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The Biomanizales

A local environmental policy

By Liliana Marulanda M.

SINPA Research Report
THE BIOMANIZALES
A Local Environmental Policy

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SINPA

**DOCUMENTATION OF THE EXPERIENCE IN
URBAN ENVIRONMENTAL MANAGEMENT OF MANIZALES, COLOMBIA**

**THE BIOMANIZALES:
A Local Environmental Policy**

Liliana Marulanda M.

INSTITUTE FOR HOUSING AND URBAN DEVELOPMENT STUDIES (IHS)

Within the Framework of the Project

**SUPPORT FOR THE IMPLEMENTATION OF NATIONAL PLANS OF ACTION
OF THE HABITAT II (SINPA) - BOLIVIA**

August 2000

THE BIOMANIZALES - A Local Environmental Policy

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I hope that the results of this work could be understood as an encouragement for the people of Santa Cruz de la Sierra in Bolivia, and the other cities in Bangladesh and Zambia that are part of the SINPA and in many other cities to continue working their concerted efforts for the success of their cities - cities that we and our future generations could be proud of.

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LIST OF ABBREVIATIONS

ACOPI:	Colombian Association of Small Industrials
ANDI:	National Association of Industrials
ARR:	Regional Association of Recyclers
BID:	Inter American Development Bank
BPIM:	Bank of Municipal Investment Projects
CEPAL:	Economic Commission for Latin America
CHEC	Hydroelectric Plant of Caldas
CODOS:	Service Cooperative of Commune Two
COLCIENCIAS:	Colombian Science Organization
CORPOCALDAS:	Regional Autonomous Corporation of Caldas
CRECE:	Regional Center of Coffee and Business Studies
DANE:	National Administrative Department of Statistics
DPU:	Development Planning Unit, University College of London
EMAS:	Municipal Cleansing Company Ltda.
FENALCO:	National Federation of Traders
GEA-UR:	Urban Environmental Studies Group
ICLEI:	International Council for Local Environmental Initiatives
IDEA:	Institute of Environmental Studies of the National University
IHS:	Institute for Housing and Urban Development Studies
IIED:	International Institute of Environment and Development
INVAMA:	Valorization Institute of Manizales
JAC:	Communal Action Board
JAL:	Local Administrative Boards
OEA:	Organization of American States
PAAL:	Local Environmental Plan of Action
PADEM:	Disaster Attention and Prevention Plan for Manizales
POT:	Spatial Development Plan
SENA:	Learning National Service
SINA:	National Environmental Information System
SINPA:	Support for the Implementation of National Plans of Action

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LIST OF MAIN STAKEHOLDERS

Since some of the actors in this experience are mentioned early in the document we present here a brief list of them. Their roles and activities are described in more detailed in Section 6 of this document.

- **The Municipal Administration** led by the mayor and represented by the heads and professionals of its different departments.
- **The Regional Autonomous Corporation of Caldas (CORPOCALDAS)** is the environmental authority at department level.
- **Researches**, professors, teachers and students of the following universities and research centres which have participated with research, studies and designs in relation to various components or activities of the Biomanizales:
 - Institute for Environmental Studies (IDEA) and Faculty of Architecture of the National University of Colombia in Manizales.
 - University of Caldas, the Autonomous University and the Manizales Catholic University,
 - Regional Center of Coffee and Business Studies (CRECE).
- **Local Administrative Board (JAL), Community Leaders and inhabitants of Olivares Commune:** they represent the community in the various activities related to the city's spatial planning, development of the environmental agenda and the formulation of the Pilot Plan of their commune.
- **Bioservicios & Ciudad Verde Ltda:** Enterprises owned partly by recyclers associations. One The first, provides services in the cleaning sector and the other manages the city's recycling plant.
- **Municipal Council:** is the Legislative body of the municipality. It plays an important role in the approval of the city's Spatial Plan (POT), the Development Plan and other ordinances in support of the environmental strategy and community initiatives.
- **Plan Commission:** it is formed by 5 town councilors. Their actions are directed to guarantee that community initiatives are taken into account in the Spatial and Development Plans.
- **Territorial Planning Council:** it is by law the representative instance of the civil society in participatory planning processes, such as the ones followed to elaborate and approve the last two Master Plans of the city.
- **Commercial Associations, Professional Associations, environmental NGOs and other organizations of the civil society:** such as ACOPI, ANDI, CODOS, FENALCO, Prosperar, ARR, Social Foundation and others. They support with human or financial resources some of the activities and projects initiated through the Biomanizales.
- **Entities of National Level:** they are the Ministry of Environment, COLCIENCIAS and National Planning Department. They have contributed with human and financial resources in support of local initiatives which can be replicated or used in other cities of the country.
- **International and other Organizations:** such as CEPAL, ICLEI, Italian Government, Municipal Government of Curitiba, etc. that have supported and in some cases got

involved in the development of tools or activities related to the environmental policy of Manizales.

EXECUTIVE SUMMARY

I. Introduction

The documentation of the experience in Urban Environmental Management of the city of Manizales, Colombia has been prepared between the years 1999 and 2000 within the framework of the implementation of the SINPA project (Support for the Implementation of National Plans of Action) – HABITAT II.

The development of the **Biomanizales** which was adopted as the environmental policy of the city since 1995, of the **Bioplan** as a Local Plan of Action for the city and the Follow-up, Monitoring and Control System of the Development Plan are initiatives that look forward to a sustainable and concerted future for the city. This experience, which was presented in the Habitat II Conference in Istanbul in 1996, has developed innovative ideas and has undertaken actions and activities that have been of interest for the SINPA and the Institute for Housing and Urban Development Studies (IHS). It has been also the case for other governments and organizations such as the Italian Government, ICLEI and CEPAL which have signed agreements in support of some of the components of this environmental policy.

This document concerning the Manizales environmental policy aims to contribute constructive comments and analysis based on the external verification of the facts and the extent up to which they have influenced better and sustainable practices. With the documentation and dissemination of this experience the SINPA aims also to contribute to enrich the information base and to make urban environmental experiences and lessons learned more accessible.

We hope that the documentation of this experience could be useful to other countries and cities, especially in those cities that are part of the SINPA Program in Bolivia, Bangladesh and Zambia.

II. The Biomanizales

The Biomanizales is the **environmental policy of the Municipality** and has been adopted as the main guide to the sustainable development of the city. This policy has been integrated in the development plan of the city for two consecutive administrative periods, becoming a legal guide for the actions of the private and public institutions in the city.

The events, projects and activities generated by the Biomanizales have had the participation of several institutions of the public and private sectors, such as the municipal administration led by the Mayor and the Municipal Planning Secretariat, CORPOCALDAS the regional environmental authority, the universities, educational and research centers lead by the Institute of Environmental Studies (IDEA) of the National University of Colombia in Manizales. Representing the civil society, there has been a linkage among the Local Administrative Boards (JALs), the Planning Territorial Council, the Municipal Council' Plan Commission and other organizations that work to protect the citizens' interests.

In many instances, the participation of the institutions varied according to the knowledge and acceptance that the leaders of the different organizations had about the environmental policy. From the side of the municipality its participation and commitment varies according to the priorities and interests of the political party of the Major in turn. Although the last Major and its administration were not very actively supportive of this policy, it is expected that the present administration's involvement will improve given the fact that a former major who was in office during 1995-1997 was appointed as assistant to the Major for environmental management issues.

Up to now the Universities have led most of the processes; however, the management and other responsibilities are shared with other institutions. The fact that the director of the Regional

Autonomous Corporation of Caldas (CORPOCALDAS) has been in charge for 7 consecutive years has contributed to develop, throughout the years, a very strong alliance between the environmental authority and the universities as leaders of the process. This has also helped to bring together various organizations and stimulated joint actions. A more active participation and commitment from the municipality is expected now that the appointed assistant is working and coordinating actions of the environmental policy with the IDEA of the National University.

It has evolved based on the results of the Municipal Environmental Profile of the city and has generated innovative initiatives that have helped to enrich and strengthen the environmental management of the city. For the purposes of this document, the following events, considered as the ones that have contributed the most to its sustainability, are described and analyzed:

- **Formulation of the Environmental Profile of the City**

The Environmental Profile of the city was elaborated with national and local support, through a participatory process. This process has been the foundation to elaborate the methodology that is recommended by the Ministry of Environment for the elaboration of environmental profiles in other cities of the country.

- **Formulation Processes of the Development Plans Periods 1995-1997 and 1998-2000**

These plans are important because they are the result of participatory processes which convened several public and private sector institutions. These development plans are important because they integrate the Biomanizales as the environmental policy for the sustainable development with the spatial and development plans of the city. However, it has not been easy to conciliate the interests of the different institutions and define the level of importance of these interests within the municipal development plan.

- **Formulation of the Bioplan**

The Bioplan or **Local Environmental Action Plan** was elaborated in order to facilitate the implementation of the various components and projects of the environmental policy of the city. This plan has been formulated with the idea that it becomes the main driving force for the application of Local Agenda 21. It defined the policies, programs and projects and draws up strategies in selected areas. In short, this plan focuses on the priorities defined in the Environmental Profile and tries to conciliate solutions to the main problems of the city and its region.

The formulation of the plan was developed in a long process of coordination lead by IDEA of the National University and by the Territorial Planning Council. It incorporated several working groups with the participation of many institutions. The result of these roundtables was the definition of policies, programs and projects of the plan which can be summarized as follows:

- **Biotourism:**

The main idea with the Biotourism is to encourage sustainable use of available natural resources to promote the tourism and recreation industry as means to activate the local economy. One of the projects is the Bioruts which aim at the development and promotion of existing urban and rural pathways of ecological and cultural interest for recreational and educational purposes.

- **Biotransport: Sustainable Urban Transport:**

This component is addressed to integrate the economical, social and environmental aspects in the development and use of urban and rural transport services. Actions are under way in order to define the location and design of the regional bus terminal for goods and passengers. The preliminary assessment study for the mass transport system was completed in 1997 and further steps are being taken for its development and construction.

- **Civic Environmental Education and Recreation in the Ecoparks:**

The projects within this component are directed to increase the number of regional and city scale recreational and educational parks and encourage the development of environmental education through recreational activities. Nine parks have been identified, and so far five had their uses sanctioned by the municipality. Three as conservation areas and two for recreation and education purposes. One of the recreational parks receives an average of 25 to 30 thousand visitors per weekend. In the other, some of the installations are still under construction, nevertheless cultural and educational events are hosted in this place.

- **Integral Handling of Waste:**

These programs aim to strengthen the consciousness and responsibility regarding the production of polluting solid waste. It wants to encourage the participation of organized citizens groups in the management, collection and handling of waste. Projects pertaining this component include the support to the consolidation of Corporación Ciudad Verde which are the managers of the city's recycling plant and it is partly owned by the recyclers associations and Bioservicios Ltda. which is owned by recyclers associations and provides cleaning services. Through another project, various private sector enterprises have been participating in the implementation of the MEDIA Manual for minimization of negative impacts to the environment with industrial processes.

- **Formulation and Management of the Pilot Action Plan of the Olivares Commune**

The results of the Municipal Environmental Profile indicated that this commune was the community with the greatest number of economical, physical and social problems. Furthermore, a good amount of additional information on Olivares Commune was available as many university studies targeted this particular community. For these reasons, it was chosen as the pilot community for the elaboration of the **Environmental Action Plan**. This pilot plan includes , among others, the following projects:

- Integrated waste management in the Ciudad Verde Recycling Plant.
- Urban environmental revitalization and bio-trade along 27th street.
- Environmental management of the productive protected open spaces and creation of agricultural nurseries.
- Relocation of households located in risk areas and environmental improvement of vacated land.
- The Olivares environmental observatory.

The elaboration of the Environmental Action Plans of this commune was developed in nine steps and this process has been used as the model for the elaboration of the Communal Environmental Action Plans for the 11 communities in which the city is divided.

• **Design of the Monitoring, Follow-up and Control System of the Development Plan.**

This system will operate taking as its basis two very innovative and practical tools being developed by local professionals. These are the Urban Environmental Observatories and the Environmental Quality Signals (Traffic Lights).

The Urban Observatories are the physical places in which the environmental information of the communes will be collected and fed into the system. The Environmental Quality Signals ("Traffic Lights") are the tools that will allow the visual representation of the city's environmental quality. The result of the processing of the data and information regarding the variables and indicators of life quality is shown through a kind of "traffic light" using colors green, yellow and red, for indicating good quality, problematic and critical conditions.

The software through which the system operates has been designed and it is currently being reviewed and tested. Agreements have been signed with different organizations that shall provide the information to the system. Among these organizations are the Municipality of

Manizales, the Autonomous and National Universities. The fulfillment of these agreements and the functioning of the Municipal Information Centre will determine how soon the system could become fully operational. An agreement between the National University and CEPAL have been signed at the beginning of the year 2000 to start dissemination and training on issues related to this system in five countries of South America and the Caribbean.

The complete system includes 11 Observatories and 3 Environmental Quality Signals (Traffic Lights) to be placed within the city. The first phase of implementation contemplates the construction and assembly of three Observatories for the Esponsión, Olivares and Arenillo Communes and the installation of one signal which will be located near Teatro Fundadores a prominent place in the city centre. To put the complete system into operation which includes, among others, the construction of observatories, provision of equipment and training of personnel is expensive. The cost of one observatory amounts approximately to U\$ 100.000 dollars. Implementation of the first phase is possible due to availability of funds from various sources including the municipality, the Ministry of Environment, the National and Autonomous Universities and CEPAL.

This system is being developed to facilitate decision making, since it permits the execution of a continuous monitoring and evaluation of indicators that reflect the impacts of the municipal investments. Besides, it is a key tool to follow-up and evaluate the Development Plan and the Local Environmental Plan of Action (Bioplan) and the Municipal Development Plan, and provides transparency to the decisions and investments of the municipal administrations.

Although it is not yet operational, the design of this system is a very important achievements of the Biomanizales. This is a very valuable system for the city and its inhabitants because they will count on a reliable system in order to follow-up the policies, programs and projects and will have access to clear and realistic information, that will allow them to judge the performance of their governments and their actions.

The integrated planning of the economical, environmental and social issues along with the concerted work of the municipality, the university and the environmental authority, represents an important achievement that has been fundamental for the integration of environmental issues within the urban planning of the city. This integration also recognizes the proportional relation that exists between the conscious planning of the environment and the decrease of disaster risks.

The connection between the economical and the environmental aspects can be noticed in the Bioservicios enterprise and in Corporación Ciudad Verde Ltda which have been dedicated to generate employment offering a wide range of services in the sanitation and waste recycling sector, using resources that had been ignored in the past.

Another important achievement has been the use of participatory mechanisms in order to promote citizen's interest in urban planning. The convening of open forums and roundtables, with the participation of the organized civil society, contributes to validate the process and the contents of the plans, and guarantees a much wider support for its implementation and management.

III. MAIN CHALLENGES OF THE BIOMANIZALES

The results of environmental management have not been achieved without complications and problems that need still to be solved. Among the most important challenges being faced by the Biomanizales, we can mention:

- **To socialize and make the Bioplan more dynamic:**

The Bioplan has not yet achieved the desired importance as a dynamic element of the environmental policy. Lack of leadership from previous municipal administrations has contributed to this situation. Greater joint efforts are required to disseminate and socialize its content and importance, not only among the professionals of the ever changing municipal administrations but also with other stakeholders.

- **To encourage greater commitment of the Municipality in the environmental management:**

Although it is true that great efforts have been made regarding this issue, the municipality should assume still a stronger commitment in the environmental management of the city. Thus, more continuity could be given to the programs and projects that are part of the environmental policy. The appointment of the new assistant for environmental management is a step forward, but there are issues such as the re-installation of the Environmental Unit of the Planning Secretariat, suspended during the last administration, that need to be resolved.

- **To increase resource mobilization for the Bioplan:**

The challenge is to increase resource mobilization for the projects included in the plan. Greater efforts need to be directed towards convergence of resources from different organizations in order to finance implementation and assure regular flow of local funds to support sustainability of actions. A stronger leadership and commitment from the municipality could help to improve this situation.

- **Lack of convergence of resources for the Pilot Plan of Olivares Commune**

The Pilot Plan of the Olivares Commune has not received the necessary support in order to initiate implementation of projects which need heavy financial input and involvement of the local government. Greater efforts need to be made in order to mobilize resources from different institutions and to get its projects included in the Multi-year Investment Plan of the municipality.

- **Training and capacity building for participatory planning and urban environmental management**

There is a noticeable need for institutional capacity building for the municipality and other relevant organizations to respond more efficiently and effectively to the challenges of the new dynamics of environmental management and sustainable development. The development and implementation of a capacity building plan would increase the possibilities of all the actors involved to become more equipped with the same information and know-how to participate in these processes which are decisive for the development of the city.

IV. CONCLUSIONS

We can conclude that the environmental management has been a continuous process working on several fronts in which the incorporation of environmental education and the participation of the organized civil society has been important. Participatory planning, oriented to the environment, became part of the development plan reinforcing the efforts towards sustainability of the municipal development.

Better inter-institutional coordination of actions, employment generated through Ciudad Verde and Bioservicios, more efficient waste management with the operation of the recycling plant, improvement of the work conditions of families of recyclers, increase of green areas for recreational and educational purposes, increase in awareness towards environmental issues among public and private organizations and individuals are some of the impacts of this policy.

It is important to note that the achievements of this policy have not been obtained from one day to another. It has been almost eight years since the formulation of the Environmental Profile of

the city began and six since the Biomanizales was included as the environmental policy of the municipality for the first time. The achievements of this policy have been the result of the continuous pressure of various actors who are convinced that the environmental issues should get the necessary importance in order to achieve a balanced and sustainable development.

Results of this experience are relevant since they have contributed to consolidate the environmental management within the municipality development planning. However this has not been achieved easily and without difficulties. It is understandable since it has been a process of many years, in which the participation of many sectors are sought, dealing with an issue that until recently was neglected in the urban scene. Thus reflecting the partial support and integration from some of the relevant actors.

Regarding the main programs and projects, in some cases the continuity has been achieved mostly because of the leadership that IDEA has assumed with the support of public and private organizations, local and international. The challenge is to motivate and encourage more active involvement of the municipal administrations and to continue working together to achieve concerted actions that could be the product of a participatory process of urban planning.

The solution of problems, such as the convergence of resources for the management of the Bioplan and the implementation of the Pilot Plan of Olivares Commune, is necessary to give continuity and a greater credibility to the actions that are being promoted with the Biomanizales as the environmental policy of the municipality.

The bases to achieve the sustainability of development are already given; it is the task of all involved actors to continue the work for the dream of a “**city for life**” to become reality.

Mechanisms such as the **participatory and consensus oriented processes**, tools such as the **Local Environmental Plan of Action** (Bioplan) and the **Monitoring, Follow-up and Control System**, the **Pilot Plan of the Olivares Commune**, just to mention some, are elements of this policy that could, with the necessary adjustments, be adopted in other cities of similar characteristics.

The innovative, participatory and practical spirit of these elements is very valuable within the search of economically efficient, socially equitable and environmentally sustainable cities for today's inhabitants and the future generations.

THE BIOMANIZALES - A Local Environmental Policy

1. INTRODUCTION

The documentation of the Biomanizales as the local environmental policy of Manizales, Colombia has been prepared within the framework of the implementation of the project **Support for the Implementation of National Plans of Action (SINPA)** or Apoyo para la Implementacion de Planes Nacionales de Acción – HABITAT II.

This environmental management experience, has developed innovative ideas and has undertaken actions and activities that have not only been of interest for the SINPA and the Institute for Housing and Urban Development Studies (IHS), but also for other governments and organizations. In order to support some of the initiatives of the environmental management in Manizales, agreements have been signed with the Italian Government and the CEPAL in order to support the design and operation of Urban Environmental Observatories; the City of Curitiba (Brazil) for the creation of the Environmental University and with the ICLEI for a development project of the Olivares Commune. Publications based on the experience have come out, supported by IIED and CEPAL, Santiago de Chile (Velásquez 1998, Velásquez 1999, Vargas and Velásquez 1998).

Given the conditions for this study, this work does not pretend, at any moment, to present a detailed evaluation of this policy. The special role of this documentation is a combination of (i) an external verification of facts and the extent of their impacts in the environmental management of the city and (ii) an effort to increase environmental management knowledge and data, and (iii) to facilitate access to information on projects and lessons learned. This document includes a summarized description and analysis of operational details, the actions performed, the participants, their roles and the conditions that have arisen during the environmental management experience in the city.

This policy has been enriched by several projects, actions and activities, but for the purpose of the present document, we will only focus on the most important ones that have contributed to reinforce the sustainability of the Biomanizales as an environmental policy of the city.

2. METHODOLOGY

During the visit to Manizales the following activities were undertaken for the gathering of information and validation of facts:

2.1 Data collection

The information was collected by the author and the counterparts in Manizales. Visits were made to the different institutions and organizations involved in the urban and environmental management of the municipality such as the Secretariat of Municipal Planning, Secretariat of Municipal Treasury, the Parks Bureau, CORPOCALDAS, IDEA and the Faculty of Architecture of the National University, the Plan Commission of Municipal Council, the Local Administrative Board and the community leaders from Olivares Commune. Visits were also made to Bioservicios, Corporación Ciudad Verde Ltda and to the places for the future “car washing parks”, the Alcazares Arenillo Ecopark, etc.

The review of existent documentation on projects and programs of the Biomanizales was also of great help to understand the process and the components of the environmental management.

2.2 Validation of the collected data

The majority of the information, related to the components of the policy referred to in this document, was validated through discussions with professionals and people involved in the actions, projects and programs of the Biomanizales during the visits carried out to the above mentioned organizations. We tried to compare the collected information and the previous claims with the facts on the ground and the perceptions of the professionals and the people who participated in activities related to this policy. The benefits and difficulties of the processes were discussed from the points of view of the different organizations. Also, the facts were verified during visits to the projects such as the Ecopark, Ciudad Verde and Bioservicios. The developments of some of the projects are shown in the Graphic Record of the experience in Annex 1.

An important mechanism used to get to know the content and the support to the Bioplan was a roundtable attended by some 40 participants from 15 organizations. The objective of this working table in May 1999 was to stimulate the plan, to update its content and to develop the guidelines for associations agreements for the implementation of its components. During this round table, the progress of each component of the plan was reviewed, as well as its capacity to mobilize the support from the various actors involved. Some of the challenges related to this plan and mentioned in this document were raised during this meeting. In addition to IDEA, the organizer of the meeting, other organizations represented included the Planning Secretariat, Tourism Promotion Office, CORPOCALDAS, Bioservicios, Corporación Ciudad Verde, JAL representatives and community leaders of the Olivares Commune, Planning Commission, EMAS, Transit and Transport Secretariat, FENALCO, CODOS, Chamber of Commerce, National and Autonomous Universities.

3. THE BIOMANIZALES

What is the Biomanizales?

The Biomanizales is the environmental policy of the municipality.

The Biomanizales is considered as the economical, social and environmental option of the city-region and its main principles are:

- The economic development,
- The improvement of the quality of life of the population, and
- The rational use of the natural and cultural resources of the municipality and its environmental region.

This policy evolved based on the results of the Environmental Profile of the city and has generated innovative initiatives that helped to enrich and strengthen the environmental management of the city. For the purposes of this document, the following events, considered as the ones that have contributed the most to the sustainability of the policy, are described and analyzed:

- Formulation of the Environmental Profile of the City,
- Formulation of the Development Plans for the periods 1995-1997 and 1998-2000,
- Formulation of the Bioplan,
- Formulation of the Pilot Plan of Olivares Commune,
- Monitoring, Follow-up and Control System of the Development Plan.

4. BRIEF DESCRIPTION OF THE MUNICIPALITY OF MANIZALES

The city of Manizales is the capital of Caldas Department, which is located in the center-occidental part of the country. The Department of Caldas, along with the departments of Quindio and Risaralda form the region denominated “coffee zone” (Maps 1 and 2, Annex 1).

The rural area of the municipality is 397.1 km. 2, with a population of 57.057 inhabitants concentrated in 7 administrative units called “corregimientos” (districts), and the urban area is 42.9 km. 2, with a population of 358.194 inhabitants concentrated in 11 administrative units called “comunas” (communes). The urban area of Manizales is located in the very humid forest of the mountains, its high rainfall (2.200 mm a year), the humidity of 78% and its topography of very steep slopes are restrictions for the urban expansion. It could be said that the city already surpassed its natural expansion limit and that it should search for alternatives regarding urban densification (Pictures 1, 2, 2a, 3 and 4 in Annex 1).

5. GENERAL CONDITIONS

In order to understand better this policy, it is necessary to mention three important aspects that have greatly influenced the acceptance and positive reaction of the citizens towards (i) participatory planning practices, (ii) environmental orientation, and (iii) the local conditions. These are:

5.1 History of Natural disasters.

- The history of disasters produced by earthquakes.
- The occurrence of disasters produced by landslides due to the location of the city in a mountainous area of steep slopes, to the geological conditions of the land and to the location of housing in risky areas (Pictures 5, 6 and 7, 8 and 9 in Annex 1).
- The economical, social and environmental consequences due to the eruption of the Nevado del Ruiz Volcano (1985).

This has contributed to:

1. Create a collective consciousness that there is a need to work together as a group to create solutions to common problems.
2. Consolidate the culture of prevention and attention to disasters in order to reduce the vulnerability and the consequences of these.
3. Create the awareness about the importance of respecting and living in harmony with nature.
4. Highlight the connection that exists between the absence of environmentally conscious planning and the occurrence of disasters.
5. Incorporate the environmental component within the spatial planning.

5.2 The city is home to a considerable number of universities of several disciplines, including one of the best faculties of architecture of the country.

This has enabled this experience to:

1. Count on capable and trained professionals in the city to fill important positions in organizations or entities of the public and private sector that are related to the urban development of the municipality.
2. Facilitate the creation of organizations and professional groups, conscious of the importance of their participation in the management of the city and its resources.

3. Count on resources from the different universities for the execution of research studies in support to management and decision making of successive municipal administrations.
4. Turn universities into participants, facilitators and monitors of municipal management.

5.3 The legislative process is supportive. It has issued during the last years laws (national level) and decrees (municipal level) that promote citizen's participation, administrative decentralization and incorporation of the environmental topic as part of the urban planning of the cities.

In brief, the content of the most relevant legislation is the following.

- **Law 99 of 1996** by means of which Ministry of Environment was created. The Ministry is the principle public sector organization in charge of management and preservation of the environment and renewable natural resources.
- **Law 152 of 1994** which establishes the proceedings and mechanisms for the elaboration, approval, execution, evaluation and follow-up of development plans.
- **Law 134 of 1994** which regulates the mechanisms of citizen's participation established in the National Constitution. It rules the channels and levels of community participation.
- **Decree 506 of 1992**, by means of which the Environment Unit is created within the structure of the Secretariat of Municipal Planning of the local governments.
- **Extraordinary Decree Nr. 760 of December 31st, 1991, Article 218** which excludes the payment of the Unified Property Tax for urban lots which, due to their technical characteristics, can not be commercially built upon or operated, as long as they are preserved according to the definition of the environmental authority. In order to take advantage of this benefit, the interested party needs to present a request to the Planning Secretariat which will communicate its decision to the Rent Bureau of the Municipality.

This has contributed to:

1. Confer greater importance to the environmental topic.
2. Have more resources assigned for investments in the implementation of environmental components of development plans.
3. Have legal channels of participation for the organized civil society through which they can address their opinions and participate so that these are taken into account.
4. The creation of Environmental Secretariats at the local level which contribute to the improvement of the environmental management.
5. Decrease the pressure to build on protected green areas.
6. The increase of protected privately owned green areas within the boundaries of the municipality.
7. Increase of the budget for environmental issues with the creation of the Ministry.
8. Enable a closer link between the government and the communities.

Besides the above mentioned aspects it is important to note the concerted and continuous work among the municipal administration, the environmental authority, and the universities with the application of the **Research – Management – Follow-up** concept. This concept is based on developing a permanent research activity of the urban environmental reality to support, with technical tools and information, the decisions of the municipal administration. It is a way of

applied research to provide continuous follow-up to modifications and adjustments in the municipal management, whenever it is necessary (Fig. 1).

The application of this concept has contributed to:

- Gradually strengthening the culture of participatory planning.
- Achieving through time certain continuity in policies, programs and projects, overcoming the obstacles and troubles of the successive changes of governments between 1990 and 1999.
- Incorporation of innovative tools and processes in the urban environmental management of the city.
- Moving forward to a shared environmental management that corresponds to the local reality.

Main Problem for the application of the concept:

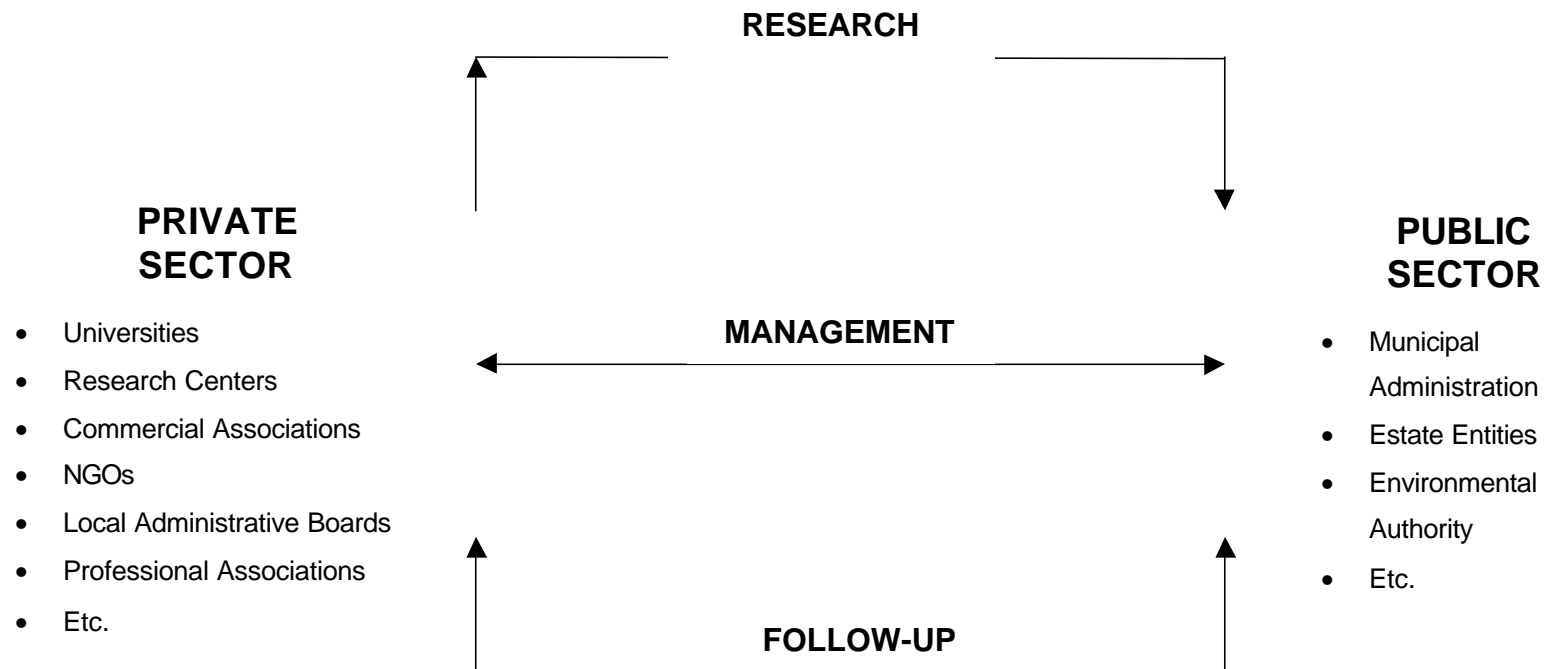
Its application has relied until today on the acceptance and recognition by the mayors and bureau chiefs of the successive administrations. For instance, the municipal administration between the years 1995-1997 was more receptive to issues like the joint work on the sustainable development than the last one (1998-2000).

For this reason, it would be convenient if this cycle of Research – Management – Follow-up could be established by local law and become a permanently applied mechanism.

Figure 1

CONCEPT OF INTER-ACTIVE AND SUSTAINABLE WORK

Research – Management – Follow-up



6. MAIN STAKEHOLDERS AND THEIR ROLES IN THE BIOMANIZALES

The principal actors in the evolution process of the environmental policy are described in the following list. Their roles in some of the most important projects, activities and actions that have taken place during this process are summarized in [Table 1](#).

- **The Municipal Administration:**
Led by the Mayor and often represented by the head of the Secretariat of Municipal Planning and the professionals of different disciplines of this office which also included the local Environmental Unit when it was in operation. Professionals from the Community Development Bureau, the Secretariat of Health, the Parks Bureau, the Tourism Promotion Bureau, and the managers of the decentralized institutions of the municipality, among others, were active participants.
- **Regional Environmental Authority:**
The Regional Autonomous Corporation of Caldas (CORPOCALDAS), as the environmental authority at department level, constitutes an approval instance of the Development Plan and the Spatial Development Plan (POT) in all aspects related to environment. It does not limit its role to the revision of the environmental component, but is also concerned with the environmental impacts of the decisions in matters of the economy, social development, resources and location of infrastructure. Together with IDEA, it has been an active promoter of better environmental practices through coordination of events and encouragement of consensus seeking actions.
- **Universities, Educational and Research Centers:**
Led by the Institute for Environmental Studies (IDEA) of the National University of Colombia in Manizales and its Faculty of Architecture, this group incorporates also the University of Caldas, Autonomous University and Manizales Catholic University and the Regional Center of Coffee and Business Studies (CRECE). They were represented in different events by the researchers, professionals and students of these institutions. IDEA has been the main force behind the conception and implementation of the environmental policy of the city. They have encourage participation of public and private actors in activities and projects relevant to environmental management. They have also contributed designs, studies and human resources to the development of the environmental policy.
- **Local Administrative Boards (JAL), Community Leaders and inhabitants of Olivares Commune:**
The members of the JALs are elected by the inhabitants of each of the communes in the city. They are by law the legal representatives of these communities. They function as the linking element between the public administration and the inhabitants of the communes. Their representatives have participated in the meetings related to the formulation of the development and spatial plans, as well as in the formulation of the Bioplan and the Olivares Commune Action Plan. They are active supporting the implementation of projects such as the Community Nurseries (Biohuertas) where food and medicinal plants are grown and products such as soaps, body and facial creams are produced and sold. Among others, they have been very dynamic in the promotion of the associations of the families working in the collection and recycling activities.

TABLE 1: BIOMANIZALES: ACTORS AND ROLES

ACTORS	ROLES IN DIFFERENT PROCESSES, ACTIVITIES AND ACTIONS					
	Formulation of the Municipal Environmental Profile	Formulation and Management of the Pilot Plan Olivares Commune	Creation of Bioservicios and Corporación Ciudad Verde	Formulation and Management of the Development Plan	Formulation and Management of the Bioplan	Design of the Follow-up, Monitoring and Control System
Municipal Administration	- Financial Support - Participant in working tables	- Facilitator - Participant in working tables	- Facilitator - Co-finance	- Conveenor - Financial support - Executor	- Facilitator	- Facilitator
Universities Educational and Research Institutes	- Initiator - Lead Actor - Monitor - Coordinator	- Initiator - Promotor - Monitor - Lead Actor	- Motivator - Trainer - Monitor	- Promotors - Participants in working tables - Monitor	- Motivator - Initiator - Conveenor	- Initiator - Executor, implementor - Conveenor
Societies, NGOs and Professional Associations	- Participant in working tables	- Participant in working tables - Financial support	- Facilitator - Initiator - Co-finance - Coordinator	- Participant in working tables - Spokesman	- Promoter - Participant in working tables	- Promotor
Territorial Council of Planning	- Representative of Civil Society - Participant in working tables	- Promotor	- Promoter	- Representative of Civil Society - Process Monitor	- Lead Actor - Promotor - Representative of Civil Society	- Promotor
Local Administrative Boards (JALs), Community Leaders	- Spokesman - Working tables participant	- Executor - Lead Actor - Motivator - Lead Actor	- Promoters - Motivator	- Spokesman - Participant in working tables	- Spokesman - Participant in working tables	-
Garbage Recycling Associations	-	- Motivator - Participant in working tables	- Supervisors - Initiator - Co-financer	-Participant in working tables	- Lead Actor - Participant in working tables	-
Environmental Authority	- Part of the Executive Team - Supervisor	- Participant in working tables	- Facilitator	- Approval Entity - Participant in working tables - Supervisor	- Conveenor - Promotor - Participant in working tables	- Promotor
Municipal Council Plan Commission	- Working tables participant	- Approval Entity - Participant in working tables	-	- Approval Entity - Participant in working tables - Financial support	- Approval Entity - Promotor - Participant in working tables	-
Local GEA-UR	- Conveenor - Executor	- Conveenor - Executors	-	- Participant in working tables	- Participant in working tables	-
National Level Entities	- Financial support			-	-	- Financial support

The Biomanizales: A Local Environmental Policy

International Organizations	-	- Financial support	-	-	-	-Financial support
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- **Municipal Council:**
Legislative body of the municipality. Its members, the town councilors, are elected by popular vote every three years. This is an approval instance for the development and spatial plans. Once the plans are elaborated are sent to the council for approval. When their interests and those of the communities they represent are not included in the plans they have the authority to send them back to the Mayor for revisions and adjustments.
- **Plan Commission:**
It is formed by 5 town councilors elected by the Presidency of the Municipal Council. They represent the municipal councilors in the formulation process of the plans and their role has been to guarantee that the contents of the plans are properly discussed and concerted and community initiatives are taken into account.
- **Territorial Planning Council:**
Since 1995, it is by law the representative instance of the civil society in participatory planning. Such councils exist at a national, departmental and municipal level. They are convened and elected by the corresponding government and they are promoted by the civil society which selects the names of potential members and send their names to the executive for consideration. When the government period finishes, the new government can only change the 50% of its members. It has a president elected by its members. In Manizales, this council has 12 members and the minimum representative quorum is 8. The main role of this council is to guarantee that the content of the plans have been properly discussed and concerted with the civil society and reflects unified public and private interests.
- **Commercial Associations, Professional Associations, environmental NGOs and other organizations of the civil society:**
This group includes ACOPI, ANDI, CODOS, FENALCO, Prosperar, ARR, Social Foundation, Chamber of Commerce and others. They have been supporting the process of development and implementation of various projects and activities. They are active in supporting initiatives such as Bioservicios and Ciudad Verde.
- **Entities of National Level:**
Ministry of Environment, COLCIENCIAS and National Planning Department. They have been active in supporting with human and financial resources the development of the Monitoring, Follow-up and Control System of the Development Plan.
- **International Organizations:**
ICLEI, Government of Italy, Municipal Government of Curitiba, etc. have signed agreements and supported various initiatives with human and financial resources.

Observing the Table 1, we can conclude that:

- The Universities have lead most of the processes; however, the management and other responsibilities are shared with other actors.
- Although there exists an obvious leadership of the universities, there is always a joint participation of the municipal administration and the environmental authority. The fact that the director of CORPOCALDAS has been in this position for 7 consecutive years has contributed to develop a very strong alliance between the environmental authority and the universities as leaders of the processes. This has been useful for mobilizing actions that they jointly undertake. These are listened to, or they are able to put pressure on the municipal administration to obtain cooperation.
- In most cases, the municipal administration assumes the role of the facilitator of the processes and projects, motivating other sectors to assume roles and responsibilities in the development of the city. However, in cases such as the management of the Bioplan or the

management of the Action Plan of the Olivares Commune, this position could be interpreted as a lack of commitment with these initiatives because of the reduced budget available for co-financing of its implementation.

- The organized civil society has had the opportunity to use the channels and instances to participate in different events. However, participation in planning being a relative new and not so frequent exercise, the degree of preparedness to participate and the different levels of information are different among the various actors.

7. EVOLUTION OF THE ENVIRONMENTAL MANAGEMENT IN MANIZALES

During the evolution of environmental management in Manizales, the topics and aspects which have been the focus have varied and have changed in emphasis according to the needs of the city and to the priorities of successive municipal administrations. Overall, it can be noticed that in each of these stages the objectives of the sustainable development are being strengthened.

The planning and management process can be summarized with the most significant events of each administrative period during the last 10 years:

- 1990 – 1991: **Social welfare and disaster prevention:**
 - The Emergency Attention Plan for Manizales (PADEM) is created.
 - The research process for the Environmental Profile of the city is initiated.
- 1992 – 1994: **Economical growth without environmental degradation. Public-Private environmental association:**
 - Finalization of the environmental profile of the city and formulation of the Communes and Municipal Environmental Agenda.
 - Creation of entities partly owned by community associations such as Corporación Ciudad Verde and Bioservicios.
 - Participation of the private sector in the provision of services with the creation of the Municipal Cleansing Company of Manizales (EMAS).
- 1995 – 1997: **The BIOMANIZALES and the BIOPLAN:**
 - Adoption of the Biomanizales as the environmental policy of the Development Plan.
 - Formulation of the Bioplan as an operative plan of the environmental policy.
 - Convening of the civil society for the elaboration of the Development Plan.
 - Beginning of the software development for the monitoring and control system of the development plan with its urban environmental observatories and the environmental quality signals (“traffic lights”) model.
 - International presentation and dissemination of the Biomanizales and the Bioplan in order to obtain resources for their development and implementation.
- 1998 – 2000: **Citizens consensus oriented process:**
 - Continuity is given to the environmental policy of the previous development plan.
 - Complying with the new law of territorial planning of 1997, Manizales proceeds with the elaboration of the Territorial Development Plan (POT), of the current Municipal Development Plan.

8. OUTSTANDING EVENTS ON THE EVOLUTION AND CONSOLIDATION OF THE BIOMANIZALES

This guide is a summary of the most important events of environmental management in the city. Without decreasing the importance of many other initiatives, actions and projects that are part of

this process, the following events are considered as the ones that have contributed the most to the sustainability of the policy.

8.1 Formulation of the Environmental Profile of Manizales

An environmental profile of the city was elaborated with national and local support, through a participatory process. This process has been the basis to elaborate the methodology recommended by the Ministry of Environment for the elaboration of environmental profiles in other cities of the country. The promoters and initiators of the process were the GEA-UR.

What are the GEA-UR?

The Urban Environmental Studies Groups (GEA-UR) are groups of professionals, mostly researchers, of different disciplines who have special interest in the environment and sustainable urban development issues. In Colombia, they exist in several cities and they are all articulated in the National Network (RESA-UR).

Who participated in the GEA-UR?

For this research process the members of the GEA-UR counted on the participation of representatives of the municipal administration, especially those who are related to the municipal planning, academic institutions, private sector, community groups and NGOs.

Which was the formulation process of the Environmental Profile?

Below a synthesis of the process is presented:

1. Consensus Oriented Phase – Research

- **Formation and consolidation of the Local GEA-UR.**
- **Elaboration of the Municipal Environmental Pre-Diagnosis:**
It was elaborated based on secondary information and its results are consulted with local institutions.
- **Validation of the preliminary results:**
The preliminary results are validated in a roundtable with the participation of GEA-UR members and members of local government, institutions, NGOs, community representatives, researchers and advisors.
- **Holding of interdisciplinary workshops:**
To concretize the investigations that are needed.
- **Establishment of agreements:**
With different regional entities to elaborate the environmental profile of the municipality. These agreements are executed in order to guarantee the personnel, the financing, the logistical support, and access to information.
- **Formation of research groups:**
With knowledge of environmental topics to develop the environmental profile.
- **Identification of the environmental problematic of the city:**
Based on this, the environmental pre-diagnosis of the municipality is elaborated.
- **Invitation to roundtables:**
To discuss the pre-diagnosis and to select a pilot case for the research. The objective is to validate with the community the results of the pre-diagnosis.

2. Research Phase – Management

- **Continuation of the Municipal Environmental Profile and selection of a pilot case.**
The Olivares Commune was selected since it was the one that presented the most concerted form of social, physical and environmental problems.
- **Finalization of the municipal profile and elaboration of the diagnosis of the pilot case.**
The environmental agenda for the municipality and the pilot case were elaborated. They included the environmental problematic and the specific projects.
- **Holding of workshops and roundtables:**
To validate the Municipal Environmental Profile and to validate with the community the preliminary environmental agenda of the pilot case.
- **Validation with the local community:**
In city forums, the results of the environmental profile and the pilot case were presented and discussed.
- **Elaboration of the communal environmental profiles and agendas and formation of the Communal Environmental Groups.**
Together with the community the environmental profile of the commune were drawn up and the environmental groups are formed.
- **Incorporation of the proposals:**
Incorporation of the urban environmental profile into the municipal development plan. The municipal environmental committee were formed.
- **Follow-up:**
Monitoring of the execution of the plan and the municipal environmental agenda.

Problems found in the formulation process of the Environmental Profile:

- Difficulties were found to consolidate the interdisciplinary and inter-institutional research group. On the one hand the members of the Municipal Administration and of CORPOCALDAS, the environmental authority, had a more technical and practical vision, but on the other hand there was the University with a vision more focused on concepts and methodologies.
- This was a slow and difficult process during which researchers from various organizations resigned. However, most of them joined the group again when they started to see the advances and results of the process.
- The profile was not well disseminated and therefore not all the actors knew its results.

8.2 Development Plans “Manizales XXI Century Quality ” of 1995-1997 and 1998-2000

Since 1994, the municipal development plan has had as its main purpose the sustainable development of city and its region. It is for that reason that the Municipal Development Plan 1995-1997 included the Biomanizales as its environmental policy at a medium and long term to:

- Incentive the knowledge about the local and regional ecosystem;
- Preserve the natural and cultural resources of the municipality;
- Search for energetic efficiency in the functioning of the city;
- Improve the conditions of urban life for all the population with emphasis on environmental sanitation, integrated management of waste and recycling, and the increase of the citizens safety in public spaces;
- Facilitate the implementation of appropriate technologies for the industrial production;

- Create an efficient system of public services including urban and rural transport; and
- Offer environmental education to encourage citizens participation.

8.2.1 Components of the Development Plan 1998-2000

The Biomanizales is not an isolated policy of the administration. It is part of the integrated development planning of the city as can be seen in [Figure 2](#) in which the various components of the Development Plan are explained.

8.2.2 Formulation Process

The formulation and approval of the Development Plans "Manizales XXI Century Quality" was carried out through a participatory process where several actors of the private and public sector were involved, as presented previously in [Table 1](#). The formulation and approval process is illustrated in [Figure 3](#).

This process is the same as the one followed for the formulation of the development plan for the 1995-1997.

What are the advantages of this kind of processes?

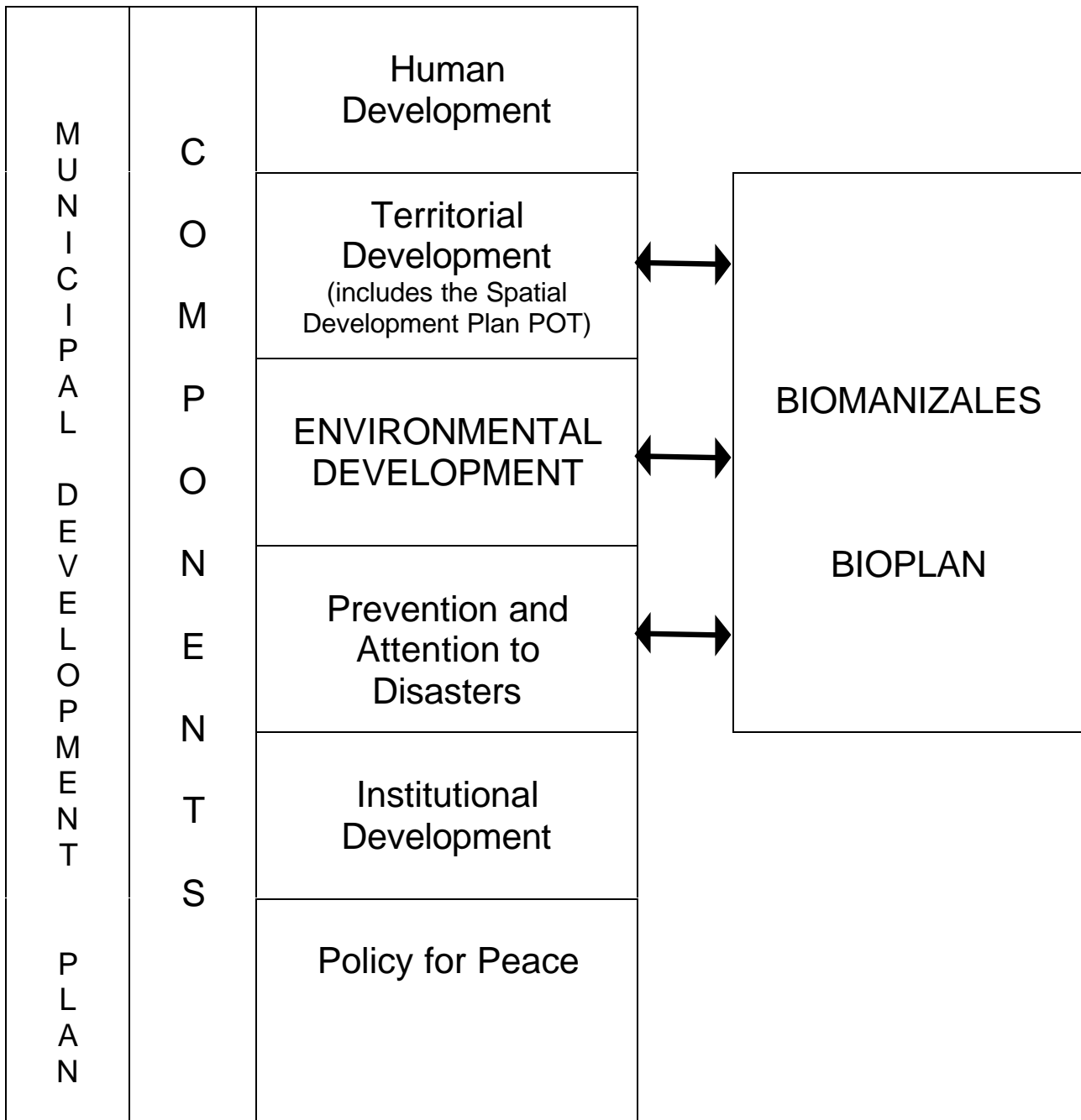
- They counted on the participation of public and private sector organizations throughout the process.
- The civil society was enabled to make use of the mechanisms of participation sanctioned by the law.
- They gave transparency to investment planning.
- They promoted the Plan's approach among the different actors with diverse interests.

Which were the difficulties found during these participatory planning processes?

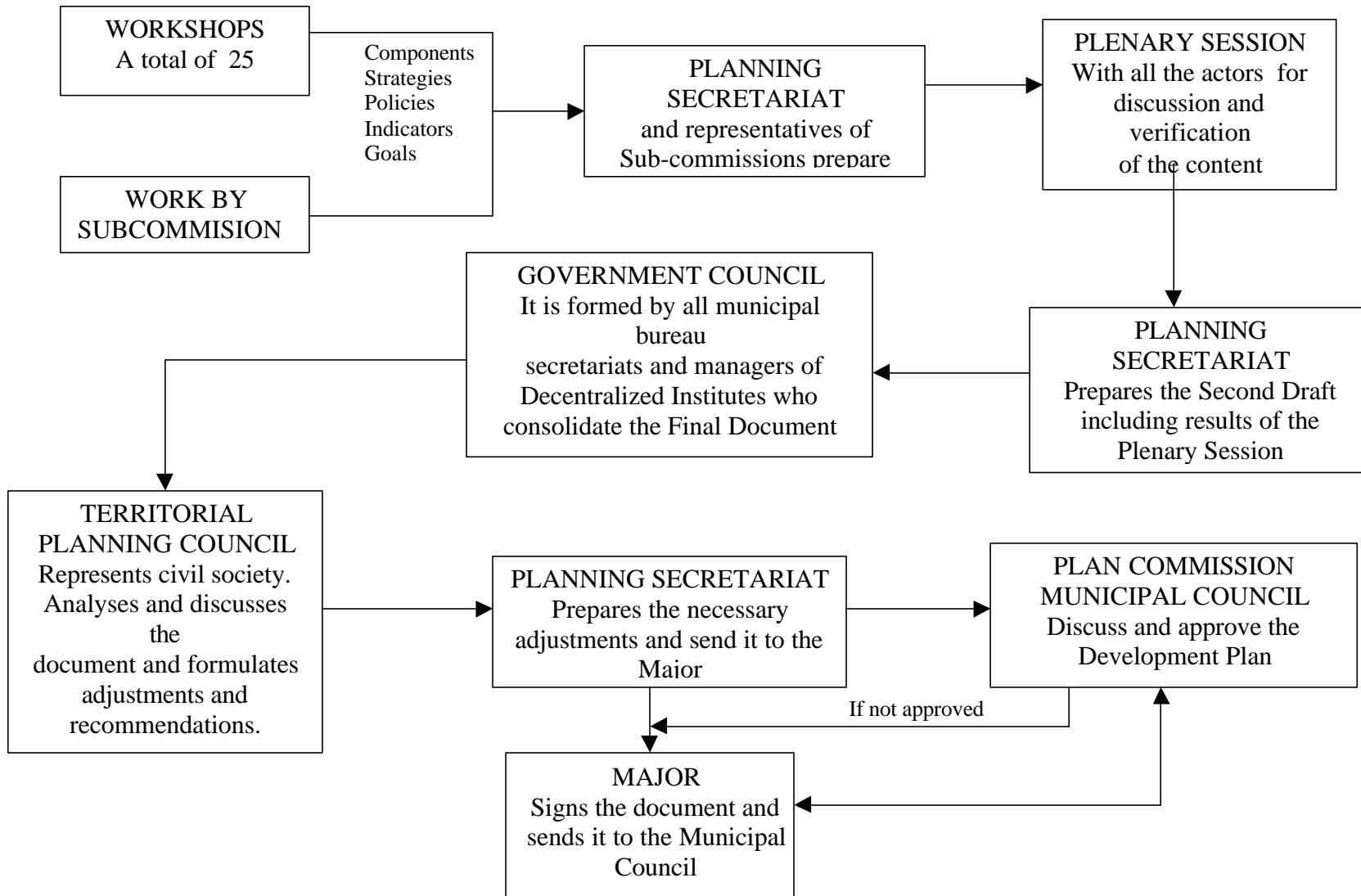
- The conciliation of the interests of the different actors and their importance within a municipal development plan has not been an easy task and failures to reach consensus are reflected in aspects such as the definition of the urban perimeter and land use definitions. These do not comply with the environmental criteria, a fact that generates negative impacts on the approval of projects on vulnerable mountainsides and in risk areas.
- Throughout the processes, it was noticed that among some of the participating actors existed a lack of knowledge regarding the environmental reality of the municipality.
- The formulation process of the Territorial Development Plan (POT) which is an integral part of the Development Plan has regulated deadlines, according to the law, to pass from the level of preparation to approval. Due to the lack of experience of some actors in participatory processes, these deadlines tend, in most cases, to be too short for achieving the desired and necessary degree of participation in a participatory planning process.

Figure 2

**COMPONENTS OF THE MUNICIPAL DEVELOPMENT PLAN
MANIZALES XXI CENTURY QUALITY 1998-2000**



**PARTICIPATORY PROCESS FOR THE FORMULATION AND APPROVAL OF
 THE DEVELOPMENT PLAN MANIZALES QUALITY CENTURY XXI 1995 - 1997**



8.3 Creation of Bioservicios and Corporación Ciudad Verde

These enterprises were created to satisfy the garbage recycling needs of the city and as an alternative of decent work for the workers of this sector.

8.3.1 BIOSERVICIOS

The objective of this enterprise is to promote social-environmental projects with emphasis on the social component in order to contribute to the improvement in the conditions of the life and to dignify the work of the recyclers, solid waste collectors and their families. It is a profit oriented enterprise. It provides personnel to EMAS, the responsible institution for the cleaning of the city, to carry out the residential waste collection in the municipalities of Manizales and Chinchiná. Besides the above mentioned service, it performs private cleaning services such as:

- **Cleaning of Buildings:**

In common, administrative and operative areas of all kind of buildings such as industrial complexes that require specialized processes of cleaning, apartment blocks, residential complexes, country clubs, educational centers, shopping centers. These services are also offered to the entities that organize carnivals, conferences and seminars.

- **Maintenance of Buildings:**

It offers services of plumbing, cabinet making, refactions, fixing and painting of buildings belonging to factories, commerce, residential and educational sectors.

- **Hospital Disinfecting and Cleaning:**

Cleaning and disinfecting of diverse areas of hospitals and health centers of the city.

- **Forest Services:**

For institutions that are in charge to take care of parks, natural reserve extensions, forests, hydric resources, green areas and meadows. Administration, maintenance, surveillance and reforestation services are offered. Besides, the organization establishes links with the pertinent entities in order to perform environmental education and ecotourism activities. They are presently managing the Alcázares Arenillo Ecopark.

- **Recycling at the Source:**

This service is offered as a complement of the cleaning service and consists in the separation of recyclable materials at the source. This reduces the volume of the waste and makes the industries participate in the preservation of the environment. In this context, BIOSERVICIOS offers an environmental education package at an organizational level that permits and stimulates the formation of "environmental management" groups that work for the benefit of the community.

How was the formation and operational process:

- With the closure of the outdoor final waste disposal site that the municipality operated next to Olivares, the recycler's unemployment problem appeared since most of them were inhabitants of the Olivares Commune.
- After an intense social work with the recyclers and their families, the formation of the "Prosperar" Recyclers Cooperative was achieved with 60 partners.
- Training and business support programs were held.
- The Recyclers Regional Association was formed with 3 local cooperatives and two regional cooperatives. This entity unites them, supports them and defends their interests.
- BIOSERVICIOS was created, with the participation of 4 recyclers' cooperatives and the Recyclers Regional Association as partners.

8.3.2 Corporación Ciudad Verde Ltda (Green City Corporation)

Regarding the organized participation of the families involved in the collection and handling of solid waste, it is important to mention the creation of the Corporación Ciudad Verde Ltda, a non-profit oriented institution in charge of the recycling plant of the city (Pictures 10, 11, 11 a, 11b, 11c, 12, 13 in Annex 1).

It started as a pilot project and has been consolidated with the support of the Municipality, the NGO "Social Foundation", other actors and the participation of the recyclers' cooperatives.

The partners of this corporation are 2 Recyclers' Cooperatives, the Recyclers Regional Association and the NGO Social Foundation. The physical installations belong to the municipality and the machinery was donated to the firm by the Social Foundation. Following this scheme, the Municipal Cleansing Enterprise (EMAS), the entity in charge of the waste collection in the municipality, provides the recycling plant with the raw material.

Currently, the plant recycles 35 to 40 tons daily, which corresponds approximately to 15% of the waste, produced by the city. From this amount, between 2 to 3 tons per day are recycled through the work of 16 workers.

Problems for the functioning of the recycling plant:

In order to achieve the mentioned levels, the plant is currently working at the 50% of its capacity. This situation is not entirely due to problems of the plant and its internal management, but it is more the reflection of the economical crisis the industrial sector is going through as a consequence of the political, economical and social problems of the country. In order to give an indicator of the crisis, this plant is operating presently with 16 workers and before this crisis used to employ 60 people increasing considerably the amount of recycled material. If the country's conditions and the local economy do not improve the plant will have serious problems to continue operating.

What has been the contribution with the creation of these entities?

- Generation of decent employment for solid waste collectors and their families through their engagement in EMAS, Ciudad Verde or Bioservicios.
- Creation of 4 cooperatives and associations of recyclers CODOS, Cooprecal, Mejorar and Prosperar with an average of 45 members each and a Regional Association of Recyclers which include associations from three Departments of the country .
- Development of sustainable alternatives to improve the life of its members with the provision of 140 jobs.
- A more efficient cleaning and waste collection service.
- Decrease by 20% the amount of non-degradable waste that is disposed on the sanitary dumps.
- The creation of Bioservicios has contributed to consolidate and strengthen the sector, diversifying the range of services they can offer to generate more incomes.

8.4 Formulation of the Bioplan

Due to the extensive and diverse nature of the environmental policy there was the need to develop a tool through which the planning and implementation of the programs and projects of this policy could be facilitated. In order to meet these needs the **Bioplan** or the **Local Environmental Plan of Action** was elaborated.

This plan has been formulated with the idea that it becomes the driving force for the application of the Local Agenda 21. In this plan the policies were defined and the programs and projects were selected in the areas considered as strategic for the sustainable development of the municipality.

8.4.1 Actors and Formulation Process of the Bioplan

The formulation of this plan was developed in a wide process of consensus building and cooperation led by IDEA of the National University and by the Planning Territorial Council. The main actors involved in the formulation process were:

- Municipal Planning Secretariat, Environment Unit,
- Transit and Transport Secretariat of the Manizales Municipality,
- Bureau of Public Works and Tourism of Manizales,
- Architecture Students – Seminar of Bioarchitecture 1996,
- Municipal Cleansing Enterprise (EMAS),
- Social Foundation – Manizales,
- Regional Association of Recyclers (ARR) Manizales,
- Urban Studies Group (GEA-UR) Manizales,
- Territorial Planning Council,
- Institute of Environmental Studies (IDEA) of the National University – Manizales.

The formulation process of the Bioplan included several roundtables with the participation of the above mentioned actors. The result of these roundtables was the definition of its policies, programs and projects.

8.4.2 Components of the Bioplan:

This plan proposes the execution of pilot projects that generate the constructive dynamic required to push forward the environmental concerns and priorities. Its components were defined as follows:

- **Biotourism:**

This is the environmental tourism that seeks to integrate economical, social and environmental aspects. The main idea is to encourage sustainable use of available natural resources to promote the tourism and recreation industry as means to activate the local economy. One of the projects is the Bioruts which aim at the development and promotion of existing urban and rural pathways of ecological and cultural interest for recreational and educational purposes.

- **Biotransport: Sustainable Urban Transport:**

This component is addressed to integrate the economical, social and environmental aspects in the development and use of transport services for people and goods which are essential for the functioning of the rural and urban centers of the municipality and its region. Actions are under way in order to define the location and design of the regional bus terminal for goods and passengers and to undertake the feasibility studies for an appropriate mass transport system for the city. The preliminary assessment study for the mass transport system was completed in 1997.

- **Civic Environmental Education and Recreation in the Ecoparks:**

The projects within this component are directed to increase the number of regional and city scale recreational and educational parks and encourage the development of environmental education through recreational activities. Nine parks have been identified in the plan and so far five had their uses sanctioned by the municipality. Three (Monteleón, Sancancio y Rioblanco) as conservation areas, two (Bicentenario and Alcázares Arenillo) for recreation and education purposes. Bicentenario Park is fully equipped and receives an average of 25 to 30 thousand visitors per weekend. Some of the installations of the Alcázares Arenillo, designed by students of the National University, are still under construction and several cultural, educational and recreational activities are held in this place. This park is managed by Bioservicios. In 1980 there was 0.5 sqm of structured green area per inhabitant and it has increased to 6.8 sqm. per inhabitant by the year 1999.

- **Integral Handling of Waste:**

These programs aim to strengthen the consciousness and responsibility regarding the production of polluting solid waste. It wants to encourage the participation of private enterprises, community based organizations and other groups, in the management, collection and handling of waste, and

to promote technical studies on solid waste issues. Projects pertaining this component include the support to the consolidation of Corporación Ciudad Verde which are the managers of the city's recycling plant and it is partly owned by the recyclers associations. Bioservicios Ltda. which is an enterprise oriented to provide cleaning services and which is owned by the recyclers associations is also the result of actions oriented towards an integral waste management.

Currently, the implementation of the MEDIA Manual for Minimization of the Environmental Impact of the Industry is being introduced. In this process the Municipality, CORPOCALDAS, the industries and the universities participate actively. The implementation of this program of clean production will potentially allow the development of procedures that prevent pollution through a minimization of emissions and waste generated by the industrial processes.

- **Pilot Plan of the Olivares Commune**

We will refer in detail to this plan in the following section.

What are the advantages of the formulation of the Bioplan?

- It integrates the short term planning policies that guide the environmental management.
- It unites the priorities defined in the Environmental Profile.
- It seeks solutions for the main problems of the municipality and the region.
- It establishes the integration of economic, social and environmental factors directed at the improvement of quality of life.

Problems of the Bioplan:

- The formulation of this plan was motivated by the National University which convened the participatory planning process along with the environmental authority and commercial associations. The participation of the current administration has not been very active and this is why the municipal commitment is less noticeable.
- It is necessary to finish the updating of the plan's programs and to elaborate tentative budgets. This will help to motivate and clarify the participation of the involved actors in each of its components.
- A stronger leadership from the municipal administration is needed in order to improve the status of the plan so that it can really work as the dynamic force for the implementation of the environmental policy.
- There are projects of the plan that have not been taken into account in the Multi-year Investments Plan of the municipality. Although efforts have been made to overcome the deficiency of the local budget through international cooperation funds there is a limitation of sustainability of actions without a regular flow of local funds.

8.5 Formulation of the Pilot Plan for the Olivares Commune

The results of the Municipal Environmental Profile indicated that the Olivares Commune was the community with the greatest number of economical, physical and social problems. It presented a high environmental deterioration due to the location of a considerable amount of houses in high risk areas due to the instability of its land. For this reason, the Olivares Commune was chosen as the pilot commune for the elaboration of the **Environmental Plan of Action** initiated by the National University. The Urban Environmental proposal for the Olivares Commune which meets the needs expressed in the action plan was designed by teachers of the National University, and in 1995 it has won the Award "Corona pro Arquitectura" (Map 3, Pictures 15, 16 and 17 in Annex 1). Its implementation is involving several public and private sector organizations and various international agencies.

The elaboration process of the Environmental Plan of Action for the commune was developed in nine phases. The summary of the steps of the process and the content of each phase can be seen in [Table 2](#).

What are the components of the plan?

This pilot plan under implementation since 1997 includes, among others the following projects:

- Integrated waste management in the Ciudad Verde Recycling Plant.

This project is under implementation in the recycling plant. It is directed to the management of organic waste for the production of compost for commercial purposes. The Regional Association of Recyclers and Bioservicios are the implementing agencies of this project which started in 1999. It operates with resources from Bioservicios, the Regional Association of Recyclers, Fundación Social, the Agriculture Secretariat of the Municipality, and ICLEI. The products are sold to supermarkets and agricultural centres in the region.

- Urban environmental revitalization and bio-trade along 27th street.

This project includes activities for the revitalization and densification of the area along the 27th street in the Olivares Commune. The plan envisages the improvement of houses along this street, of which the majority have architectural value and encourages addition of well structured spaces for small business and enterprises. Environmentally friendly activities in the sectors of tourism, small and home based industries, commerce and services are some of the possible alternatives to be encouraged through this project. Through university students and with the cooperation of the community the detailed lay out of all houses along the street has been finished and the proposal which integrates physical and economic aspects is in progress. Parallel to the design, the municipality has approved U\$ 300.000 dollars for credits in support to the commercial activities proposed through this project.

- Environmental management of the protected open spaces and creation of agricultural nurseries.

The agricultural nursery has an area of 6.400 sqm. and it is managed by 55 mothers. This initiative operates using a plot owned by the municipality for agricultural and other compatible uses. Through this initiative vegetables for communal use are planted and distributed among the members of the Mothers Associations to be used for preparation of lunch for 280 children of working mothers under their care. Other medicinal plants are also grown and lotions, soaps, facial and body creams are produced for commercial purposes. Seventy children or Environmental Guards are involved in the management of the nursery. They receive environmental education and training in agricultural activities.

- The Olivares environmental observatory.

This observatory is part of the Monitoring, Follow-up and Control System of the development plan that is being developed for the city. This observatory is the place where the information from the commune will be gathered and fed into the system. Once this information and other provided by different sources is processed the results will measure the environmental quality in the commune. This is one of eleven observatories that will constitute the system. An initial budget of U\$ 300.00 dollars from the municipality and CEPAL is now available for starting assembly of three observatories including the one in Olivares Commune.

What are the advantages of this plan?

- This plan has been used as pilot case for the elaboration of the Communal Environmental Action Plans for the 11 communities in which the city is divided. However, the Plans of most communes are not being updated systematically. This denotes some indifference from the communities and the municipal administration.

- With the conscious and organized participation of the community, the realization of the proposed solutions is enhanced and a sense of belonging towards the projects is being developed.
- It validates and promotes participatory planning processes.
- It is the result of concerted efforts.

Management Problems of the Pilot Plan:

- Although several projects are currently being implemented, the Pilot Plan has not received the necessary support from the municipal administration in order to begin with implementation of the projects related to housing improvement and relocation of households in risk areas.
- The plans create expectations within the communities and it is necessary to obtain support for projects that require heavy financial input from the municipality. In this sense, joint efforts and convergence of resources of the different institutions need to be sought to increase the pace of implementation.

Table 2:

FORMULATION PROCESS OF THE PILOT PLAN OF THE OLIVARES COMMUNE

Phases	Responsible Organizations	Contents
1. The Induction	<ul style="list-style-type: none"> Workshops were convened by the university and the Municipal Community Development Office. 	<ul style="list-style-type: none"> Emphasis in the municipal, national and international environmental policies. Mechanisms of citizens participation in municipal decentralization as per the political Constitution of Colombia. The Environment Law. The promotion of the democratic environmental participation as conceived in the Agenda 21.
2. The Environmentalization of the Plan	<ul style="list-style-type: none"> The invitation was done by the Environmental Committee of the Olivares Commune. 	<ul style="list-style-type: none"> The objectives of the Local Environmental Action Plan were explained. The institutional commitments for the elaboration and execution of the Plan were established.
3. The Environmental Education and Training in the Plan	<ul style="list-style-type: none"> The training has been handled by the universities and the Social Foundation. 	<ul style="list-style-type: none"> Permanent environmental training program were established. Key areas for the training were defined: the environmental education for leaders and teachers' and the environmental education for enterprises.
4. The role of a "Plan" in the Creation of a Political Culture	<ul style="list-style-type: none"> City Forums convened by the Local Administrative Board (JAL) and the National University. 	<ul style="list-style-type: none"> In the case of Olivares commune and of other sectors of high marginality, the confidence in the political leaders, in the public institutions and the credibility in the government actions have been lost. For this reason, in order to implement the Local Environmental Action Plan, City Forums were established as discussion spaces concerning the importance of the plan for the recuperation of the political leadership.
5. The Update of the Commune's Environmental Profile	<ul style="list-style-type: none"> The update of the Profile was handled by the Urban Environmental Studies Group (GEA-UR). 	<ul style="list-style-type: none"> Throughout the roundtables problems and development potentials were detected and became the technical base for the elaboration of the Agenda 21 and the definition of the programs and projects of the plan.
6. The elaboration of the Commune's Environmental Agenda	<ul style="list-style-type: none"> The GEA-UR coordinated the consensus oriented tables and elaborated the Commune's Environmental Agenda. 	<ul style="list-style-type: none"> Environmental Consensus Oriented Tables defined priorities, alternatives of programs and projects and problems for the management process of the Plan. The technical, economical and community resources were committed for the actions proposed.
7. The execution of the Plan	<ul style="list-style-type: none"> The Planning Territorial Council convoked the City Environmental Forum 	<ul style="list-style-type: none"> Presentation of the Plan to the citizens. The Municipal Council approved, after several debates, the Environmental Action Plan of Olivares Commune.
8. The Follow-up and the Evaluation	<ul style="list-style-type: none"> Actions to execute the Local Environmental Plan of Action. 	<ul style="list-style-type: none"> For the follow-up and evaluation of the Local Environmental Plan of Action (PAAL) of Olivares Commune, the Environmental Observatory which is part of the monitoring system of the Biomanizales will start functioning.
9. The decision on the priority programs and projects.	<ul style="list-style-type: none"> The community associations and the representatives of the JALs and JACs convened to the different meetings. 	<ul style="list-style-type: none"> Programs and projects to be developed in the 1997-2000 period were defined. For this, different roundtables were held, proposals were discussed and the commitments of each of the partners were established.

8.6 Follow-up, Monitoring and Control System of the Development Plan

This system is based on two innovative and practical tools developed by local professionals (Fig. 1 in Annex 1). These are:

1. The Urban Environmental Observatories

IDEA of the National University and the Autonomous University of Manizales designed, with the technical support of CEPAL from the United Nations and the financial support of the Italian Government, a system of **Urban Environmental Observatories** for the municipality. The system of observatories will be implemented starting in the year 2000 with the technical and financial cooperation of the Ministry of Environment in Colombia.

What are the Urban Observatories?

They are the physical locations where environmental information of the communes is gathered and introduced into the system, and where the information is within the reach of the Community. In the observatories, in a decentralized manner, the environmental education programs for the execution of the Local Environmental Action Plan are executed. In these places the community will be motivated to improve the environmental quality indicators (Picture 14 in Annex 1).

2. The Environmental Quality Signals (“Traffic Lights”)

They are tools that allow the visual representation of the city’s environmental quality as a result of the data and information regarding the variables and indicators of environmental data developed for the city of Manizales. These signals will be placed in strategic places in the city, especially in those where massive crowds of people gather. In this manner, the population will be informed of the environmental quality situation of the city and will get motivated to participate in the improvement of the indicators.

What Kind of Information is required?

Information regarding the social conditions, the economy and the environment which is contained within a range of 10 **Urban Environmental Quality Indicators** are defined as the basis for the follow-up of environmental management and are easy to understand by the majority of the population. The components, factors, variables and indicators of the Environmental Quality Signals (“Street Light”) were defined taking into account their relevance and application for the reality of this particular city (Tab. 3). The complete list of indicators can be seen in Annex 3.

How does the system work?

- Gathering and processing in the Data Collection Centre the information of several sources from public and private sector institutions and from the urban observatories.
- This information is centralized and processed with the purpose of obtaining the indicators that show the environmental condition of the municipality. It will indicate the impacts of the actions involved in the Bioplan and the Development Plan. For 5 years, before the computer design of the system was completed, its operation was manually made for the 11 Communes and the five “corregimientos” of the municipality.

Table 3: SUMMARY OF INDICATORS OF URBAN ENVIRONMENTAL QUALITY

Components	Factors	Indicators
Social	Welfare	<ul style="list-style-type: none"> • Education • Health • Social security • Citizens safety • Recreation and culture
	Equity	<ul style="list-style-type: none"> • Housing quality • Ratio of housing with basic services • Ratio of population below the poverty line • Ratio of population with unsatisfied basic needs
	Organization for citizens participation	<ul style="list-style-type: none"> • Participation in politics • Community participation • Government participation • Non-government participation • Private sector participation
	Investment	<ul style="list-style-type: none"> • Investment in infrastructure for community services • Investment in education for participation • Investment for housing improvement and its surroundings.
Economic	Efficiency	<ul style="list-style-type: none"> • The main budget sources of the municipality, including the local, national and international ones. • The debt handling • The administrative efficiency
	Production	<ul style="list-style-type: none"> • Economic behavior by sectors • Municipal accounts of production • Population groups linked to economic activities • Behavior of the industrial, commercial and agricultural sectors as dynamic sectors of the economy.
	Investment	<ul style="list-style-type: none"> • Projects started and completed by the Bank of Municipal Investment Projects and Programs (BPIM) • Efficiency of the tax collection • Ratio of the municipal budget assigned to technical assistance for the productive sector • Investment level in the municipality
Environmental	Natural Resources	<ul style="list-style-type: none"> • Indicators are available for the monitoring of the quality and the use of water, land and air.
	Physical safety of the surrounding	<ul style="list-style-type: none"> • Physical risks • Geological risks • Sysmic risks • Landslides and forest fires
	Energetic Efficiency	<ul style="list-style-type: none"> • Monitoring of the ratio of industries that use clean production methods and alternative energies • Extension of recycling • The efficiency of energy utilization. • Performance of the transport sector
	Sanitation	<ul style="list-style-type: none"> • Monitoring of particular environmental risks, such us the percentage of the population affected by diseases related with the water or respiratory diseases, etc.
	Investment	<ul style="list-style-type: none"> • Investment in infrastructure • Investment in environmental education • Investment in training

Note: for more details on Indicators see Annex 3.

- Assigning values to each indicator, the results will reflect the environmental quality of each commune, corregimiento and the city (Fig. 2 in Annex 1). In order to visualize the results, these are placed in three categories:
 - **red** indicating problems;
 - **yellow** indicating that possible problems need to be prevented;
 - **green** indicating good quality.
- The results will be visualized according to the colors expressed in the Environmental Quality Signal ("Street Light").
- All the indicators that determine the environmental quality and the achievements of the Local Environmental Plan of Action should be evaluated by the technical committee, the Municipal Government Council and the Planning Territorial Council.
- Once the indicator's values for a determined period are obtained, they need to be analyzed by the municipal government, in order to evaluate the progress achieved and to search for explanations and corrective measures.
- As a result of this process, a list of projects and investments, related to the improvement of each indicator should be obtained, comparing the positive or negative variations achieved with the investments.

Which are the advantages of a system like this?

- It facilitates decision making through permanent monitoring and evaluation of the indicators that reflect the impacts of the investments.
- It is a key tool to monitor and evaluate the Local Environmental Action Plan – BIOPLAN, the Municipal Development Plan and the Environmental Action Plans of the Communes.
- It contributes to provide transparency to the decisions and investments of the municipal administrations.
- It decreases the possibilities that investments could be politically manipulated.
- It allows to make decisions in favor of realistic goals.
- Since it is a participatory system and it involves the population during the data collection, the citizens can easily identify the urban reality and get motivated in order to support the corrective actions.

9. COSTS AND BENEFITS OF PARTICIPATION

When dealing with costs and benefits of participatory processes it is essential to take into account tangible as well as intangible costs and benefits. Depending on the degree of progress of the diverse processes, a growing tendency of tangible benefits is noticed as various projects or programs get closer to implementation stage. This tendency shows the other way around at the beginning of the processes because projects are in the planning and programming stages when participation is high and the benefits are still contemplated as goals to be achieved.

The costs and benefits of participation of some of the main actors of the Biomanizales can be seen in Table. 4.

Table 4

COSTS AND BENEFITS OF PARTICIPATION

Actors	Costs		Benefits	
	Tangible	Intangible	Tangible	Intangible
Organized Community	-time and energy to assimilate new ideas. -time and energy to attend to meetings -transport costs	-income opportunities lost for attending meetings -time not dedicated to his/her family	-strengthening of its leaders and organizations -better income opportunities for the recycler's families	-better environment in their neighborhoods -greater income opportunities
Municipal Administration	-human resources -financial resources	-time and resources to adapt to participatory processes	-possible solution to environmental problems -increases its management capability -expenses decrease for attention to disasters and increase of budget for prevention of disasters	-satisfaction of a good performance -better relationship between the municipality and the citizens -greater citizens satisfaction with the municipal management
Universities Research Centers	-time of professionals, researchers and students. -financial resources of researchers		-learning of new topics and new experiences -better position to manage new ideas and monitoring its performance	-greater professional satisfaction due to the link between university and society / theories and their application in the real world
Environmental Authority	-professional resources -financial resources	-time and resources to adapt to participatory processes	-more resources for prevention because of reduced occurrence of disasters -better management capability	-better image because of good performance. -satisfaction of fulfilled duty
Commercial Associations, etc.	-extra working hours	-time and resources to adapt to participatory processes	-more attractive city for investments -better environment for the economical development	
The City	-deficient infrastructure		-reduced occurrence of disasters -decrease loss of life -better public health -better quality of life -increase protection for green areas	

From the analysis of this chart we can conclude:

- Until the moment the city and its inhabitants are the principal beneficiaries of the participation process. Through participation, joint actions have been negotiated and coordinated with results that would not have been the same if the actors had worked on their own.
- The organized community incurs the highest costs because at the beginning of the process it had to invest more while waiting for the benefits from the implementation of the projects.

10. ACHIEVEMENTS AND CHALLENGES OF THE BIOMANIZALES

Seeking the sustainability of the development, the environmental management in Manizales has achieved several milestones (Tab. 5). It has been a long way and although the achievements are important, these have also brought significant difficulties. Some have been dealt with during the consolidation process and others are not solved yet. Among the most important achievements and the serious problems that need to be deal with are:

10.1 Achievements:

- **Integrated Planning of economical, environmental and social components, and joint work of the municipality, the university and the environmental authority:**

It has been fundamental for the integration of the environmental issues in the urban planning of the city, to recognize the direct relation that exists between the conscious planning of the environment and the decrease of risk of disasters. Integration of resources that each one can provide, has strengthened of urban planning and the municipal management through realistic studies and proposals produced by the universities with the backing of CORPOCALDAS. This joint work has reduced considerably the occurrence of disasters, material and human losses in recent years. Therefore, the municipality and CORPOCALDAS, as environmental authority, can dedicate more budget and resources to disaster prevention and natural resources' protection. This policy has been useful in bringing closer the interests of these actors towards a topic of common interest and of vital importance for the performance of these three organizations.

The integration between the economical and the environmental aspects of development can be also noticed in the performance of Bioservicios enterprise and in the Corporación Ciudad Verde. Both have been dedicated to generate employment offering a wide range of services in the cleaning and garbage recycling sectors, making use of resources that were ignored before.

- **Continuity of the environmental policy, the programs and the projects.**

This has not been as consistent as it would be desirable. However, with the continuity of the Biomanizales as the environmental policy for the last five years and the image that has acquired due to the growing acceptance of its importance, we can assume that following municipal administrations, will continue to support it. The appointment of the assistant to the Major for environmental issues is a step ahead towards generation a stronger leadership from the municipal administration in support of continuity of programs and projects of the policy.

Table 5: Summary Achievements of Environmental Management in Manizales

Achievements	Validation
<ul style="list-style-type: none"> Decrease of risks and improvement of the environmental conditions. 	<ul style="list-style-type: none"> Decrease of the percentage of housing in risk areas. Improvement of quality of life of the population relocated from risk areas including Olivares to San Cayetano, El Paraiso and Yarumales. Creation of the Disasters Attention and Prevention Bureau. Formulation of the Disasters Attention and Prevention Plan and its integration in the POT.
<ul style="list-style-type: none"> Integrated Planning and joint work among the municipality, the university, the environmental authority, the commercial associations and the NGOs and JALs. Strengthening of the joint work between the municipal management and universities with the Research-Management-Follow-up process. 	<ul style="list-style-type: none"> Integration of the physical vulnerability topic into the territorial ordinance and development policies. Joint formulation of the Biomanizales, the Bioplan and the Development Plans, periods 1995 to 2000. Initiation of the Alcazares Arenillo Ecopark construction according to the design of the architecture students (Pictures 16, 17, 18 Annex 1). Elaboration of environmental management support studies such as the Environmental Profile and others. Design of the Monitoring, Follow-up and Control System of the Urban Development.
<ul style="list-style-type: none"> Continuity of the environmental policy. 	<ul style="list-style-type: none"> Formulation of the Environmental Profile of Manizales and the Municipal and Communal Environmental Agenda. Presentation of the Manizales Environmental Management experience in the HABITAT II Conference as "Best Practice". Adoption of the BIOMANIZALES as the environmental policy for the Development Plan of the city by two consecutive administrations. Elaboration of the BIOPLAN.
<ul style="list-style-type: none"> Citizens participation in the urban planning, to promote the citizen's participation culture in the urban planning. 	<ul style="list-style-type: none"> Invitation to the JAL, JAC, associations, universities, community leaders, environmental NGOs, politicians, etc. to participate in the working tables for the preparation of the different plans. Formation of the Communal Environmental Committees. (Only 7 of a total of 11 are active).
<ul style="list-style-type: none"> Introduction of the environmental component as an economic development factor. 	<ul style="list-style-type: none"> Inclusion of Biotransport and Biotourism as priority programs of the Bioplan and as dynamic components of the economy.
<ul style="list-style-type: none"> Consensus oriented activities of the public and private sector to provide public services. 	<ul style="list-style-type: none"> Increase of private sector participation for the provision of public services. Creation of Bioservicios, Ciudad Verde and EMAS.
<ul style="list-style-type: none"> Consolidation of Green Protective Areas and Natural Reserves. 	<ul style="list-style-type: none"> Increase of 168 hectares of green protected areas. Definition of land uses for some green protective areas. Creation of 9 Ecoparks. Environmental Education Program in the Alcazares Arenillo Ecopark.
<ul style="list-style-type: none"> Use of tributary mechanisms in favor of the environmental management. 	<ul style="list-style-type: none"> Gasoline Tax Surcharge (15%, still in force). Use of exchange, credit and soft loans mechanisms. Budget increase for the Massive Transport Study. Budget support for the elaboration of the Development Plan.

	<ul style="list-style-type: none"> • Creation of tributary incentives to preserve privately owned green protective areas.
<ul style="list-style-type: none"> • International promotion of the BIOMANIZALES and the BIOPLAN • International Support to the management of the BIOPLAN 	<ul style="list-style-type: none"> • Agreement with Curitiba –Brazil for the creation of the Environment University. • Agreement with CEPAL and the Italian Government to support the design and assembly of the Urban Observatories and Environmental Quality Signals (“Traffic Lights”).
<ul style="list-style-type: none"> • Management of the Local Environmental Plan of the Olivares Commune 	<ul style="list-style-type: none"> • A cooperation agreement with ICLEI for the Olivares Commune Development Project. • Participation of the recyclers’ cooperatives, other community based organizations and community leaders in the implementation of the ICLEI project.
<ul style="list-style-type: none"> • Active participation of the political class in the planning and socialization process of the Plan 	<ul style="list-style-type: none"> • Production of a video and special cards for the plan’s socialization in the communities. • Financing of the expenses of the participatory working tables during the Plan’s elaboration process.
<ul style="list-style-type: none"> • Stimulation of environmental management at a local level 	<ul style="list-style-type: none"> • Up-date of the BIOPLAN in participatory forums. • Development of the training program for the operation and management of the Urban Environmental Observatories. • Conclusion of the software development for the Monitoring, Follow-up and Control System of the environmental development, the design of the Urban Environmental Observatories and the Environmental Quality Signals (“Traffic Lights”). • Initiation of the construction of the first Urban Environmental Observatory in the Autonomous University.

This continuity has allowed that not only the environmental component, but also the city's urban development is planned on a medium and long-term perspective. Due to their magnitude, projects such as the Sustainable Transport, the Biotourism development and the Pilot Project for the Olivares Commune, need continued actions and support in order to get the desired impacts.

In Colombia, as in other countries, it is quite frequent that policies get affected by the fluctuations and interests of the mayors and the political parties in turn. Luckily, in Manizales the environmental policies have had the continued support of several successive administrations. Nevertheless, it can be noticed that there are administrations that give more importance than others to the execution of projects and programs of the environmental policy.

Another factor that has been very important for the continuity of the environmental policy is the new legislation and norms that have been created during the last years. This may be due to the emphasis that environmental issues are receiving in the international, national and local arenas during the last years.

- **Strengthening of citizen's participation culture in urban planning:**

A very important progress during this experience has been the use of participatory mechanisms to promote citizen's interest in urban planning. The convocation to open forums and roundtables with the participation of the organized civil society contributes to validation of the processes and the content of the plans, and guarantees a much wider support for their implementation. The local government, the Municipal Council, the commercial associations and the universities have made efforts to turn the development plans and spatial Development Plan (POT) into an issue of public interest. With these actions they are contributing to establish a participation culture. Besides, an attitude change is being promoted in the local administration as well as among the citizens. A consciousness is being created that planning and the development should be issues of collective interest. It is very important to mention the interest and participation of the local politicians in participatory planning processes. The video production and other initiatives for the socialization of the urban policies contribute to widen the support base required for the success of urban environmental management.

- **Design of the Monitoring, Follow-up and Control System of Urban Development.**

The design of the software for the monitoring and follow-up system is a very important progress in the field of methodologies and technology applied for urban development. The system started with the development and manual application of the Environmental Quality Signals ("Traffic Lights") and the conceptual development of the Urban Environmental Observatories methodology. Manizales was the first city that had the idea to use this signaling system to visually represent the results of the environmental situation of the city. Initially, when it was still manually operated, the system was applied with emphasis in the monitoring and follow-up of the environmental data. Now with the development of the software, it got enriched and completed so that it would be applicable to the concept of monitoring of indicators of sustainable development. The system has been developed and designed by local professionals and its first implementation phase is expected to start by December 2000. A training course for the management and operation of similar systems has been designed and courses in Cuba, Trinidad & Tobago, Chile, Argentina and Colombia will start in 2000 - 2001 with the support of CEPAL.

A system with such characteristics is very valuable for the city and its citizens because they will count on a reliable system through which the policies, the projects and programs can be monitored. They will also be able to count on clear and realistic information to judge the performance of its local governments.

- **Consensus Oriented Action of Public - Private Partnership for provision of better and more efficient services.**

The creation of enterprises such as Corporación Ciudad Verde and Bioservicios in association with the municipality and the community associations of the recycling sector, have brought very positive results regarding the effective provision of cleaning, solid waste collection and recycling services. It is true that some financial problems exist and that the operation was subsidized for two years but with the new business-oriented administration that is in power since 1998, these problems are gradually being solved. This initiative is important in three aspects: First, the cleaning and waste collection services are being provided in a more efficient way. Second, the recycling task is being done in an industrial way which has contributed to a decrease in the amount of waste and the amount of non-degradable material that otherwise would have to be placed in the final garbage disposal area. Thirdly, more employment and income are being generated benefiting recycler's families. Besides, with this business alternative the work of the garbage recyclers and collectors is being dignified. The cooperatives have organized approximately 300 collectors and recyclers who receive business training and the opportunity to improve their incomes in a more decent job atmosphere. The creation of Bioservicios, of which the recyclers cooperatives are also partners, have contributed to consolidate and strengthen the sector, diversifying the range of services that they can offer in order to generate more income.

- **Introduction of the environmental component as an economic development factor.**

What is expected with the programs and projects of the BIOPLAN and with other initiatives, is to take advantage of the environmental potentials of the region in order to boost the economy. The use of the natural resources along with activities that do not cause negative impacts to the ecosystems is promoted. Activities that could be developed make balanced use of the physical, cultural and natural resources with economical purposes. Such is the case with Biotourism and the projects of the Bioroutes, the Coffee Hostels, the Biocommerce in 27th street, the urban balconies and other projects of Pilot Plan. All these initiatives are focused on activities that generate employment and incomes in the tourism sector, having a positive impact on the economy of the municipality and the region.

9.1 Challenges:

- **Socialization and stimulation of the Bioplan:**

More efforts are required in order to achieve sufficient socialization and dissemination of the plan. Socialization of its content and importance among professionals of the public and private sector is needed to increase support for its implementation.

- **Greater commitment of the Municipality towards environmental management:**

The environmental management of the city could greatly benefit from a stronger commitment by the municipal administration not only in terms of leadership of actions but with the provision of resources for implementation. There are issues such as the re-installation of the Environmental Unit of the Planning Secretariat, suspended during the past administration that needs to be resolved.

- **Increase of resource mobilization for the Bioplan**

The challenge is to increase resource mobilization for projects that have been included within the plan but until this date have not been taken into account in the Multi-year Investment Plan of the municipality. Efforts have been made to increase the local budget through international cooperation funds. Nevertheless, the lack of a regular flow of local funds limits the possibilities of sustainability of programs and projects of the plan.

- **Support to the Commune Environmental Action Plans**

These have been updated and evaluated and most of them present deficiencies regarding the commitments of institutions and inhabitants. For this reason it is necessary that the communities get more prepared for the coordination and decision making phases. This is equally valid for the solution of environmental conflicts derived mostly from problems related to land use in which the individual economical and political interests have priority over the collective interests of the communities. Conflicts like these have made difficult the execution of some projects and have limited the participation of several community leaders.

- **Lack of convergence of resources for the Pilot Plan of Olivares Commune**

The Pilot Plan of the Olivares Commune has not received the necessary support in order to initiate all planned projects. For various reasons, the pace of implementation has not matched expectations of the community. The plan created expectations within the community and it is necessary to obtain financial support to implement the projects which require a heavy financial input and involvement of the municipal administration. In this sense, joined efforts and combine resources from the different institutions need to be mobilized in order to implement the remaining projects of the plan. Unjustified delays could endanger the compromise of the community to participate in the implementation. Nevertheless attention needs to be paid not to overcharged the community with too many responsibilities with simultaneous implementation of projects.

- **Training and institutional capacity building for participatory planning and urban environmental management.**

There is a noticeable need for institutional capacity building for the municipality and other relevant organizations to respond more efficiently and effectively to the challenges of the new dynamics of environmental management and sustainable development. The implementation of a capacity building plan could help to improve such deficiencies. This plan should include the design and development of training programs that, among others, explain and popularizes in detail the environmental management experiences. It will increase the possibilities of all the actors involved to become more equipped with the same information and know-how to participate in these processes which are decisive for the development of the city.

11. CONCLUSIONS

We can conclude that the environmental management has been a continuous process working on several fronts in which the incorporation of environmental education and the participation of the organized civil society has been important. Participatory planning, oriented to the environment, became part of the development plan reinforcing the efforts towards sustainability of the municipal development.

Better inter-institutional coordination of actions, employment generated through Ciudad Verde and Bioservicios, more efficient waste management with the operation of the recycling plant, improvement of the work conditions of families of recyclers, increase of green areas for recreational and educational purposes, increase in awareness towards environmental issues among public and private organizations and individuals are some of the impacts of this policy.

It is important to note that the achievements of this policy have not been obtained from one day to another. It has been almost eight years since the formulation of the Environmental Profile of the city began and six since the Biomanizales was included as the environmental policy of the municipality for the first time. The achievements of this policy have been the result of the continuous pressure of various actors who are convinced that the environmental issues should get the necessary importance in order to achieve a balanced and sustainable development.

Results of this experience are relevant since they have contributed to consolidate the environmental management within the municipality development planning. However this has not been achieved easily and without difficulties. It is understandable since it has been a process of many years, in which the participation of many sectors are sought, dealing with an issue that until recently was neglected in the urban scene. Thus reflecting the partial support and integration from some of the relevant actors.

Regarding the main programs and projects, in some cases the continuity has been achieved mostly because of the leadership that IDEA has assumed with the support of public and private organizations, local and international. The challenge is to motivate and encourage more active involvement of the municipal administrations and to continue working together to achieve concerted actions that could be the product of a participatory process of urban planning.

The solution of problems, such as the convergence of resources for the management of the Bioplan and the implementation of the Pilot Plan of Olivares Commune, is necessary to give continuity and a greater credibility to the actions that are being promoted with the Biomanizales as the environmental policy of the municipality.

The bases to achieve the sustainability of development are already given; it is the task of all involved actors to continue the work for the dream of a “**city for life**” to become reality.

Mechanisms such as the **participatory and consensus oriented processes**, tools such as the **Local Environmental Plan of Action** (Bioplan) and the **Monitoring, Follow-up and Control System**, the **Pilot Plan of the Olivares Commune**, just to mention some, are elements of this policy that could, with the necessary adjustments, be adopted in other cities of similar characteristics.

The innovative, participatory and practical spirit of these elements is very valuable within the search of economically efficient, socially equitable and environmentally sustainable cities for today's inhabitants and the future generations.

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ANNEX 2:

**PROPOSED METHODOLOGY FOR THE
ELABORATION AND APPROVAL PROCESS OF THE
TERRITORIAL DEVELOPMENT PLAN (POT) IN MANIZALES**

**P.O.T.
PERMANENT PLANNING OF THE TERRITORIAL ORDINANCE OF THE MUNICIPALITY OF MANIZALES
1997-2010
PROPOSED SCHEDULE**

	JULY TO NOV 1997	JUNE 9 TO JULY 8 1998	AUG 3 TO AUG 21 1998	AUG 4 TO OCT 21 1998	OCT 21 TO NOV 30 1998	NOV 30 1998 TO JAN 24 1999	JAN 24 TO FEB 24 1999	27 MAY 1999	JUNE 1999- DEC 1999	JAN 2000 – JUNE 2000	JULY 2000 – DEC 2000	2000 TO 2010
	MOMENT 1	MOMENT 2	MOMENT 3	MOMENT 4	MOMENT 5	MOMENT 6	MOMENT 7	MOMENT 8	MOMENT 9	MOMENT 10	MOMENT 11	
BACK-GROUND	Approval of the Territorial Plan Law	Background of Environmental Dimension	First Convocation	Working Tables	Characterization - Physical Territorial Synthesis and Analysis	Characterization - Physical Territory Synthesis and Analysis, Preliminary Proposals Agreement Projects	Hand over of Document Instances, Citizens' Assembly , Evaluation and Feedback of the Proposal	Agreement on Project and Exposition of Motivation	Approval of Vision of the POT	Departmental Vision of the Territorial Plan	Regional Vision of the Territorial Plan	IMPLEMENTATION AND ADJUSTMENTS OF THE EXECUTION TOOLS OF THE POT. MONITORING MANAGEMENT EVALUATION
ACTIVITIES	Revision of Territorial Plan, under the terms of law 388.	Analysis and definition of guidelines	Approximation to the methodological and legal reference terms of the Territorial Plan	Preliminary Thematic Analysis	Administrative Technical Workshops	Technical Working Tables	Workshops Forums Working Tables	Report of Plan Commission sessions	To be defined	To be defined	To be defined	
INSTANCES	Planning Secretariat	CORPOCALDAS Municipal Administration Analysis and definition of reference guidelines	Instances Municipal Council Municipality Planning Territorial Council	Instances - Institutional Actors Associations Public-Private Sector	Planning Technicians Local Advisors Government Council	Planning Technicians Local Advisors International Advisors Experts Planning Secretariat	Territorial Planning Council CORPOCALDAS	Municipal Council	To be defined	To be defined	To be defined	
RESULTS	PRELIMINARY REVISION OF DOCUMENT	PRELIMINARY ENVIRONMENTAL DOCUMENT	POT CITIZENS PACT FOR MANIZALES	PRELIMINARY THEMATIC CHARACTERIZATION	STARTING POINT VISION	PROPOSED VISION	CONCERTED VISION	APPROVED VISION	ARTICULATION OF DEPARTMENTAL VISION	ARTICULATION OF REGIONAL VISION	ARTICULATION OF NATIONAL VISION	PERMANENT PLANNING

ANNEX 3:

**INDICATORS OF THE MONITORING, FOLLOW-UP AND
CONTROL SYSTEM OF URBAN QUALITY**

**SYSTEM OF THE MUNICIPAL INFORMATION
SIGNAL OF THE URBAN QUALITY - MANIZALES MUNICIPALITY - COLOMBIA**

I. SOCIAL COMPONENT

FACTOR: WELFARE

VARIABLES	INDICATORS	SOURCES	PERIODS	RESPONSIBLE FOR THE PROVISION OF THE INFORMATION
EDUCATION	<ul style="list-style-type: none"> - Illiteracy - Students desertion - Average education level of the population over 15 years old. - Schooling population / population in school age. - Total of students / Total of teachers 	SISBEN - SABE 50	Annual Annual Annual Annual	Education Secretariat.
HEALTH	<ul style="list-style-type: none"> - Morbidity - Mortality - Maternal mortality - Perinatal mortality - Infant mortality - Life expectancy at birth. 	Health Secretariat.	Monthly Monthly Annual	Health Secretariat.
SOCIAL SECURITY	<ul style="list-style-type: none"> - Coverage of the social and family security system / Total Population. - Population covered by health subsidized system / Total Population. 	Health Secretariat.	Annual	Planning Secretariat.
CITIZENS SAFETY	<ul style="list-style-type: none"> - Number of violent deaths / Number of traffic accidents. - Number of assaults and homicides in public spaces. - Number of homicides per month. - Number of traffic accidents / Total vehicles 	Government Secretariat, Traffic and Transport Secretariat	Trimester 1 Trimester 1 Trimester 1	Traffic Secretariat. Government Secretariat.
RECREATION AND CULTURE	<ul style="list-style-type: none"> - Percentage of green area structured per inhabitant. - Number of inhabitants in proportion to the number of cultural buildings. 	Manizales Verdece Office Community Development Secretariat	Bi-annual	Community Development Secretariat.

RESPONSIBLE ENTITIES OF THE EVALUATION, CONTROL AND FOLLOW-UP SYSTEM:

Planning Secretariat and Organization and Systems Secretariat, University of Caldas, National University

FACTOR: EQUITY

VARIABLES	INDICATORS	SOURCES	PERIODS	RESPONSIBLE FOR THE PROVISION OF THE INFORMATION
HABITAT QUALITY	<ul style="list-style-type: none"> - Percentage of crowding - Population density (inhabitants per hectare) - Land use compatibility with the surrounding housing: - Number of housing located in non-residential sectors. Families per house in areas with vulnerable population. - Number of housing in high and medium risk areas / Total of houses. - Coverage of public services: % of urban population with access to domestic water supply, sewers, sanitation, electric energy and public telephones. 	Government Secretariat SISBEN	Bi-annual	Planning Secretariat
		Attention and Disaster Prevention Office	Bi-annual	Popular Housing Office
		EMAS – EMTELSA – Aguas de Manizales - CHEC		
INCOME AND INCOME DISTRIBUTION	<ul style="list-style-type: none"> - Economic dependence of percentage of family members. 	SISBEN – DANE	Bi-annual	SISBEN, HEALTH SECRETARIAT
URBAN POVERTY	<ul style="list-style-type: none"> - SISBEN level - Unsatisfied Basic Needs. NBI - Poverty Line - Percentage of population per socio-economic strata - Social composition by commune: diversity of strata per commune. - Per Capita income per familial nucleus in vulnerable population. 	DANE – SISBEN	Annual	SISBEN
		Community Development Secretariat	Annual	
		DANE-SISBEN		DANE

FACTOR: ORGANIZATION FOR CITIZENS PARTICIPATION

VARIABLES	INDICATORS	SOURCES	PERIODS	RESPONSIBLE FOR PROVIDING THE INFORMATION
PARTICIPATION IN POLITICS	<ul style="list-style-type: none"> - Active Political Groups / Total population able to vote - Total of voters / Population able to vote 	Community Development Secretariat. Civil Status Register Office	Corresponding Electoral Period	Community Development Secretariat.
COMMUNITARY PARTICIPATION	<ul style="list-style-type: none"> - Community Representation: Number of active “comuneros” / total population. - Number of community organizations / total of communes - Number of projects presented by the Community / Total number of BPIM projects. - Number of executed projects presented by the Community / Total of projects presented by the Community. 	Community Development Secretariat	Annual	Community Development Secretariat.
		BPIM	Annual	
		BPIM	Annual	
GOVERNMENTAL SUPPORT	<ul style="list-style-type: none"> - Number of inter-governmental programs and projects in process. - Percentage of municipal budget for inter-institutional and governmental cooperation. - Number of inter-institutional projects / Number of projects registered in the Municipality. 	Community Development Secretariat	Annual	Community Development Secretariat.
		Organization and Systems Secretariat. BPIM	Annual	

	- Number of international agreements / Number of agreements that derived from the execution of programs and projects.			
NON-GOVERNMENTAL ACTIVITIES	- Percentage of municipal budget for programs and projects / Percentage of projects executed by the NGOs.	Treasury Secretariat.	Annual	Community Development Secretariat
PRIVATE SECTOR	- Percentage of municipal budget for programs and projects / Percentage of projects executed by private organizations.	Treasury Secretariat.	Annual	Community Development Secretariat

FACTOR: INVESTMENT

VARIABLES	INDICATORS	SOURCES	PERIODS	RESPONSIBLE FOR PROVIDING THE INFORMATION
INFRASTRUCTURE FOR COMMUNITY SERVICES	- Percentage of municipal budget executed for the improvement and construction of infrastructure of community services: Education, Health, Recreation and Sports, community centres.	Treasury Secretariat. Works Secretariat.	Annual	Treasury Secretariat.
EDUCATION FOR PARTICIPATION	- Percentage of annual investment in training for participation.	ICAM	Annual	Treasury Secretariat.
PROGRAMS FOR THE IMPROVEMENT AND QUALIFICATION OF THE SETTLEMENTS AND THEIR AREA OF INFLUENCE	- % of the municipal investment in improvement programs for housing.	Popular Housing Office CORPOCALDAS	Annual	Treasury Secretariat.

II. ECONOMIC COMPONENT

FACTOR: EFFICIENCY

VARIABLES	INDICATORS	SOURCES	PERIODS	RESPONSIBLE FOR PROVIDING THE INFORMATION
PARTICIPATION OF THE MUNICIPALITY IN REGIONAL AND NATIONAL ECONOMIC PRODUCTION	<ul style="list-style-type: none"> - Percentage of municipal PIB contributed by the municipality. - Percentage of microbusiness participation in the municipal economy. - Percentage of industrial participation in the municipal economy. 	DANE. CRECE. Chamber of Commerce	Quarterly Quarterly Quarterly	CRECE, Bank of the Republic Chamber of Commerce
FISCAL BEHAVIOR OF THE MUNICIPALITY. BEHAVIOR OF THE DEBT.	<ul style="list-style-type: none"> - Percentage composition of local, national and international financing sources. - Fiscal Performance: Fiscal tributary incomes / Total number of inhabitants. 	Treasury Secretariat.	Annual	Treasury Secretariat.
ADMINISTRATIVE EFFICIENCY	<ul style="list-style-type: none"> - Investment behavior against total budget of the municipality. 	Treasury Secretariat.	Annual	Treasury Secretariat.

FACTOR: PRODUCTION

VARIABLES	INDICATORS	SOURCES	PERIODS	RESPONSIBLE FOR PROVIDING THE INFORMATION
FINANCIAL BEHAVIOR BY SECTORS	<ul style="list-style-type: none"> - Producer price index. Percentage growth. - Percentage participation of each sector in the municipal PIB. - Unemployment and employment rates by economical sub-sectors 	DANE. Chamber of Commerce. ANDI	Monthly Annual Monthly	DANE
MUNICIPAL ACCOUNTS OF PRODUCTION	<ul style="list-style-type: none"> - Percentage of added value in the production accounts by economic sector. - Percentage of value of production accounts paid in salaries by economic sector. 	CRECE CRECE	Annual Annual	CRECE
POPULATION GROUPS: LINK TO ECONOMIC ACTIVITIES	<ul style="list-style-type: none"> - % of working and non-working population / Total population. - Average of salaries and benefits compared to the national one. - Consumer Price Index (C.P.I). - Salaries Range 	DANE	ANNUAL	Organization and Systems Secretariat.
BEHAVIOR OF THE INDUSTRIAL, COMMERCIAL AND AGRICULTURAL SECTORS	<ul style="list-style-type: none"> - Percentage composition of municipal economic production. - Percentage of imports by economical sector. - Percentage of raw materials and output exports by economic sector. - Municipal exports levels by economic activity / Total of exports. - Foreign price of the Colombian coffee. 	DANE – CRECE Coffee Producers' Committee. Chamber of Commerce	ANNUAL	CRECE – CHAMBER OF COMMERCE.

FACTOR: INVESTMENT

VARIABLES	INDICATORS	SOURCES	PERIODS	RESPONSIBLE FOR PROVIDING THE INFORMATION
BUDGET EXECUTION	<ul style="list-style-type: none"> - Number of executed projects / Number of projects registered in the BPIM. - Efficiency of tax collection: Cost of total collection / Real tax collection. - Percentage of budget execution by sector (executed value / assigned value). - Number of national and international agreements related to industrial development projects. - Percentage of budget assigned by the Municipality for the technical assistance to the productive sector. - Per capita investment: Expense of executed investment / Municipality total population. 	Organization and Systems Secretariat. Treasury Secretariat.	<p>Quarterly</p> <p>Annual</p>	Organization and Systems Secretariat.
TECHNICAL ASSISTANCE FOR THE PRODUCTIVE SECTOR	<ul style="list-style-type: none"> - Percentage of budget assigned to the promotion of science and technology for the improvement of production. 	ANDI	Annual	ANDI

III. ENVIRONMENTAL COMPONENT

FACTOR: NATURAL RESOURCES

VARIABLES	INDICATORS	SOURCES	PERIODS	RESPONSIBLE FOR PROVIDING THE INFORMATION
WATER – AIR – FLORA – FAUNA - LAND	<ul style="list-style-type: none"> - Volume of extracted water by economic sector. - Quality of the water. - Potential of the basins: Average flow of the water supply. - Reforested area in protected basins / Total area of the basins. - Deforested Areas / Total area of the municipality. - Percentage of non-urban reservation areas / Total area of the municipality. - Percentage distribution of the air pollution according to the vehicular, industrial and commercial sources. - Area of primary and secondary forests / Total area of the municipality. - Percentage of total area of the municipality / total area with some type of erosion. - Percentage of land area with agricultural potential. - Percentage of geologically unstable area. - Percentage of overdeveloped area in the municipality - Percentage of environmental protection area / urban area - Expansion area / urban area 	<p>Waters of Manizales</p> <p>CORPOCALDAS CORPOCALDAS Coffee Producers Committee Municipality of Manizales</p> <p>Unit of Attention and Prevention to disasters. Planning Secretariat</p>	<p>Monthly Monthly Annual Quarterly</p> <p>Annual</p>	<p>Waters of Manizales</p> <p>CORPOCALDAS</p> <p>Planning Secretariat</p>
PHYSICAL SAFETY OF THE AREA OF INFLUENCE Physical, geological, seismic risks, landslides, fires	<ul style="list-style-type: none"> - Number of events registered for attention and prevention of disasters. - Number of events attended by social-economical sectors. - % of seismic resistant buildings / Total of buildings - % of the municipal budget assigned to the basic research for the prevention of disasters. - % of the municipal budget for the improvement of degraded areas. - % of human settlements located in risk areas. 	<p>Office of Prevention and Attention to Disasters. Treasury Secretariat Office of Prevention and Attention to Disasters. Treasury Secretariat.</p>	<p>Annual</p>	<p>Office of Prevention and Attention to Disasters.</p>

FACTOR: ENERGETIC EFFICIENCY

VARIABLES	INDICATORS	SOURCES	PERIODS	RESPONSIBLE FOR PROVIDING THE INFORMATION
CLEAN PRODUCTION	<ul style="list-style-type: none"> - Percentage of industries with implementation of clean technologies. - Percentage of industries using alternative energies 	<p>ANDI ANDI</p>	<p>Annual Annual</p>	<p>Chamber of Commerce</p>
EFFICIENT PRODUCTION	<ul style="list-style-type: none"> - Percentage of waste recuperated by the recycling plant. - Percentage of industries with internalization of environmental costs. 	<p>Corporacion Ciudad Verde ANDI. Chamber of Commerce</p>	<p>Monthly Annual</p>	<p>Planning Secretariat.</p>
URBAN ENVIRONMENTAL	<ul style="list-style-type: none"> - Percentage of development area / Urban area. 	<p>Planning Secretariat.</p>	<p>Monthly</p>	<p>Municipality of</p>

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ORDINANCE	- Percentage of urban area assigned to a collective use by commune.	Planning Secretariat.	Annual	Manizales.
ENERGETIC CONSUMPTION BY ACTIVITY GROUP	- Annual Gross Energy Consumption / sector of the economy - Energy Consumption / Municipal P.I.B. - Annual projection of electric energy consumption by economic sector.	CHEC	Monthly Annual	Chamber of Commerce CRECE – Republic Bank
URBAN SCALE	- Number of Recycling industries - Distribution of the occupation of urban land by activity group.	Planning Secretariat	Annual Annual	Chamber of Commerce
TRAFFIC AND TRANSPORT	- Average speed of vehicular circulation. - Number of vehicles / Road Network in kilometers. - Condition and type of pavement in the urban area. - % of massive public transport vehicles. - Number of transported passengers per kilometer. - General Accident Rate	Traffic and Transport Traffic and Transport Works Secretariat. Traffic and Transport.	Monthly Annual Bi-annual Annual Annual Monthly	Municipality of Manizales.

FACTOR: SANITATION

VARIABLES	INDICATORS	SOURCES	PERIODS	RESPONSIBLE FOR PROVIDING THE INFORMATION
SPECIAL IMPACTS – EDAFIC, HYDRIC, SONIC, VISUAL POLLUTION.	- Percentage of population affected by water born diseases, per social group. - Percentage of outlets without treating water bodies. - Polluted water bodies / Total of water bodies - Percentage of population affected by respiratory diseases - Number of forest fires and devastated areas / total area of the municipality. - Gas concentration pollution in critical places. - Noise levels. - Population affected by disasters. - Population in risk area, relocated.	Health Secretariat. Waters of Manizales. Waters of Manizales. Health Secretariat. Planning Secretariat. Attention to Disasters. CORPOCALDAS. Observatory of environmental conflicts. Attention and Prevention to Disasters.	Monthly Annual Monthly Annual Monthly Annual	Health Secretariat. Waters of Manizales. Waters of Manizales. Health Secretariat.

FACTOR: INVESTMENT

VARIABLE	INDICATOR	SOURCE	PERIOD	RESPONSIBLE FOR PROVIDING THE INFORMATION
INFRASTRUCTURE	- Percentage of municipal budget for road and transport infrastructure works. - Percentage of investment for the solution of urban conflict issues. - Percentage assigned to monitoring, treatment and sanitary process of the water. - Percentage of municipal investment in research about	Treasury Secretariat and Public Works Secretariat. Works Secretariat.	Annual	Public Works Secretariat. Waters of Manizales. CORPOCALDAS. Treasury Secretariat.

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	biodiversity. - Percentage of public and private investment in pollution controls. - Municipal budget for the local emergency fund. - Square meters in construction of basic and complementary infrastructure for the integral management of solid waste.			
ENVIRONMENTAL EDUCATION	- Number of higher education programs on environmental education / total of programs. - Number of teachers trained in environmental education / total of teachers.	Universities. Organization and Systems Secretariat. Education Secretariat.	Annual	Education Secretariat.
TRAINING	- Percentage of municipal budget assigned to environmental education training. - Number of environmental education training programs in coordination with the municipality and the university.	Treasury Secretariat. Education Secretariat.	Annual Annual	Treasury Secretariat.

Source: VELASQUES, L.E., CORREA, L.F.: Semáforo de Calidad Urbana para el Desarrollo Sostenible del Municipio de Manizales. Diseño de un Sistema de Montireo, Evaluación y Seguimiento del Plan de Desarrollo de Manizales Calidad Siglo XXI. Manizales, 1998