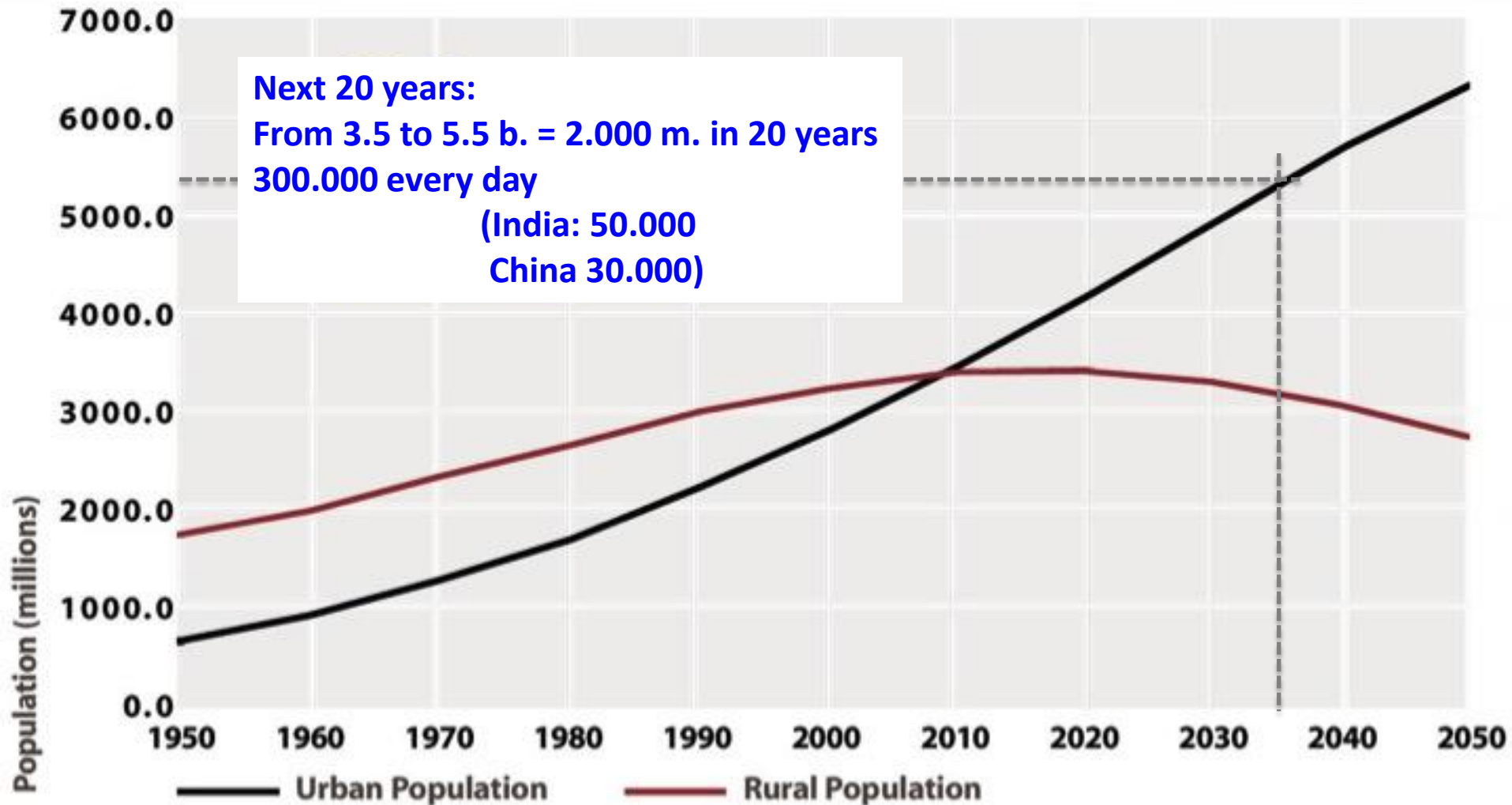


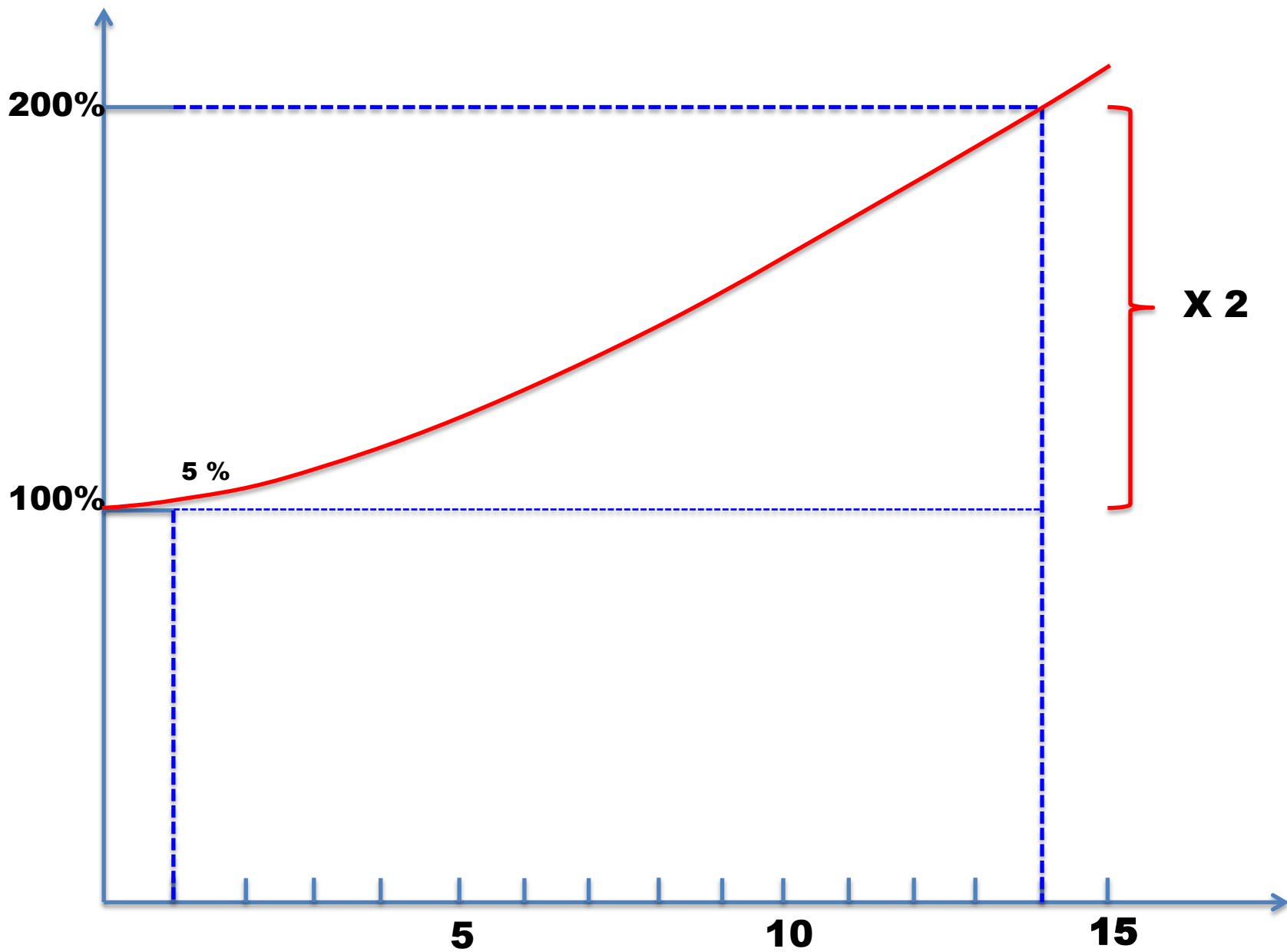


150525 Pedro B. Ortiz

MEGA-MUMBAI / MAHARASHTRA SOUTH ASIA'S CAPITAL REGION

URBAN AND RURAL POPULATION OF THE WORLD 1950 - 2050







NY City Built Area: 800 km²

**800 km² in ten years =
21 Hectares / day =
10 Manhattan blocks / day**

1) Deny

2) Look away

Result: x3 cost

Result: slums

Result: 300 years

1 v. 3/9 families

30 years challenge / 300 years to solve



Cities of more than 750,000 people

1800

2025

Map

Grid

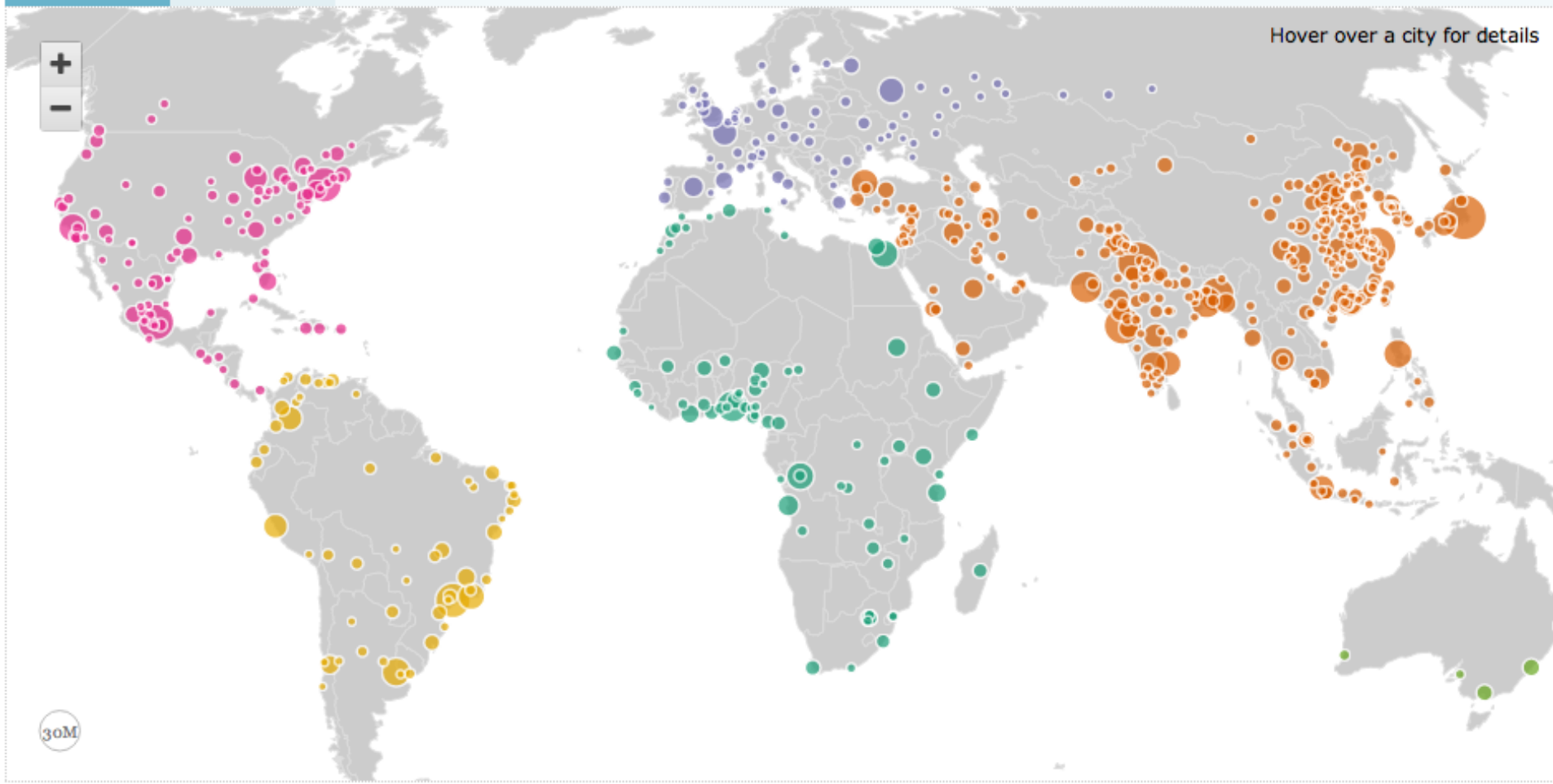
Info

2025

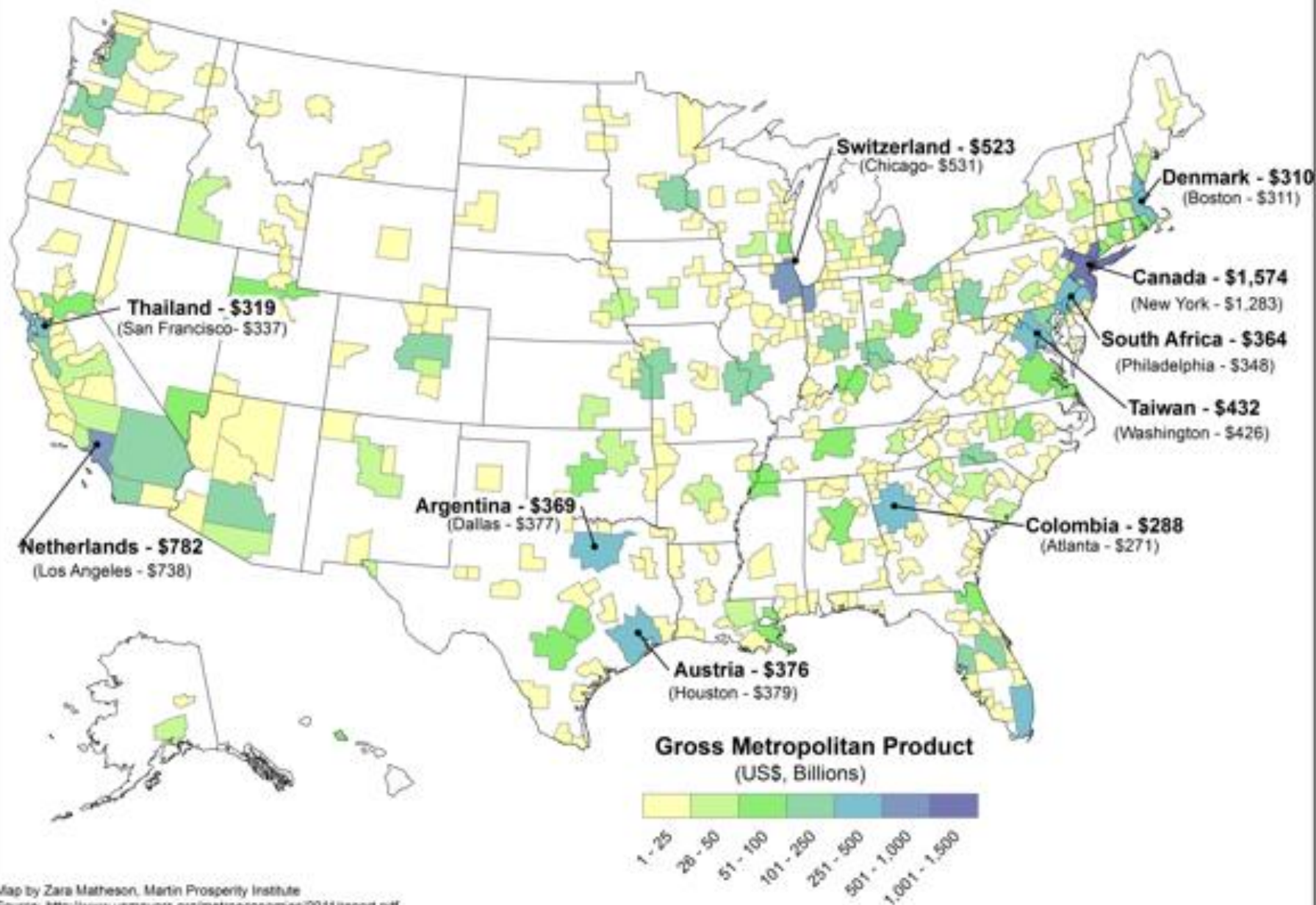
?

cities of
750,000+

If the projected populations of cities prove accurate, by 2025 Tokyo will have 38 million inhabitants; Delhi will have 33 million and Shanghai, Mumbai, Mexico City, New York-Newark, São Paulo, Dhaka, Beijing and Karachi will have 20 million+. Africa is much more prominent in the scale and concentration of large cities and will have three mega-cities: Lagos, Al-Qahirah (Cairo) and Kinshasa.



Countries & US Metros: Nearest GDP Equivalents



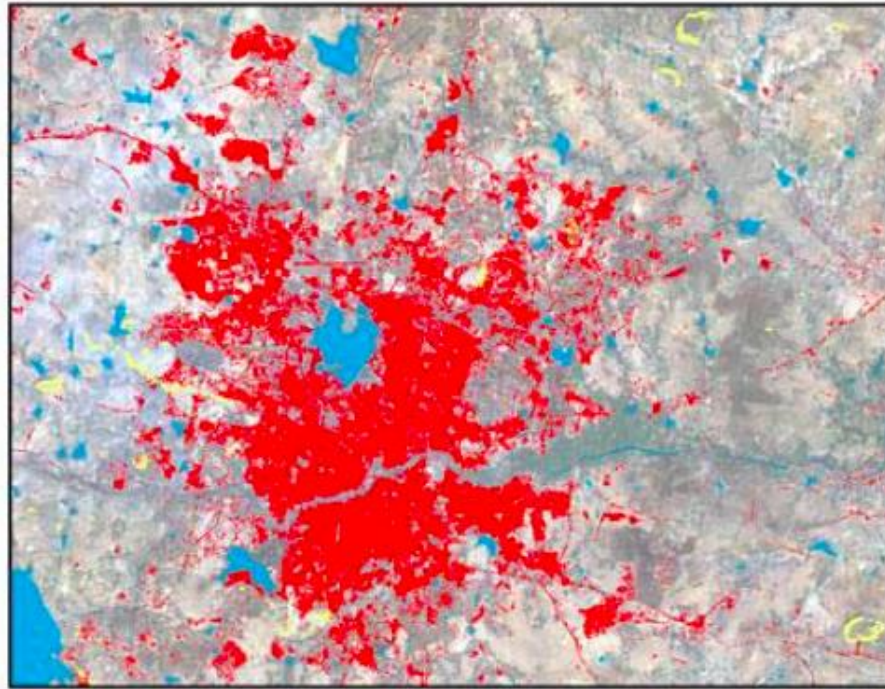
> 2.5

> 1.5

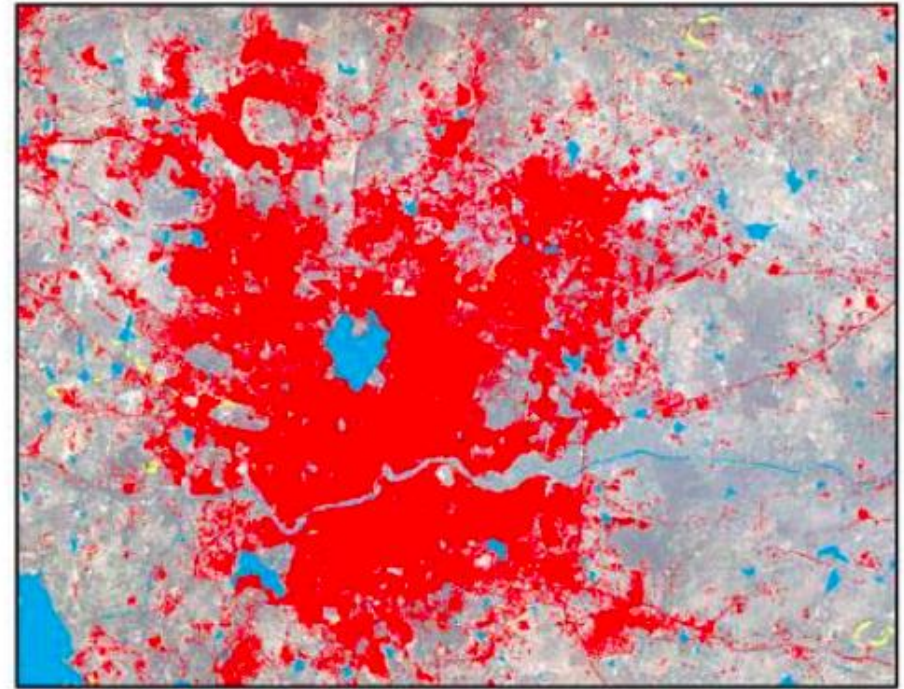
> 1.0

Rank	UA	State/Territory	Population (2011)	Population (2001)
1	Mumbai	Maharashtra	18,414,288	16,434,386
2	Delhi	Delhi	16,314,838	12,877,470
3	Kolkata	West Bengal	14,112,536	13,205,697
4	Chennai	Tamil Nadu	8,696,010	6,560,242
5	Bangalore	Karnataka	8,499,399	5,701,446
6	Hyderabad	Andhra Pradesh	7,749,334	5,742,036
7	Ahmedabad	Gujarat	6,240,201	4,525,013
8	Pune	Maharashtra	5,049,968	3,760,636
9	Surat	Gujarat	4,585,367	2,811,614
10	Jaipur	Rajasthan	3,073,350	2,322,575
11	Kanpur	Uttar Pradesh	2,920,067	2,715,555
12	Lucknow	Uttar Pradesh	2,901,474	2,245,509
13	Nagpur	Maharashtra	2,583,911	2,129,500
14	Ghaziabad	Uttar Pradesh	2,358,525	968,256
15	Indore	Madhya Pradesh	2,210,447	1,506,062
16	Coimbatore	Tamil Nadu	2,151,466	1,461,139
17	Kochi	Kerala	2,117,990	1,355,972
18	Patna	Bihar	2,046,652	1,697,976
19	Kozhikode	Kerala	2,030,519	880,247
20	Bhopal	Madhya Pradesh	1,883,381	1,458,416
21	Thrissur	Kerala	1,854,783	330,122
22	Vadodara	Gujarat	1,817,191	1,491,045
23	Agra	Uttar Pradesh	1,746,467	1,331,339
24	Visakhapatnam	Andhra Pradesh	1,730,320	1,345,938
25	Malappuram	Kerala	1,698,645	170,409
26	Thiruvananthapuram	Kerala	1,687,406	889,635
27	Kannur	Kerala	1,642,892	498,207
28	Ludhiana	Punjab	1,613,878	1,398,467
29	Nashik	Maharashtra	1,562,769	1,152,326
30	Vijayawada	Andhra Pradesh	1,491,202	1,039,518
31	Madurai	Tamil Nadu	1,462,420	1,203,095
32	Varanasi	Uttar Pradesh	1,435,113	1,203,961
33	Meerut	Uttar Pradesh	1,424,908	1,161,716
34	Rajkot	Gujarat	1,390,933	1,003,015
35	Faridabad	Haryana	1,404,653	1,055,938
36	Jamshedpur	Jharkhand	1,337,131	1,104,713
37	Srinagar	Jammu and Kashmir	1,273,312	988,210
38	Jabalpur	Madhya Pradesh	1,267,564	1,098,000
39	Asansol	West Bengal	1,243,008	1,067,369
40	Allahabad	Uttar Pradesh	1,216,719	1,042,229
41	Dhanbad	Jharkhand	1,195,298	1,065,327
42	Vasai-Virar	Maharashtra	1,221,233	NA
43	Aurangabad	Maharashtra	1,189,376	892,483
44	Amritsar	Punjab	1,183,705	1,003,917
45	Jodhpur	Rajasthan	1,137,815	860,818
46	Ranchi	Jharkhand	1,126,741	863,495
47	Raipur	Chhattisgarh	1,122,555	700,113
48	Kollam	Kerala	1,110,005	380,091
49	Gwalior	Madhya Pradesh	1,101,981	865,548
50	Durg-Bhilainagar	Chhattisgarh	1,064,077	927,864
51	Chandigarh	Chandigarh	1,025,682	808,515
52	Tiruchirappalli	Tamil Nadu	1,021,717	866,354
53	Kota	Rajasthan	1,001,365	703,150

Hyderabad, India



T₁: 21-Nov-89



T₂: 29-Oct-01

0 4 8 12 16 km

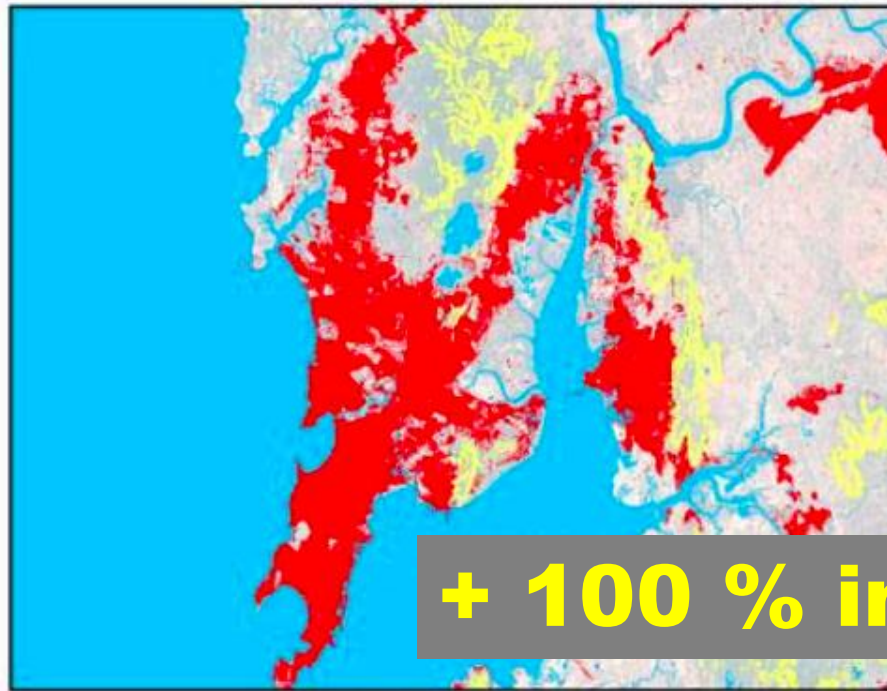
1:300,000

- Water
- Excessive slope
- Built-up area



			Annual
Measure	T ₁	T ₂	% Change
Population	4,887,789	5,707,677	1.31%
Built-Up Area (sq km)	166.96	301.89	5.09%
Average Density (persons / sq km)	29,275.98	18,906.43	-3.60%
Built-Up Area per Person (sq m)	34.16	52.89	3.73%
Average Slope of Built-Up Area (%)	2.82	3.12	0.84%
Maximum Slope of Built-Up Area (%)	14.43	17.16	1.46%
The Buildable Perimeter (%)	0.94	0.93	-0.04%
The Contiguity Index	0.75	0.88	1.36%
The Compactness Index	0.37	0.38	0.22%
Per Capita Gross Domestic Product	\$1,541.53	\$2,343.04	3.57%

Mumbai, India



T₁: 9-Nov-92



T₂: 25-Oct-01

+ 100 % in 23 years

0 8 16 24 32 km

1:475,000

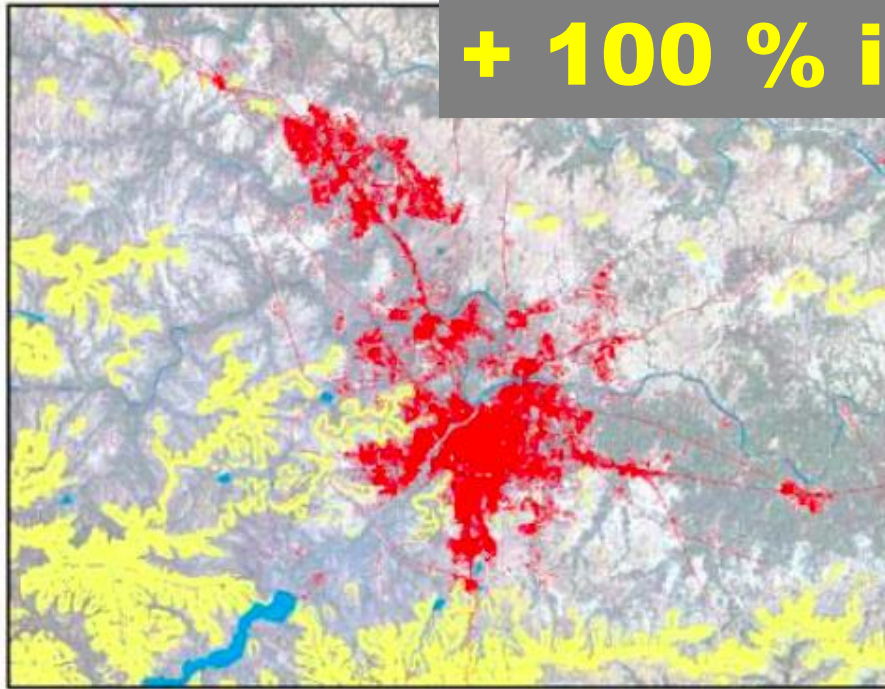
Water
Excessive slope
Built-up area



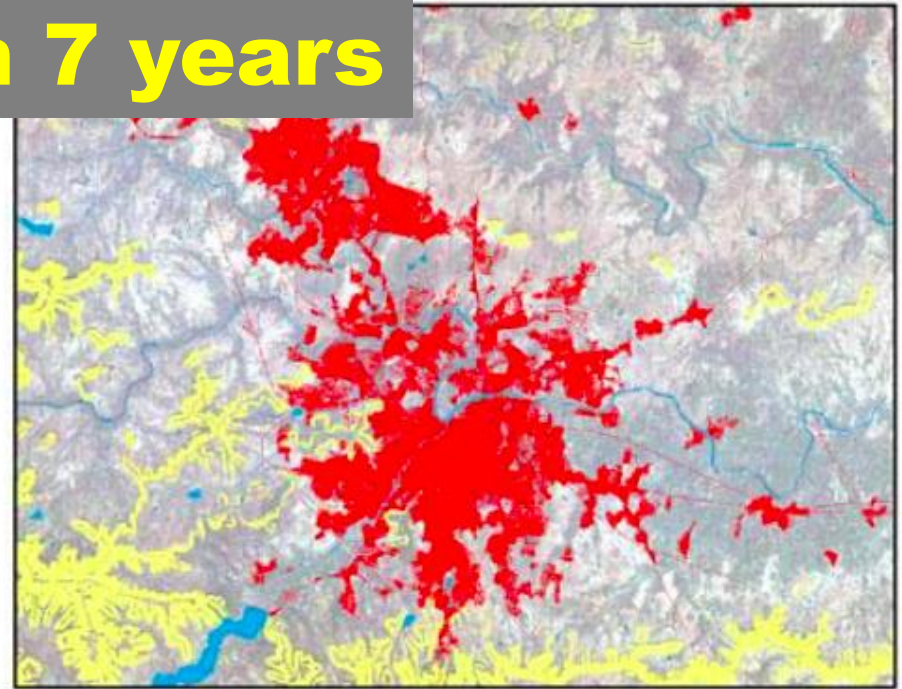
Measure	T ₁	T ₂	Annual % Change
Population	14,223,505	17,069,993	2.06%
Built-Up Area (sq km)	344.33	450.60	3.05%
Average Density (persons / sq km)	41,307.79	37,882.69	-0.96%
Built-Up Area per Person (sq m)	24.21	26.40	0.97%
Average Slope of Built-Up Area (%)	3.65	3.68	0.11%
Maximum Slope of Built-Up Area (%)	22.81	23.86	0.51%
The Buildable Perimeter (%)	0.70	0.78	1.27%
The Contiguity Index	0.69	0.65	-0.75%
The Compactness Index	0.46	0.53	1.77%
Per Capita Gross Domestic Product	\$1,710.64	\$2,342.15	3.57%

Pune, India

+ 100 % in 7 years



T₁: 4-Dec-92



T₂: 14-Nov-99

0 6 12 18 24 km

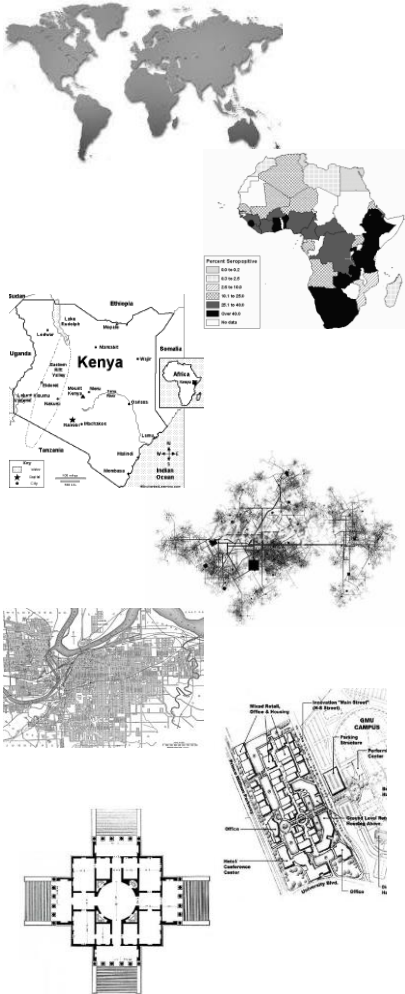
1:400,000

- Water
- Excessive slope
- Built-up area

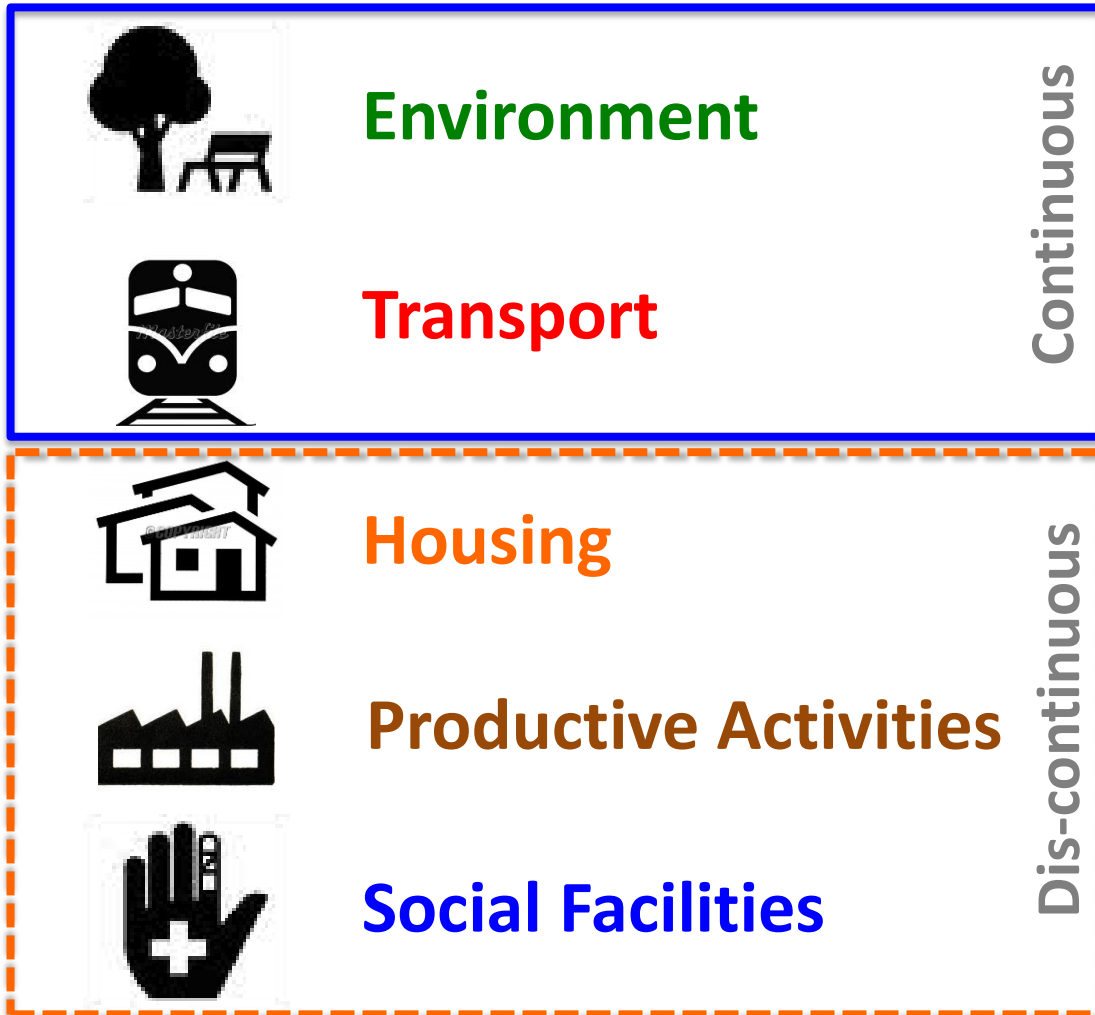


Measure	T ₁	T ₂	Annual % Change
Population	3,508,945	4,041,868	2.06%
Built-Up Area (sq km)	92.54	191.20	11.02%
Average Density (persons / sq km)	37,916.96	21,139.08	-8.07%
Built-Up Area per Person (sq m)	26.37	47.31	8.78%
Average Slope of Built-Up Area (%)	2.61	3.24	3.21%
Maximum Slope of Built-Up Area (%)	13.19	17.38	4.06%
The Buildable Perimeter (%)	0.99	0.99	-0.05%
The Contiguity Index	0.57	0.66	1.99%
The Compactness Index	0.30	0.42	5.00%
Per Capita Gross Domestic Product	\$1,714.75	\$2,187.57	3.57%

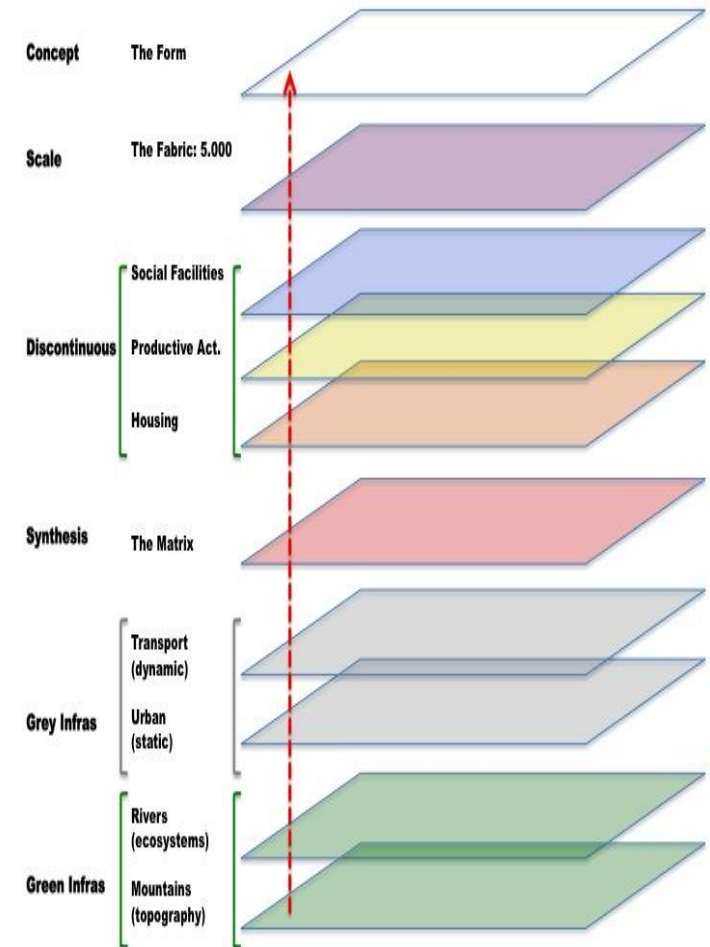
Spatial Scales and Disciplinary approach

	Scale	Discipline	Knowledge areas
	1: 50.000.000	Geopolitics	UN. NATO. US. EU. IMF, OPEP,
	1: 5.000.000	'Regional' (Continental) Politics	UN. OAS. WB. BID. ADB. AFDB.
	1: 500.000	National Development	Politics, Economics, Sociology, Environment, Geography
	1: 50.000	Regional Planning	Economics, Sociology, Infrastructure, Environment, Utilities
	1: 5.000	Urban Planning	Housing, Industrial, Services, Commerce, Transport, Environment
	1: 500	Urban design	Space, Volume, Semiotics, Engineering,
	1: 50	Architecture	Light, Space, Texture, Materials, Structure, Installations, Budget

URBAN SECTORS



COORDINATION



Economic

Economic Efficiency

Built Environment

- Infrastructures
- Economic Investment

Sustainable Development

Physical Environment

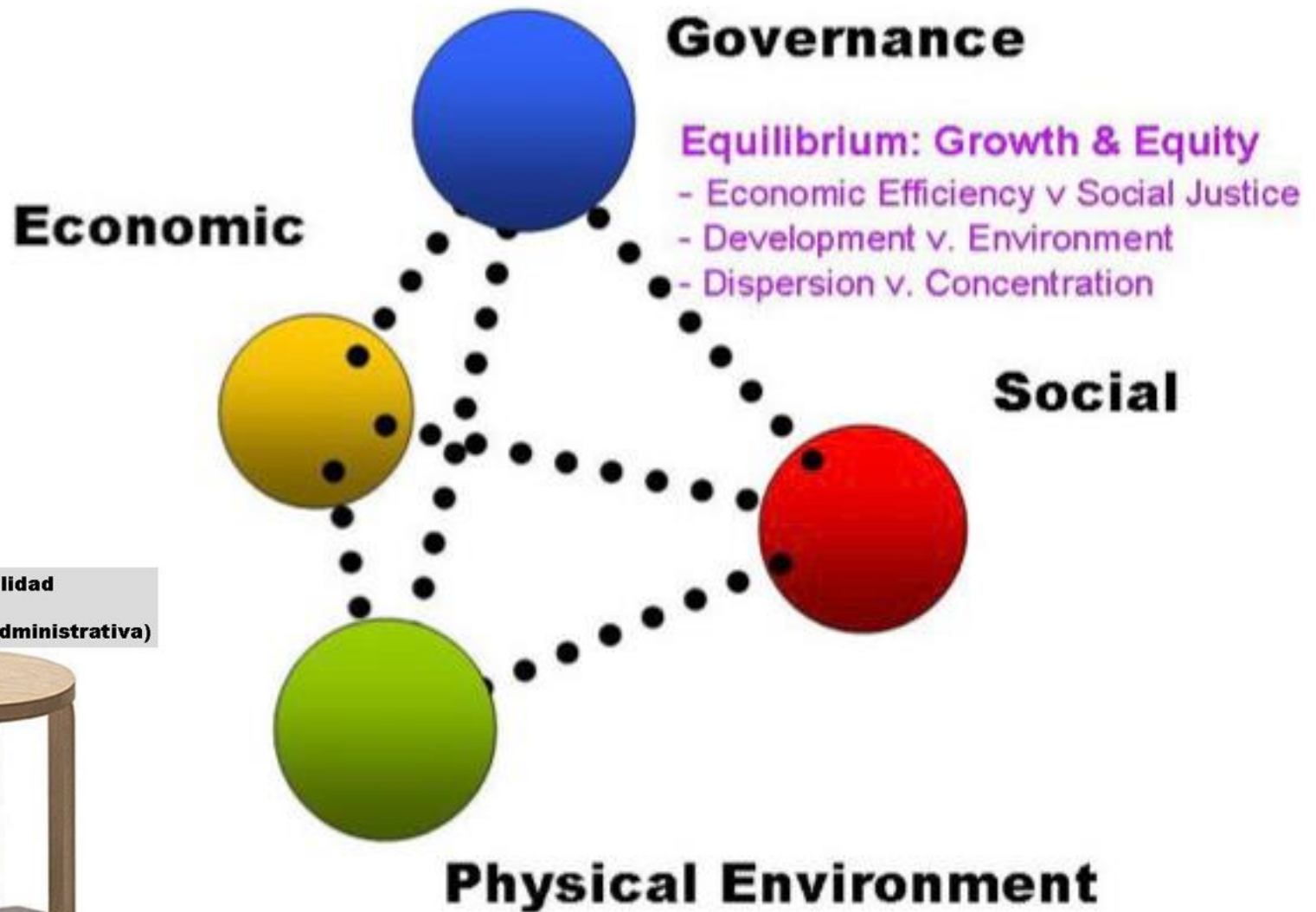
Dichotomy

Social

Social Equity

Redistribution

- Collective Consumption
- Accessibility to Opportunities



Institucionalidad
objetivo

(Coordinacion Interadministrativa)

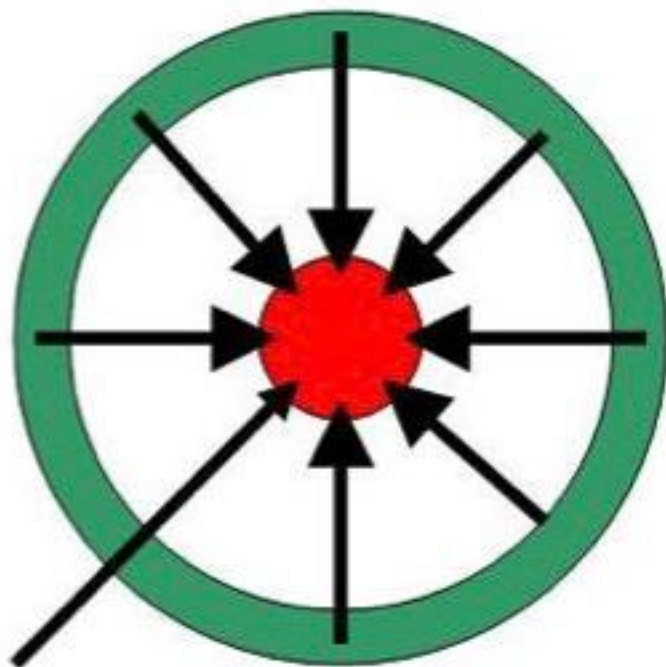


Social
(Justicia)

Económica
(Eficacia)

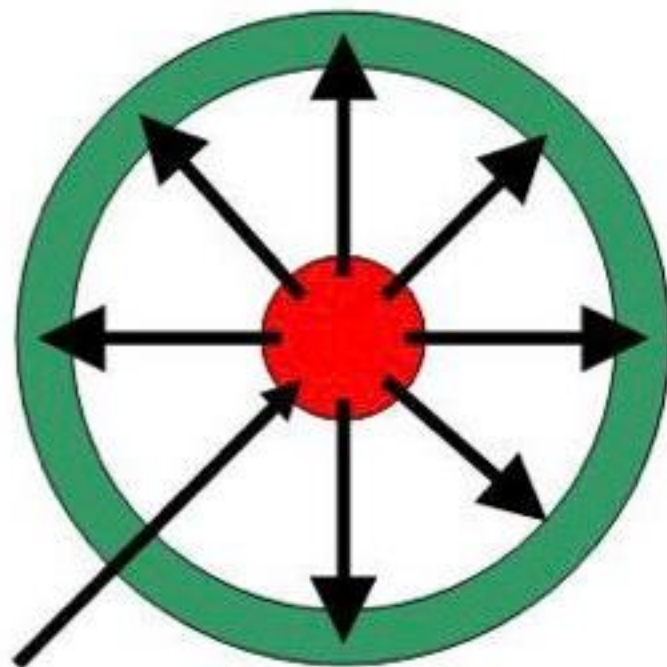
Territorial (Sostenibilidad)

Economic Efficacy



Efficacy = Concentration

v. Social Justice

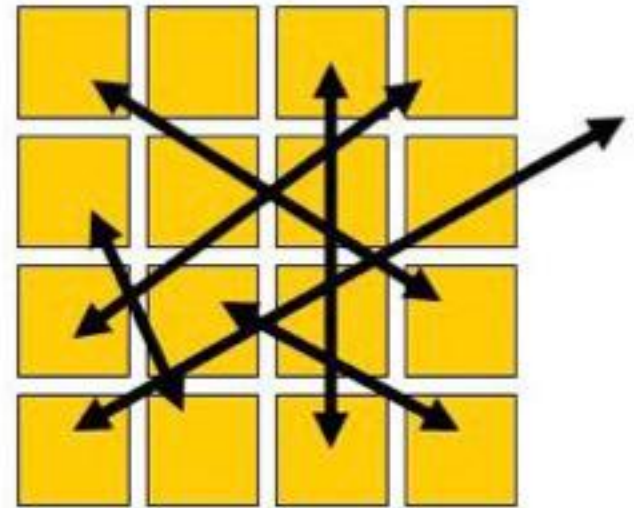
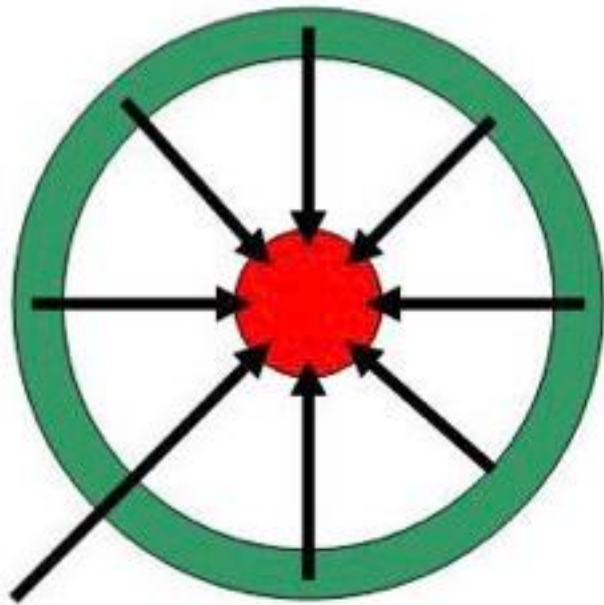


Dispersion = Redistribution

Scale Leap

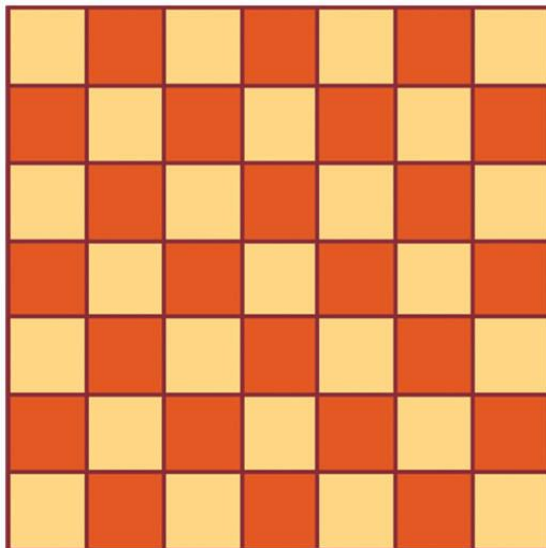
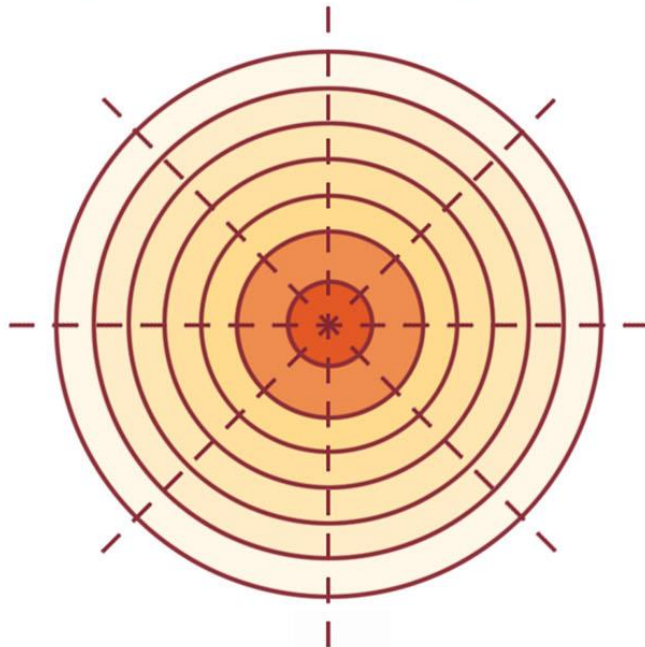
—

Evolution of Species



Radial – Orbital System

Reticular – Polynuclear System





A detailed map of the urban structure of Madrid, showing the grid system and major roads. The map is oriented with North at the top. Major roads are labeled: AVE VALLADOLID (top left), AVE SEVILLA (bottom center), AVE BARCELONA (right), and AVE MADRID (top right). The grid is composed of green squares (blocks) and red squares (streets). Key locations marked include: ZONA DE NÚCLEO CASTELLANA (top left), ZONA DE NÚCLEO CANTILLANA (top center), ZONA DE NÚCLEO VALLEHERO (top right), ZONA DE NÚCLEO CAMPESTRE (middle left), ZONA DE NÚCLEO CAMPO REAL (middle right), ZONA DE NÚCLEO DEL REY (bottom left), and ZONA DE NÚCLEO DEL PRÍNCIPE (bottom right). The map also shows the location of the AVE VALLADOLID, AVE SEVILLA, AVE BARCELONA, and AVE MADRID. The map is divided into four quadrants by the AVE VALLADOLID and AVE SEVILLA. The quadrants are labeled: N-I (top left), N-II (top right), N-III (bottom right), and N-IV (bottom left). The map also shows the location of the AVE VALLADOLID, AVE SEVILLA, AVE BARCELONA, and AVE MADRID. The map is divided into four quadrants by the AVE VALLADOLID and AVE SEVILLA. The quadrants are labeled: N-I (top left), N-II (top right), N-III (bottom right), and N-IV (bottom left).

The diagram illustrates the spatial organization of a city, showing various urban forms and their relationships to transportation networks and land use patterns. The city is depicted within a green diamond-shaped boundary, with a central area labeled 'Historic Nucleus' and surrounding areas labeled 'Further Housing Development Growth' and 'Infrastructure Networks and Utilities'. The city is divided into several distinct zones, each with specific characteristics and functions. The zones are defined by a network of red lines representing major transportation routes, including 'Commuter Train', 'Heavy Industry Rail & Road Access', 'Road Network Primary & Secondary', and 'Interurban Road Network'. The zones include 'New Developments', 'Social Facilities', 'Urban Centrality', 'Peripheral Commercial Centers', 'Entrepreneurial Production Locations', and 'Large Regional Facilities'. The diagram also shows 'Interstitia Environmental Protection and Compensation' areas, which are green spaces located between the urban zones. The overall layout suggests a multi-centered urban form with a mix of land uses and a strong emphasis on transportation infrastructure.

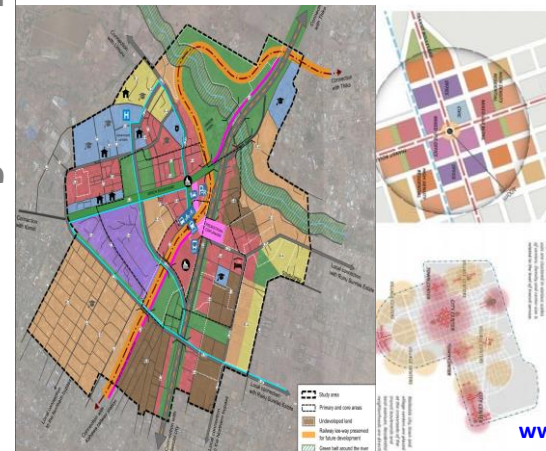
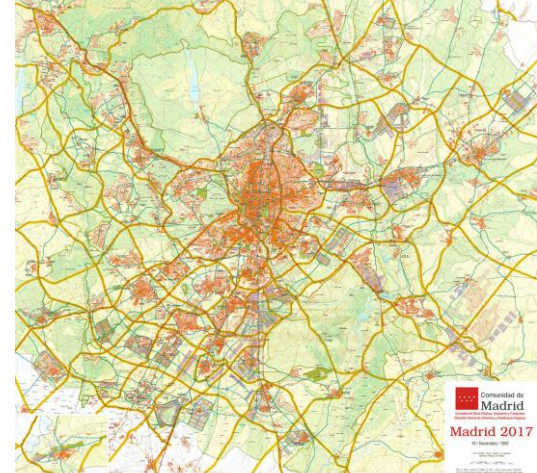
Labels and descriptions in the diagram include:

- Commuter Train
- Heavy Industry Rail & Road Access
- Road Network Primary & Secondary
- Historic Nucleus
- Further Housing Development Growth
- Infrastructure Networks and Utilities
- Interstitia Environmental Protection and Compensation
- New Developments
- Social Facilities
- Urban Centrality
- Peripheral Commercial Centers
- Entrepreneurial Production Locations
- Large Regional Facilities
- Interurban Road Network

The Centrality Stereotype

- 1) Intermodal Station Buses/taxis/parking
- 2) Public/Green Space
- 3) Commercial
- 4) Office/Business
- 5) Institutional Building
- 6) Social Facilities
- 7) Iconic social reference

Required contiguity

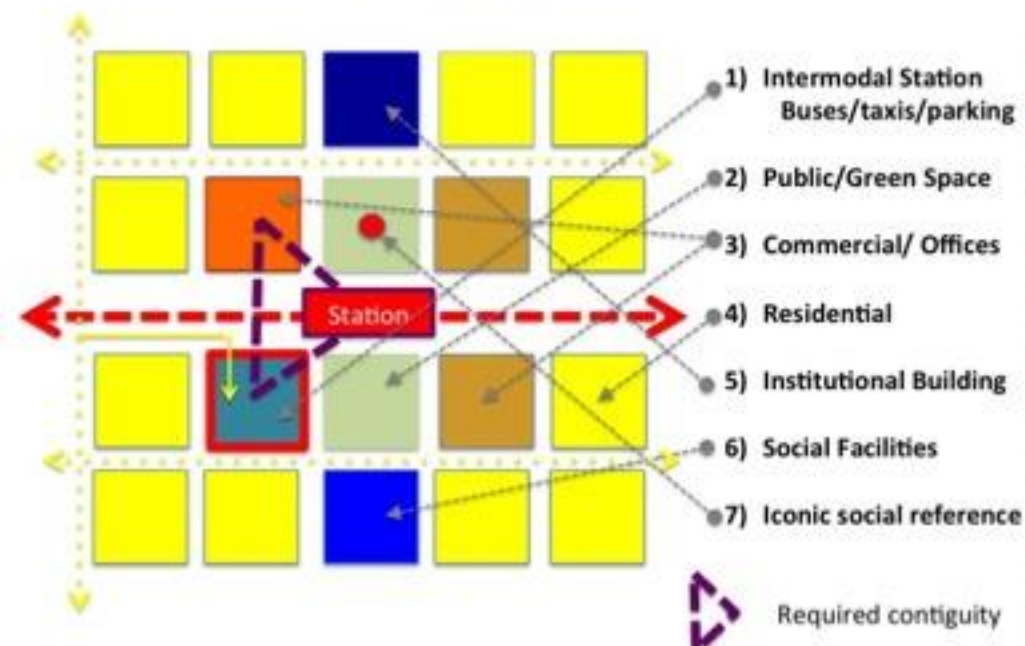


www.pedrobortiz.com

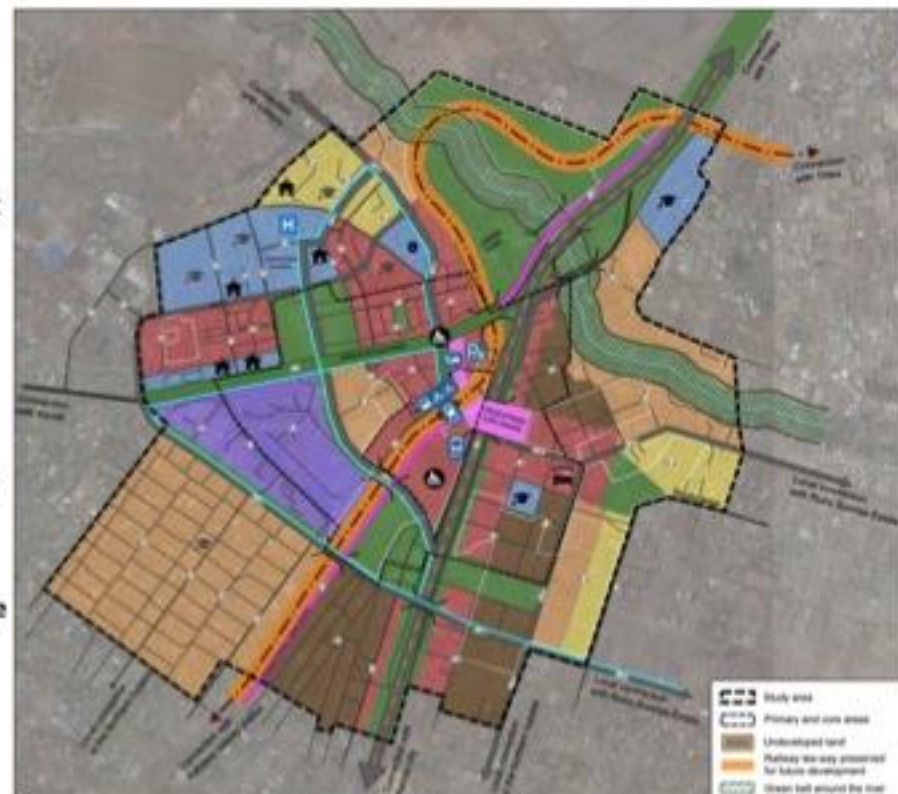
System practical scale application

Urban Design scale 1:500
World Bank application: Nairobi

The Centrality Stereotype



Centrality location system



Nairobi - Riuru, design NaMSIP/Egis

Urban Scale 1:5,000 MADRID Metro Plan



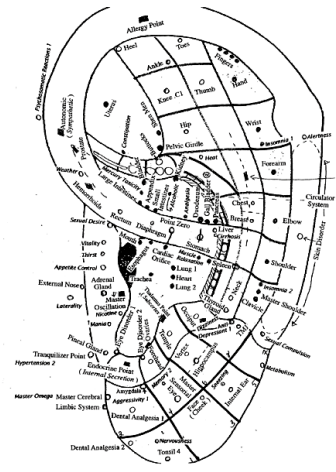
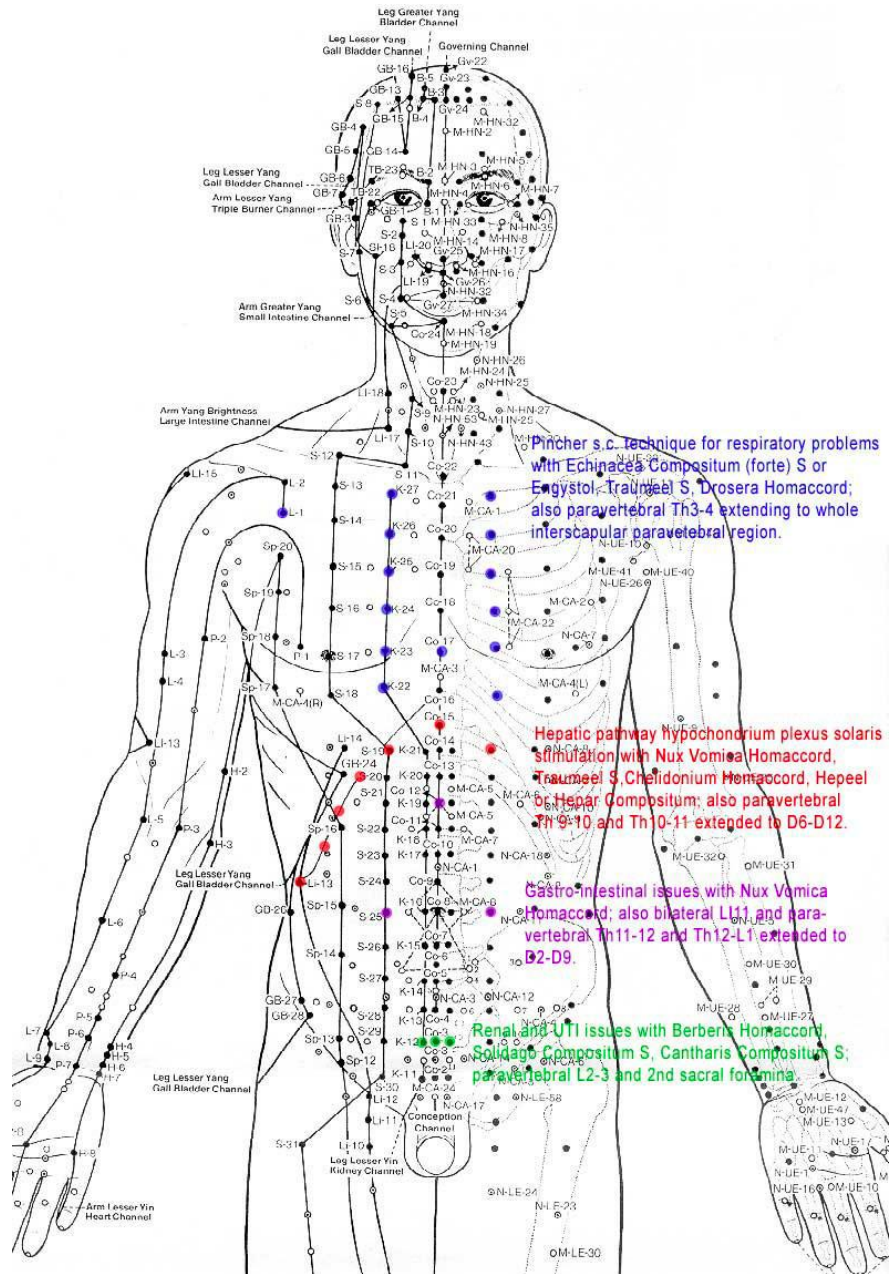
BUD urban location system (Balanced Urban Development)

- Intermodality
- Centrality
- Green Infrastructure
- Gray Infrastructure
- Land uses

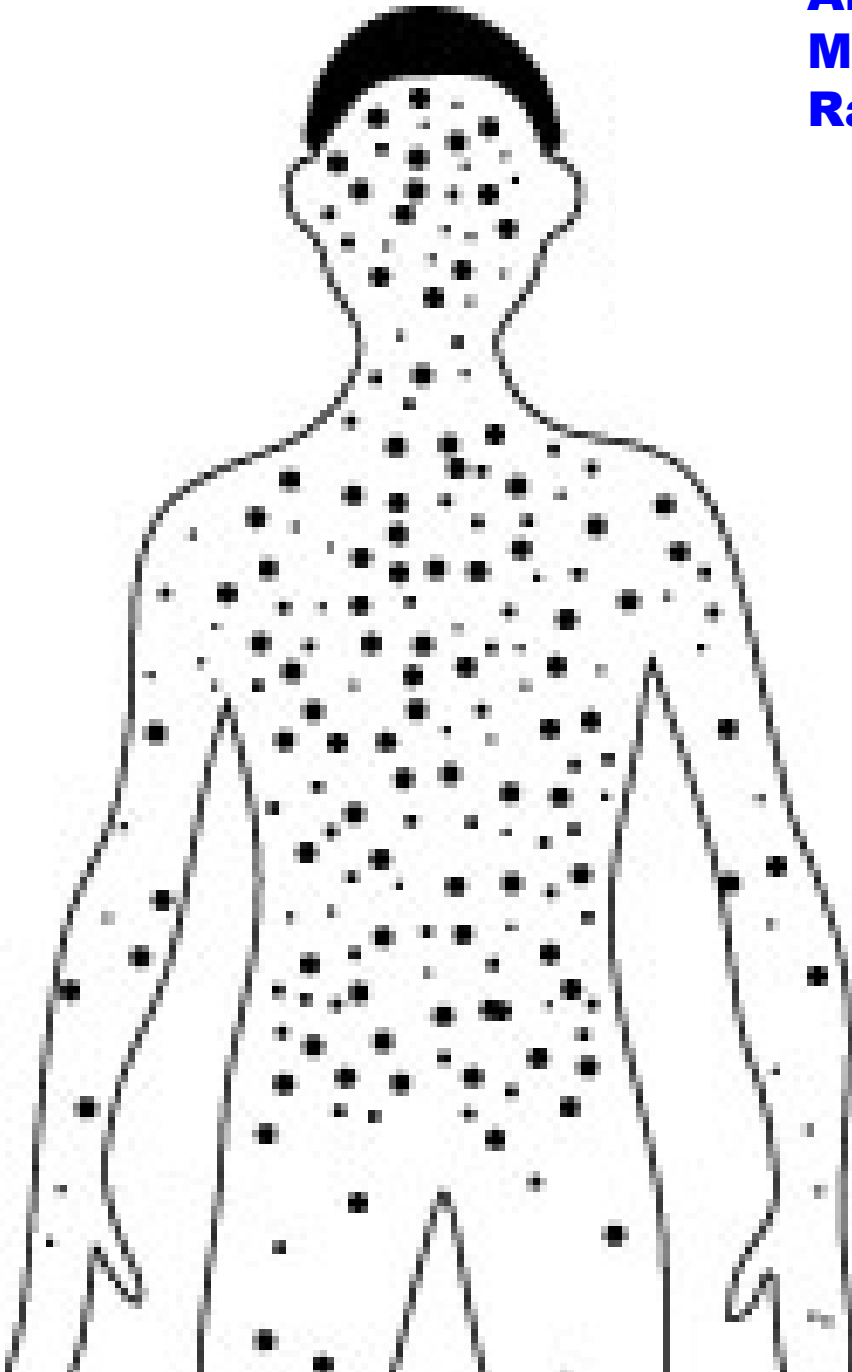
**Four municipal applications out of 50:
Pinto, Cubas, Meco, Torrejón Calzada**

Metro Matrix Mental Map

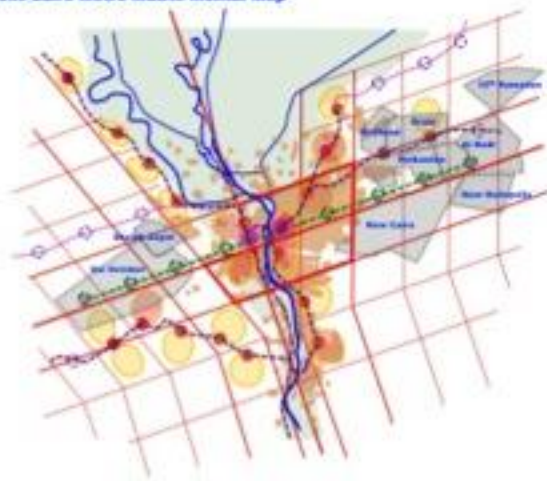
Metropolitan Acupuncture Chart



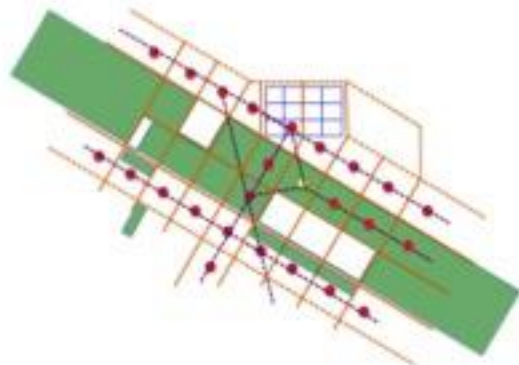
Alternative to Metro Matrix Mental Map?
Mosquito strategy planning approach:
Random extensive 'blood' extraction



Crescent Cairo Metro Matrix Mental Map



Tehran Metropolitan Matrix Structure



Mumbai's National Diagonal



IP-666 Istanbul Metro Matrix Mental Map Pentagram



M5 Mexico Metro Matrix Mental Map

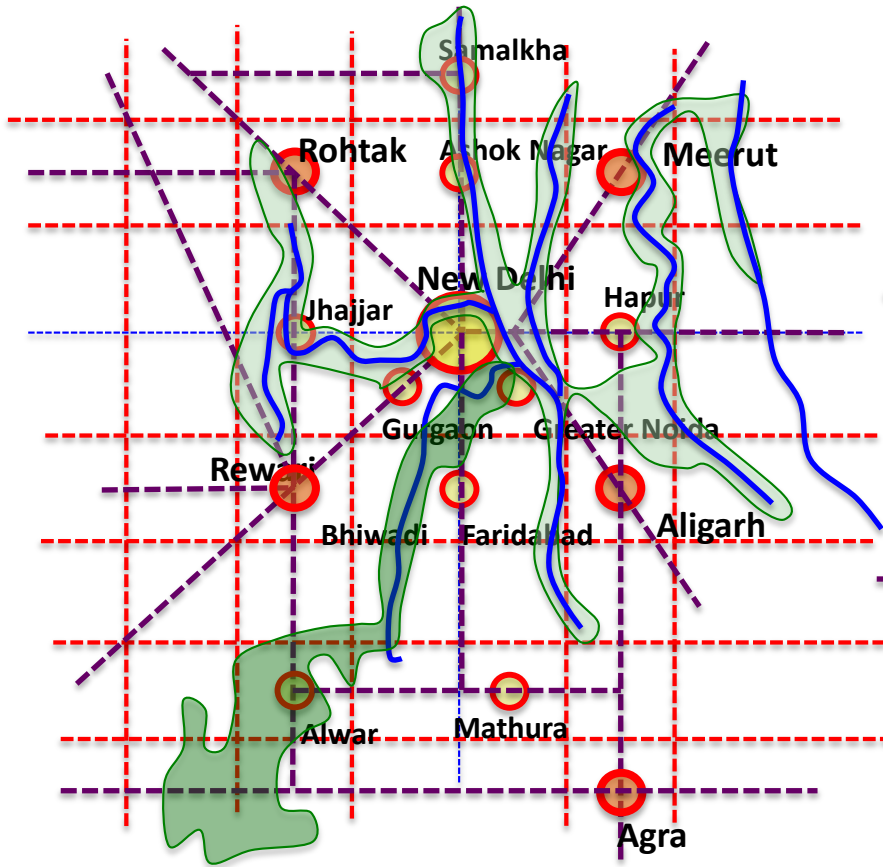


Nairobi 2031 Metro

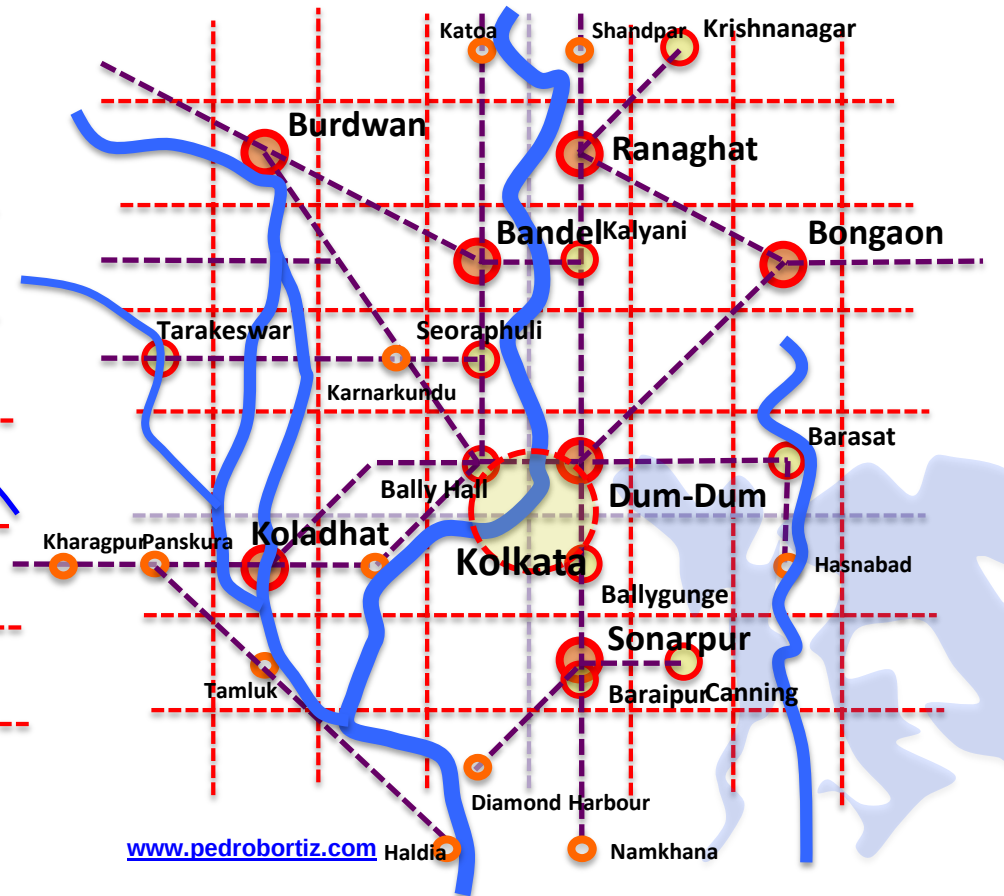


'MegAbuja' Metro-Matrix Mental Map





New Delhi Tic Tac Toe
Four-Corner-Post Metropolitan Structure



Kolkata polycentric expansion
3+ corner post Metropolitan Structure

Mega-Mumbai Regional Plan:

10-fold challenges and a 5-fold vision



Challenges: The 10-fold challenge.

- From 8.000 GDP/Cap (India 4.000) to 75.000 Paris, Inner London 153.000, Stuttgart 50.000, Lazio 36.000 (USA 53.000) x10
- From 2 m. cars (less than 0.1 ratio on 22 m. inhabitants) to 20 m. cars (0.7 on 28 m. +25% inhab.=15 years?) x10
- From 35 m. passengers to 150 m. (from 2 to 10 runaways) x5
 - +100m passengers = 500.000 jobs at 32.000 USD/year = 16b USD. Mumbai GDP = 210b USD. +8%
- From 50% informal to 50.000 dwellings/year. (200.000 inhab/y) from inertia to 625 ha. (more than 6 sqkm).
Plus deficit = tot. 200.000/y <http://www.99acres.com/articles/the-mumbai-housing-paradox.html>
- From 10 New Towns (250.000 dwellings) in 50 years (Navi Mumbai) to 4 NT (200.000 dw.) every year. x20

Way forward: The 5-fold Vision

- 1) **Accept** the Challenge: social agreement on figures: Housing, Transport, economic, Social, Environmental
- 2) **Strategic** Plan: A Vision, and not a shopping list. (Economic, Social and Physical)
- 3) **Governance** setting (dialogue/Collective intelligence)
- 4) **Financial** framework (Infrastructures, housing [*danger], Social facilities)
- 5) **Capacity** building (human and social resources)

...Report to follow



OBSERVER RESEARCH FOUNDATION MUMBAI

Interesting!

*by
9/10*

Mr. Prachi

SECOND AIRPORT:

What Mumbai must learn from international experience

Hormuz P. Mama



Summary

MUMBAI'S SECOND AIRPORT ... TOO LITTLE, TOO LATE

All in all, an inadequate new airport for Mumbai could hit the city's development – and the country's economy – very hard.



Mumbai Development Plan: Challenges inside, solutions outside



Challenges:

Assets

- Plan of Plans: Sectors?
- FSI/DR Development Control: 'Who' implements?
- Flexibility/adaptability: Thresholds?
- Metropolitan context: The other way around?
- Addressing Basics: IE. Housing from 'land' to 'demand'

Challenges

- High FSI: Public Space Index (PSI) to be increased?
- Road expansions: Targeted?
- Green cover: expansion or contraction?
- Heritage: Catalog/rank procedures?
- Affordable Housing: Structuring demand?
- Open Space facilities: Green infrastructure networking?

Way forward:

- 1) Assets: Improve what is improvable
- 2) Challenges: Resolve what is required
- 3) ... and beyond: Take it to a new dimension
- 4).....Political.

IE: Madrid 1997

Maharashtra Development

Possible road map

1) Urban Growth expectations

Mumbai Metro Population growth: + 6 million/30y. = 200.000 /y.
 Necessary Annual Housing: 5 m/f. = 40.000 families/dwellings /y.
 Sustainable High Density: 300 Inh./Ha = 30.000 Inh./km²
 Necessary annual serviced land provision: 6.6 km²
 Locations; 6 locations of 1 km² (100 Ha.)

2) Required land production management

Required investments:

- Land acquisition: 5-fold alternative locations: 30 locations
- Infrastructure: Land retribution payment
- Urban services: Divisibility and PPP

3) Planning and management

Planning:

- TOD based development
- Mass public transport centralities
- BUD's and Centrality design

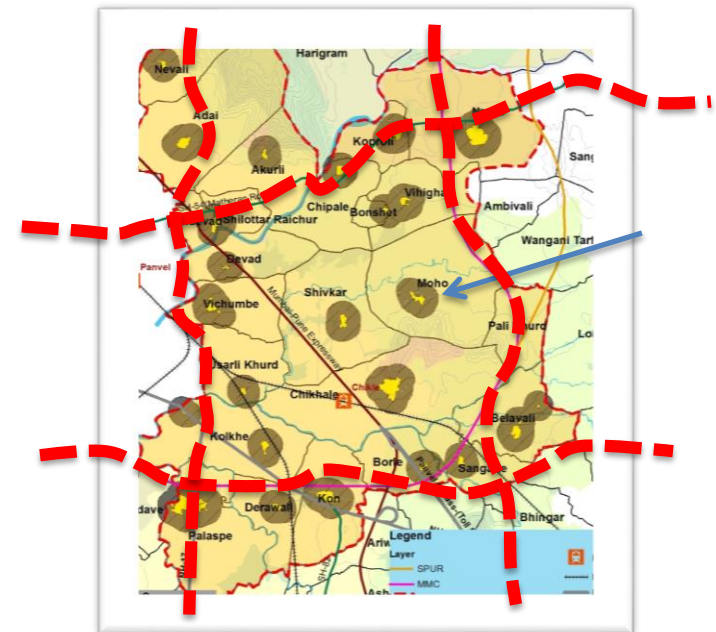
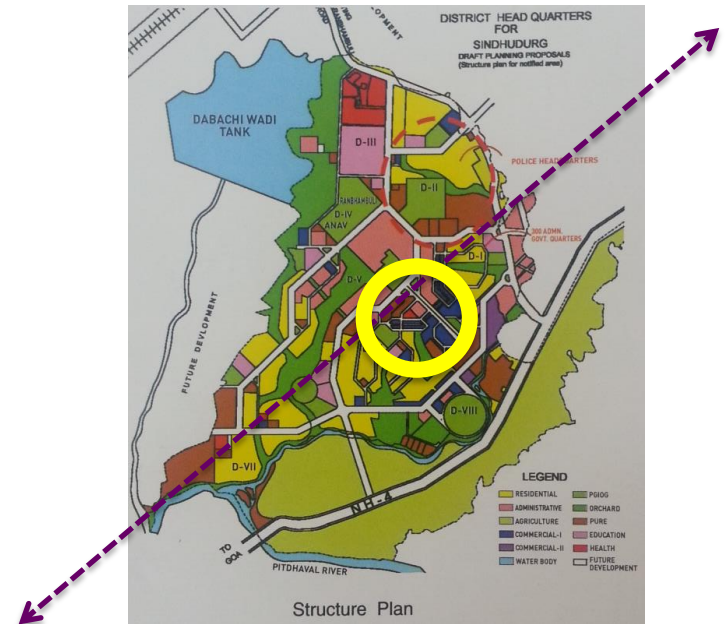
Management:

- Arpeggio Model: 60% land benefit. 150 m. USD/y. 15.000 land units/y.
- Land retribution

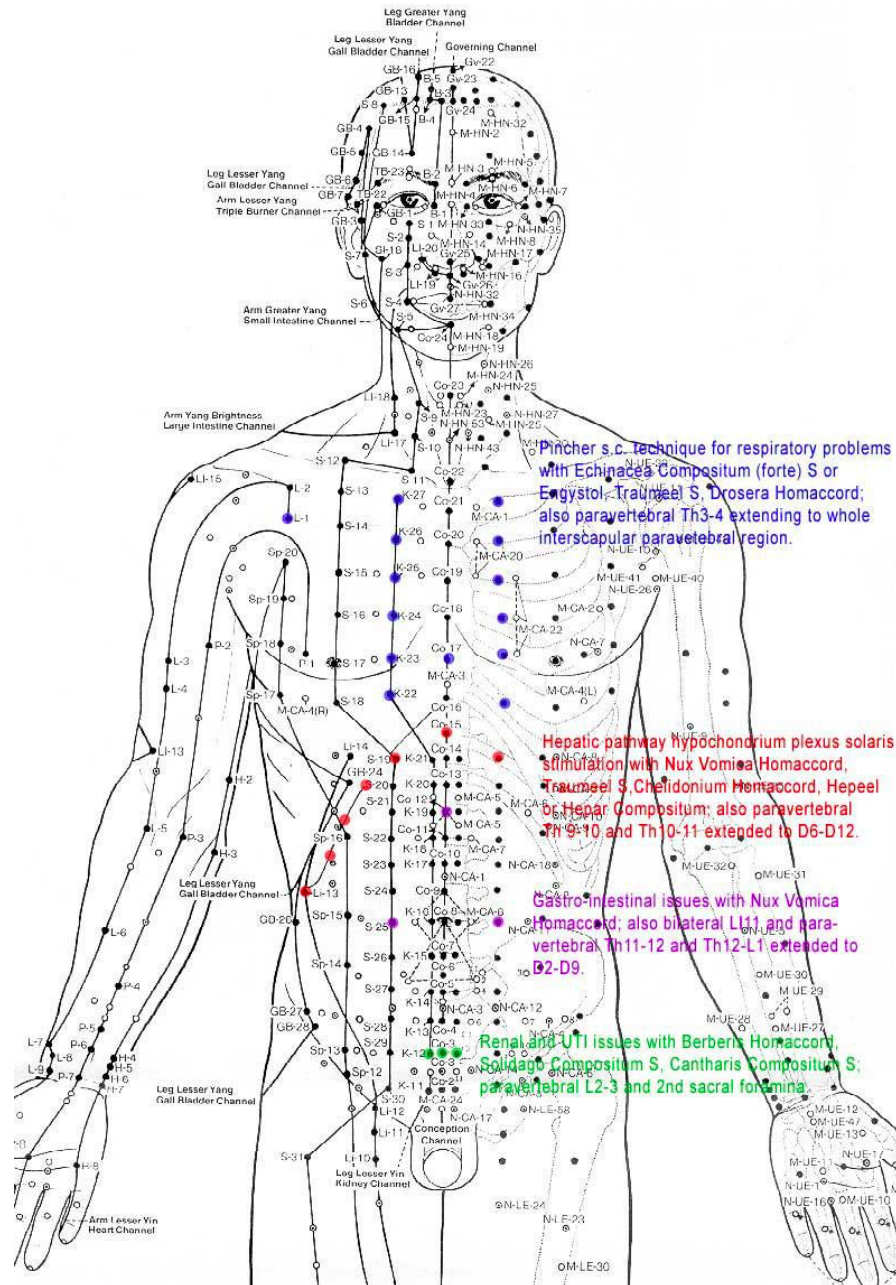
4) Smart Cities Partnerships

Knowledge and product provision

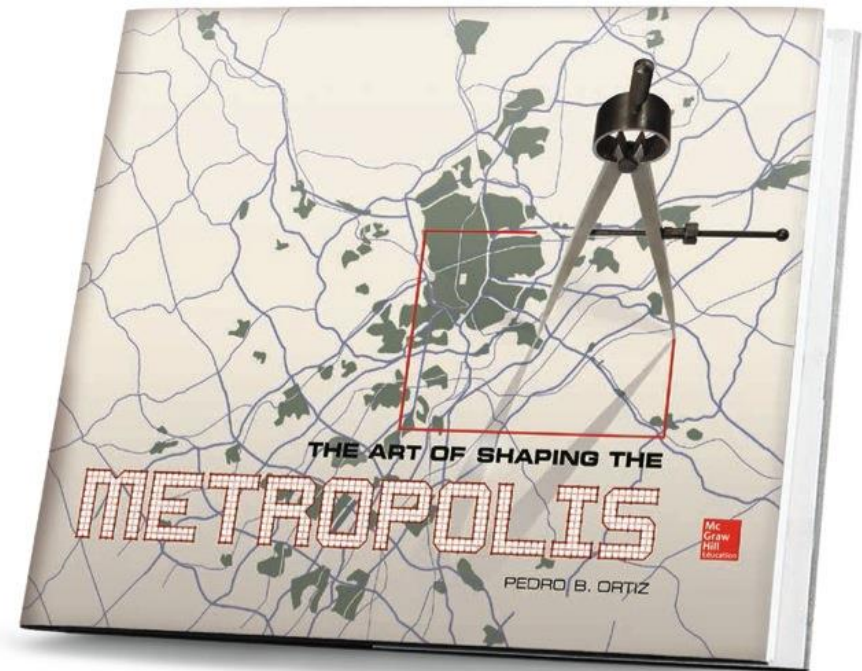
- Product divisibility
- Smart roads, Smart trains, Smart public transport
- Smart energy (EU 2050), Smart lighting, Smart water, Smart sewage, etc...



Mega-Mumbai Metropolitan Acupuncture Chart



All in this book...



The Art of Shaping the Metropolis
McGraw Hill, New York, 2014

Thank you
www.PedroBOrtiz.com