Urban Development and its Impact on the Ecological Systems of Costa Rica

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Supreme Salus Populi Lex This
"Let the health of the people be the supreme law."
Marcus Tullius Cicero, De Legibus 3, 3, 8, year 52 AC

Introduction

In the past 15 years, San Jose the capital of Costa Rica, and three other mayor cities (Cartago, Heredia and Alajuela), have been presenting the negative symptoms of the large cities in matters of development, housing, urbanization, industry and commerce have grown uncontrolled and unregulated. The mixing of the different zones has dictated a time bomb in the ecological environment. Contamination is an every day issue in today's news in Costa Rica and in the world, and is becoming more and more the concern of the political and civil society.

This is why in such a small country as Costa Rica the environment has to become, sooner or later, the most important point in the national agenda, knowing the potential in it is natural resources. Some how it is a priority to involve this topic as a social concern, from a global point of view. The idea for a better cities, can be seeing only if we have the right natural environment.

The national constitution explicitly in the chapter 50, establishes:

"Article 50. - The State shall procure the greatest welfare of all inhabitants of the country, organizing and promoting production and the most adequate distribution of wealth. Every person has the right to a healthy and ecologically balanced environment, being therefore entitled to denounce any acts that may infringe said right and claim redress for the damage caused.

The State shall guarantee, defend and preserve that right. The law shall establish the appropriate responsibilities and penalties."[1]

Problem Definition

The population of Costa Rica has increased 4.8 times in the past 50 years, from 800.875 inhabitants, in 1950, to almost 4 millions in the year 2.000. A 2,8% rate growth. This confirms the urbanization process in the major cities of the country and the secondary cities as

[1] (As amended by article 1, Act N° 7412, June 3, 1994.) Official Translation Bilingual Edition, Constitution of the Republic of Costa Rica. Zeledon, Ricardo. 2001Codigo Ambiental. Costa Rica, Editoria Porvenir.

well, that are extending to become one. Surrounded by absolute natural parks and reserves.

One of the biggest problems is the mixing of the different zones in the grand central area (G.A.M.). This leaves us to the problem of the contamination not only of human waste, but more delicate and dangerous the chemical waste used in the industry. Important steps were taken in reducing air pollution, which has reached a serious level in urban centres, especially in the Central Valley.

We can appoint from a capitalism point of view:

> *"that the market it's the centre and the environment becomes and obstacle to the business it self…"*[2]

Our culture has considered that water is an endless resource. In this belief rests the uncontrolled contamination and the unconcern in the use of water. Rivers have been used generally like an average way for elimination of black waters, industrial and domestic remainders, residual and pesticide, the deficiency of networks of sanitary sewage system and the inadequate operation of the systems in the existing processing.

Motivation for the Choice of Study

Costa Rica has developed rapidly, the understanding of the development of cities and the impact in the ecological environment is a delicate issue. The main idea of this study is the analysis of the actual framework, laws and mechanism to see if is working.
If not, the idea is to make a proposal of a new scheme for the management of natural resources giving more concern to the water resources, and ground water reserves.

Method of Study

The method of study will be seeing the general aspects of the problem, then the framework, the actors and then come down to the specific and detailed problems, not seeing the housing and urbanization problem from an individual point of view. The answer or solutions must be analyses from a global, complete and sustainable point of view. Analysing why the actual laws, policies and frameworks do not work.
The approach to the problem will be as follows:

1. Presentation of the problem.
2. Literature review.
3. Analysis.
4. Country
5. G.A.M.
6. Maps: density, cities, etc…
7. Analysis
8. General proposal.
9. Conclusion and recommendations.

[2] Idem. page II.

Background: Urban Development and the Impact in the Ecological Environments

Costa Rica at a Glance - 2000

Population : 3.7 million
Surface area : 51.1 thousand sq. km
Population per sq. km : 71.5
Population growth : 1.7 %
Life expectancy (1999) : 77 years
GNP per capita : 3,960 US$
GDP : 15.8 billion US$
Source: *World Development Indicators Database*

Urbanization

The growth of the cities and the development of the housing in Costa Rica did not get such a problem until 1940, and it transformed into chaotic by 1970. Today Costa Rica presents an unmeasured urban and inhabitation growing that has generated big social problems, not only in the housing matter but is becoming a disease that can turn in to more and more dangerous to many other environments.[3]

Added to this growth, in the past ten years a new phenomenon entered the scene, Nicaraguan immigration to Costa Rica. The Nicaraguans are searching for better living and education, has great relevance, due to the massive migratory flow and to the economic and social weight of this community in the country.[4]

Costa Rica had an economic growth of 8.3% in 1999. [5] This economic fact has its social consequences. In a survey made to sectors of the middle class by the Institute of Social Studies in Population (IDESPO) of the National University detected that:

> *In opposition to previous surveys of IDESPO, 55.5% of the middle-class affirmed that, to bear his crisis, it has had to send to work other members of the house and to work more. Also it has had to make adjustments in his expenses, mainly in education, leaving the studies, change of educative centre, request a scholarship or to leave the study to work, 59,1% have had to change their feeding buying the basic thing, to look for lower prices, to eat more chicken and less meat.*[6]

As much the poverty as unemployment increased of 19.7 % and 5.6 % in year 98 to 20.6 % and 6 % in year 99.

> *"if a country applies policies guessed right in the long term, it can advance more human developing express than in economic growth, and can take advantage of better the growth, in the promotion of the human development."*[7]

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3 The national census of 2000, San Jose, Costa Rica.
4 FLACSO. Latin American Faculty of Sciences Socials. 1999.
5 Institute of Social Studies in Population (IDESPO). 1999.
6 http://www.nacion.com/ln_ee/2000/julio/01/pais3.html
7 Proyecto el estado de la Nacion, setimo informe 2000, Costa Rica. http://www.estadonacion.or.cr/Info2001/nacion7/CR-info%20mundial.html

In the Report of Human Development 2001, it is indicated that Costa Rica has obtained important advances developing human, in spite of a modest advance in its national income. Like tendency of long term (data available for a reduced assembly of nations), Costa Rica and Korea are two countries that have obtained impressive advances in human developing, but Costa Rica has obtained that result just by half of the income of Korea. (PNUD 2001).

Costa Rica presents a tropical weather with 25.3% percentage of its areas as refuges and sanctuaries for the protection of the flora and fauna. The most recent data consider that between 41.0% and 43.5% of the national territory are under some type of arboreal cover.

Today these 1,291.289 hectares are protected. The tropical zones of the American continent, the Neotropic, host a greater number of species then other similar zones in the world, and obviously more than the deserts and ice latitudes. Costa Rica has been considered as one of the most diverse regions and is estimated that 4% of the total live species are hosted in 0.01% of extension global area. Costa Rica is the country in the world with the major concentration of species per square kilometre: for every 10,000 km^2 it can be find 295 species of trees.

The climate has three basic zones: Cold from 10°C on under, template from 10°C and 22°C and hot from 22°C and up.

The actual population of Costa Rica is 3,810,179 with a density of 68.2 inhabitants per square kilometre, and the size of families is 4.1 persons.

In the index of human poverty (IPH-1) Costa Rica occupies a position of privilege between the 90 countries classified, second, after Uruguay, position number one, and before Chile. The last census 2000, had revel the next figure: Housing Poverty: 21.1%
Garbage (metric tons / day) = 1.257
Production per capital (grams/ person) = 969.

Pollution and Environmental Problems

- Forestation. The deforestation rate continues to slow—reforestation in 1996 was approximately three times the rate of deforestation (21,738 hectares vs. 7,000 hectares).
- The solid wastes are an environmental problem that is the most visible to the population and because of its difficult solution by its socio-cultural complexity.[8] A study establishes that the amount of waste that take place annually in the country is 514,935 metric tons, for an average of 0,7kg by inhabitant. The coverage of municipal collecting was the 66 percent, being considered that 15 percent was taken care of by private companies, and that the only sanitary filling of Rio Azul, with 20 years of operation and whose life utility has ended.

[8] Pan-American Organization of Health (OPS), 1996

YEAR	MT	VARIATION %
1989	225.412,0	-
1990	235.601,0	4,5
1991	242.818,0	3,1
1992	259.990,0	7,1
1993	278.428,0	7,1
1994	301.126,0	8,2
1995	292.439,0	-2,9
1996	284.834,0	-2,6
1997	295.958,0	3,9

- In air pollution the programs included the elimination of lead from gasoline; the introduction of the "ecomarchamo," a program of mandatory emissions testing for vehicles. While the concentration of carbon monoxide in San José grew during 1996, the amount of suspended particles in the air diminished from the previous year, and there was a reduction in the use of substances damaging the ozone layer.
- In the solid waste. Due to the inability of public authorities, the private sector and communities to reach a solution, the problem of solid waste disposal continued to worsen.

Pollution of Rivers and Underwater Reserves

 [9]

The greater contamination of the country is concentrated in the river basin of the River Grande de Tárcoles[10], where in an area of 2,169 km² in 1996, 55 percent of the national population, 85 percent of the services and commerce, 80 percent of the public transport service, and processes the 50 percent of the coffee. Studies determine that in the G.A.M (Grand Metropolitan Area) is unloading daily in rivers

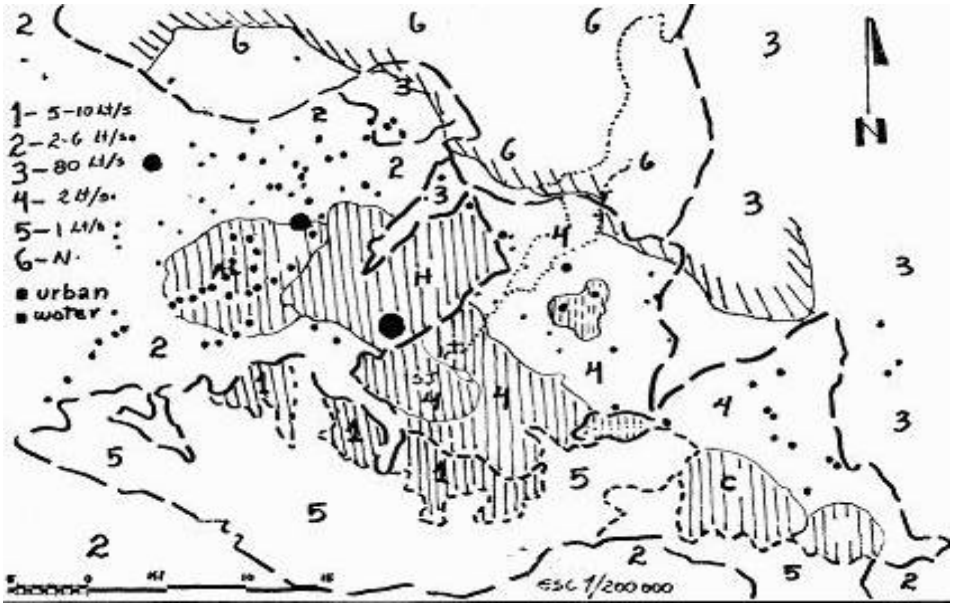
9 http://www.nacion.com/ln_ee/2001/julio/30/home.html

10 Although, an abundant normative frame exists, the centralized beings of the State have not been able to make fulfil it, due to its lack of technical and financial capacity to respond indeed. An example of this is that out of the 206 operational information presented/displayed by industries in 1999 (taking care of the norm on spills that forces it to them) less of 50% it was reviewed by the Ministry of Health. Without counting on those industries that not even fulfil the requirement of presentation of their report (around 5000 established in the country).

300,000 kg/day of organic and industry waste, of which 250,000 kg comes from the coffee benefits.

A program to treat water from coffee processing plants was implemented, but the enormous job of reducing contamination of the Rio Grande de Tárcoles still remains.

The next figure shows, in stripes, the urban growth, the main cities are extending to become one big urban area, surrounded by national parks and absolute reserves and the different numbers are the quantity of water under the urban area.



"In agreement with study descriptive of Laboratory National of Waters, of Costa Rican Institute of Aqueducts and Sewage systems (AyA) that takes as it bases those reports of the OPS, have I leaved behind of 20 years in relation to other nations of the region in the matter of residual water treatment.

… according to the director of the National Water Laboratory, Darner Alvarado Moor, from 1983 the 4 percent of waste waters receives treatment. "It is certain that in potable water and water for human consumption there is advance, but also is truth which we are in a situation where already we touched ceiling and is necessary to make much more to make the improvement sustainable of the quality of the water. In black waters we are a shame", said Alvarado Moor.

…The black tanks, latrines and wells constitute a threat for the quality of underground waters of the country …

… nevertheless, the centre of the country where lives the 51.7 percent on the population has "zero" residual water processing. At the moment, AyA works in a tax model for the metropolitan area that it includes, among others, the canon by environmental service, the service of sanitary sewage system and the improvements to the aqueduct. According to the executive president of AyA, Rafael

Villalta, the proposal will be finish before this administration finalizes". [11]

"…the water, sweet as much salty, has received much less attention than the forests. The result is that, in spite of being a relatively abundant resource, it is at the present time under serious threats. The urbanization process, especially in the G.A.M (GRAND METROPOLITAN AREA), has issued without order or concert, and mainly without the provision of the necessary infrastructure for the good handling of the water. The contamination of superficial sources and badly been of the aqueducts attempts against the health of the population.[12]

Costa Rica is a country equipped with abundant water. Estimates have show that the availability of 29,800 m^3 per inhabitant of under water and superficial water relatively well administered in Costa Rica, but there is much left to do to ensure the availability. An estimate shows that 81% of the water for domestic consumption and 91% of the water of industrial use come from underground channels. But the lack of control and the mismanagement have also shown that the resource is fragile and can damage directly and instantly the health of the entire population, like the episode of contamination dated in 14 July 2001.

"Two weeks ago, the contamination of two sources (one with Kerosene and another one with faecal matter) no only put in risk the health of 400,000 people of the metropolitan area. Also it served to unmask the weaknesses of the system of Aqueducts and Sewage systems (AyA), and the risks that there are on 242 municipal aqueducts and 1.620 rural ones".[13]

Country Level

The study is contemplating the entire country, assuming that the problem is based in the lack of legislation and inefficiency of policies to control and solve the existing problem, giving special attention to the G.A.M. (Great Metropolitan Area) and is related to the environment and its concern with ecological aspects.

Actual Strategies and Analysis

"The most crucial pre-requisite for an affective national urbanization strategy are political commitment at the highest level and appropriate adjustment of the governmental structure and modes of operation…"14

" the present states of contamination of superficial waters reflect that the legal frame and the institutions with competition have not fulfilled their functions of protection of the resource, nor have

11 "La Nacion" 12/4/2002. " Rezago en alcantarillado". http://nacion.co.cr/ln_ee/2002/abril/12/pais7.html

12 http://www.estadonacion.or.cr/Info2001/nacion7/armonia.html#Inicio

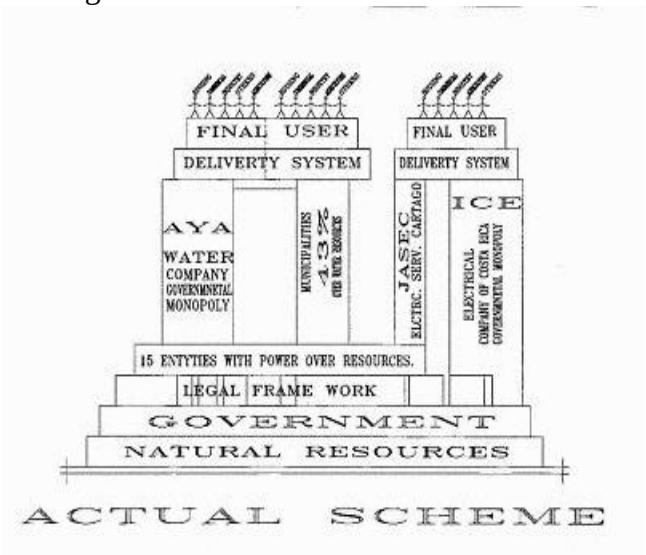
13 http://www.nacion.com/ln_ee/2001/julio/30/home.html

14 Renaund, Bertrand. 1939 National urbanization policy in developing countries. Oxford University Press, London. p 129.

responded to the necessities required in relation to the protection of the same one, or they have made it in a deficient way."[15]

The actual situation in Costa Rica is positive in many ways, and is good to say that the government and local municipalities have been looking for a way to relieve the problem, but the projects don't have a long term period, and their expectations are to relieve the problems until there political time is up. But the answers to this kind of problems are to eradicate the actual problems and project answer to the future conflicts that the different sectors will be having.

The actual scheme has already proved that in many ways is not working.



But in the long term the application of new scheme based in new and improved strategies have to be implanted to procure a stable and sustainable solution to the environmental problem. As an analysis of this we have a cultural problem, believing that environmental problems, social poverty problems, pollution of superficial water and under grounded water, air pollution and deforestation are the government's concern and problems and not the problems of the civil society. In this aspects there has to become a new and more educated generation understanding that the use of the earth and it is resources are very delicate and involve every person.

From other point we have in the scene more than 15 independent institutions and ministries all with competitions related to the water resource, in addition to the existence of more than eighty related legal norms to the subject. This has caused the creation of confusion of sectors each one with the same role to be play and for being able in terms of administration, planning and decision making with respect to the resource.

The present states of contamination of superficial waters reflect that the actual scheme and legal frame of the institutions with competition have not fulfilled the function of protection of the resource, nor have responded to the necessities required in relation to the protection of the same one, or they have made it in a deficient way.

A logical and vertical national strategy has to be applied, the framework is set up, but the need to reinforce it is imminent. The

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analysis of today's laws, mechanisms and institutions, have to be put under study to determinate a short cut to the global solutions; making a discrimination on which of the institutions have the better technical human resource and scientific tools, and dictating a hierarchy.

The tools for a better and more understanding sustainable growth in Costa Rica are dictated, but the main obstacle is yet to be jump, which is the POLITICAL WILL. The existence of globalisation and that the economical matter is the most important aspect in today's political world. It is also true that the industrialized and first world countries, push there interest above any social or human needs, but the need to preserve and maintain the natural resource is the back bone for a better future.

Actors

Actors in Costa Rica, related to this issue, are a long list; this aspect can be seen as part of the problem in the burocracy machine. We will name here the most important, with more power and more related to the development of the cities and the environment resources giving more attention to the water resource.

INTERNATIONAL BANKS: International Monetary Fund and World Bank. http://www.worldbank.com/. Main actors in loans and dispositions of the money to be giving to the development countries.

GOVERMENT: Democratic selected by the people, elections every four years. (http://www.casapres.go.cr/).

Main actor in the disposition of the policies to be following.

A Y A: Acueductos y Alcantarillados. (Aqueducts and Sewage systems)

LOCAL GOVERMENTS or **MUNICIPALITIES**

CIVIL SOCIETY: People not contemplating the social structure. It's to be considered the entire sectors, not from a structural social point of view.

MIRENEM: Ministerio de Recursos Naturales y Marinos. Ministry of Natural and Maritime Resources.

MIDEPLAN: Ministerio de Planificación Nacional y Política Economica. Ministry of National Planification and Economical Policies. http://www.mideplan.go.cr/ Plan Nacional de Desarollo Urbano. PNDU: www.mideplan.go.cr/PNDU/principal.htm

I.C.E.: Electricity Costa Rican Institute. Entity that regulates the electrical resource in Costa Rica, it's a monopoly of the government. www.ice.go.cr

MINAE: Ministerio de Energía y Minas, (Ministry of Energy and Mines. www.minae.go.cr). This actor has many functions related to our work the consolidation of the property of the State on the national parks, by the indemnification to the previous proprietors of earth. It also has a department of water, which is in charge of give the conceptions in water matter, but has the lack of technical skills, human resources and money to control the extraction of the wells, this department has only fifteen employees to control 5.711 wells legally establish, but it estimated that 15.000 work with out the legal permit.

SETENA: Secretaría Técnica Nacional Ambiental...(art. 83 de la Ley Orgánica del Ambiente) Technical National Secretary of environment; is a decentralized institution of the Ministry of the Environment with the main purpose of harmonize environmental impact with production process.

Description and Analysis of the Actors

> *"Improving the urban environment as a means of improving human development: central to this objective is the emphasis on links between environmental protection, growth, and poverty reduction. People-first environmentalism must have a strong focus on the cities, because is there were the majority of the population is going to be living. Reducing urban poverty is an essential precondition for reducing urban environment problems".*[16]

The actors in the picture of management the natural resources in Costa Rica are many, and the technical staff of the different ministries have proposed different solutions or plans but, some of the entities have greater power in decision than others, this takes to an uncontrolled in hierarchies. Combined to this the imminent necessity is denoted to establish one environmentalist legislation, with a legal frame with absolute sufficiency to dictate fines according to the committed crimes against environment.

For many of the poorer developing countries the prospects for poverty reduction depend crucially on reducing their external debt. The boards of the World Bank and the International Monetary Fund (IMF), at their annual meetings in September 1999, endorsed measures to provide faster, deeper and broader debt relief to the 41 heavily indebted poor countries (HIPCs) and to strengthen the links between debt relief and poverty reduction.

Assuming that the international picture changes and the wind of prosperity blows in the social and more human direction, the governments of the under developed countries have to change their way of thinking and try to look for improving the internal structure to fight against corruption and impunity. The need for success objective is the application of long-term programs, condition *sine qua non* of the sustainability policies, must continue, even in the recurrent change in the central administration every four years.

From all of the actors that have a line in this scene, SETENA, have proof to be success in regulated the new housing developments.

And the MINAE, have implemented the recent PNDU, in the first phase, whose main objective has been to generate a vision shared on the course that must give to the urban development at national level in general and individual of the Great Metropolitan Area.

An integrated approach of the actors is irremediable and the use of multi – thematic professional and strategies of the environmental concept is a reality if we want to give rapid response to the problem. The danger in the actors domain is to take a too simplistic view, and to support policies that reduce poverty at the expense of the environment or protect the environment at the expense of the poor. This false

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[16] *1994Serageldin,.Flores S, Ivan Alvaro 1997 Environmental Evaluation of Housing Projects. Pag. 21*

dichotomy is part of the reason why national anti-poverty plans and national environmental plans are implemented separately.

The initiative is seeking to identify and promote policies and public actions that can break this cycle. Surveying a range of experience, it has been concluded that "win-win" options can be found - options that both reduce poverty and protect the environment. Many centre on participatory and accountable governance institutions, such as effective community-based institutions for the collective management of resources.

Proposal

The future of urban development, industry, commerce and tourism of the country will depend, in a large scale, on the institutional capacity of controlling and monitoring of under water resources.
The need of a new conception of the natural resources has to be designed, staring with a new philosophy, and a way of seeing the natural resources.

- A new legal framework has to be established.
- Dictating a new organization in charge of legal power and economical resources to control the use of the production.
- This organization has to implement a new Country Plan of the Urban Development.
- This plan has to delimitate the border were the G.A.M will be growing, contemplating the resources to be protected.
- The National Plan (PNDU), have to regulate and select the growth of the industrial zones, commercial zones, housing. A macro zoning of the G.A.M.
- In a short term have to apply an educational program changing the philosophy view, for the absolute respect for the natural environment (concentric rings around the water reserves, protected areas, risk zones, biological corridors, etc…)
- The plan has to consider new premises for the efficient management of the water resources. An integral vision of the problem that considers the water more than like a natural resource of public dominion, a corporate property and economic strategist for the development of the country.

The integral management of the water resource must consider the following basic steps.

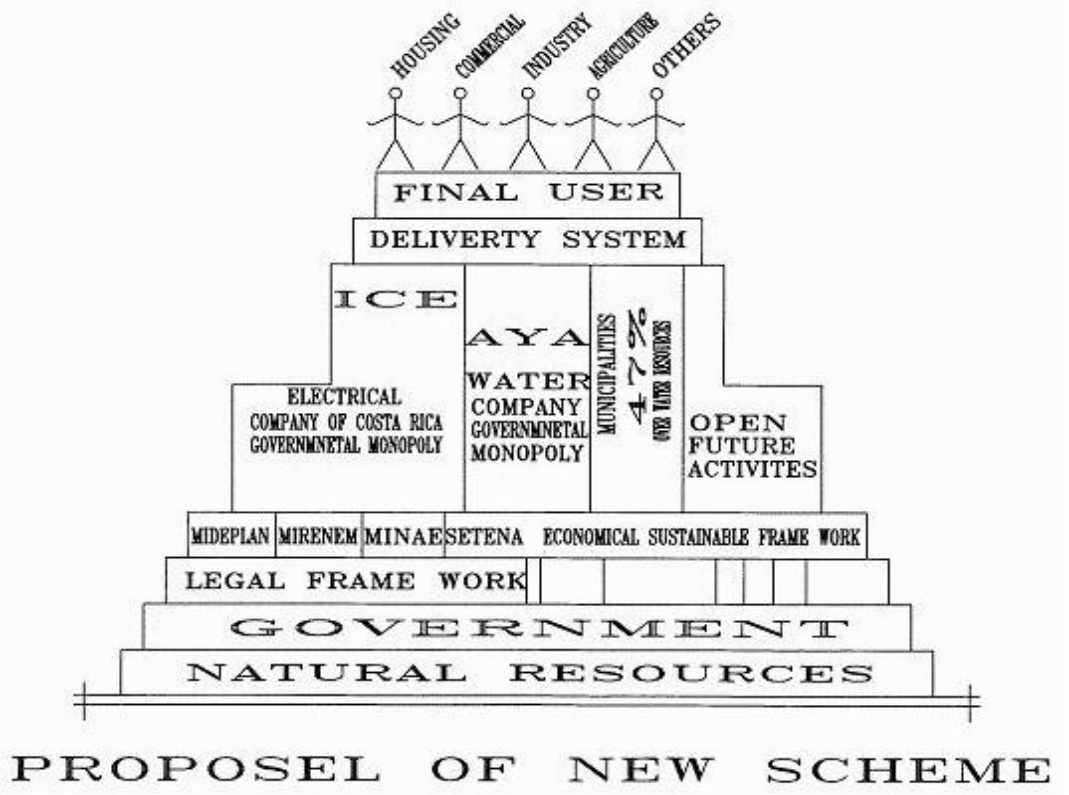
1 The necessity to establish a geographic boundary, that stops the case of the water, must be defined under the concept of " River basin
2 The integrated handling of river basins, must consider the interrelations between the hydraulic production with the tropical variables as use of the ground, industrial production, agriculture, growth of the urban spot, supplying for consumption of human populations, transports and recreation; with the natural variables that they have to do with preservation of the biodiversity and conservation of the water resources.
3 The formulation of a new legal and institutional framework allows integrated handling of river basins and is expressed in three scopes of management: national, regional and local. In the National scope,

the concept of a National Water Authority must be fortified that it contemplates the following functions at least:

- Establishing norms of quality of the effluents
- Establishing norms of quality for human consumption
- Establishing norms for the different uses of the water (recreation, irrigation, hydroelectric generation, etc.)
- Establishing norms for the conservation of zones of charge
- Management of information and research centre on quality and amount of the water resources in the country in order to advance in this a series of today dispersed competitions in different institutions is due to unite in a same organism.

4 A new scheme of economical and sustainable resource.

5 The implementation of the newer technology for the continuing control of the drinking water.



Conclusions and Recommendation

In a priority order, the main recommendations strategies are:

A social revolutionary idea in the way of seeing the environment and poverty issues as one.

In Costa Rica, poverty and environmental problems are government issues; the civil society does not understand that these aspects are a circle that involves in some way every single citizen of the nation. It's a need to let the entire civil community to know how they can be stop the pollution and helping other Costa Rican citizen that lives in the lack of food, house, medicine, etc.

A social revolutionary idea of seeing the natural resource from a realistic point of view.

Recent studies on the situation of the water in Costa Rica, agree in indicating a series of aspects that put in evidence the exhaustion of the present schemes of management of the resources and which they treat

with generating one serious crisis in the next years. Between the most significant elements and repeatedly indicated is that in our culture, traditionally it has been considered that water is an extractive and inexhaustible resource.

Environmental plans and poverty plans must be kept together. Environmental plans and poverty plans have been kept separate.
The division between national anti-poverty plans and national environmental plans needs to be broken down. A start would be to make sure that poverty reducing environmental policies are a major component of poverty programmes, and that environment ministries are represented on the coordinating bodies for the programmes.

The initiative has tried to debunk several myths about the links between poverty and the environment. A central myth is that population growth and lack of resources compel the poor to damage the environment. This myth claims that the environmental damage then leads to a downward spiral of increased impoverishment and further environmental damage.

Important strategy to work on, is the educational programs for the people, in the "know how" can they be part of the solution. Not the problem it self.
Contamination problems in Costa Rica do not have a guilty sector to point at; the problem is from all of the sectors with in the frontiers, the industry, commerce, high class, middle class, poverty sector, spontaneous settlements, etc.

Analysing the actual framework, legal aspects and the capabilities of the government and the municipalities, in their obligations on the environmental issue.
The present states of contamination of superficial waters reflect that the legal frame, the framework and the institutions with competition have not fulfilled their functions of protection the resource, nor have responded to the necessities required in relation to the protection of the same one, or they have made it in a deficient way.

The need to implement a new Urban Development Plan.
Collecting, processing and final disposition of the solid waste are power of the Municipalities, for which the Government, by the MS (Ministry of Health) as director national wide to create a formulation of a National Plan of Handling of Solid Waste, will coordinate completion of a national campaign of spreading and education. It will undertake the coordination mechanisms to improve the access to the financial resources that are required by the Municipalities to cover the necessities with investment

Correct management of solid waste disposal.
A new a strong program of recycling the solid garbage, directed to the social society, not discriminating, none of the sectors.

The main actions to resist the contamination of the water
The immediate or short term program to collect the grey and black water and it is correct treatment. The uses of grey waters for agriculture and a correct treatment of black waters before it is poured in to the rivers.

The need of a new economical mechanism in the sustainability of the entities related to the natural resources.

Until today one of the great problems is the lack of economic resources to sustain a good scheme and good management of the resources. New ideas have to be implemented to maintain the actual parks and to buy the ones that are in the private hands.

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