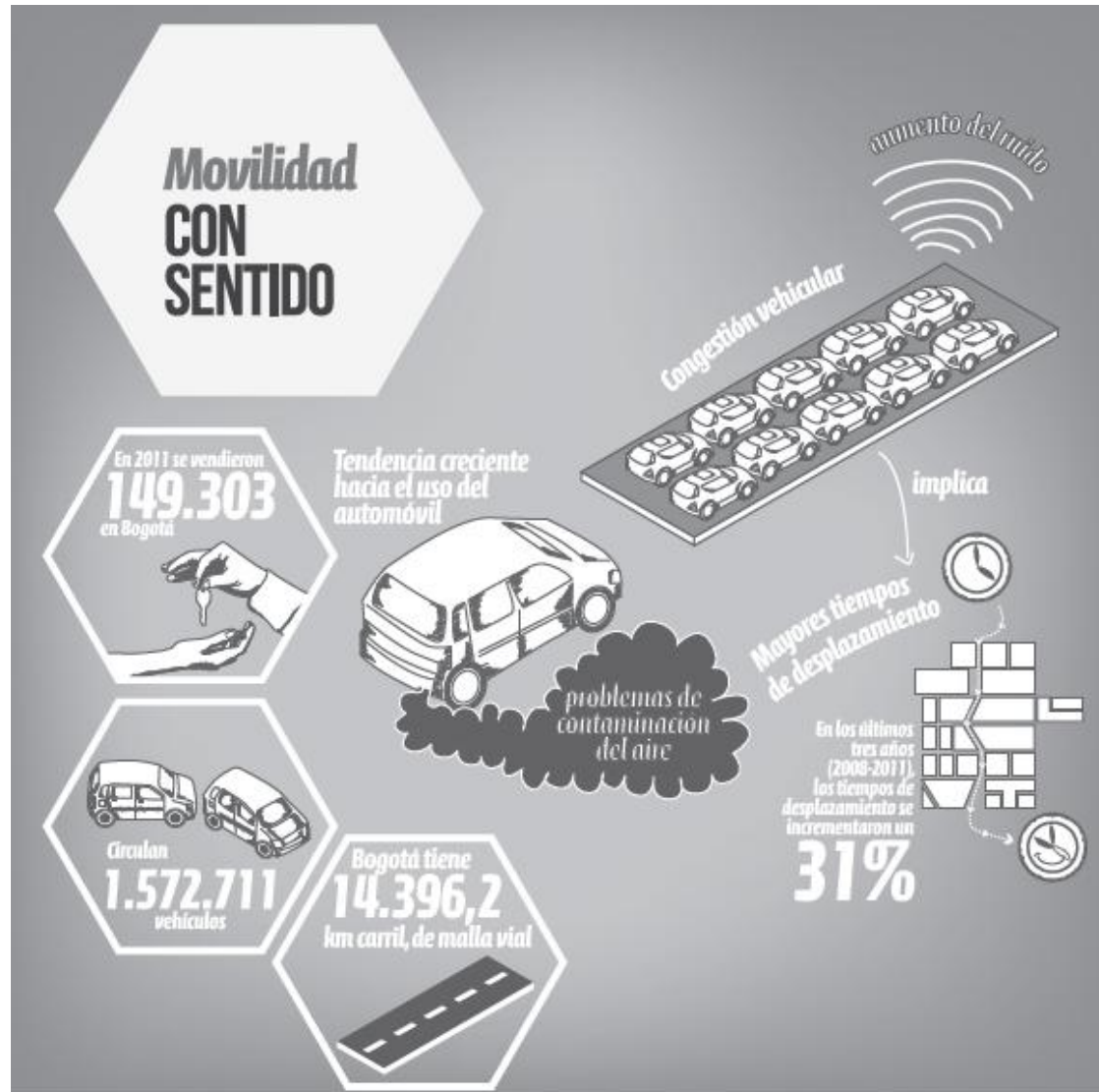


- Increase of lands under protection
- Increase salience of environmental values and ecological structure
- Restriction of urbanization in zones of high risk.
- Consolidation of public transportation system, taking advantage of environmental potential of public transportation axes
- Multifunctional land uses to facilitate emplacement of public equipment and mitigation actions
- Densification zones, and focalization in low income housing in areas with better access to urban services and job supply.



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The proposed city model: public transportation



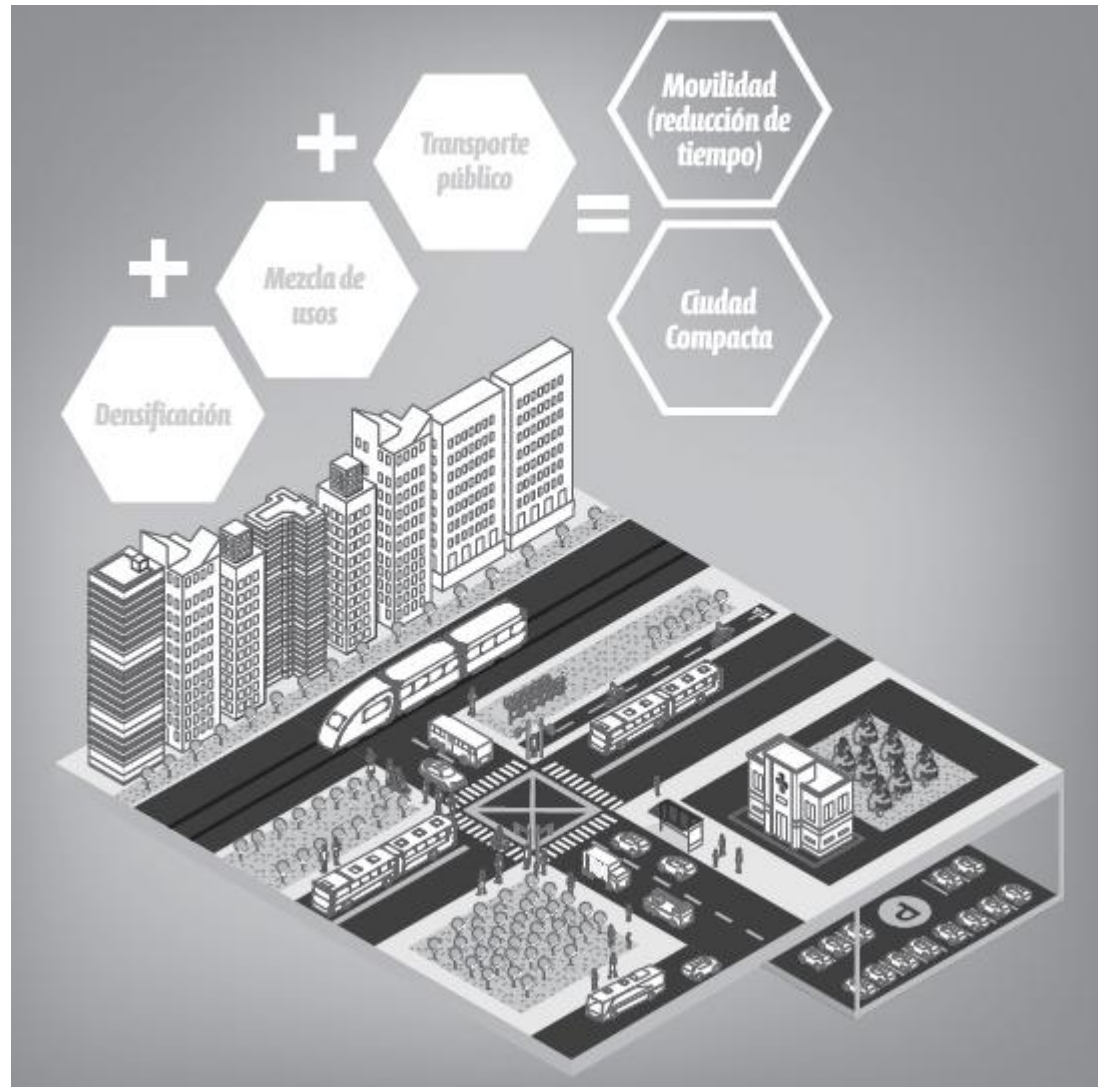
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JARDIN BOTANICO JOSE CELESTINO MUTIS

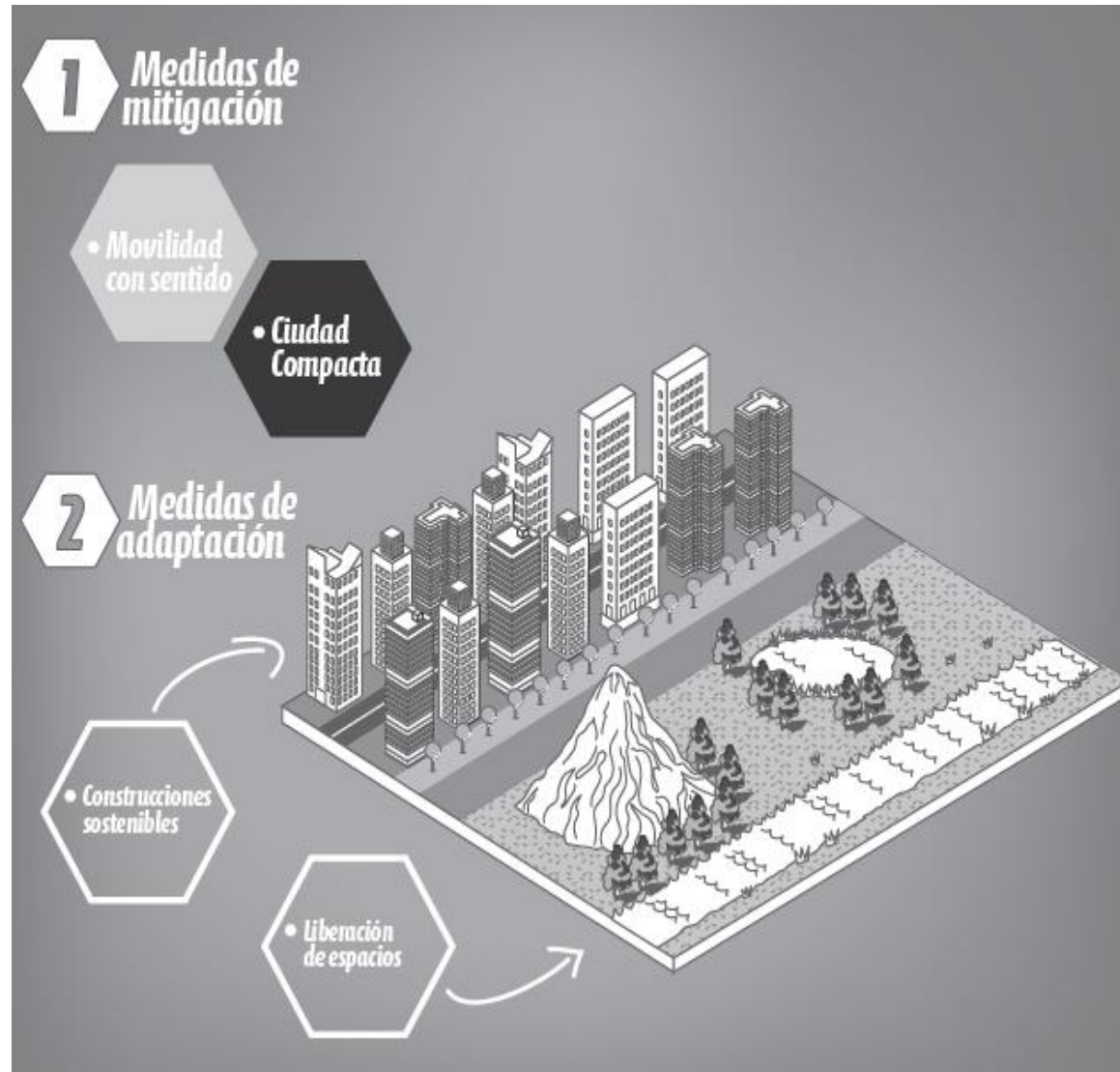


The proposed city model: multiple-use zones



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The proposed city model: New urbanism



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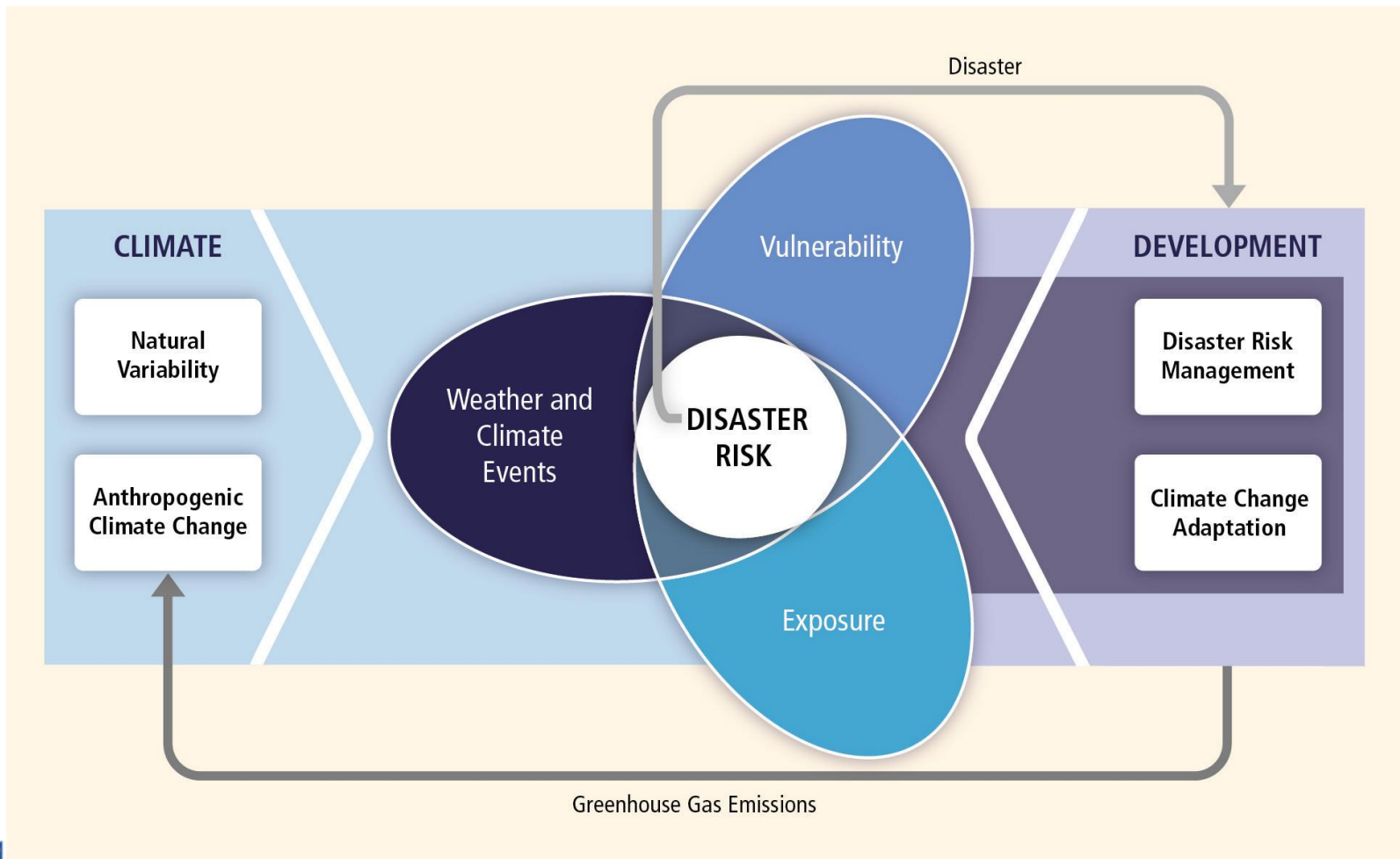
The proposed city model: climate change



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Facing-up to climate change

Following IPCC's 2012 framework of integration



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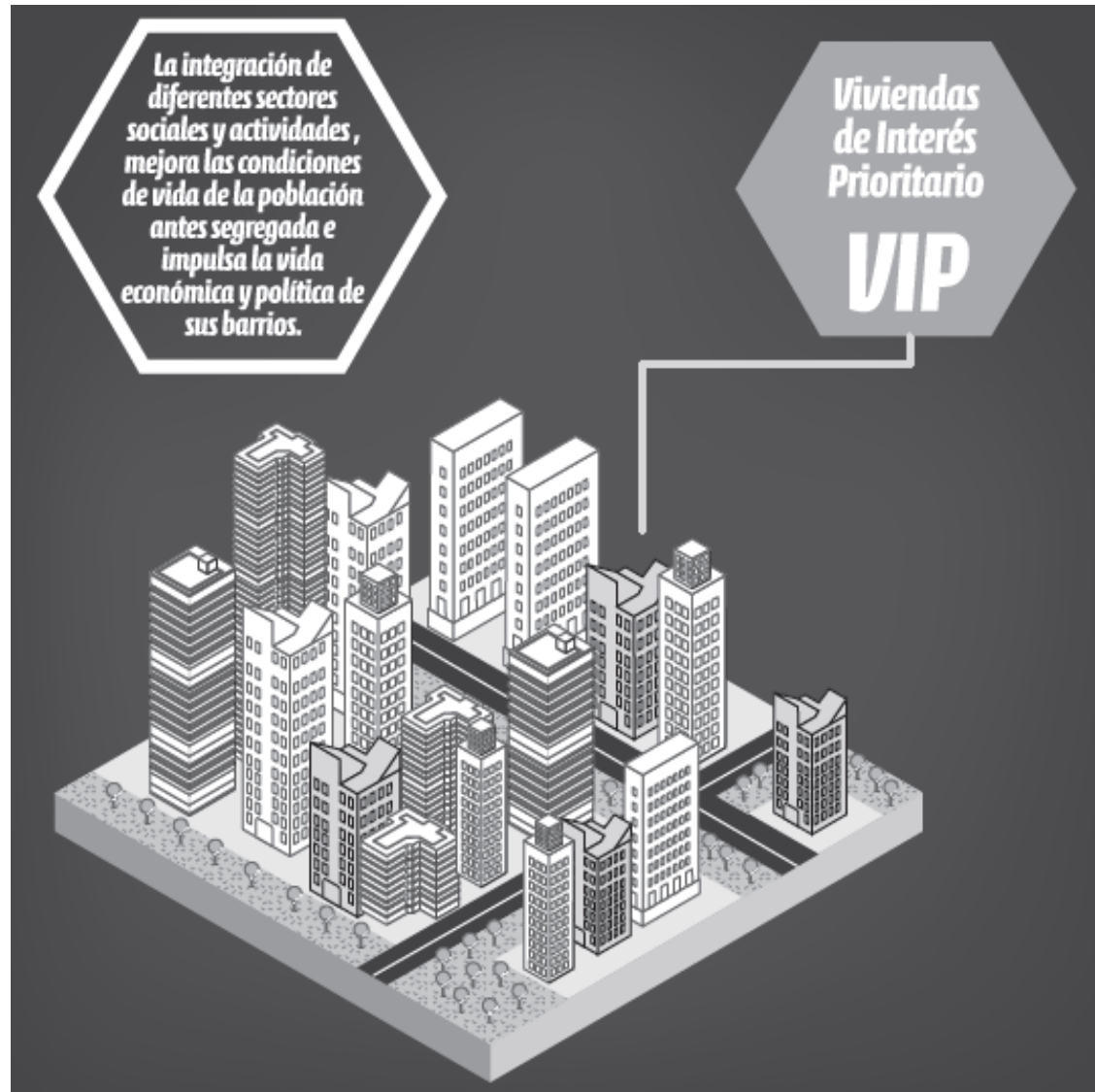
Vulnerability: Bogotá (Bosa) 2011

- La Niña 2011-2012: A major drought event



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The proposed city model: social integration



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Target of development at national level

“5 locomotives”

- Mining and oil industries,
- Infrastructure,
- Housing,
- Agro-industry (biofuels, export-oriented mono cultures)
- Science and technology.

Targets at local level Bogotá

“3 Axis”

- Overcome social segregation
- Adaptation to climate change
- An agenda oriented around the Public Domain



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National model for cities

Urban expansion on productive land

Water divertments across watersheds

Urban obligations in charge of Government



Increase of vulnerability



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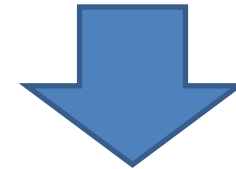
Model of cities proposed in Bogotá

Compact city

Limits to urban expansion

Regional articulation

Urban obligation in charge of private investors



Increase resilience

Orientation of rural development in National policies

Extractive economies

Infrastructure

Agro industries for export

Food trade from global markets

Trust for investors



Increase vulnerability



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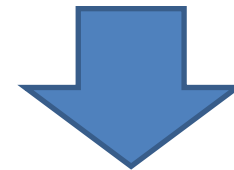
Orientation for rural policies in Bogotá

Protection for peasant economic systems (Peasant Reserve Zones ZRC)

Agro-ecology

Food sovereignty

Protection on Main Ecological Structure



Increase Resilience

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Bogotá's Green Heart

Six research programs

Main ecological structure

Environmental Education



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- Natural Ecosystems
- Green Infrastructure
- Eco urbanism
- Citizen Science
- Governance



FAUNA-FLORA

ΓΑ
HUMANANA

Urban Wetlands



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41
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Creation of Wetland Gardens



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Enrichment of Tree Species (*Venado de Oro* Humboldt Institute)



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Thanks!

Jardín Botánico de Bogotá José Celestino Mutis
www.jbb.gov.co

Victoria amazonica