

## “Networking in green”

### INTRODUCTION

This paper analyzes connective process on network structures in Mexico City through a specific case of study, suggesting that malfunctions on networks causes urban sprawl as “irregular human settlements” nearby geographical city boundaries or protected natural areas which seriously threatens the ecosystems that sustain the city. In Mexico City and metropolitan area inhabit 20, 000 million, 60% of its soil is ecological reserve, occupies 0.23% of the country, contains 18% of the national population and produces 32% of the national economy income.

Urban growth and sprawl are complex and multidimensional phenomena; this paper is based on connective processes linking urban, social and environmental structures aiming to establish a “connected city” based on the sum of its parts causing an effective connection and compact function. Urban sprawl may decrease if all networks layers: environmental, social, infrastructure and government develop an articulated dynamic form. “Networking” practices are in favor of all initiatives aiming to promote connectivity, either by restoring the existing networks or generating new ones.

Every network is part of a "gestalt" that joins together city structure; networking systems are grouped based on their vocation and triggers different dynamics.

Networks, function together in compact self sustainable structures, satisfy people’s needs and promote quality of life. If one network fails, “gestalt” system disassembles and generates urban sprawl with lacking infrastructure spread over long distances from urban centers.

A city is a complex phenomenon composed of networks; sometimes are physical networks: land uses, roads, built space/open space (tangible net) or networks based on the dynamics of the people: activities, habits, use and practices (intangible net). Tangible and intangible nets interlink city realities; networks link us on an individual basis with every other city dwellers.

According to the dynamics of interaction among different networks each city has a unique essence.

In developing countries as Mexico, due to deficiencies in city network structure; urban sprawl is presented as irregular settlements located in ecological and high risk areas, these settlements generates serious dilemmas from the moral up to the functional point of view. Origin analysis of irregular settlements is associated with excessive tolerance of governments towards lawlessness and political manipulation associated to electoral campaigns and commitments combined with established association of corruption at all levels (leaders, sellers, property holders, intermediaries, authorities).

Mexico City urban sprawl, because of its scale among other factors, occurs in two forms:

- a) Exogenous dispersion: directed into geographical boundaries of the city and normally surrounded and isolated by roads.
- b) Endogenous dispersion: directed to the interior of green vulnerable areas.

It has been identified four relevant key players to achieve successful interaction between networks:

- a) Environment: as a guiding axis of sustainable planning,
- b) Government: as responsible developer of standards, plans and programs,
- c) Infrastructure: as a mutable reality that provides services,
- d) Society: as generator of development dynamic.

Mexico city's growing rate exceeded regulatory capacity of the State for administrate and plan. This situation generates serious problems in short and long term, declining life quality of its inhabitants and placing the issue of urban planning in an outbreak warning for authorities and citizenship.

## NET OF NETWORKS

***Green network + social network + government network + infrastructure network = connected city = urban growth without sprawl***

Net of networks refers to a complex system closely linked tidng together every component in cities dynamics.

I will describe some networks that compose cities, and based on them analyzed a specific case of study aiming to discuss how urban sprawl is related to lacking networks. Each network is analyzed separately but among them exist reciprocal and imminent relationship.

In a connected city all networks are considered as reciprocally interacting elements in a single territorial system. As citizens, we are part of the interlinked system, we affect the net and the net affects us.

***Green network*** Green spaces regardless of their scale can be isolated areas unconnected with the rest of the city: walled spaces living towards its inside. If we can accomplish the connection between natural elements (as a development axis of projects) and dense built up areas, we can contribute to sustainable planning and the ideal of "eco city".

Natural and artificial green areas function as connectors between people of different social strata, working together on their surrounding environment improving urban image and social structure. It is interesting the positive influence of social responsibility and sense of belonging generated by quality public spaces.

In this network decisions are made for enhancing ecosystems health and those who coexist with it. Development is desirable from an environmental concern given priority to pedestrians, encouraging non-motorized transport, generate more oxygen, humidity, aquifer recharge and forest management.

As a propose methodology urban planners must identify \*natural elements and propose developments around them according to a global vision. An urban park or a river channel can interact with a lot of different neighborhoods, lifestyles, political ideologies and multiple individual realities concentrated around them. It is proposed that this natural elements function as backbones of guiding development.

\*Understand as natural elements all components that gives environmental benefits to the city, regardless whether their origin is natural or artificial: rivers, lakes, wetlands, oceans, streams, springs, waterfalls, seas, mountains, hills, gullies, parks , sidewalks, ecological reserves and protected natural areas.

Human history has plenty examples of how cities emplacement are determinate by environmental criteria located near natural elements that ensure basic livelihood of its inhabitants: water, fertile land and areas that provide raw materials to ensure group continuity.

Spreading green networks through connectors as corridors, patches and mosaics allow open spaces to expand into intense densification areas, developing open and recreational spaces into neighborhoods in poor condition with little infrastructure. Green network helps to articulate natural elements with the city.

Natural elements and surrounding areas are highly vulnerable to dispersal growth. In developing countries irregular settlements are located in unsuitable areas for urban growth (natural protected areas, slopes of rivers, ravines steeply sloping, flood areas) frequently involving precarious housing. Because of its extreme location and in the absence of a developing plan involved, incorporate this isolated settlements in to city structure is very complex.

This settlements compromises ecosystems health, exposing constant threats of invasion. The network promotes green sustainability and life quality for all inhabitants of the planet. Permanence and expansion of green networks are a priority task of every urban planner.

**Social network:** It is referred to a gathering of individual realities creating a collective image, it refers to uses, habits, and tendencies in movement and displacement or subjective perception obtain in places as well as how city dynamic affects people lives. Includes active citizens who reject or promote plans and programs, inhabitants affects and is affected by the city.

Social network is in continuous movement, all dominant ideologies, history memories and prevailing beliefs can be read along the city. It reflects socio cultural and economic reality of each country.

There are many factors that encourage establishment of groups in disjointed locations, the logic of formal housing market is not comparable with the economic reality of the inhabitants who look for places to settle improving their living conditions. Prices are unattainable. As a result, families opt for progressively constructions that can afford (lower prices not stick to fixed payments). Periods of self construction takes more than a decade and buildings change based on family members.

In addition, protected natural areas have a community land property scheme (ejidal or communal) which is governed under a particular legal vision that facilitates their illegal occupation. Moreover, eviction procedures are extremely complicated and involve a large number of institutions inefficient coordinated.

I should highlight the lack of credit schemes for poor population in Mexico, nearly 63% of the country working force does not have social security benefits and nearly two thirds of total population does not have sufficient income to be considered for a credit.

As a result of economic centralization in the capital city, social dynamics comprises a complex and interesting study including migration patterns from other parts of the city, or even the country, searching for better opportunities.

The importance of this network lies on involving good practices through citizen participation and consensuses. Scenarios without actors are empty spaces of meaning.

**Government network:** It refers to people, institutions and processes responsible of planning decisions and implementation actions in order to generate synergy between all networks avoiding city fragmentation.

Latin American countries suffer severe problems of corruption at the highest levels of power, this network has strong inner problems, and it seems that Government regulations are versus economic self interests. Social and Government networks should work together developing projects and making them more real.

This network determinates strategies to establish political choices, intervention priorities, available resources and privileged actors.

Government's role as a provider of housing and services for poorest strata is affected by political and financial constraints as electoral periods, lack of continuity in programs and budget availability.

A lack of clarity by the Government regulatory authority and excessive tolerance towards irregular processes generates disjointed and chaotic systems. Also, government operational structure and technical capabilities are exceeded by the bureaucratic structure, leaving an important vacuum perceived by the population generating little confidence in government policies.

Therefore, it is essential that government policies renewed people confidence through actions as:

- a) clarity in its structure and implementation of public policies,
- b) integrate high-level academic groups in key positions,
- c) promote a close relationship between decision making and pure knowledge of situations,
- d) zero tolerance to corrupt acts.

Every project should be managed according to society common good and connective processes, not disjoint actions based on self interests.

**Infrastructure network:** it refers to the elements that physical link inhabitants and spaces. This network relates several spaces such as:

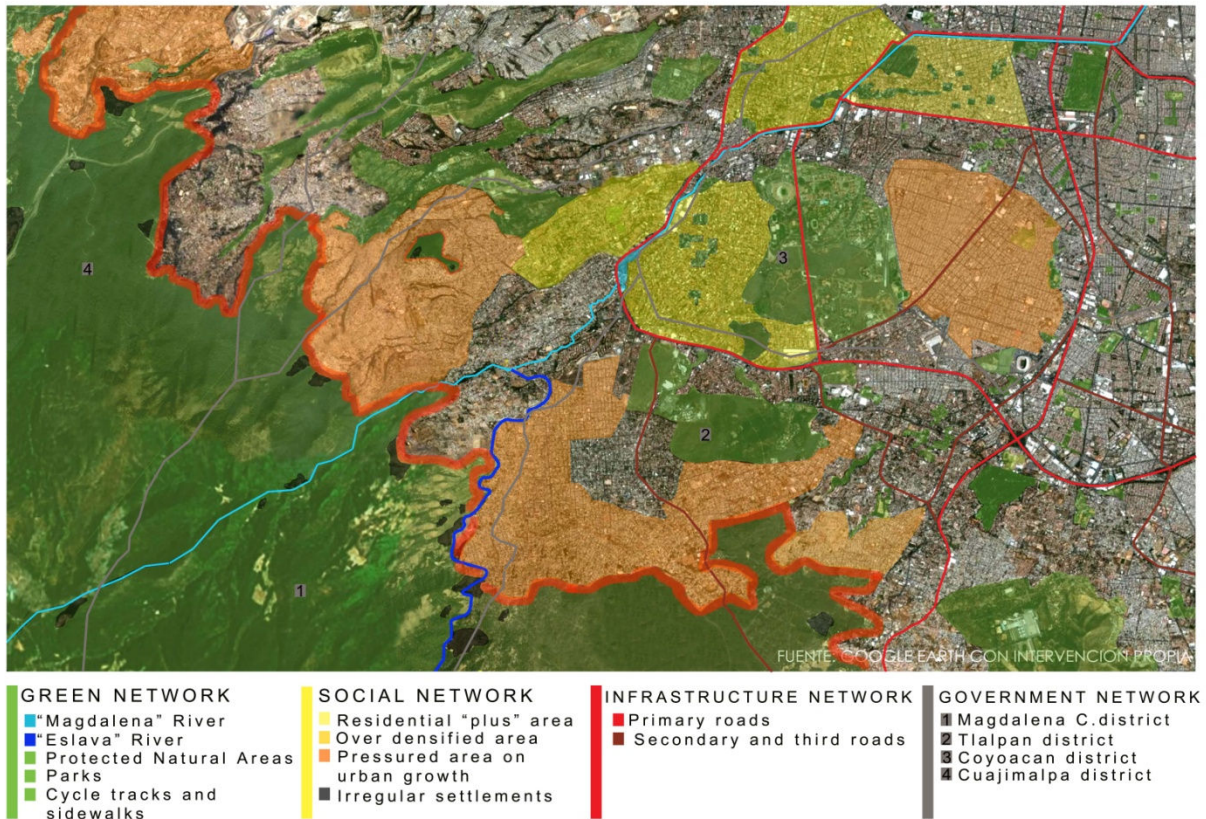
- a) public spaces (parks, squares, sidewalks, trails),
- b) sports (cycle climber and walker tracks),
- c) cultural (themed tours),
- d) transport and movement (primary, secondary and third roads)
- e) services (recreation and leisure facilities),
- f) skin city (pavements, colors and textures)
- g) accessibility elements (access ramps).

Nowadays cities are heavily influenced by the automobile.

This network includes architectural and cultural heritage, important elements for every civilization which provides identity to inhabitants. Connections can be established between constructions with cultural theme tours. If these buildings or natural elements are forgotten and isolated, they become segregated from networks.

## NET OF NETWORKS

Image 1



Aerial photograph of Google earth with author's intervention

## GREEN INITIATIVES LINKED TO URBAN SPRAWL IN LATIN AMERICA

### *Magdalena and Eslava river restoration*

Below there is an analysis of networks in a specific case of study in southern Mexico City that aims to rescue through an integral program two natural elements: Magdalena and Eslava rivers.

This project promotes synergy between environmental, social, infrastructure and government networks. Proper function on complementary networks generates a connected city.

Magdalena's River has 28 km in length, flowing through four districts inside Mexico City: Cuajimalpa, Magdalena Contreras, Alvaro Obregon and Coyoacán. The river enters the urban zone with an open and permanent channel. Water quality is excellent in its upper basin; only one 5<sup>a</sup> part of the volume is use while the rest is derived to the Mexico City sewage system. Great part of its river basin is located in an ecological reserve zone; however large part of this river basin surface is in advanced degree of deforestation and environmental degradation. The zone is invaded frequently by illegal settlements and urban growth threat to cover green area. The river in the high lands is clean and pristine but in mediates and low parts presents

severe pollution grade mainly due to numerous and illegal residual waters discharges and rubbish dumps throughout all over the channel.

Eslava River has 7.9 km of length and is a strong contribution of hydrological flow into the Magdalena River with a high degree of contamination.

The program aims carrying out the required actions in the basins and rivers to preserve rehabilitate and restore involved ecosystems. Additionally consider necessary actions to identify and quantify environmental services, improving landscape and define those social and productive projects that are compatible and economically viable. Additionally, the program includes essential actions for urban regeneration and land use planning.

The overall program will last 5 years, starting in 2007 and concluding in November 2012. Program stages are:

- 2007 - Master Plan (develop planning tools).
  - Identification and diagnosis of green networks both rivers acting as central elements, taking in consideration all the systems involved. Develop connectivity diagnosis in urban parks, patches, mosaics and protected natural areas.
- 2008 –Works of restoration, conservation and protection of soil and water. First stage of construction and urban projects.
  - Management and consensus of actions planned in Master Plan with the social network linked to the project, highlighting their performance as promoters and beneficiaries.
- 2009-2012: Hydraulic projects, recovery of public spaces, community projects and environmental restoration.
  - Diagnosis and proposed infrastructure networks to improve the quality of the ecosystem.
  - Management plans, prioritization of actions and decision-making within the government network through all the implementation process

Urban and environmental benefits generated by actions are carried out in the rivers basins as:

- a) Increase moisture, and hence, greater runoff and flow of rivers and springs,
- b) aquifer recharge and improved forest management,
- c) eviction processes, inter institutional coordination and urban growth policies,
- d) landscape projects improving the image of the city through natural healthy elements,
- e) consistency between land uses and suitability,
- f) economic and social development through productive projects,
- g) increased capture of carbon dioxide,
- h) social co-responsibility in civic actions and environmental protection.

Loosing water bodies can lead to severe climatic and environmental disruption. Its maintenance and conservation generate positive figures to global warming, air quality and forest health.

After making a sectoral diagnosis of networks involved, were warned that due to its disband and internal malfunction, one of the most problematic weakness of the program are irregular settlements on protected natural areas generating disjointed structures with lacking infrastructure and very poor life quality.

Urban sprawl subsist in the absence of an integral project vision that is why is so complex integrate them to the existing city structure. Due to the lack of a leading planning, providing an area of irregular settlements with basic infrastructure is very complicated and expensive, also carry strong moral and environmental dilemmas as whether some decisions are or are not "appropriate". Families lives between irregularity and danger.

Zones of irregular occupation do not obey regulations of land uses and seriously damage ecosystems by:

- a) polluting aquifer and superficial water,
- b) stealing water and electricity services,
- c) living in high risk conditions of flooding, mudslides or fire.

Government system, as well as being part of a corporatist structure and support of irregular market, lacks of the operational instruments to proceed properly on eviction.

Also, social-economic reality all over the country offers a formal market for house purchase insufficient to segments of population with low incomes and their uncertainty based on income and employment. Prices are unattainable.

It is appropriated to emphasize within field work with inhabitants of irregular settlements exists a strong disinformation and lack of inters towards several topics as: risk, irregularities incurred by them, environmental degradation.

As an overall economic development strategy, government must have:

- a) soil reserve to provide subsidized land for people who cannot afford it,
- b) continuous supply of housing for all socioeconomic levels.

Diverse and intense pressures over the river basin and through Magdalena River itself put in danger its own survival. It is still possible to obtain a total rehabilitation of the river but fast integral actions are needed. Rivers restoration means to save for the future generations a very important natural patrimony and for Mexico City the contribution with significant water volume an environmental services to the city including ample green zones.

## **CONCLUSION**

- The strategy refers to weaving networks in a self sustainable development balance between human settlements and nature dynamics, relating consolidated dense built up areas and remnants of natural spaces.
- Urban structures grouped society according to cultural an economic factors and generate areas with certain characteristics. The challenge consists in integrate very different people achieving common goods with something in common: its surrounding environment. We can read cities through their networks.
- Relationship between networks is complex, the goal is to promote a correct interlink. All networks should reciprocally interact in a single, large territorial system integrating a connected city.

- Urban sprawl is generated by shortcomings in the functioning of networks, every city has its particular “gestalt” structure that causes a particular operation, and the task of restoring city networks should prevent a disjointed dispersed growth.
- It is imminent incorporate cross disciplinary solutions with high-level academic groups incorporated to governmental structures.
- Latin American countries are prone to irregular settlements dismantled in stages unfit for urban planning. The excessive tolerance of government concerning these practices is inappropriate.
- Water as a hub of planning ensures the lives of a group, technology provides us with accurate data on areas with intense rainfall, aquifer recharge areas, broad masses of trees that generate oxygen and also, on the damage and population pressure in conservation areas. Interesting tools for urban planners.
- A well connected city with strong network dynamic preserves natural environment and social quality of life.

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