

City Planning through symbiosis

Jorge Diaz Tejada
Facultad de Arquitectura y Diseño
Universidad Autónoma del Estado de México
Doroteo Arango 80 D-203 México D.F C.P. 02420
México

Abstract: - City planning through history, has taught us in such a dramatically way, the importance of nature as a resource for human life, that we should consider going back to ancient practices to prepare future city planning. What comes new is the possibility of interpret the relation between nature and the built environment.

I propose the notion of trophic relation between urban activities and nature, particularly exploring transportation as a key element from which much symbiotic relation emerged. Uneven development of cities, at least in Latin America, is one of the main problems derived from not considering the city as a complex system where dynamic interaction takes place. In this scenario nature is a key element for equilibrium. So we should consider symbiotic relation between urban activities (i.e. transportation and retail land use) and trophic links between urban activities and nature, particularly I'll focus on the link between nature and accessibility.

Key-Words: - city planning, nature, trophic links, symbiosis, transport.

1 Introduction

Conventional planning measures mobility rather than accessibility, which favours motorized modes and undervalues alternative modes and land use policies to increase accessibility [1]. On the other hand, motorized modes especially cars, require more land for roadway infrastructure than any other transportation mode and are not the most efficient mode if we take into account its capacity, as it's shown in Fig.1.

From left to right, we can see land needed to transport group A using bikes, then the same group using cars and finally the group using a bus.

Land use is a key factor for determining the balance between nature and the built environment, so from this starting point we may be able to predict the affected conditions for environments like México City, where about 3.5 millions of cars enable not more than 20% of the total daily trips.

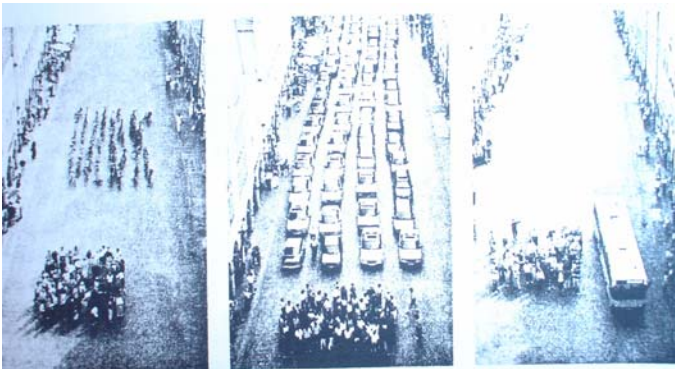


Figure 1. Comparative Land Use needed for transportation in different modes.

2 Symbiosis Perspective

The typical relation between land uses and traffic flow would be like the one shown in Fig.2, where it's shown the ratio between the activity and the volume of trips. Of course, the city centre is the most affected area when these patterns of interaction occur.

Besides traffic congestion, environmental pollution, noise and some other consequences, the interaction with nature as landscape, recreational area, and pedestrian environment almost disappear.

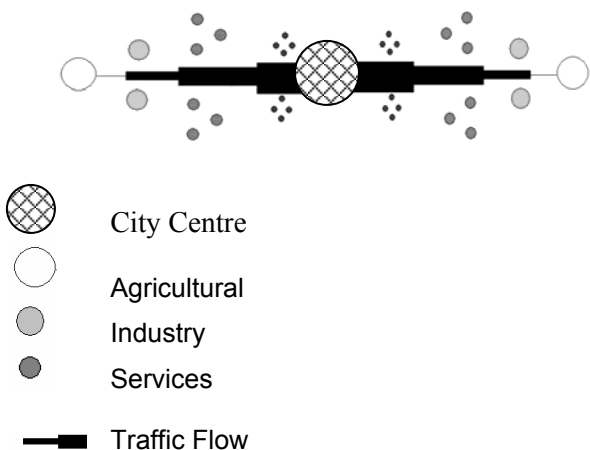


Figure 2. Theoretical Model : Relation between traffic flow and land use.

3 Brief Historical Evolution

Since first dwellings were established in ancient México city, their inhabitants developed a close interaction between the built environment and nature. Toward the year 1299 an "Island-city" called *Aztlan* was built. A system of canals allowed reaching each part of the city, known as *Chinampa*. Along with the environmental issues were organized the social and economic interaction, Fig.3.

Before the arrival of the Europeans to America, the Central Valley of Mexico, now occupied by the Mexico City metropolitan area, was developed by the Aztecs, with the use of the *chinampa*. This small parcel was built on the muddy and swampy soils of the valley allowing the Aztecs to make the soil productive. Associated to the *chinampa* is a canal system for irrigation and fish farming created by the digging required to obtain soil to build the plot.

From a historical viewpoint, the *chinampas* are unquestionably important since they are the living testimony of a production method that nourished and maintained various human groups during the prehispanic, colonial and independent periods. From an agricultural viewpoint, the *chinampas* represent a sustainable agro ecosystem that is one of the most diverse and productive systems known today" [2]

During the twentieth century, the urban sprawl was much faster than ever before, interaction with nature is reduced to isolated areas like Chapultepec Forest. In this scenario we may shift our attention to underground rapid transit system like the *Metro* which enables about 20% of the total daily trips in the city and which can still preserve nature as a resource for human activities.

The Great Tenochtitlan, the capital city of the Aztec empire was created in the lacustrine soils of the central valley, initially on an island which none of the previous settlers wanted. The use of the *chinampa* as a productive unit was not only an effective strategy in economic terms, but it also offered a productive unit with no negative effects on their surroundings environment. Development based on *chinampas*, allowed other species to thrive around it and also

created the template for settlement patterns by the modular characteristic it offered in the growth of the city. The *chinampa* also had an important role for urban development in those times, allowing agricultural production at greater population densities.

Paradoxically, this highly efficient system in ecological, social, and economic terms was replaced by the largest city in the world, with no relationship whatsoever to its previously successful precedent. Instead, the modern Mexico City has developed under the industrial paradigm in economic terms, has concentrated the nation's power, and has become the home for millions of immigrants from a nearby as well as distant rural population. This place now faces tremendous environmental challenges trying to deal with air pollution, water supply, and waste. It is also showing signs of complicated social problems, such as violence and crime, as it struggle to continue maintaining control in politics and the economy.

In ecological terms the *chinampa* completed and connected in multiple ecological cycles. This arrangement provided for continuous recycling of energy and materials [3] as shown in Fig.3. At both small and large scale this system created a symbiotic process, allowing human residents and its environment to sustain themselves, in mutual interaction. The *chinampa* provided conditions for a dynamic equilibrium. This setup is now completely broken by modern patterns of settlement and production. Fig. 4 displays the cycles interrupted or altered by the replacement of this crucial link in the equilibrium chain.

As a metaphor for planning, the *chinampa* can be seen as an approximation of a methodological approach for a sustainable planning process in the full expression of the term. Comparable to proposals of permaculture [4], the approach suggests a living style associated with a wider understanding of the implications of such a lifestyle.

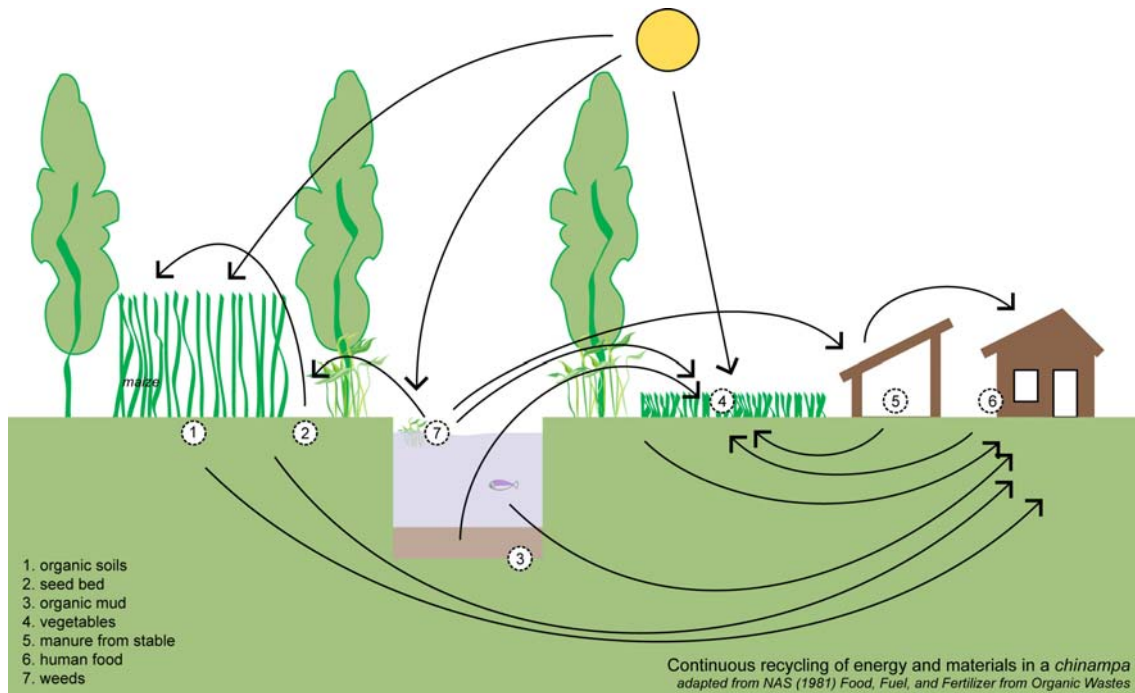


Figure 3. *Chinampa* system

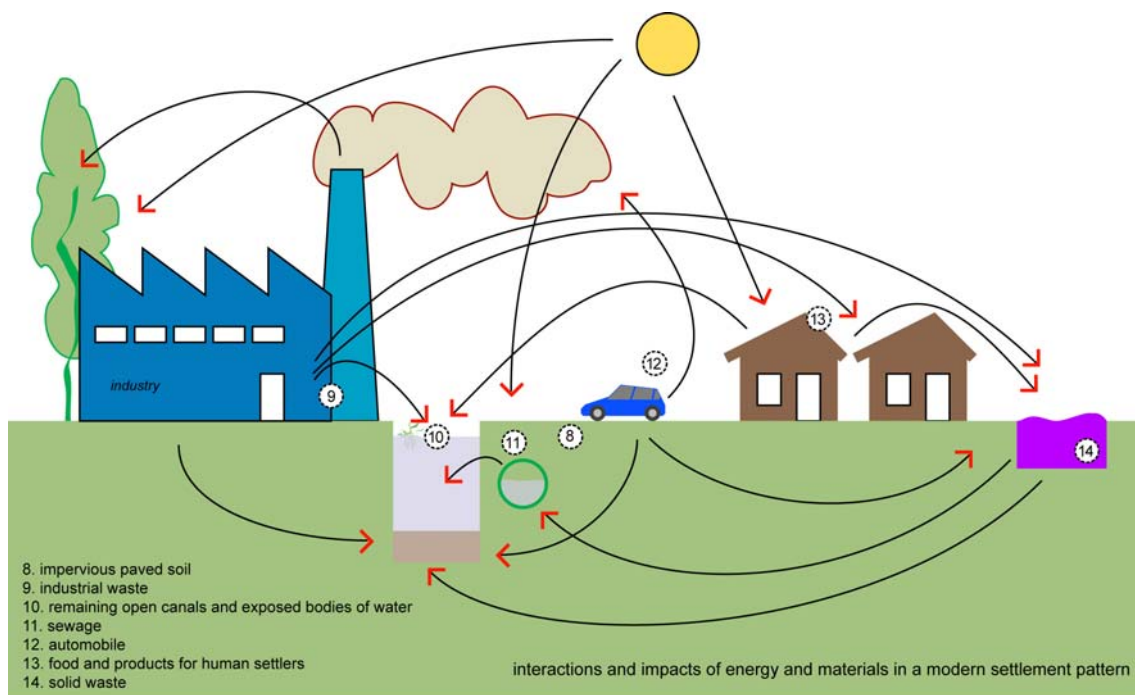


Figure 4. Modern settlement pattern system

4 Conclusion

We may conclude that due to excessive concentration of economic activity, the formation of high density land use areas is inevitable. Conventional motorized modes cause the progressive extinction of nature as a resource for human life. An alternative for reversing the process observed, is promoting a transportation modal split that include pedestrian circuits as well as high capacity rapid transit system.

Any effort toward implementing a planning approach of this nature presents great challenges and states critical questions that need to be answered

- Is there enough time to revert the a-symbiotic process in a place like Mexico City?
- Is the scale a factor impossible to overcome, therefore we should expect an environmental overshoot before a new approach can have a chance of success?

- Where can the equilibrium be pursued from?
How do we establish a hierarchy of issues that need to be addressed?
- How can the lessons of the permaculture-*chinampa* approach be translated and implemented into modern terms?

Considering the central valley in Mexico still provides and sustains under tremendous social, economic, and environmental stress, an unprecedented population close to 20 million people the efforts for reconstruction an ecologically sound system requires addressing the needs of one of the largest concentrations of people in the planet. Ecological planning can not provide sound contributions without addressing large and severe problems, with a complex network of interactions. Still the example was there, simple, dynamic, productive, safe, and appreciated system of production with clear connections with its resident's lifestyle, a *chinampa*.

References:

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