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Environmental management and local action plans in Manizales, Colombia

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Agenda 21: a form of joint environmental management in Manizales,
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and
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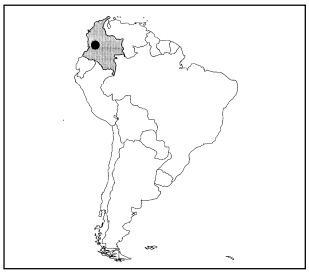

Agenda 21; a form of joint environmental management in Manizales, Colombia

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SUMMARY: ***This paper describes the development of Bioplan-Manizales, a local environmental action plan (LEAP) for the city of Manizales, and the different groups that contributed to its development; also, how this plan became integrated into the municipal development plan and the municipal budget. The measures taken to monitor and evaluate the social, economic and environmental effects of the environmental policy are also described and these include a series of urban environmental observatories. The paper also describes the broader national and international context for the innovations in Manizales – including the political, legislative and fiscal changes in Colombia that have encouraged local authorities to develop local environmental agendas. Manizales' own historical development is described including the environmental changes that this development brought and the environmental problems that it precipitated.***

I. INTRODUCTION

COLOMBIA, A TROPICAL country rich in ecological and cultural diversity and facing multiple political and social conflicts, today faces the challenge of strengthening local environmental management in 1,134 municipalities, home to some 38 million people. In Colombia, following the UN Earth Summit in Rio in 1992, all the legal instruments needed to facilitate broad community participation in environmental decisions have been put in place. But the capacity for popular management that environmental decisions require has yet to be achieved. Responsibility for the environmental management of regions, municipalities and cities cannot rest solely with the state.

In Manizales, a plan for local environmental action (Bioplan), an interesting scheme of joint environmental management, is developing, linked to the principles of Agenda 21. A continuing commitment by local government and the state university to environmental research and to the sustainable development of the municipality and the region has succeeded in consolidating a programme of continuous environmental action which is addressing the social, economic and environmental problems of

this geographically complex area.

As a result of continuous leadership by the universities and the NGOs, and the ownership and commitment of the communities, the environmental policy is underpinned by a continuous investigation into the area's environmental problems and potential and broad popular participation. The public sector, the private sector and the communities have all come together in this constantly growing participative process. As a result, Bioplan's various programmes and projects are being implemented and Manizales has succeeded in improving the quality of life of its residents and in increasing the capacity for environmental management of the poorest communities.

II. THE DEVELOPMENT OF THE CITY AND THE SHAPING OF ITS ENVIRONMENT

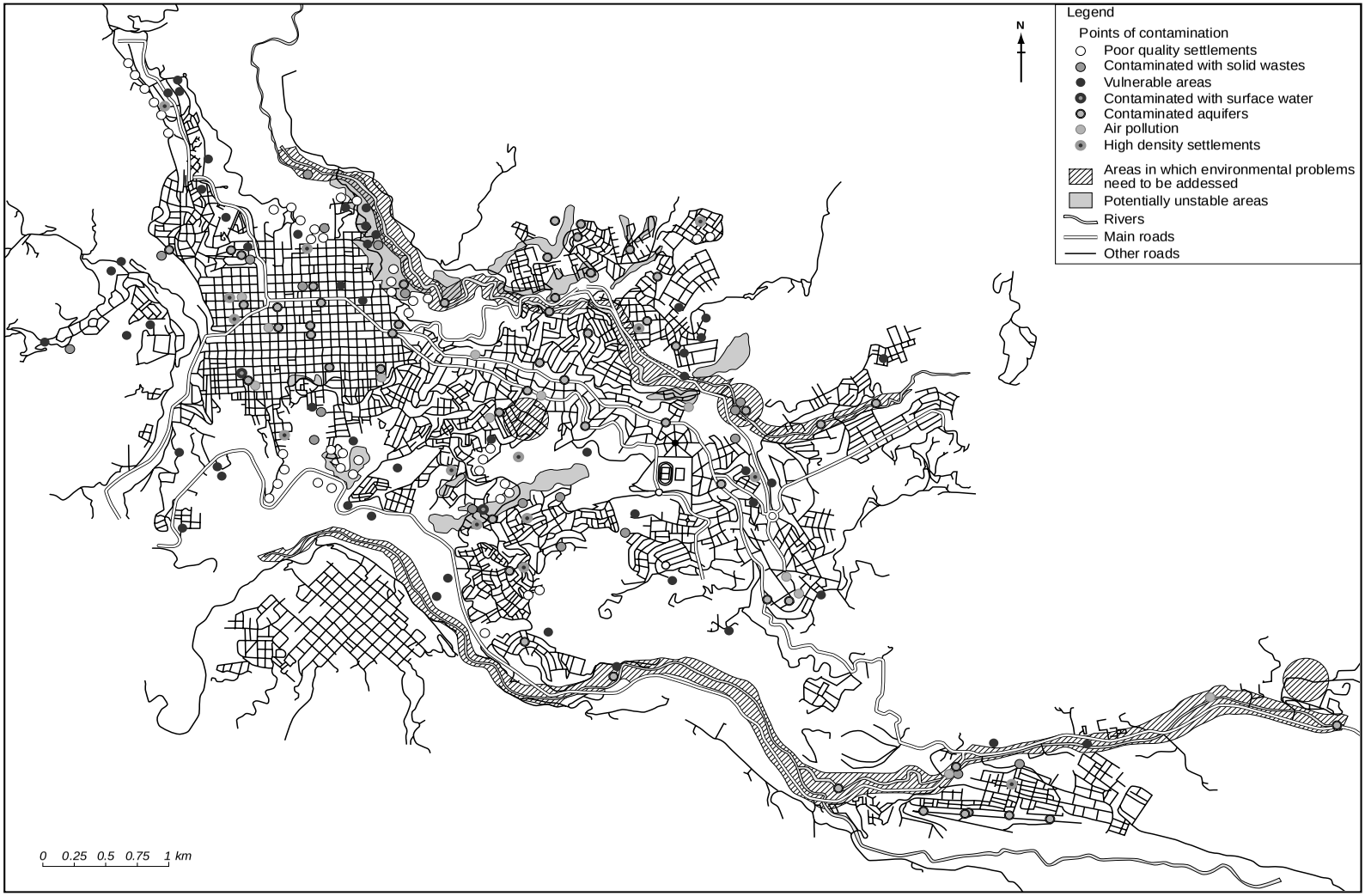
THE MUNICIPALITY OF Manizales lies in the tropical zone, to the west of the Andes, Colombia's central mountain range. Its physical geography, soil characteristics, rainfall and water resources are determined by the influence of the Cumanday massif. Among the active volcanoes of this massif, at a height of 5,400 metres above sea level, is the snow-capped volcano of the Ruiz, whose eruption (and resulting thawing of snow) in 1985 led to avalanches of stones and mud which destroyed the town of Armero and other small riverside communities where over 35,000 people lived. In Manizales and the surrounding area, this event generated a "culture of disaster prevention" which is now an integral part of the research and environmental planning programmes of the region.

By virtue of Manizales' geographical location, with marked variations in altitude, the territory of the municipality is characterized by great climatic and ecological diversity:

- moist tropical forest at 880 metres above sea level, with an average temperature of 30°C, occupying 19 per cent of the municipality's territory;
- very moist forest in the foothills at 1,500 metres above sea level, with an average temperature of 23°C, occupying 62 per cent of the municipality's territory;
- very moist forest in the mountains at 2,100 metres above sea level, with an average temperature of 18°C occupying 12 per cent of the municipality's territory; and
- very moist forest in the mountains at 3,800 metres above sea level, with an average temperature of 4°C, occupying 6 per cent of the municipality's territory.

At present, rural areas account for 397.1 square kilometres of the municipality's territory; in 1997, they had a population of 57,057 inhabitants concentrated in seven administrative entities known as ***corregimientos***. The urban area covers 42.9 square kilometres, with a population in 1997 of 358,194 inhabitants concentrated in 11 administrative entities called ***comunas***. The urban area of Manizales lies in the very moist forest of the mountains and its topography of steep slopes, its high rainfall (2,200

Map 1: The City of Manizales - Highlighting the Location of Some of the Most Serious Environmental Problems



Source: Drawn from a map prepared by the Departamento de Planeacion Municipal and IDEA at the Universidad National, Manizales.

mm per annum) and its 78 per cent humidity restrict urban expansion onto the hillsides. It could be said that Manizales has already surpassed the natural limits to its expansion and must seek alternative ways of managing growth – for instance, through increasing density in selected areas and through re-using existing buildings and lots. For this reason, proposals to define and allocate land use will be developed, linked to the restrictions of the hillsides.

According to data in the municipal environmental profile, the environmental problems of Manizales can be summarized as follows:

- inappropriate transformations in its ecosystems, including felling of trees to make way for permanent and temporary crops, the impact of agricultural expansion on the buffer zone of the snow-capped volcano of Ruiz and the transformation of green protection zones by urban expansion;
- pollution of rivers and water catchment areas by industrial, agricultural, mining and domestic pollutants; and
- high seismic and geological risks as a result of the steep slopes and high levels of soil humidity.

Impacts within the urban area arise from:

- a transport and road infrastructure system inappropriate to the city's topography;
- dwellings located in high risk areas due to the increase in urban poverty;
- industrial contamination of the city's rivers;
- degradation of the landscape including a loss of urban and architectural heritage;
- shortage of green spaces and public recreation areas; and
- problems arising from a lack of education and training in participative environmental management.

Manizales' environmental potential lies in the biodiversity of its ecosystem, the variety of climates within the municipality's territory, the quality and quantity of water in its catchment areas, the hydro-electric and geothermal potential of its water resources, the agricultural quality of its soil and in the scenic quality of the landscape. Also central to its potential are the credibility of its institutions (including local government), the efficient size of the city's urban area, the many community environmental action groups, and the NGOs and universities.

Manizales municipality has always had a moderate rate of population growth; in 1997, it was 2.1 per cent lower than the national average. Of the economically active population of 137,000, 28 per cent work in commerce, 17 per cent in industry, 11 per cent in education, 12 per cent in agriculture and 9 per cent in construction while a variety of service sector occupations account for the remaining 23 per cent. At present, due to the "coffee crisis", local investment has fallen and the current unemployment rate of 12.4 per cent is four points above the national average. This is just one of the challenges that Manizales

has faced in the course of its history and, in considering its settlement process, one must bear in mind two factors, popularly known as "the culture of coffee" and "the culture of prevention".

The striking geographical location of Manizales' urban area amidst steep slopes is the result of the historical dynamic of settlement of a country which, as a result of the Spanish conquest in the sixteenth century, lost almost all of its indigenous population with only a few small local settlements in inaccessible mountain areas remaining. Manizales remained unchanged until the end of the nineteenth century when, as a result of the poverty prevailing in the state of Antioquía in the west of the country, a small group of inhabitants migrated in search of gold for use by craftsmen. They settled in a large part of the territory which today makes up the municipalities of Salamina, Neira and Manizales. This internal migration gave rise to what is known in Colombia as the "Antioquian settlement" which forms part of the identity of the local and regional culture. The new inhabitants transformed the ecosystem of the Andean cloud forests, constructing small settlements which served as temporary dwelling places, while dedicating themselves to mining and growing food crops. These settlements were strategically sited in the highest parts of the mountain range so as to dominate the territory visually and allow the defence of the mining activities. This explains how, later, towns became consolidated around roads that were relatively inaccessible, in areas with such steep slopes.

However, it was the cultivation of coffee at the beginning of the twentieth century that transformed the region socially, economically and environmentally. The optimal ecological conditions for coffee growing provided by the moist forests of the mountains, together with the internationalization of the coffee trade, generated significant economic surpluses. The area allocated to cultivating coffee grew steadily and it now accounts for 72 per cent of the municipality's total agricultural production. The temporary settlements remained and make up what today is known as the "coffee axis" where a network of medium sized towns and rural and urban communities are home to a population of 2.3 million inhabitants in what is considered one of the regions with the highest quality of life in Colombia. The "re-urbanization" of the municipality of Manizales, where countryside and city merge without any well-defined territorial boundaries, also derives from the coffee economy and the construction of a road network and of services for the transport and commercialization of the coffee bean. Research on aspects of the economic and environmental history of the settling of Manizales has been important for the environmental planning of its territory. This history can be summarized into the following periods.

a. The Coffee Boom; the New City Following the Fires

As a result of coffee exports and its commercialization in international markets, between 1920 and 1930 Manizales was Colombia's main supply centre for merchandise coming from Europe and the United States. It became the country's second most economically and politically important city. In 1927 and 1928,

two conflagrations destroyed almost the entire city, leaving only a few buildings standing on the periphery of the city centre. The prosperity of the majority of the population enabled work to go ahead on reconstruction. However, the new city changed from being a mountain city of the Antioquian settlement to being one whose architecture, parks and urban structures were designed by firms from Paris or London who had won international competitions. The construction of the new projects required substantial modification of the topography and the tropical Andean forest trees were replaced by species brought from Europe while the bamboo framework used in traditional building was replaced by cement and steel which had to be imported from Europe. Subsequently, using technology imported from Europe, a system of transport to and from Manizales using aerial cables for carrying cargo and passengers for up to 80 kilometres facilitated communication with the Magdalena river, from where coffee was sent to the embarkation port of Barranquilla on the Atlantic coast. During this period, Manizales succeeded in overcoming the physical isolation resulting from its mountainous topography and rebuilding a new city following the fires.

b. The Coffee Crisis and the Celebration of the Centenary

Towards the end of 1930, coffee prices fell on the international market and the former production boom declined. Communications within Colombia had been expanded and modernized, and Manizales was no longer the point of confluence of roads linking what became Colombia's three largest cities, Cali, Bogotá and Medellín. Manizales was now a terminal city on the crest of the mountain range and on the margin of the principal road and rail links. Nonetheless, it retained its political importance and, for this reason, on the occasion of the 1950 centenary of its foundation, the government provided significant funding for the construction of new infrastructure in the city. It also decided to establish two universities of national rank in Manizales and the city began to distinguish itself in the educational and cultural fields. From that moment on, the universities played an important role in the development of the region, including participation in its planning. Today, the city's eight universities have approximately 20,000 students and, together with the municipality, are managing the consolidation of Manizales as a university city.

c. The Second Coffee Boom and its Environmental Impact

In 1975, coffee prices went up on the international market, generating significant economic surpluses for the city and the region which lasted for five years. Coffee's high profitability led to increased cultivation of a new variety (Caturro coffee) which needs more sun for increased production. This led to serious damage to the moist mountain forest ecosystem as a result of deforestation of large areas of secondary woodland which had pro-

vided shade for the existing variety (Arabic coffee). Thus began a rapid exhaustion of the soils and a decline in the productive diversity associated with other food crops and fruit trees. In addition, large areas of woodland with great biodiversity were lost. The increase in coffee production also raised the demand for water for growing and washing the beans to the point where demand exceeded possible supply from the region's catchment areas. For this reason, in 1979, the national coffee growers' federation began a programme of rural environmental education, environmental action, reforestation and research on clean, appropriate technologies for coffee production which would minimize the impact on the ecosystem and take account of integrated resource management. This programme had a positive outcome for the region and the country, and achieved its objectives.

However, the boom also had negative environmental effects on Manizales' urban area due to the rise in investment in construction. At the time, Miami, not London, was more influential, along with a drive to "modernize the city". This led to the destruction of much of the urban and architectural heritage which had been completed for the centenary in 1950. The city began to transform its roads, which had to fit into the steep slopes, and construct high speed avenues and increase the density of the central areas. The architecture also became more homogenous. In this period of what was called "urban renovation", the expansion of the urban area coincided with the gradual deterioration of the natural and constructed landscape. In many cases, this surpassed the capacity of the surrounding environment and overstepped natural limits during "adaptation" of the hillsides for the large-scale erection of housing and urban structures. The technological and architectural solutions used within town planning were not the most appropriate ones, and the quality of the landscape and of Manizales' public and historic places suffered.

Manizales' history is full of events that illustrate the topographical conditions adverse to the city's urban construction: the construction of building lots by "terracing"; the diversion of river courses; and deforestation for the construction of buildings and roads. When, in 1979, a major earthquake destroyed a large proportion of the "modern structures" and the new "infrastructure works", intensive work was begun to investigate the links between seismic and geological risks and construction characteristics. At the time, the municipality developed a new building code which related the appropriateness of the terrain to the possibilities of earthquake resistant constructions, and a project on seismic micro-zoning was initiated to generate knowledge of the carrying-capacity of the city's different areas.

d. The Eruption of the Ruiz Volcano: Environmental Crisis and Economic Recovery

In November 1985, the volcano Arenas del Nevado del Ruiz erupted. One of the social consequences of this was that part of Manizales' population moved to other cities because of the risk of a fresh eruption affecting Manizales and the surrounding region. Meanwhile, all new investment in the city came to a halt. This

had drastic repercussions on the local economy and the national government declared an economic emergency in Manizales and the region affected by the eruption. The economic emergency decrees sought to stimulate investment by allowing the tax-free import of machinery and products associated with industrial production and by supporting employment generation. During the three years for which these provisions were valid, a total of 76 national and international businesses were set up in Manizales' industrial zone, of which 42 remain active. Although this was important for restarting Manizales' economy, it also brought negative environmental impacts in the form of increased environmental pollution in the Chinchiná river and the Manizales stream. In addition, the increased demand for water outstripped the installed capacity of the industrial zone's aqueduct. At present, work is being done under a business cooperation agreement, together with the National Industrialists' Association and the environmental authorities, to reduce the environmental impact by improving the technology.

e. The Present Coffee Crisis and Regional Integration for Sustainable Development

From 1994 to the present, Manizales and its surrounding region have been undergoing one of the greatest coffee crises. The international pricing agreement between producer and consumer countries was ended and the way opened for the free market. A consequence of this has been a fall in coffee prices because of excess supply at the international level. The economic impact both on the region and on the country is significant. The signs of poverty in the cities and countryside of the "coffee axis" are obvious. In Manizales, because of its dependence on coffee-growing, the result has been a major fall in people's quality of life. Much of the city's commerce is linked to investments which were made possible by the profits and surpluses arising from the commercialization and sale of coffee. The proportion of Manizales' population that is below the poverty line has risen from 18 per cent in 1994 to 27 per cent in 1998. Since this phenomenon affects not only Manizales but the whole region, it is interesting to note that those in power have joined together to implement a regional agenda of sustainable development. Today, programmes and projects aiming at economic recovery, the construction of macro-projects of regional urban infrastructure, and the environmental recovery and territorial definition of the Cumanday massif bio-region are being supported at international level.

f. Municipal Environmental Autonomy and Environmental Territorial Conflicts

Municipal autonomy has been important for Manizales and the outcome of the process of decentralization which has been taking place in Colombia since the mid-1980s has been very positive in making possible the integration of municipalities in decisions on economic and political issues and on regional and metropolitan action. But this autonomy has been less positive for

the environment and, today, there are frequent conflicts between neighbouring municipalities, departments and regions throughout the national territory on issues of environmental administration. In Colombia, environmental regions do not coincide with politico-administrative regions. This is why it is so difficult for the environmental authorities to work within the territory's politico-administrative jurisdiction. Decentralization and local autonomy for environmental management give rise to problems because of the existence of economic and political interests at odds with the principles of environmental planning. In addition, environmental management has barely started to consolidate processes of community participation and environmental education. The municipalities are still not ready to administer their environmental territory sustainably.

In 1997, conflicts along these lines between Manizales and Villamaría, its neighbouring municipality, became sharper as a result of the application of measures to restrict land use with respect to shared areas and resources, both natural and urban. However, through the implementation of Villamaría's local environmental action plan (LEAP) linked to the goals of the Local Agenda 21 and developed by the urban environmental study groups of both municipalities, the National University of Colombia's Institute of Environmental Studies (IDEA) and the Ministry of the Environment, cooperation around joint environmental actions to manage water, tourism, transport and recreation was achieved. Similarly, projects were formed for municipal environmental integration and the establishment of an inter-municipal environmental committee to work towards solving "environmental conflicts".

III. ENVIRONMENTAL POLICY IN COLOMBIA AND IN MANIZALES

ENVIRONMENTAL POLICY IN Colombia has important antecedents with regard to popular participation and inter-institutional commitment to environmental management. The National Institute for Natural Resources (INDERENA) was founded in 1974 and initiated a diagnosis of the country's environmental situation which alerted the national government to problems which continue to receive priority on its environmental policy agenda. The regions' and municipalities' responsibility with respect to these problems was assessed and the Green Municipalities of Colombia programme was established to address them. This was an important milestone and support was given to the green councils, and broad popular participation in environmental management was generated. Subsequently, with the commitment to seek a sustainable form of national development, the development of environmental policy has been closely linked to the 1991 constitution and the 1992 UN Earth Summit whose outputs included support for Local Agenda 21. Below, is a summary of some of the key components of Colombia's environmental management.

a. The Environmental Profile of Colombia (1990)

Colombia's environmental profile described the country's environmental situation and problems including those arising from unequal socio-economic development, the use of inappropriate technologies, the growing urbanization resulting from unemployment and violence in the countryside, natural processes that were transforming ecosystems such as earthquakes, volcanic eruptions and floods, and atmospheric changes. The profile also pointed to the difficulties for environmental management arising from a centralized administration in a country with such a complex and varied geography and with such a high percentage of autonomous municipalities and urban centres. For this reason, it put forward proposals of an institutional nature for participative environmental management and for consolidating a national system of environmental management. It also provided the basis for producing regional environmental profiles and urban environmental profiles.

b. The New Political Constitution of Colombia (1991)

The new constitution established the ecological function of property and indicated the environmental rights and duties falling to the state and to its citizens. It also decreed that the formulation of environmental policies was part of the national development plan and that sustainable development was a political goal for the country.

c. Creation of the Ministry of the Environment (1993)

In accordance with the constitutional mandate and following Colombia's participation in the UN Earth Summit in 1992, the conditions were in place for drawing up Law 99 of 1993 (the environmental law) and the Ministry of the Environment and the National Environmental System (SINA) were created. Thus, principles were established for an environmental policy with the institutional, technical and financial legislative bases to support local, regional and national environmental management.

d. The Urban Environmental Profile of Colombia and the Manizales Case Study (1993)

Colombia's environmental profile recommended the production of urban environmental profiles, emphasizing that 75 per cent of all Colombians live in urban areas and that the main environmental problems are concentrated there – due to pollution, lack of basic services and inadequate housing (in turn linked to unemployment and poverty). In Manizales, with national and local support and with the participation of universities, local government and the environmental authority, a municipal environmental profile was produced which served as a pilot research project for other cities in the country and as a basis for environmental planning for the municipality of Manizales and its region.

e. Bogotá's Local Environmental Agendas (1993)

The Institute of Environmental Studies (IDEA) and the Administrative Department of the Environment developed environmental agendas for Bogotá directly related to the Local Agenda 21. This was the first experience of its kind in the country and succeeded in consolidating a management process for environmental problems and possible solutions in Bogotá's various areas. These agendas have become an important instrument of local planning. They have also served as a methodological basis for developing environmental agendas in the rest of the country, including Manizales.

f. The Environmental Policy of the National Development Plan (1994-1998) – the "Social Leap"

The environmental policy of the National Development Plan (1994-1998) – entitled the "Social Leap" (***Salto social***) – engendered the organization of the National Environmental System (SINA) and set it in motion. It also ensured the inclusion of the environment as a factor of development in the policies and programmes to be promoted by the state. Priorities were defined for a national environmental agenda to halt the accelerated environmental decline and the loss of the country's natural resources. The agenda's priority themes included:

- reducing the rates of extraction of natural resources;
- implementing mechanisms to reduce the environmental impact of industry;
- improving the quality of life in cities and towns;
- reducing poverty in urban and rural areas;
- preventing disasters caused by the inappropriate management of natural resources;
- reducing wasteful consumption patterns;
- increasing research on renewable natural resources;
- implementing environmental information and monitoring systems; and
- training public officials to improve environmental administration.

g. Colombia's Urban Environmental Policy (1995-1996)

The Colombian government's commitment to improving urban environmental quality finds clear expression in the environmental policy principles of the national development plan: better cities and towns. These principles provided a basis on which the Ministry of the Environment and IDEA could design the urban environmental policy which is being driven by the SINA in the country's 1,134 municipalities. Local Agenda 21 and its methodological and practical applications to the Manizales Bioplan and to the environmental agendas of Bogotá were very important in defining the policy's participatory character and in prioritizing action. The priorities of urban environmental policy were centred on:

- the promotion of urban environmental research;
- better management of energy consumption in the cities;
- an increase in public and a reduction in private transport;
- waste recycling and improved environmental sanitation;
- industrial production with minimal environmental impact and wastes;
- functional and self-managed growth of the cities with improvements in the quality of the surroundings in marginal communities, the regeneration of city centres and urban public spaces, and increased provision for recreation in urban areas; and
- popular environmental education for participation and support for the implementation in all of Colombia's cities and towns of the local environmental action plans linked to Local Agenda 21.

h. The Local Environmental Action Plans (LEAPs) – Local Agenda 21 (1997-1998)

Colombia's urban environmental policy proposed developing local environmental action plans (LEAPs) as the main means of implementing Local Agenda 21. It is hoped that all of Colombia's municipalities will implement the plans, with the aid of a methodological guide to be supplied by SINA. The guide will be developed by the Ministry of the Environment and IDEA, after evaluating Manizales' Bioplan and Bogotá's environmental agendas and constructing four pilot plans in different areas of the country:

- Villamaría (within the coffee zone and with its urban area contiguous to Manizales);
- Buenaventura (port city on the Pacific Ocean);
- Yumbo (a major industrial conurbation that is within the Cali metropolitan area); and
- Yopal (a petroleum-producing area).

These towns, each with different environmental problems, are considered a priority for the development of LEAPs. These pilot projects have already had multiplier effects. For instance, the government of the department of Caldas (of which Manizales is the capital) has committed itself to providing financial and technical support to the implementation of LEAPs in the 24 municipalities under its jurisdiction. The most important aspects of this process have been the active participation of citizens and NGOs in the phases of socialization and of commitment to the programmes, and the coordinated financial support for its implementation from the various governmental and environmental authorities.

IV. AGENDA 21 IN MANIZALES: JOINT ENVIRONMENTAL MANAGEMENT

THE CONSOLIDATION OF environmental management in Manizales is just as recent as in the rest of Colombia. Its development has been closely linked to national and international environmental policy. In 1992, as a result of the political decisions emerging from the UN Earth Summit, the National University persuaded the municipal government to take up the theme of the environment and integrate it as policy in the municipal development plan. It took concrete form in 1993 in the first municipal environmental agenda. This first, rather general, agenda was gradually integrated into local management. From this moment, inter-institutional actions were being consolidated among the universities, local government, the regional environmental authority, NGOs and residents' associations in order to develop programmes and projects on environmental education and the recovery of marginal areas.

Today, this shared commitment to the sustainable development of Manizales is receiving recognition at national level. Similarly, the positive results coming from programmes and projects to resolve the concrete environmental problems of the poorest communities make these a model for environmental management throughout the country. This joint action between the municipality and the university has gradually strengthened the link between research and management. A detailed knowledge of Manizales' social, economic and environmental reality was essential to the formulation of the LEAPs linked to Agenda 21.

To better understand how environmental planning developed in Manizales, the next section has a summary of the last three periods of government and includes an assessment of the most important factors for developing a form of environmental management that meets the priorities of municipal development.

a. 1990-1992: Social Welfare and Disaster Prevention as the Environmental Priorities

Although projects were being developed in Manizales for the recovery and improvement of the environment, the hillsides posed serious problems of degradation and a high risk of landslides. In these areas, the building of illegal settlements by invaders had increased and the number of families belonging to the marginal sectors had risen considerably. A total of 4,239 dwellings, housing 7 per cent of the urban population, were located in sub-standard areas as a result of critical overcrowding and a lack of urban infrastructure. The problems had become even more severe due to the rising population in risk areas and the increased need for civil works to protect the slopes. For this reason, the central goal of the municipality's environmental planning during this period was to improve the welfare and safety of the poorest population whose dwellings were located on hillside areas with a high risk of landslides.

Work was done on disaster prevention and disaster readiness, drawing on studies on the municipality's physical vulnerability. From this moment on, environmental management emphasized the development of integrated programmes and projects on habi-

tat. The first environmental agenda was formulated with the aim of improving dwellings and providing security to the inhabitants while also considering the physical risks of the terrain. These projects were implemented in association with the local university. During this period, 2,320 dwelling units were built for people from among the lowest-income groups. At the completion of the government programme, the number of dwellings located in high risk zones had been reduced by 63 per cent and a total of 360 hectares had been reforested as protected green areas.

Box 1: The Eco-parks

The Eco-parks are protected green areas located within the municipality's urban area. Most are owned by the municipality or have been acquired through donations from individuals. Only buildings for recreation and education and the infrastructure required for its ecological conservation are allowed in the Eco-parks. The Eco-parks set natural limits on the expansion of the built-up areas and prevent construction on areas at high risk from landslides.

The environmental education programme developed in the Eco-parks is managed by different institutions including non-government organizations and the National University. For example, in Eco-park Alcazares Arenillo, the university is developing environmental educational programmes. The Recycler's Association manages this Eco-park through an annual contract with the municipality.

Some examples of the different Eco-parks:

– Eco-park Alcazares Arenillo (78 hectares) has a focus on conserving biodiversity. It is used for scientific research linked to environmental education.

– Eco-park Montele-Yarumales (36 hectares) is an ecological reservation for scientific and technological investigation and citizen environmental education.

– Eco-park Sancancio is a symbolic hill with the city. The park area includes an archaeological site of regional importance.

– Eco-park Rioblanco is a strategic ecosystem providing water to the municipality.

– Eco-park Bosque Popular (53 hectares) is the most important place for popular recreation and sport.

There were some problems in defining the boundaries of these "protected green areas" and in determining the use of the soil – they were subsequently converted into eco-parks for environmental education and research. Eco-parks combine provision for recreation, environmental education and conservation while also keeping buildings off sites that are prone to land-slides or hazards – see Box 1. During this period, 168 hectares of protected green areas were incorporated into the municipality, corresponding to 9 per cent of its total area. In addition, the municipality established a new city boundary which incorporated environmental conservation as an alternative means of disaster prevention and provided tax incentives for the owners of these areas. For the owners of dwellings in high risk areas, there were land-exchange schemes so that they could resettle on safer sites, with the high risk areas recovered for use as forest. Also during this period, the Office for Preventing and Dealing with Disasters was created within the municipality and corresponding policy was formulated integrating the themes of the city's physical vulnerability and its physical suitability for urban expansion.

During this period, the municipality invested 17 per cent of its budget in the environment and disaster prevention area. The National University supplied 83 per cent of the budget for the joint extension programme and the regional corporation invested 23 per cent of its budget in infrastructure works to reduce the risk of landslides on the hillsides. The municipality also received significant national contributions towards the implementation of its plan for preventing and dealing with disasters. The affected communities were linked to this mix of technical and financial support and the first local disaster prevention committees were set up.

b. 1993-1995: Priority: Economic Growth without Environmental Deterioration. Public-private Environmental Cooperation

The years 1993-1995 were a significant period in Manizales' economic growth, as reflected in the municipality's fiscal performance and the growth of its revenues in real terms. Current revenues increased by some 64 per cent by the end of 1995, with capital investment up by 139 per cent and municipal incomes up by 56 per cent. At the end of the period, public finances were in surplus. For 1995, investment accounted for 59.9 per cent of the municipal budget, while municipal spending on administration fell to 23.5 per cent of the budget.

The process of administrative and fiscal decentralization within Colombia obliged the municipalities to transform public enterprises into mixed ownership entities which took over the administration of parks and green areas (Regreening Manizales), the management of the water supply (Waters of Manizales – Pure Water), the management of solid wastes (Green City) and the sanitation services (Sanitation Enterprise of Manizales). It is important to emphasize the efficiency of these businesses and the importance of the public-private association as well as the participation of community associations as members of the enterprises.

This was an important period in the consolidation of environmental management in Manizales because of the municipality's support for the university's initiative to develop the urban environmental profile of Manizales as a pilot case in Colombia. The profile provided the technical basis for management and it proved possible to assemble an inter-institutional work team to carry out the research. Programmes and projects of importance to community environmental education were formulated and the first community environmental committees were set up. The first community environmental agenda was developed and environmental priorities for Manizales were established.

The first phase of the large-scale transport plan was developed and got underway. This included the renovation of roads, the installation of traffic lights and the development of connections between the city's main road corridors. There was also a programme of environmental education for drivers and pedestrians which sought to discourage the use of private transport. The use of private vehicles had grown considerably due to low prices and incentives for the free import of vehicles resulting from the opening up of the country's markets. Other transport alternatives were sought and the first aerial cable project for public transport was developed. With the new scope for municipal autonomy, the local government approved a tax surcharge on petrol with the proceeds going to the large-scale transport project.

For the first time, Manizales had a budget explicitly allocated to environmental policy into which a large part of the municipality's financial surplus was invested. The budget equalled 21 per cent of the total municipal investment budget, of which 15 per cent went to environmental education programmes, community training and tax incentives for those protecting areas of ecological importance to the city, while the remaining 6 per cent was used to purchase land for use in environmental protection and conservation. However, unusually heavy rain resulted in landslides in areas which had not been considered high-risk areas. Two hundred and twenty-six families lost their houses, and lives were lost. As a result, the municipality had to spend much of the budget it had set aside for environmental policy on dealing with this emergency, on constructing new infrastructure works and on preparing land on which the displaced population was to be resettled.

c. 1996-1998: Community Environmental Training and International Management of the Bioplan

During this period, significant advances were made in developing participative methodologies for strengthening local entities' and communities' capacity to manage environmental issues and disaster prevention. The Municipal Training Institute (ICAM) and the Secretariat of Community Development developed programmes and supported the community environmental committees in the implementation of projects. The municipality also contracted several community associations to manage and administer two eco-parks, two community plant nurs-

eries and 15 neighbourhood parks. Community participation was established in three mixed economy enterprises (with public and private members), running rubbish dumps, the recycling plant and the centre for supplies. The integration of policies for economic growth, social welfare and environmental improvement, and the design of a system to monitor and evaluate sustainable development in Manizales were significant contributions of this period. The first stage of this system will be implemented in 1998 and it will put into operation the urban environmental observatories for the 11 ***comunas*** and seven ***corregimientos*** of the municipality's urban and rural area.

Manizales' participation in the UN Habitat II Conference in 1996 with the Bio-Manizales project as an example of successful practice was important because its environmental policy became known nationally and internationally. This led to cooperative actions to support sustainable development in Manizales. Following Habitat II, the municipal administration and IDEA signed six cooperation agreements with Latin American and European cities on technical exchanges and support for urban environmental management, community environmental education, environmental sanitation and environmental monitoring. These agreements have strengthened cooperation between cities and have had a definitive role in providing continuity to the LEAP:Bioplan.

During this period, municipal investment in environmental work continued to grow with the municipality allocating 23 per cent of its investment budget to environmental policy and disaster prevention. Furthermore, international support made possible investments equivalent to 4 per cent of the municipal environmental budget. The local universities contributed technical and infrastructure resources equivalent to 60 per cent of the budget allocated to activities in support of the community, and international and national support enabled the NGOs to establish projects equivalent to 6.3 per cent of the municipal environmental budget. The municipality and IDEA received technical and financial support from the United Nations Environment Programme, the Organization of American States, the Inter-American Development Bank, the UN Economic Council for Latin America and the Italian, Spanish and Brazilian governments.

During this period, the municipal environmental budget was increased through a 1.2 per cent extra charge on urban and rural properties, representing an environmental surcharge. Colombian national law requires municipal governments to invest this tax in addressing the main local environmental problems. In Manizales, this tax expanded the municipality's financial capacity to implement the Bioplan's programmes and projects. The extra funds went towards the construction of infrastructure to protect the hillsides, towards reforestation programmes, the purchase and preparation of geologically high-risk land for conversion into eco-parks, and the programme for popular environmental education and the creation of a university of the environment.

V. THE LOCAL ENVIRONMENTAL ACTION PLAN FOR MANIZALES

a. The Bioplan

FROM 1994 ONWARDS, the municipal development plan has had the sustainable development of the municipality and the region as its fundamental aim. For this reason, the Bio-Manizales project was approved as its environmental policy goal in the medium and long term in order to:

- stimulate knowledge of the local and regional ecosystem;
- conserve the municipality's natural and cultural resources;
- increase energy efficiency in the running of the city;
- improve urban living conditions for the whole population with attention to environmental sanitation, integrated waste management and recycling, and improved security for citizens in public spaces;
- facilitate the application of appropriate technologies in industrial production;
- create an efficient supply of public services and transport; and
- provide environmental education for popular participation.

In addition, the projects and infrastructure works that were needed to environmentally reclaim, revitalize and reconstruct the municipality were designed: eco-parks, water parks, bio-cycles, urban lifts, urban outlook points, urban washing parks, bio-markets, community plant nurseries, green corridors, bio-communities, the university of the environment and bio-tourist routes. A plan has also been drawn up to develop the historic cable car system that functioned in Manizales until 1958. The plan is for a network of cable car lines using small wagons each seating up to 20 persons. The central station of this system would be situated close to the viaduct of the Autonomous University with four routes covering the most important urban and inter-municipal flows: Manizales-Villamaria, Centre-North, Centre-South and North-West. These different projects were presented by the municipality to the industrial and construction guilds as a way of revitalizing the municipality and region's economy.

However, in 1996, when the development plan was carried out and no modifications were made in the commitment to implementing the municipal environmental policy, with Bio-Manizales once again remaining a long-term goal, there were swift reactions from the universities, residents' associations, ecological groups and environmental NGOs. The environmental sector's representative to the territorial planning council publicly called a citizens' forum which, after several days of discussion with the municipal council, was able to formalize an agreement for the implementation of the LEAP:Bioplan 1997-2000. Thus, the political commitment to improving the environmental quality of the municipality of Manizales passed from the realm of theory to that of action and the investment budget for envi-

ronmental policy was increased to carry out the programmes and projects.

For this reason, it is very important that the LEAP be converted into the principal driving force of the environmental policy linked to Agenda 21. Problems that require priority need to be selected; there is also the need to encourage the institutions and communities to support the development and implementation of the Bioplan. Following an extensive process of meetings and coordination led by the Institute of Environmental Education and the territorial planning council, the following were defined as LEAP programmes: bio-tourism, bio-transport, popular environmental education, integrated waste management and the action plan of Olivares Bio-***comuna***.[1]

b. Community Environmental Action Plans

As part of the Bioplan, plans were designed for the 11 ***comunas*** into which Manizales is divided. These plans have already been implemented and evaluated. Most show shortcomings in terms of commitment to participation on the part of institutions and residents so that, in future, the communities need to prepare better for the coordination and decision-making phases. Some environmental conflicts also arose which usually revolved around problems of land use, individual economic interests or political group interests. Recently, this has posed difficulties for project implementation and has limited the participation of many community leaders.

VI. EVALUATION AND MONITORING OF THE ENVIRONMENTAL POLICY

a. The Need for Monitoring and Evaluation

AN EFFECTIVE LOCAL environmental action plan in Manizales needs careful and detailed monitoring of conditions and trends. It is also important to monitor programme and project progress and the extent of citizen involvement in all aspects of the plan. The monitoring must also allow a constant evaluation of progress and of difficulties in the application of the policies, investments, programmes and projects in accordance with the plan's declared objectives of social equity, economic efficiency, effective research and protection or restoration of the environment. But it must also produce indicators that are useful for, and easily understood by, the population.

b. The Environmental Quality Traffic Lights

As will be described in more detail later in this section, a great range of data are collected on social conditions, the economy and the environment, and these form the basis for monitoring conditions and trends. Most are available for each of the territorial units for the city (the 11 ***comunas***) and for the wider municipality (***corregimientos***) at least annually. Many are available each

1. The October 1999 issue of ***Environment and Urbanization*** will form the second volume on "Sustainable Cities Revisited" and will include a paper on the development of a local environmental action plan (LEAP) in Olivares, one of the 11 ***comunas*** into which the urban area of Manizales is divided. Olivares is one of the poorest and most environmentally deteriorated areas of the city and the plan developed there serves as a model for encouraging similar local action plans with strong commitments to participation and to combining social, economic and environmental goals.

Table 1: The Environmental Traffic Lights; how each *Comuna* scored for Composite Indicator of Environmental Quality

	The different *comunas* into which Manizales is divided										
COMPOSITE INDICATORS	1	2	3	4	5	6	7	8	9	10	11
Social well-being (including indicators of health, education, social security and income)	G	R	Y	Y	R	Y	Y	G	Y	Y	Y
Quality and accessibility of public services (based on provision for piped water, sanitation, electricity, gas, public telephones)	G	Y	G	G	Y	G	G	G	Y	Y	G
Housing quality (based on quality of construction, density and provision of community services)	G	R	Y	G	Y	Y	Y	G	Y	Y	Y
Healthy environment (based on air and water quality and extent of noise and pollution)	G	Y	G	G	Y	Y	Y	G	G	Y	G
Possibility of enjoying public space (based on, among other things, access to parks and ecological reserves)	G	R	R	Y	R	Y	G	G	Y	Y	Y
Aesthetic and symbolic value of landscape (related to richness and variety of natural and built environment)	G	R	Y	Y	Y	Y	Y	Y	Y	Y	Y
Physical security of the area (based on level of risk from earthquakes, eruptions, landslides and floods)	Y	R	Y	Y	R	Y	Y	Y	Y	Y	Y
Citizen security (based on frequency of assaults, murders, traffic accidents, vandalism of public space)	Y	R	Y	Y	Y	Y	Y	Y	Y	Y	Y
Quality and efficiency of transport	G	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Citizen participation in environmental issues (related to extent of participation in different projects and programmes)	R	G	Y	G	G	Y	G	G	Y	Y	R
SUMMARY	Y	R	Y	Y	Y	Y	Y	Y	Y	Y	Y
SCORE	4912	2900	4241	5035	4095	4781	4834	5433	4348	4177	4290
R — red which indicates problems; Y — yellow which gives a warning of possible problems; G — green which indicates good quality											

month or every three months. Based on this data, ten composite indicators have been developed reflecting overall environmental quality – see Table 1. For each of these, scores have been derived which fall into one of three categories:

- red which indicates problems;
- yellow which gives a warning of possible problems;
- green which indicates good quality.

As Table 1 shows, this allows a visual representation of where environmental problems are concentrated in terms of sector and in terms of area within the city. Table 1 shows the scores for the 11 ***comunas*** into which the urban area of Manizales is divided.

Since the completion of the Manizales municipal environmental profile in 1994, environmental quality traffic lights scoring has been applied as a manually operated monitoring system. Its methodological advantages have proved themselves over the course of four years as it has proved possible to monitor the ten environmental quality indicators listed in Table 1.

Many communities have helped to gather the data needed for this monitoring with help from the university. The simple methodology has also allowed communities to apply and interpret the system directly and to use the system to help define their community environmental agendas.

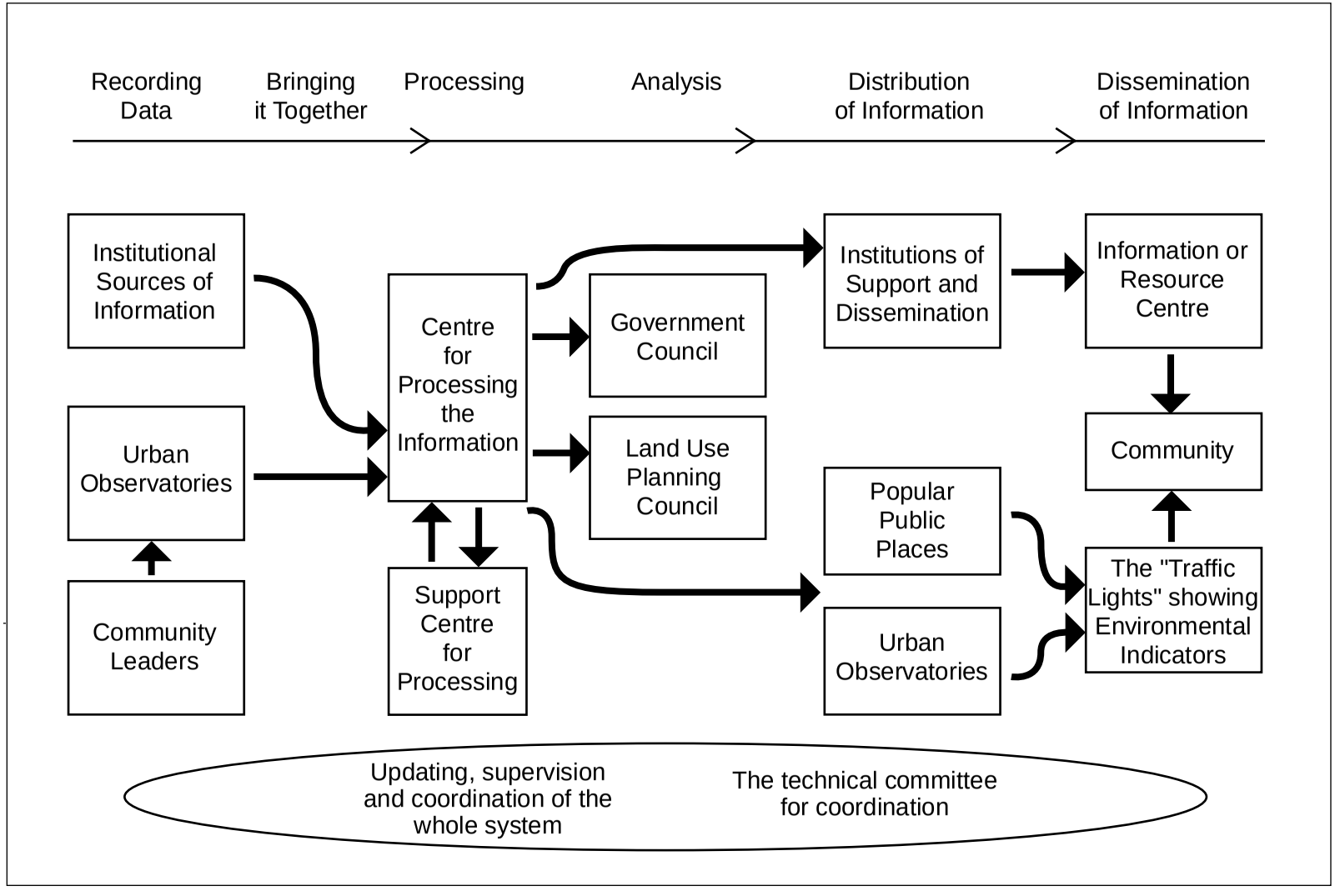
However, at present, there are still difficulties in covering the whole territory and in processing, verifying and analyzing the data. Systematization of the results is very slow and the information is not distributed regularly to the institutions and communities. Problems have also arisen in relation to the municipal office which collates, centralizes and distributes the information, as well as the commitment of the institutions supporting the process due to the magnitude of the human resources required during the evaluation of the results. As a result, IDEA and the Autonomous University of Manizales, using the environmental quality traffic lights methodology, technical advances in information technology and geo-referenced information, with technical support from the United Nations' ECLA and financial assistance from the Italian government, designed a system of urban environmental observatories for Manizales. The first stage of this will be implemented in 1998 with technical and financial support from Colombia's Ministry of the Environment.

c. The Urban Environmental Observatories

It is important to describe some of the main features of this system of observatories because it brings together much of the technical, economic and managerial effort which has succeeded in making popular participation in sustainable development a priority in Manizales today.

The urban observatories are the physical locations where the community has access to environmental information. They are also the places where the programmes of environmental education for the implementation of the LEAP-Bioplan unfold and where the community is encouraged to improve the environ-

Figure 1: The System in Manizales to Monitor, Follow up and Manage the Implementation of the Development Plan



mental quality indicators. For this reason, their operational budget includes the resources necessary to develop activities which complement the planning process.

Figure 1 illustrates the role of the urban environmental observatories as intermediaries and information sources, linking the community and the municipal administration. They serve both as key points for collecting data and for analyzing and disseminating it.

It is around the action plan of these sites that the joint work for carrying out the programmes and projects are to be formulated and promoted. The observatories need not be separate from existing community meeting places. In each community, existing facilities were evaluated and the most suitable site was chosen, thus reducing running costs.

i. The Operation of the System: To help run the system, agreements were reached and an accord signed between the municipality, IDEA and the Ministry of the Environment. The system is part of the Bank for Programmes and Projects with Municipal Investment (BPIM) which will be responsible for supervising LEAP investments. At the BPIM, the technical and financial viability of the Bioplan's projects will be evaluated. These projects should be able to solve environmental problems and also draw on local resources in order to reduce costs and implementation time. The municipal budget provides 80 per cent of the financing and they can receive co-financing from regional or national governmental bodies.

ii. Technical Training of the Communities: In each ***comuna***, people were called together to facilitate broad participation by the various working groups, cooperative residents' associations and community leaders. This led to the selection of individuals to receive technical training, leading in turn to subsequent selection of the operators and coordinators of the observatories.

iii. The Indicators for Monitoring the Environmental Action Plan – Bioplan: Following a careful bibliographic review of recent experiences with environmental management indicators, the components, factors, variables and indicators of the environmental quality traffic lights system were agreed, taking into account which were feasible in the municipality of Manizales. Thus, the most relevant and feasible indicators for implementing the system of environmental observatories took shape. A relatively simple way of classifying the factors into groups and, in turn, the groups into variables and sub-variables was chosen because of the desire for the procedure to be comprehensible to all – not only to experts. For Manizales, the system is made up of three components: the social component, the economic component and the environmental component. These are summarized briefly below – with Tables 2 and 3 giving more details of the indicators used for monitoring social and environmental conditions and trends.

Table 2: Examples of the Indicators used in Monitoring Social Conditions in Manizales

A. WELFARE

Sector	Indicators	Area for which available	Frequency
Education	Percentage of population who are literate	*Comuna* and municipality	Annual
	Staff to student ratio		Annual
	Percentage of school age children not at school for: preschool; primary school; and secondary school	*Comuna* and municipality	Annual
	Percentage of students not attending: preschool; primary school; and secondary school	*Comuna* and municipality	Annual
Health	Morbidity	Municipality	Monthly
	General mortality rate		Monthly
	Maternal mortality rate		Annual
	Perinatal mortality rate		Annual
	Infant mortality rate Monthly		Annual
	Life expectancy at birth	Municipality	Annual
Social security	Proportion of population covered by social and family security	*Comuna* and municipality	Annual
	Number of persons by subsidized health care services		
Citizen security	Number of murders per month	*Comuna* and municipality	Quarterly
	Number of traffic accidents relative to number of automobiles		
	Number of traffic accidents per month		
	Number of assaults and homicides in public space per 10,000 persons		
	Number of murders per month		
Recreation and culture	Percentage green area	*Comuna* and municipality	Six-monthly
	Number of inhabitants in relation to the number of cultural buildings		

NB. This list is to illustrate some of the social indicators collected or calculated; it is not a complete list and does not include the many economic indicators also collected.

B. EQUITY

Sector	Indicator	Area for which available	Frequency
Housing	Percentage of housing	*Comuna* and municipality	Every three years
	— that is overcrowded		
	— with good quality construction		
	— with piped water, sewers, gas, electricity		
	— in areas served with public telephones		
Income	Dependency ratio	For low-income *comuna*	Six-monthly
Urban poverty	Level of SISBEN (municipal indicators of poverty)	Municipality and for poorer *comuna*	Annual
	Proportion of population with unsatisfied basic needs		
	Proportion of population below poverty line		
	Proportion of population in each socio — economic stratum		
	Income per nuclear family for the vulnerable population		
	Social composition; diversity of social strata		

C. ORGANIZATION FOR CITIZEN PARTICIPATION

Sector	Indicator	Area for which available	Frequency
Participation in politics	In relation to the population of voting age	*Comuna* and municipality	Whenever elections take place
	— number of active political groups		
	— number of people who vote		
Community participation	Number of active community representatives	*Comuna* and municipality	Annual
	Number of community organizations		Annual
	Number of projects presented by the community to the BPIM		Annual
	Number of projects executed by the community		Annual
Governmental	Number of public projects	Municipality	Annual
	Percentage of municipal budget for inter-institutional cooperation		
	Number of international agreements		
NGOs	Percentage of municipal budget going to projects executed by NGOs	Municipality	Annual
Private sector	Percentage of municipal budget for projects and programmes executed by the private sector	Municipality	Annual

iv. The Social Component

- **Welfare:** This concentrates on measuring the population's quality of life so it is a decisive factor for interpreting municipal environmental quality. As shown in Table 2, a variety of indicators are available for the quality and coverage of education, health, social security, citizen security, and recreation and culture.

- **Equity:** This is intimately linked to the urban quality offered by the municipality to the lowest-income population. Within each ***comuna,*** and for the whole municipality, the quality of housing is monitored, including the proportion of households with basic services, as is the proportion of the population that is below the poverty line or which has unsatisfied basic needs.

- **Organization for citizen participation:** Improving the population's quality of life depends, to a considerable degree, on this factor. It is necessary to evaluate the degree of genuine popular participation in management processes and the options for such participation offered by the municipality. As shown in Table 2, a variety of indicators are used to monitor the level of participation in politics, community action and public programmes, and the extent of NGO and private sector involvement.

- **Investment:** Here, the interest lies in evaluating and measuring the implementation of programmes and projects in the municipality which improve the population's quality of life. Among the variables to be taken into account are investment in infrastructure for community services, investment in education for participation, and investment in improving dwellings and their surroundings.

v. The Economic Component

- **Efficiency:** Various indicators are used to measure and monitor the proportion of regional and national production that the municipality contributes; the main sources of funds for the municipality including local, national and international sources; the management of the debt; and administrative efficiency.

- **Production:** Various indicators are used to monitor the scale and nature of economic activity and of the labour force within the municipality.

- **Investment:** Here, the main interests are in monitoring the number of projects started and completed by BPIM; the efficiency of tax collection; the proportion of the municipal budget destined for technical assistance to the productive sector; and the level of investment within the municipality.

vi. The Environmental Component

- **Natural resources:** As Table 3 shows, a variety of indicators

Table 3: Examples of the Indicators used in Monitoring Environmental Conditions in Manizales

A. NATURAL RESOURCES

Sector	Indicators	Area for which available	Frequency
Air, water, soil, flora and fauna	Volume of water extracted by sector	Municipality and the wider region; some data also available at the level of the *comuna*	Monthly
	Water quality		Monthly
	Proportion of total potential of the river basin/catchment area used		Annual
	Proportion of area deforested		Quarterly
	Proportion of protected watershed areas reforested		
	Proportion of land covered with primary and secondary forest		
	Relative importance of vehicles, commerce and industry in air pollution		
	Percentage of land area: — subject to erosion — with potential for agriculture — unstable geologically — protected from development		Annual
Physical security	Number of registered events in attending to and preventing disasters (broken down by income group)	Municipality and *comuna*	Annual
	Proportion of housing: — with earthquake resistant construction — in zones of high risk		
	Proportion of municipal budget allocated to research on disaster prevention		
	Proportion of municipal budget going to improvement of degraded areas		

B. ENERGY EFFICIENCY

Sector	Indicators	Area for which available	Frequency
Clean production	Percentage of industries using clean technologies	Municipality	Annual
	Percentage of industries using alternative energy		Annual
Efficient production	Percentage of plant wastes recycled	Municipality	Monthly
	Percentage of industries internalizing their environmental costs		Annual
Energy consumption	Total energy consumption by sector	Region and municipality	Monthly
	Total energy consumption relative to municipal GDP		
Urban system Transport	Number of industries who are re-using or recycling	Municipality	Annual
	Average velocity of road traffic	Municipality and some *comunas*	Monthly
	Number of vehicles relative to road length		Annual
	State and type of road paving		Six-monthly
	Percentage of vehicles that are for public transport		Annual
	Number of passenger-km travelled per km of road		Annual
	Indices of accidents		Monthly

C. CLEANING UP

Sector	Indicators	Area for which available	Frequency
Particular impacts	Percentage of population affected by water-related disease (by social group)	Municipality	Monthly
	Percentage of households without treated water		Annual
	Proportion of water bodies contaminated		Monthly
	Percentage of population suffering respiratory diseases		Annual
	Concentration of different polluting gases at certain critical points		Annual
	Noise levels		Annual
	Population relocated from areas of high risk		Annual

D. INVESTMENT

Sector	Indicators	Area for which available	Frequency
Infrastructure	Percentage of municipal budget for infrastructure investment	Municipality	Annual
	Percentage of investment for managing and treating water		Annual
	Percentage of investment on research on biodiversity		Annual
	Percentage of public and private investment in control of contamination		Annual
	Municipal budget for funds for local emergencies		Annual
	Scale of construction of basic infrastructure		Annual
Environmental education	Number of programmes for environmental education within higher education	Municipality	Annual

are available to monitor the quality and use of water, soil and air.

- **Physical security of the surroundings:** Including the levels of risk arising from floods, landslides, avalanches, forest fires, and geological and seismic risks,.

- **Energy efficiency:** Here, the interest lies in monitoring the proportion of industries using clean production methods and alternative energies; the extent of recycling; the efficiency with which energy is being used; and the performance of the transport sector.

- **Cleaning up:** Here, the interest lies in monitoring the extent of particular environmental hazards such as the percentage of the population affected by water related diseases or by respiratory diseases (see Table 3 for more details).

- **Investment:** This includes investment in environmental education and investment in infrastructure (see Table 3).

vii. Developing the System's Computerized Logical Support (software): This involves writing computer programmes to support the processes of recording and processing the data and of distributing the information produced by the system. It includes tests of the software's reliability and consistency and the production of complete documentation (user's manual, administrator's manual, and maintenance and updating manual).

viii. Data-processing: This includes all the activities of grouping, arranging and performing calculations on the data in order to obtain all the indicators showing the state of the environment in the municipality and in particular the impact of the actions considered in the LEAP. These indicators are produced in detailed form for each ***comuna*** as well as for each evaluation factor aggregated at the level of the whole municipality. As a result of this process, it is possible to make changes in the indicators. Similarly, a relationship is to be established of projects and investments associated with improvements in each indicator, comparing the positive or negative variations achieved by the investment.

ix. Continuous Assessment: All the indicators determining environmental quality and the achievements of the LEAP are to be assessed by the technical committee, the council of municipal government and the territorial planning council. Once values for the indicators have been obtained for a set period, they need to be analyzed by the municipal government with the aim of evaluating the advances achieved and seeking explanations for the setbacks. This should allow corresponding decisions to be taken to promote the desired goals. In order for the mayor and his group of immediate collaborators to make a complete analysis of the results, they need to have available all the indicators calculated and to have at their disposal their variation

over time; also, the indicators applicable to the ***comunas*** or the territorial unit, as a point of reference. The system will supply this information, with the values corresponding to investments in the BPIM's projects and programmes.

x. Socialization and Dissemination of the Information to the Residents: To achieve effective dissemination of environmental information, the mass media (press, radio and television) will be used, supported by the production and distribution of printed leaflets and direct interaction with the community through activities coordinated by the secretariat of community development and the university. An intense campaign of information dissemination regarding the system is to be carried out, telling people about the system's goals, its manner of operation, the function of the urban observatories and, above all, about the role which the community is to play in the system's operative structure. The most suitable locations for the dissemination of information about the system's results are, in the first instance, the urban environmental observatories which will assume responsibility for the continuous promotion of training and actions to address social, economic and environmental problems in the communities corresponding to their respective areas of influence. Other information dissemination sites are busy public places such as the airport, the transport terminal, Bolívar Square and the commercial centres, among others, where it would be appropriate to have effective means of communicating the state of the indicators – for example with an electronic panel displaying the environmental quality traffic lights.

xi. The Environmental Bulletin: To help disseminate the results in the urban observatories and public places, it would be useful to produce periodically a bulletin containing the most important indicators, together with explanatory notes and commentaries in order to motivate action. The bulletins should be oriented towards producing greater popular awareness of the need to improve certain aspects of the city and the importance for this of popular participation. It would also be useful to employ the mass media such as radio, the press and television to disseminate results and to educate citizens to interpret these and to assume responsibility vis-à-vis the variations.

The establishment of the system of environmental observatories for monitoring and evaluating the LEAP-Bioplan aims to facilitate decision-making and provide a continuous evaluation of the indicators making up social, economic and environmental components. For the construction and activation of the system, various technological alternatives were considered and their respective set-up and running costs compared. As a result of analyzing and comparing them, it was possible to select the one offering the greatest possibility for the integration of inter-institutional management and for socialization among the population.

The local environmental action plan for Olivares commune in Manizales, Colombia

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SUMMARY: This paper describes the development of a local environmental action plan in Olivares, one of the poorest areas in the city of Manizales. It discusses both the successes and the difficulties in developing an environmental plan in a low-income area that fully involves community organizations – especially when many projects in the past had failed. It also describes the long process whereby different stakeholders were brought together to reach consensus on priorities and whereby priority items received support from the municipal government. The paper also discusses the different stages of the plan and highlights the degree of commitment by the local government, institutions, universities, the private sector, NGOs and community associations in the development and joint management of various programmes and projects.

I. INTRODUCTION

A STUDY BY the Colombian statistics office in 1996 found that 47.9 per cent of households in Colombia's 23 provincial capitals were living in poverty.(1) The study also showed that Manizales had one of the lowest proportions of people living in poverty and one of the least skewed income distributions. However, the municipality's effectiveness in putting into practice the goals of sustainable development will depend to a large extent on the way it confronts the current problems generated by rising poverty, a result of the severe economic recession affecting Colombia, especially the coffee-growing region where Manizales is located.

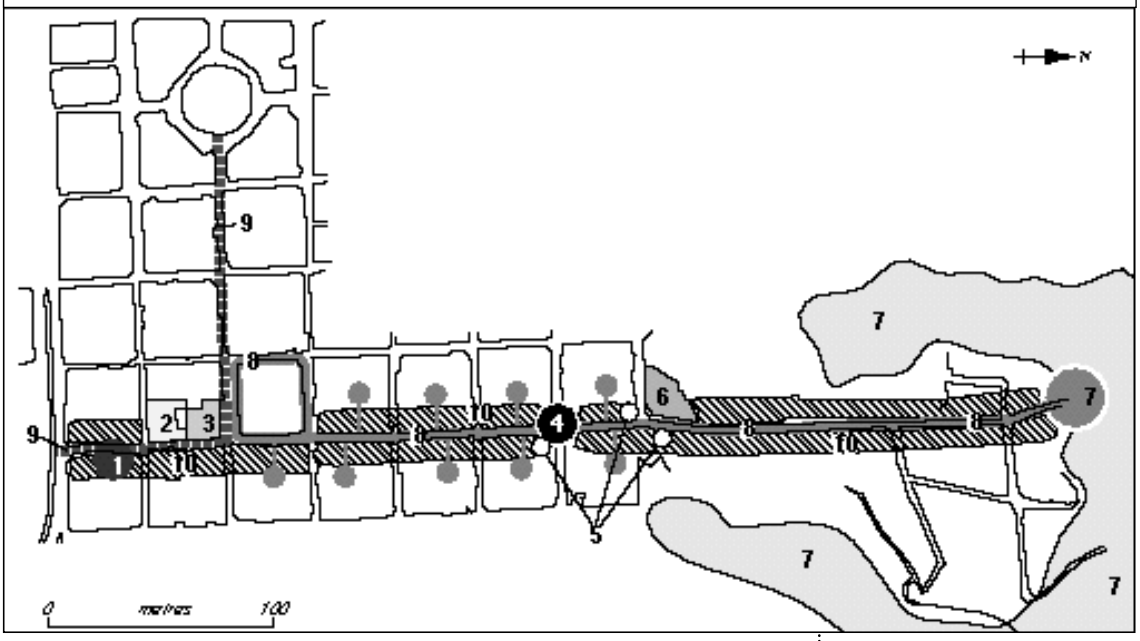
According to another recent study(2), 115,428 people in Manizales, representing 36 per cent of the municipality's total population, may be regarded as being vulnerable because of their poverty levels. A paper published in *Environment and Urbanization* last year(3) described how the local authority had managed to address many environmental problems – including increasing the availability of open space and recreational facilities to the poorest population, improving their housing conditions, enhancing the physical stability of individual buildings on vulnerable terrain and relocating those living on particularly dangerous sites. But the current economic recession has reduced the capacity of the local authorities to continue this work. According to a 1997 survey,(4) the main social problems which result from poverty in Manizales are the high levels of overcrowding that affect 65 per cent of the poorest population, limited access to training in poor communities, the low educational levels

1. The study, by the Departamento Administrativo Nacional de Estadísticas (DANE), was based on the 1994-1995 National Survey of Incomes and Expenditures and the National Housing Survey of 1996. To measure income distribution, the study used the Gini coefficient. The value of the coefficient was 0.32 for Manizales compared to 0.47 for the country as a whole.

2. CRECE (1998), *Estudio de competividad del departamento de Caldas*, Centro de Estudios Empresariales Cafeteros, Manizales.

3. Velásquez, Luz Stella (1998), "Agenda 21: a form of joint environmental management in Manizales, Colombia",

Figure 1: Examples of projects being implemented along Calle 27 (Street 27) in Olivares



Project 1: House for citizen's environmental education centre. This is a city-wide project where the main environmental education programmes are being developed.
Project 2: House of culture. Renovation of a building representing the local architectural heritage to be used for a range of community cultural activities.
Project 3: Museum of religious art.
Project 4: Improved traffic intersection.
Project 5: Urban balconies. Public space, park for recreation and the visual enjoyment of the landscape.
Project 6: Community house and youth club. Physical renovation of a school to be used as a meeting place by the young.
Project 7: Vegetation research centre. Nursery used for research and for providing seedlings of native species of trees for use in construction.
Projects 8 and 9: Street park and commercial streets. The main promenade used for social encounters by the local inhabitants. Serves the dual purpose of recreation and commerce.
Project 10: Renovation of buildings. Renovation, reconstruction and change of function of existing buildings to make better use of them for housing and commerce.

for men and women heads of households, and unstable sources of income such as trade, on which 31.8 per cent of the poorest population within the municipality rely. There is also great concern about the rapid increase in unemployment; by mid-1999, the unemployment rate in Manizales had reached 20.6 per cent of the labour force, above the national average of 19.3 per cent.

The local authority, trade associations and other local institutions have increasingly sought to respond to worsening social conditions, reactivate the city's economy and give priority attention to programmes and projects to reduce urban and rural poverty. It is in this context that a pilot local environmental action plan (LEAP) for one of the poorest areas in Manizales, the *bio-comuna* of Olivares, was earmarked as one of the current municipal development plan's priority actions.(5)

Despite the difficulties described below in getting this LEAP off the ground, the pilot plan has already produced positive results. One of its more important achievements has been a genuine sharing of the practice of environmental management within a sustainable development framework among the private sector, NGOs, universities and community organizations. Through a range of programmes and projects, it has helped bring about improvements in quality of life in one of poorest sectors of the city.

Environment and Urbanization Vol.10, No.2, pages 9-36.

4. SISBEN (1997), *Encuesta para el sistema municipal de información a beneficiarios*, Bogotá. SISBEN is a means-tested national government welfare system of subsidies administered by local authorities.

5. Communes (or *comunas* in the Spanish original) are geographical sub-divisions within a municipality. In the case of Manizales, the population of a commune ranges between 30,000 and 50,000 inhabitants.

II. BACKGROUND

IN 1992, SOME lecturers and students at the National University in Manizales initiated a programme of community training for the environmental management of Olivares, as part of an undergraduate architecture course on the urban environment. The aim was to encourage community participation in the design of projects for the recuperation of public spaces, parks and recreational facilities in the commune.

Further work by course participants led to a first environmental diagnosis of Olivares in 1993, which highlighted the main problems and outlined the opportunities for action within a sustainable development framework. This diagnosis was presented to the local authority who used it as the basis for a comprehensive plan for coordinating the inputs of different local institutions. This sought to improve sanitation, recuperate public space, undertake stabilization works on the steep slopes where the commune lies and relocate households whose homes were on land at high risk of landslide. This led to a first project by the municipal government through its community development secretariat. However, despite attempts at creating the first community environmental committee with the participation of local government institutions, the top-down welfarist spirit behind this first approach limited its legitimacy among the local population. As a consequence, the project was only partially carried out. Eventually, the project had to be reformulated to give greater autonomy and leadership to the community.

By 1994, the direct and permanent contact that the university had established with the community through training programmes facilitated the university's role as an institutional coordinator for future projects. Initially, as a result of the partial failure of the first project, community organizations were wary of allowing municipal officials to become involved directly in the management of future projects. Gradually, through a constant dialogue between the municipality and the local administrative board, [6] some of the credibility that the municipality had lost in the eyes of the community was regained. At that point, the municipality provided support for an environmental profile of the commune.

This profile was to provide details of environmental conditions in each of the commune's neighbourhoods. The initial research effort provided the methodology for a system of "environmental quality traffic lights" for the city through which progress on improving the environment was measured and made public.[7] It also allowed a consolidation of urban environmental research groups to provide support for environmental management in the commune. In the same year, the municipal government, with support from the national government, commissioned the university-based urban environmental research group (GEA-UR) to prepare a municipal environmental profile using the methodology applied in Olivares.

By 1995, the results of the research for the Manizales environmental profile were used as a basis for developing the policies, programmes and projects of the Manizales environmental plan (bioplan). They also provided the basis for local environmental action plans as part of a Local Agenda 21 process for which Olivares was chosen as a site for a pilot project. There were still difficulties in implementing a style of shared management. By then, the project had gained national visibility and many local stakeholders wanted to lead it. Local political groups sought to appropriate it for their own political benefit. But the independence of the founding group and regular joint performance assessments by the univer-

6. Local administrative boards (JALs is the Spanish acronym) are elected bodies which monitor the delivery of public services and represent the interests of commune residents on the boards of utility agencies.

7. For more information on the "environmental quality traffic lights" methodology, see reference 3.

sity, the NGOs and the community were instrumental in ensuring the unity of the steering group. This also helped greatly in ensuring continuity for the local plan from one elected local government to the next.[8]

Olivares's environmental action plan has been in place since 1996 and has served as a model for LEAPs in other communes in Manizales. There has been a constant process of reflection concerning the plan's effectiveness, involving assessments of the methodology used, examining shortcomings in ensuring wider coverage of the projects and putting in place monitoring systems. But the most significant achievement is the involvement of a growing number of institutions in the process, including the private sector and trade associations, in its various programmes and projects. This has ensured greater local, national and even some international support for the plan. Community training still plays a crucial role in the process. In recent years, training has increasingly focused on environmental management to support community based enterprises providing environmental services (such as waste collection and disposal, tree-pruning, local road maintenance and so on) both in the commune and in other parts of the city.

III. THE ENVIRONMENT OF OLIVARES COMMUNE

OLIVARES IS LOCATED on the slopes of the northern hillsides of Manizales.[9] It has a built-up area of 102 hectares and 76 hectares of protected green area. The steep hillsides are prone to frequent landslides. Some 122 households live in areas of moderate or high environmental risk and 16 of the commune's 23 neighbourhoods are geologically unstable. This is why they are given priority attention in the disaster prevention policy of the municipal development plan. This involves programmes for upgrading housing, relocating selected households from high risk areas and soil stabilization works.

Olivares has 33,000 inhabitants, representing 8.2 per cent of Manizales's population. The labour force in Olivares has above average levels of unemployment, under-employment and temporary employment. Many of its inhabitants find work in the local fruit and vegetable wholesale market (known as Galería Plaza de Mercado), the local sanitary landfill and the recycling plant (run by the NGO Ciudad Verde). Some 63 per cent of the working population earns below the current legal minimum wage which, in Colombia today, stands at US$ 120 per month.

Olivares is within the area of influence of the city's historic centre. This central location, seemingly privileged, has been an object of discussion concerning its future urban and environmental planning. While some projects suggest upgrading to avoid population displacement,[10] other projects advocate urban renewal as a way of raising the value of the centrally located area.[11] Unfortunately, efforts to improve the quality of service provided by local traders are still recent, so there is not much hope that they will attract a wider consumer population. On the other hand, the number of informal sellers on the streets has increased as a result of growing unemployment. This has also made the area less safe for shoppers, while much of the architectural heritage has been lost through the deterioration of buildings, thus reducing the market value of the commune.

Olivares was shown in the environmental profile for Manizales as having the lowest levels of environmental quality in the city. Its problems can be summarized as it follows:

8. The Manizales Urban Development Plan (Bio-Manizales) has provided the development guidelines for four consecutive elected local governments. This is unusual in a political context where elected governments often seek to distance themselves from their predecessors' work. The plan is regularly monitored and updated, with the involvement of local institutions including the universities.

9. For a more complete description of the environment in and around Manizales, see Velásquez (1998) in reference 6; also Velasquez, Luz Stella and Margarita Pacheco (1999), "Research management as an approach to solving environmental conflicts in metropolitan areas: a case study of the Manizales-Villamaría conurbation, Colombia" in Atkinson, A., J. Dávila, E. Fernandes and M. Mattingly (editors), *The Challenge of Environmental Management in Urban Areas*, Ashgate, UK, pages 275-286; and Corubolo, E. (1999), "Peri-urban profile of Manizales" prepared for the Strategic Environmental Planning and Management of the Peri-urban Interface research project, Development Planning Unit, University College London (this paper can be downloaded at no cost from: http://www.ucl.ac.uk/dpu/pui).

10. A research project where the author was involved proposed a series of programmes and infrastructure projects to upgrade the area of the commune. This included preserving present land uses, upgrading individual dwellings and their environment, renovating old buildings for change of use, locating services there which serve the whole city, attracting investment and generating employment, urban agriculture in common land, and an environmental education centre. See Arias, Gerardo and Luz Stella Velázquez (1995), *"El barrio como unidad de desarrollo sostenible de la biocomuna Olivares", Premio Corona Pro Arquitectura 1995*, Universidad Nacional de Colombia-Fundación Corona, Bogotá.

11. Municipality of Manizales

(1997), "Propuesta de renovación urbana del sector de las Galerías", Municipal Planning Secretariat (mimeo).

- environmental risks of landslides on the steep hillsides;
- high crime rates;
- lack of public space and recreational facilities. With an average of 2.2 square metres of green area and public space per inhabitant, it is much lower than the 6.3 square metre average in Manizales as a whole;
- deterioration of the urban and architectural heritage. Sixty-three per cent of buildings classified as having some architectural value have high levels of deterioration. There are, on average, 1.3 households per dwelling, which points to high levels of overcrowding.

However, the environmental profile also identified some environmental opportunities:

- the beauty of the natural landscape;
- the existence of 76 hectares of protected green areas incorporated into the city's bioplan as green areas of environmental protection, and its ecological potential in terms of both its flora and its fauna;
- the urban and architectural heritage;
- a central location within the city with access to most major urban services;
- good coverage (98 per cent) by public utilities such as water, electricity, telephone, waste collection and sewage;
- good coverage by trading facilities in the whole commune;
- active community participation involving settlers' associations, community groups, cooperatives, civic groups and other community based enterprises; these have developed from the needs of the local community.

IV. DIFFICULTIES OF THE PLANNING PROCESS IN OLIVARES COMMUNE

WITHOUT THE COMMITMENT of Olivares's community organizations, it would not have been possible to prepare and carry out the projects contained in the environmental plan. By the time the environmental profile was prepared, it became clear that the commune's main potential was its community's organizational capacity. However, because many institutions had tried to implement initiatives locally, which had rarely become concrete programmes or projects, it was very difficult to get community commitment for a wider programme of action for the commune. The main difficulties encountered can be summarized in the following questions that the community asked about the plan.

a. The Environmental Action Plan in Olivares Commune: Yet Another Project?

Many of the programmes and projects contained in the municipal development plan are never put into practice. In the case of Olivares, the municipal government had given high priority to infrastructure projects; however, these were generally the result of political interests rather than a response to the real needs of the community. Work would often start just before elections. In some cases, operating expenses were not included in the budget so they offered a poor quality service or the service stopped due to a lack of funds. Similar problems dogged short-term programmes of local institutions. In Olivares, the number of programmes came to surpass the organizational capacity of the community. For example, in terms of social welfare provision, between 1993 and 1995 there were 17 social welfare organizations in operation, 78 programmes were launched,

of which only 16 eventually survived, and the community was called on to attend 364 meetings.

b. What Political Group is Leading the Project?

A survey of public opinion for the commune's environmental profile showed that 63 per cent of those surveyed believed that participation in the commune was in response to political clientelism and 72 per cent thought that their leaders did not represent them but represented political groups. This meant that the possibility of uniting different interests around a common process was remote and, for 41 per cent of the respondents, the success of any common project depended on whether the political group that led it was in power.

c. Has the Commune Again Become a University Research Laboratory?

Community associations were very critical of the role played by university groups in the commune. Inhabitants complained in the meetings that their private lives were under scrutiny and that the information they supplied was only useful for the university's theoretical undertakings and to undergraduates who were preparing their final dissertations. They never found out what use was given to the programmes or projects developed by academics during their field trips and the reports never found their way to the local libraries. They therefore demanded that formal agreements be signed and that they be made active participants in any future research.(12)

12. Inhabitants' irritation can be gleaned from a sign that hangs above the entrance of one of Olivares' modest houses: "Surveys answered after lunchtime for 5,000 pesos" (US$ 2.50).

d. Is This a Simple Plan or Does It Involve Attending Many Lectures?

The main challenge for the research group was explaining the environmental action plan using simple language. For this reason, the "environmental quality traffic lights" methodology prepared by the community in 1994 was updated for each of the commune's neighbourhoods, with a public display of information on each one's trends and conditions. Local inhabitants could find up to date information on the environmental situation of the commune and on the plan's progress in public places and in local churches. Meetings were used to answer questions and explore possible responses to specific problems. The programmes and projects contained in the plan are the result of a process of priority-setting. To summarize , the process of preparing the local environmental action plan involved a sequence of actions: environmental profile, priority-setting and, finally, the plan.

V. COMMENTS ON THE METHODOLOGY

BECAUSE OF THE particular social and environmental problems of the commune, it was very important for the local government and for the institutions supporting the process to devise more stable, comprehensible and flexible mechanisms of communication and agreement with the community. This led to the design of a number of phases for the environmental action plan for Olivares for the period 1997-2000.

a. First Phase: Induction

This phase saw the launch of a programme called "Environmental participation is a citizen's right". The aim was to raise awareness about the importance of the environmental action plan. The induction phase stressed the objectives of international, national and municipal environmental policies. It also informed participants about the mechanisms for participation included in the recent process of municipal decentralization, Colombia's new political constitution of 1991, the 1993 Environmental Act, as well as the spirit behind greater democratic environmental participation contained in Agenda 21, the document coming out of the UN Conference on Environment and Development (the Earth Summit) in 1992. Training workshops were organized by the university and the municipality's Community Development Office. Workshops involved active participation by the local and regional environmental authorities, the environmental representative on the regional planning council, commune representatives to the community action boards[13] and the local administrative boards[14], grassroots environmental organizations, the Committee for Environmental Education, municipal environmental officials, "community mothers",[15] recyclers' organizations and the university based urban environmental research group. The university, participating NGOs and the local government jointly covered costs. This phase saw the creation of an environmental committee for Olivares commune, charged with promoting and guiding the environmental action plan and made up of members of the local community and representatives of the main institutions involved in the plan.

13. Community action boards were set up in the late 1950s in Colombia to promote self-help community action around the supply of basic infrastructure such as water, sanitation and roads at the neighbourhood level.

14. See reference 6.

15. The successful "Community Mothers" programme, launched by the Colombian government in the early 1980s, allows working mothers to leave their children in the care of a local "community mother" who receives a stipend for caring for them outside school hours.

b. Second Phase: Dissemination of the Plan

In this phase, the aims of the LEAP were widely disseminated while securing the firm commitment of institutions involved in the preparation and execution of the plan. The commune's environmental committee took a leading role in this. There was widespread participation in the various meetings involved, including most of those who had attended the first phase workshops, plus church representatives. Resources for this phase were provided by the university, the local government and Fundación Social, one of the largest and most active private foundations involved in community development in Colombia. In this phase, an agreement between the different institutions involved in the plan was secured, while tasks were clearly set out for them and for the local community.

c. Third Phase: Environmental Education and Training for Active Participation in the Plan

One of the main commitments secured in the second phase agreement was the development of a continuous programme of environmental training. The key areas were defined as environmental education of leaders and teachers, and environmental training for local entrepreneurs. This has been an on-going programme and has led to improvements in the community's capacity for environmental management. The programme has been funded by the universities and *Fundación Social*. The environmental training for local entrepreneurs has also been very fruitful, especially for recyclers, "community mothers", local cooperatives, traders and young workers, who now see in the environment an area for their economic and

social development.

The training programme was run in parallel with infrastructure works, slope stabilization, waste-recycling, employment generation and the integrated management of agricultural nurseries. The local branch of the National University, *Fundación Social* and the national government's technical training service (SENA) jointly covered the costs of this phase. This phase also led to the establishment by the National University of the Centre for Environmental Advice for Entrepreneurs in Olivares.

d. Fourth Phase: The Plan in the Creation of a Political Culture

The inhabitants of Olivares and of other poor areas of the city have lost confidence in local political leaders and in government institutions and their activities. To implement the LEAP, it was necessary to create citizens' fora to discuss the potential relevance of the plan to regaining some political leadership. These fora were called by the local administrative board and staff of the National University, and involved the active participation of the local environmental authority, the community action boards, representatives from the municipal council, the regional planning council, the community development secretariat, NGOs and local inhabitants. Funds for this phase came from the local government, the National University and the regional environmental authority (CORPOCALDAS).

e. Fifth Phase: Updating the Commune's Environmental Profile; "Environmental Quality Traffic Lights"

The environmental profile had been prepared in 1994 and the "environmental quality traffic lights" methodology applied since 1995 as a means of evaluating and monitoring environmental programmes and projects. This facilitated a swifter and more participatory updating of the profile. Problems and opportunities were identified and provided the basis for preparing the agenda and for defining the programmes and projects contained in the plan. The local urban environmental studies group updated the profile and participated in the various working groups charged with assessing diagnosis and performance. This also involved municipal environmental officials, representatives from the regional environmental authority and community based organizations in the higher risk areas. Costs were covered by the regional environmental authority, the local government and the National University. This phase led to the establishment of the technical coordination committee for Olivares's environmental action plan.

f. Sixth Phase: Preparing the Commune's Environmental Agenda

The environmental agenda is a vital instrument of the plan, and its development involves a process of negotiation in search of consensus. To achieve this, a series of working groups were charged with agreeing on priorities, examining different scenarios for the implementation of programmes and projects, seeking ways of overcoming plan management problems and committing technical, economic and community resources to its implementation. This involved a range of institutions including the

local government, supporting institutions (such as the universities and NGOs), trade associations, community organizations and local inhabitants. Costs were covered by the regional environmental authority, the local government, and the National and Caldas Universities. The university based urban environmental research group GEA-UR coordinated the working groups and prepared the final draft of the commune's environmental agenda.

g. Seventh Phase: Plan Implementation

The implementation of Olivares's LEAP called not only for the active participation of a range of institutions, trade associations and the community but also of the local government and civil society. This plan was an important political milestone as it demonstrated how the goals of sustainable development enshrined in the municipal development plan (bio-Manizales) could be implemented with active participation from the community. For this reason, it was important that the plan left the somewhat narrow confines of the commune's reality and became the object of wider discussions in citizen fora and in the municipal council. Similarly, there was a need to promote a debate in the lead-up to the formulation of the legal instrument by the municipal council which would ensure the inclusion of the plan's programmes and projects in the municipal budgets.

The regional planning council, an advisory body to the municipality whose role includes providing guidelines in the search for local sustainable development, called for a citizens' environmental forum where the plan was presented to all the citizens. After several debates the municipal council approved the plan.

h. Eighth Phase: Monitoring and Evaluation

For the population of Olivares, the main preoccupations were the effective implementation of programmes and projects contained in the plan and the need to improve the quality of the commune's environment. Their active participation in the plan and in monitoring its implementation was also a priority for many of those involved in the plan. In order to ensure adequate monitoring and evaluation of the plan, a local environmental observatory will be created. This will be one in a network of observatories that are to provide the monitoring system of bio-Manizales (the municipal environmental plan). A prototype of the monitoring system is currently under trial. This has been accompanied by an environmental community training programme to create five of the system's 11 observatories.

i. Ninth Phase: Decisions about Priority Programmes and Projects

Although the plan includes all the programmes and projects to be implemented in the short, medium and long terms, it was necessary that those who are actively involved in its participation set their priorities as to which programmes and projects were to be developed in the period 1997-2000. With this aim in mind, working groups were organized to discuss the different proposals and to ensure the commitment of each of the participants. These groups were organized jointly by community organizations and representatives from the local administrative boards and the commu-

nity action boards. The criteria for deciding on the list of programmes and projects involved assessments about the working capacity, leadership and commitment of each one of the participating institutions. As a result of this process, a number of projects and programmes were included in the list of municipal projects and each was included in the planned municipal budgets. These are described below. In addition to local and regional support in terms of infrastructure, technical and economic resources, some of these have also received national and international support.

- Integrated waste management in the Ciudad Verde recycling plant. The regional recyclers' association, the cooperative for environmental services (BIOSERVICIOS), Manizales chamber of commerce, *Fundación Social* and Manizales University jointly share the management of the project.
- Urban environmental revitalization and "bio-trade" along Calle 27 street. The National University, *Fundación Corona* (a private foundation), the municipal planning secretariat, the Manizales chamber of commerce, and the Olivares environmental committee share the management of this project.
- Environmental management of the productive protected open spaces and creation of agricultural nurseries. The management of this project is shared by the regional environmental authority, the municipal community development secretariat, *Fundación Social*, the cooperative association of Olivares commune and the Olivares “community mothers”.
- Housing upgrading and the change of use of old buildings in Colón and Galerías neighbourhoods. Management of this is shared by the National University, the municipal planning secretariat and local community organizations.
- Relocation of households in areas of high risk and environmental improvement. Management of this is shared by the National and Caldas Universities, the regional environmental authority, and the municipal office for the attention and prevention of disasters.
- Environmental training as support to community processes. Management of this is shared by National, Caldas and Autónoma Universities, the municipal community development secretariat and the Olivares local action board.
- The Olivares environmental observatory, for which management is shared by the National University, the municipal planning secretariat, Autónoma University and the Olivares environmental committee.