

A Different Approach for spatial Planning of the Tlalpan Delegation of Mexico City

A WISE IDEA: In urban planning, you get closer to a reasonable solution after you analyze all the restrictions concerning the region you are dealing with.

A. Mexico City and Tlalpan

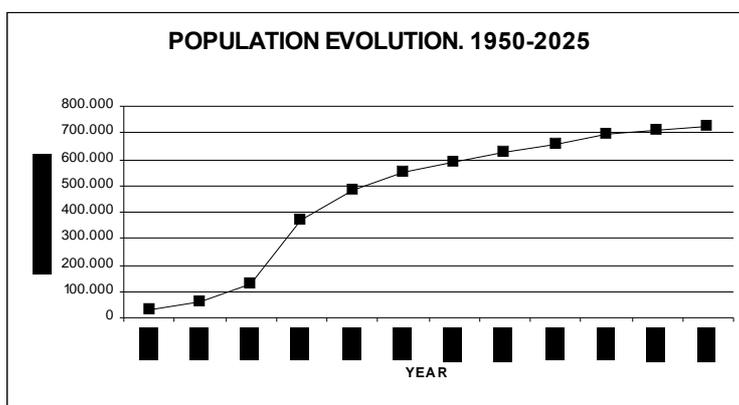
The Metropolitan Area of Mexico City has a population close to 20 million inhabitants occupying 1,320 square kilometers. Territorially, it embraces 16 counties (Delegaciones) of the Federal District with 45% of the total population and an urban area of 750 square kilometers and 30 municipalities of the State of Mexico which represent the other 55% of the population of this metropolis and the rest of the above mentioned area.

Historically only the Federal District has been considered as Mexico City and for the purpose of this document we assume this definition, so, we refer to Mexico City as a region with a population of nearly 9 million inhabitants in the Federal District alone.

Tlalpan, main territory of interest of this paper, is the largest county of Mexico City and located to the south of it. Characterized by having a territory composed of rural and urban areas, makes it different from other counties of the city which are totally urban.

From its 304 square kilometers, 16.49% is urban with a population for 2004 of 618,000 inhabitants and an estimation of 720,000 inhabitants for the year 2025. The population growth rate during the last 4 years is close to 1% a year; however, it is important to mention that rural towns which account for 14% of the total population have a population yearly rate growth close to 5%.

Another important characteristic of Tlalpan is that its non urban area is a mountainous forest region of volcanic subsoil which permeates the heavy rain of the area to the undergrounds of Mexico City, from which 70% of the water supply for 20 million inhabitants is provided, also it contains an important forest region which is essential for the purification of air pollution.



Source: General Census of Population and Housing 1950-2000 INEGI Mexico and, Development Delegational Program of Tlalpan (in process).

B. The Way urban Planning in Mexico City is done today

The basic model for urban planning of Mexico City, deals with the definition of land uses in pieces of territory, considered as part of the region of analysis (neighborhood or counties). When dealing with counties (delegations) in the border of the city the definition of land uses is done for urban and non urban areas, that is to say, urban planning considers non occupied territories in which the land uses refer to forestry, agriculture, mining and other non urban activities.

Currently, the urban land uses considered individually for each lot are: Housing (H); Housing with commerce in the first floor (HC); Housing with offices (HO); Housing with other Mixed Activities (HM); Commerce (C); Offices (O); Mixed (M); Neighborhood Centers (CB); Urban Centers (CU); Buildings for public use (E); Industry (I); Parks and Plazas (EA) and, Open Spaces with environmental value (AV).

The land uses for non urban areas are: Ecological Preservation (PE), Ecological Restoration (RE), Agro industrial Production (PRA), Rural Housing (HR), Rural Housing with Commerce on the ground floor (HRC), Rural Housing Low Density (HRB) and, Neighborhood Rural Centers (CBr). The last four described land uses refer to small towns in the rural areas.

Once the land use is classified, the intensity of use, in terms of population density for housing areas or density of workers for other uses is defined. This characterization has been done during the last 20 years and is applied through the following procedure (formula) which contains 3 digits for most of the cases, for each lot of the region of analysis:

Example:

<i>H</i>	<i>/</i>	<i>2</i>	<i>/</i>	<i>30</i>
<i>Proposed land use</i>		<i>number of levels allowed</i>		<i>% of empty space required in the lot</i>
<i>First digit</i>		<i>Second digit</i>		<i>Third digit</i>

In this example ***H*** is the permitted land use, in this case housing, the ***2*** described that two floors are the maximum levels allowed and, the ***30*** means that 30% of the area of the lot has to be left free of construction.

The number of dwelling units permitted in the lot, for the majority of the cases, is calculated considering the minimum area for a housing unit defined in the “Building Code for the Federal District” (Reglamento de Construcciones del Distrito Federal), which nowadays is 45 square meters.

Following our example, if the ***lot is 200 m²***, we would be able to build ***140 m²*** on the ground level and ***140 m²*** on the first level, because we would be forced to leave on the ground floor ***60 m²*** of empty space, therefore, as far as we can construct a total of ***280m²*** we could, considering the minimum area for a dwelling describe above, build ***6 apartments***.

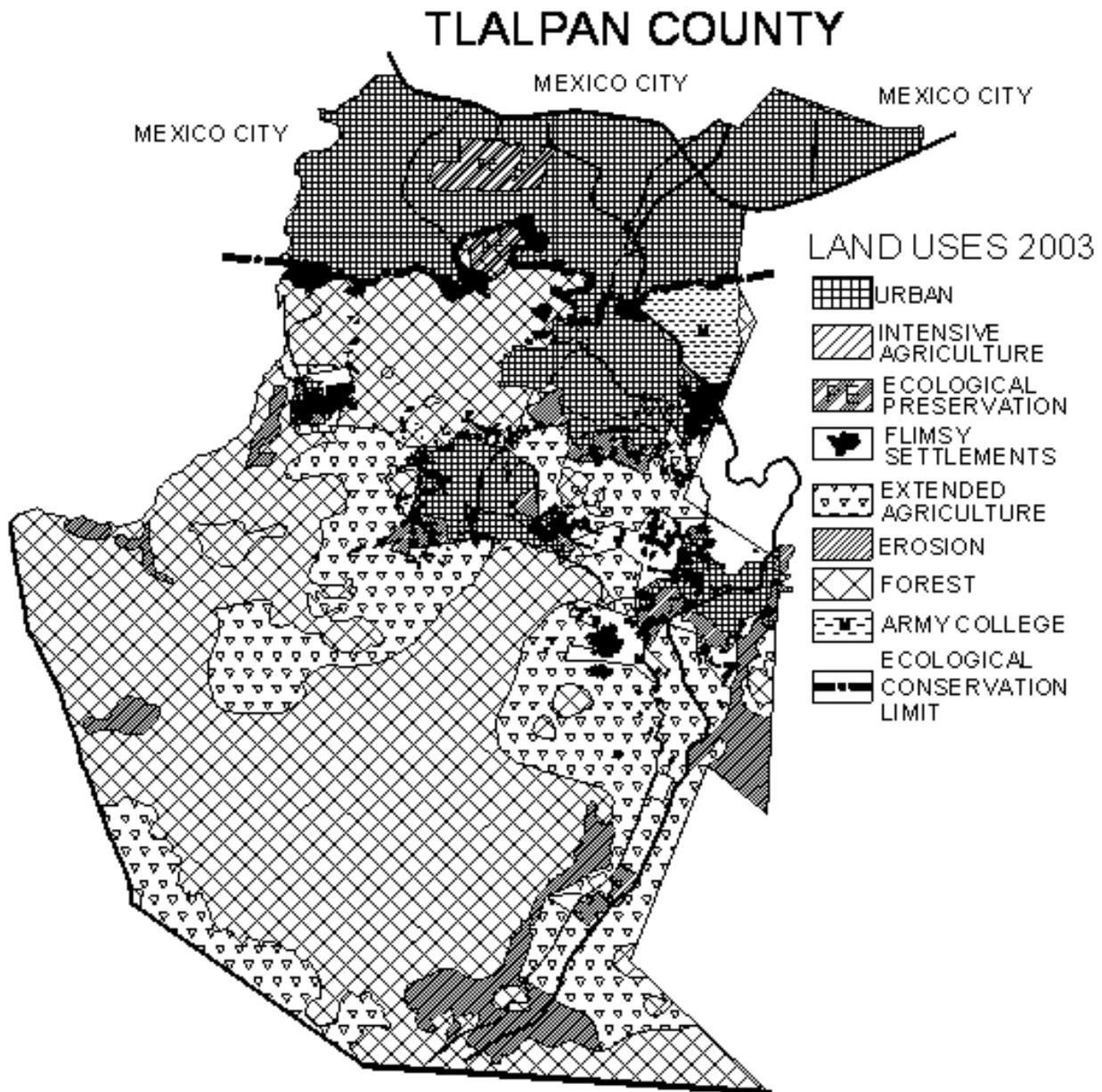
Unfortunately as far as in most of the cases, the number of housing units is not considered in the current procedure for zoning, residential areas which were planned considering one house per lot, are transforming into “multifamiliar” areas increasing its building density, thus changing the primary residential planning idea.

C. 2003 Land Uses and Height of Buildings in Tlalpan vs those permitted in the current Urban Plan

In September of 2003 a field recognition for of all the neighborhoods of Tlalpan was done in order to define the real land uses of each lot and its height in terms of number of floors built.

According to the "1997 Urban Plan", most of the neighborhoods in this county were planed as **Housing** and for buildings of a maximum of two floors. Most of the **Main Urban Corridors**, which developed along primary avenues that cross Tlalpan, were plan as **Housing with other Mixed Activities (HM)**. **Urban Centers** permitted a mixture of different uses. No **Urban Corridors in Secondary Avenues**, inside neighborhoods were planned.

In terms of a number of floors, except for buildings located in **Main Urban Corridors** which allowed four or more floors, mostly all other areas permitted no more than two levels.



The diagnosis permitted us to establish:

- That most of the residents of neighborhoods inhabited by high-medium and high income families, which represent close to 30% of Tlalpan area, respected the land uses of the “1997 Urban Plan” areas in which a land use just for housing was permitted.
- That a great deal of residents of neighborhoods inhabited by low medium and low income families, planed with a land use just for housing had a different land use than this one, since in the ground floor of many of them, commercial and service activities were taking place. In fact, the map of land uses, which according to the “1997 Urban Plan” for these neighborhoods should be of just one color (yellow), looked yellow with confetti of different colors on top, the different colors of this confetti representing different uses other than housing. Also a concentration of confetti appeared in main axis crossing these neighborhoods.
- In **Main Urban Corridors** and **Urban Centers** the land use of the “1997 Urban Plan” is the one expected.

This phenomenon could be explained considering two issues. First of all, the fact that 60% of the neighborhoods in Tlalpan are inhabited by low medium and low income families, which in many cases, because of the shortage of employment, are self employed, reason why they transform part of their houses for service and commercial activities. This transformation done in the ground floor and facing the street.

Secondly, the fact that the areas planned for commercial and services activities were not enough, for this reason, the demand for this type of land uses was higher than the supply.

Also the diagnosis allowed us to confirm:

- That most of the buildings of neighborhoods inhabited by high-medium and high income families, respected the number of levels defined in the “1997 Urban Plan”.
- In **Main Urban Corridors** and **Urban Centers** the number of floors of the buildings located in them conforms to the “1997 Urban Plan”.
- That nearly 80% of the buildings located in neighborhoods inhabited by low medium and low income families, do not respect the number of floors planed for these areas.

The explanation of this is that, as time passes in these neighborhoods original single family houses are transformed, in order to allow more families in the same lot, this mainly because, once the descendents form new families, do not have enough resources to rent or build another house.

D. Reason why the 1997 Urban Plan was not Observed

As describe above, except for neighborhoods inhabited by high-medium and high income families and in **Main Urban Corridors** and **Urban Centers**, the land uses and number of floors permitted in the “1997 Urban Plan” were not respected.

This fact could be grounded on three different reasons.

The first one is that the authors of the “1997 Urban Plan” did not make a correct diagnosis regarding land uses and height of buildings; therefore, they ignore the realities of this type of neighborhoods.

In the second place, one could argue that the urban authorities when the “1997 Urban Plan” was approved did not want to recognize the mixture of land uses in these areas because the immediate consequence would be the re-densification of these areas.

A third reason, could be that when the “1997 Urban Plan” was approved, in these neighborhoods the land use was mainly single family housing and therefore there was a very rapid transformation in the following seven years. This hypothesis is in my point of view very improbable, so I think that the first reason exhibited is the right one.

E. Some Basic Ideas I Consider when Planning

When dealing with urban and regional planning with the idea of giving at least some order and rationality to the territorial development, there are some important issues you should consider related with the fact that society changes take place faster everyday, if not your plan **will fail**. Among other considerations I believe the following are essential. You have to:

1. Develop an instrument which is transparent (everybody can understand it), just (is based on laws and regulations) and equitable (equal benefits for everybody);
2. Privilege the general public interests above those of individual's, without forgetting individual rights;
3. Approve your Plan considering the consensus of the community;
4. Solve where new inhabitants due to natural or social population growth, poor or rich, locate according to their particular economies;
5. Take into account the “majority desire” of individuals or families related to land uses and intensity of them in their communities;
6. Plan a transformation of land uses in response to market forces concerning changes in land values and new ways of dealing with commercial, service, and industrial activities because of technological changes;
7. Visualize how you entire population will transport in a reasonable time to go to work, to study, for leisure or any other activity;
8. Take into account a different behavior of families or individuals which reflects new realities such as:
 - The decrease of the fertility rate which makes families smaller everyday;
 - The raising of the life expectancy level of all individuals basically because of fast advances in medicine;
 - The everyday increase of woman's participation on activities other than those performed at home;
 - The raising of single family homes and,
 - The raising of women or men taking care of their children alone.

It does not matter how you make your analysis, that is to say, you can consider classical thoughts of urban planning, comprehensive planning, innovating planning, strategic planning, etc., but authorities and citizens expect you to define for the future at least seven basic things.

1. In the first place, which areas could be urbanized and which ones should be preserved for non urban activities;
2. In case of population growth, where will you locate these new inhabitants;
3. Definition of permitted land uses in and out the city;
4. Definition of the intensity of use, through the classification of a population density and / or employment;
5. Design of the roads and transportation infrastructure;
6. Definition of the urban infrastructure systems, such as, schools, health and government facilities, etc., and,
7. Cost of these actions and sources of monies to make them a reality.

Another issue which I consider of prime importance when planning in a county located in a city which belongs to a developing country, is the fact that neighborhoods differ a lot depending upon the economic level of its inhabitants, the land tenure and the age of them. A primary typology of neighborhoods could be:

New neighborhoods located in irregular settlements inhabited with poor families. Here what is fundamental for their inhabitants is the legalization of land tenure, the introduction of basic infrastructure, such as, water, sewerage, electricity, main accesses, etc., and security.

Neighborhoods derived from irregular settlements already legalized. In these entities their inhabitants fight for the consolidation of the physical infrastructure (water, sewerage, electricity, carpeting, etc.), security, plus the construction of urban infrastructure (schools, health facilities etc.).

Neighborhoods with legal land tenure since the beginning and inhabited with medium low income families. - These areas are born totally urbanized, therefore, the basic demands concentrate in the improvement of the physical and urban infrastructure, services and security.

Neighborhoods with legal land tenure since the beginning and inhabited with medium and high medium income families. – The main concern of the inhabitants of these entities, since they were totally urbanized from the beginning, are land use changes and the improvement of the quality of the environment and security.

Neighborhoods with legal land tenure since its beginning and inhabited with rich families. - Here, the basic demands are the privatization of the urban space and the demand for optimum services, physical and urban infrastructure, security plus the improvement of the urban image.

Neighborhoods located in irregular settlements and inhabited with rich families. - Here, the basic demand is the land tenure legalization plus all the other demands of the last classification.

As we can notice the demands on different types of neighborhoods differ a lot and consequently it is very difficult to establish general policies towards large amounts of territory, since the city could seem as a deformed chess table in which each square is different in size, shape and inhabitants pertaining to their incomes, hence, solutions should be different for each of these spaces.

F. Issues and Restrictions we considered for the Urban Planning of Tlalpan

In the following lines I describe the main issues that we confront dealing with an urban planning for a county such as the one we are analyzing.

F.1 Non-Urban Areas

In the edge of the urban area of Tlalpan in 1985 an “ecological” limit of urban growth towards the south was imposed, this limit was assumed by the current “General Urban Development Plan of Mexico City” authorized in December 2003.

Supposedly no urban development should take place after this limit, reason why all the area of this county south of this limit was named as an ***Ecological Conservation Area***. The only

land uses permitted here, were those related to non-urban activities, such as, **Ecological Preservation (PE)**, **Ecological Restoration (RE)**, **Agro Industrial Production (PRA)** and Rural Towns. The idea was to avoid as much as possible the population of this area, therefore, supposedly the only new inhabitants in this **Ecological Conservation Area** would be those derived from the natural growth of 4 rural towns located here.

Unfortunately during the last 20 years, close to 200 shanty towns were established in this **Ecological Conservation Area**, with a population near to 5% of the total population of the county, also, rural towns were the sites that showed the highest percentage population growth from all others in the county, hence these 4 towns represent 14.37% of the total population of Tlalpan.

Another important problem in the **Ecological Conservation Area**, as said before, is that the agriculture frontier continually grows towards a mountainous forest region of volcanic subsoil which permeates the heavy rain of the area to the undergrounds of Mexico City, from which most of the water supply for Mexico City inhabitants is provided. The urbanization of the agriculture and forest spaces reduces the area for infiltration of water, which is of capital importance for the maintenance of the water underground reservoirs; also, the reduction of the forest endangers the supply of trees essential for the purification of air pollution.

F.2 Urban Areas

The “ecological” limit mentioned above, imposed a severely physical restriction for urban development, therefore, the urban population growth should be located inside the urban area, no further urban growth beyond this limit is permitted.

As part of the urban planning process imposed in Mexico City, it is possible to plan one or more neighborhoods with more detail than the one possible in the General Plan for a county, these plans are called “Partial Plans”. In the case of Tlalpan 7 of these plans were authorized recently and are legally current, hence, the proposals in them should be observed.

The inhabitants of many neighborhoods in this county, organized in local societies, do not want any physical change in their neighborhoods, arguing that their traditions or way of life would change if they allowed territorial transformations, hence, this attitude is imposed as a restriction even if physical changes are considered beneficial for these areas or are necessary for a better transformation of the whole county.

Another important issue to be considered is that related to the urban trace. Medium low and low income families in Mexico City, as opposed to other cities in developed countries, spontaneously produced, without almost non official urban intervention, more than 60% of the urban area, that is to say, most of the territory has grown with urban traces which are far from the maximization of the urban fabric.

Tlalpan is not far away from this phenomenon. In many neighborhoods, the urban trace does not allow big changes because in avenues and streets the congestion of traffic and infrastructure, due to technological improvements, a long time ago surpassed the demands for space.

Other restrictions that should be taken into account are those imposed by general sectorial plans for the whole city such as the “Water and Sewerage Plan”, the “Roads and Transportation Plan”, the “Protection Civil Plan”, the “General Urban Development Plan” and the “Ecological Plan”. Unfortunately all these plans are done by groups of professionals which are concerned mainly in the issues which are of main importance for each particular sector and not always the melody is play on tune.

Finally, another important issue that should be considered, is the one related to the rights that property owners attain through approved past urban plans for the county. In a new plan you can change the land uses or the density or intensity of use but these changes do not apply if an owner calls on for these rights.

G. Our Proposal for Urban Areas

G.1. Land Use and Density and Intensity of Uses for specific lots

In terms of land uses planned for each lot, we consider that the actual list of uses, in general terms, is correct, this, since before 1997 this list was enormous and the planning process became very difficult. Up until 1997 the list of land uses considered were more than 30 uses, from 1997 this list was reduced to 15 uses.

For our case of analysis, Tlalpan, we are planning one additional use, Hb, this land use being housing with a commercial area of 60m² maximum on the ground floor and only for low income neighborhoods, where for economic needs many of the families living in this areas, with or without official permits, build premises in the first floor aimed for commercial activities or services.

In terms of the procedure (formula) for the specific definition of the intensity of construction for all the areas in our county, we plan a 4 digit formula for all the cases, the last digit planned to define the maximum number of dwellings permitted in the lot.

Example:

<i>H</i>	/	<i>2</i>	/	<i>30</i>	/	<i>200</i>
<i>Proposed land use</i>		<i>number of levels allowed</i>		<i>% of empty space required in the lot</i>		<i>m² considered for the definition of number of dwellings in the lot</i>
<i>First digit</i>		<i>Second digit</i>		<i>Third digit</i>		<i>Fourth digit</i>

In this example ***H*** is the permitted land use in this case, housing, the ***2*** describes that two floors are the maximum levels allowed; the ***30*** means that 30% of the area of the lot has to be left without construction and, ***200*** is the number of square meters in which the total construction allowed should be divided to define the number of housing units permitted in the lot.

Following our example, if the ***lot is 200 m²***, we would be able to build ***140 m²*** on the ground level and ***140 m²*** on the first level for a total of ***280 m²*** of construction, because we would be forced to leave ***60 m²*** of empty space on the ground floor and, we would be allowed just one housing unit since the total construction in square meters divided by the 4th digit would give 1.4 dwellings in the lot, rounding this number to one house.

G.2. Land Use and Density and Intensity of Uses per areas

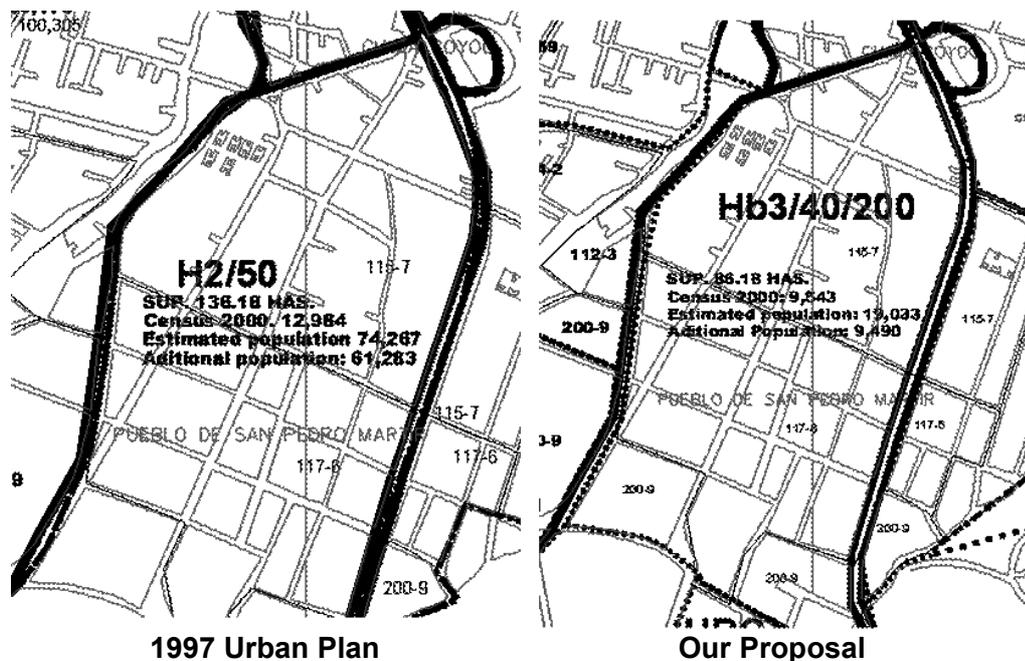
In terms of land uses planned for areas composed of one or several complete neighborhoods or parts of them, we use the same procedure as the one defined in the above section, but this procedure (formula) applied for an entire area.

For the definition of an area that should be considered with the same standard, we follow the next procedure:

- We analyzed the composition of these areas according to the “1997 Urban Plan” for this county, calculating the maximum population that could eventually live in these areas if in

all the lots contained in them the standard defined in the aforementioned plan would have been applied.

This analysis allows us to estimate the total population that could live in Tlalpan according to the "1997 Urban Plan". The result showed that the standards approved permitted a population of 2 million 400 thousand more compared to the existing one. These results mainly due to the fact of the absence of the fourth digit in the formula already exposed. This because the definition of numbers of dwellings are based, as said before, on a different instrument of planning;



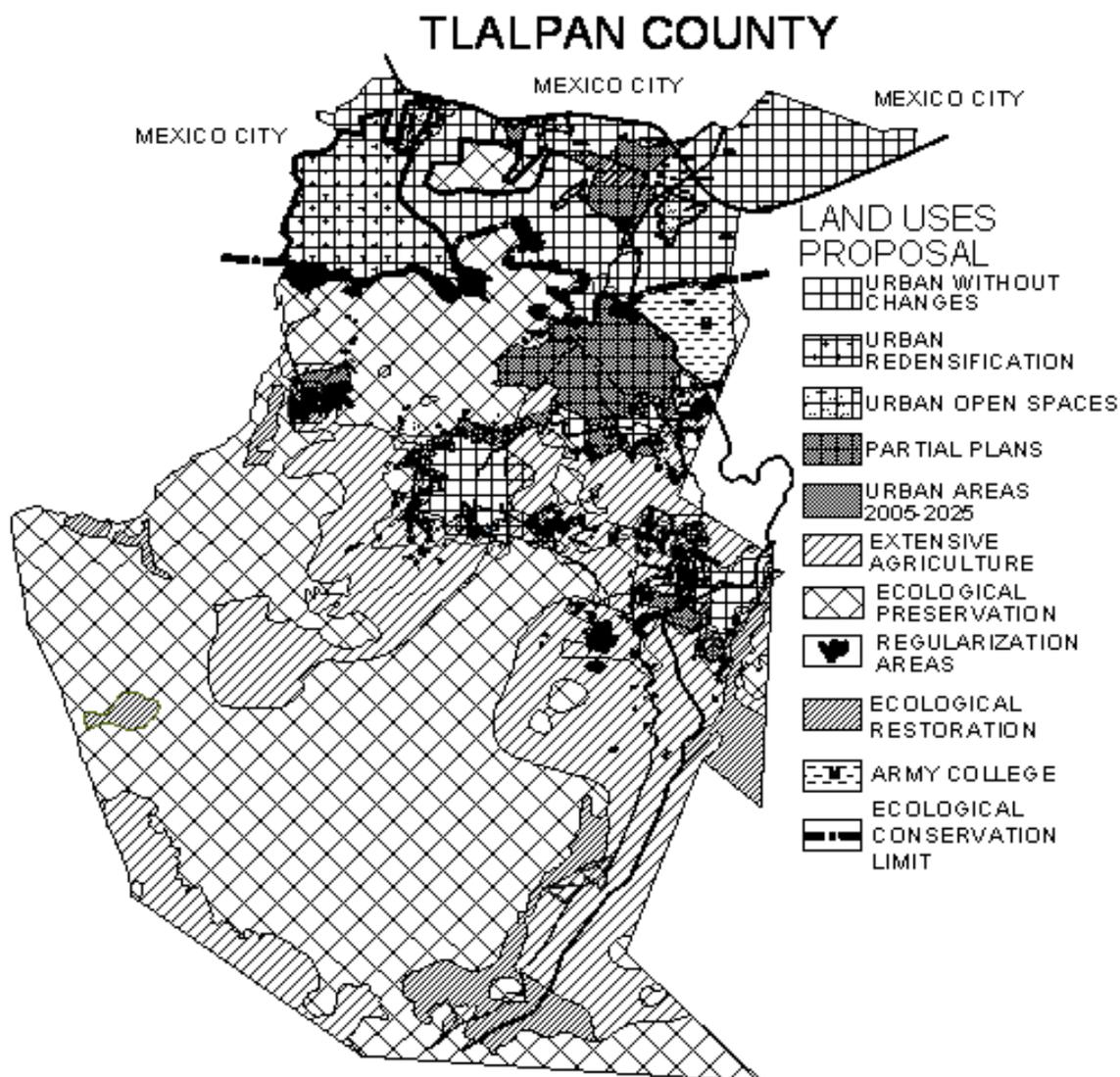
- We re-design these areas, taking into account the differences of results of land use and intensity of land use and density of population between its diagnosis and what is proposed in the "1997 Urban Plan".
- Finally, for each area, we applied our procedure (formula) which includes the fourth digit, same that allow us to control population densities and intensities of land use.
- Modeling different sceneries changing the fourth digit, we were able to select one, which allows us to:
 - Increase our population as planed for the year 2025, that is to say, in the urban area of Tlalpan, we can located 500 thousand more people than the 140 thousand which are estimated as new inhabitants for this year.
 - Increase the population in neighborhoods which had had a very rapid transformation and in which their inhabitants would benefit from this policy and agree with it.

H. Confrontation of View Points between City and Regional Planners and Environmental Experts

H.1. Our Proposal for Non Urban Areas

In non urban areas our definition for future land uses was done considering 7 basic things:

1. The territorial diagnosis of land uses, these being, forest areas, agricultural areas, soil erosion areas, etc.;
2. The topography;
3. The infrastructure crossing these areas, such as, roads, railways, energy lines and petroleum ducts, etc.;
4. Water corps, rivers and water draining;
5. Human settlements define by rural towns and flimsy settlements. For these considering their population evolution in the past and for the future;
6. Danger areas defined by: soil fractures and cracks, colapsations, floods and industrial infrastructures and,
7. Legal figures imposed to protect or preserve non urban land uses.



The method of analysis used was based on a “territorial analysis model”, which takes into account, the current land uses and the evolution of them, with an emphasis of the ecological restoration of decay areas and the preservation of the existing forest.

As a result of this planning we re-defined the **Ecological Preservation Areas, Ecological Restoration Areas, Agro Industrial Production Areas** and **Rural Towns**. For flimsy settlements we defined which of them:

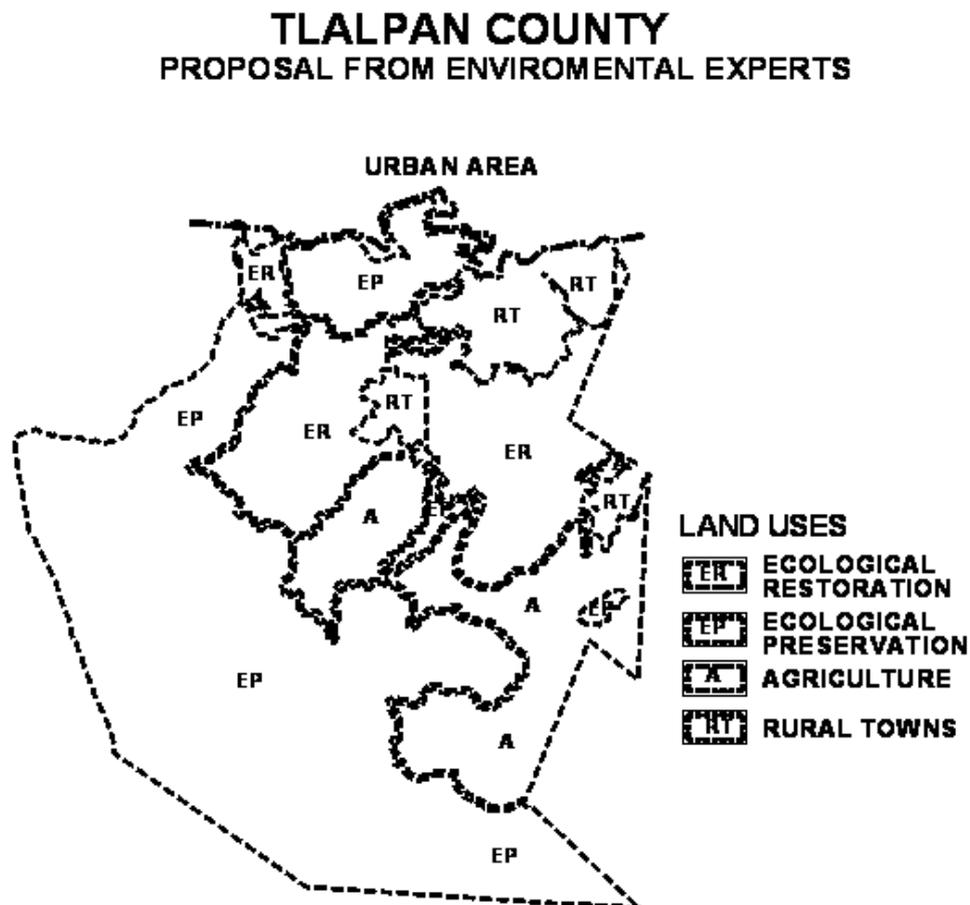
- Should be removed because they are located in dangerous areas or they affect the environment;
- Could be regularized immediately and,
- Should be analyzed in more detail in order to define what to do with them?

For flimsy settlements we recommend to establish a Regularization Program in order to handle them in a period of no more than 3 years.

H.2. Proposals for Non Urban Areas from Environmental Experts

For these areas, a group of experts in natural environment composed by ecologists, geographers, biologists, sociologists and lawyers, appointed by the government, which we will call the “environmental experts”, review our work and make a new proposal. The result of this proposal differs from ours since their analysis is based on different premises. They are much more concern with the handling of the different types of areas defined considering “environmental factors” than in the definition of land uses.

In the work of Tlalpan, it was imperative to define land uses for the entire county, in such condition these “environmental experts” planed these land uses with a very different result from the one developed by my team, which is mainly composed of city and regional planners.



The main issues considered by the “environmental experts” were:

1. The river or water draining basins;
2. The capacity of different areas in terms of water absorption;
3. The urban land uses and flimsy settlements in **Ecological Conservation Area**;
4. The cause and effect of variables related to:
 - The different types of agricultural commodities produced in the area and their corresponding productivity;
 - The characteristics of rural housing in terms of: basic infrastructure of each lot (water, characteristics of the drainage, etc.);
 - The inhabitant's level of education and family incomes and,
 - The flora of the site.

The method of analysis used by these "environmental experts" is mainly based on a territorial technique of analysis known as "Map Algebra", supported by Arc View, through it, you can produce regions with related characteristics, hence, the possibility of establishing different types of policies for regions alike.

As a result of this exercise of planning, they re-defined the **Ecological Preservation Areas**, **Ecological Restoration Area** and **Agro Industrial Production Areas**, but these typologies are different from our proposal because they compartmentalize (open) these land uses in order to have more possibilities of uses.

I. Conclusions

I.1 For Urban Areas

1. We respect the philosophy of the "General Urban Development Plan of Mexico City" in terms that urban growth should be avoided, this, through recognizing the "Ecological Conservation Limit". Following this idea, our plan, for locating the population growth up to 2025, considers the use of all empty lots in the urban area, also, the re-densification of approximately 1,200 hectares, this allowing more than one house per lot and one more floor.
2. For the urban growth of rural towns we also plan to use all the empty lots in order to occupy the least possible area of agricultural lands.
3. We developed a model of zoning, introducing in most of the cases the fourth digit in the formula for the definition of the number of dwellings per lot.
4. We respect the land use and density in those neighborhoods in which the community groups don't want any change, also in residential areas which maintain its original use and density.

I.2 For Non Urban Areas

1. The two groups of analysis agree that the Ecological Conservation Area should allow the minimum possible future population.
2. A comparison of the two proposals let us know that the main differences are in the forest areas. The "environmental experts" consider that forest areas could be combined with agriculture.
As far as there is a conflict of perspectives, much more work has to be done in order to come to a satisfactory solution for both parties.
We consider that a possible solution could be the partition of the land uses proposed by the "environmental experts" in more uses in order to allow a richer typology that permits us to deal with this problem.

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