

8. VALIDATION

Of the various projects to which CINARA applied the proposals made in this research, this chapter presents the experiences that are the most relevant because of their success and recognition. At present, there are no projects which have failed when the TLP strategy has been used.

8.1. TEAM LEARNING PROJECTS

8.1.1 Improving water quality in Mondomo

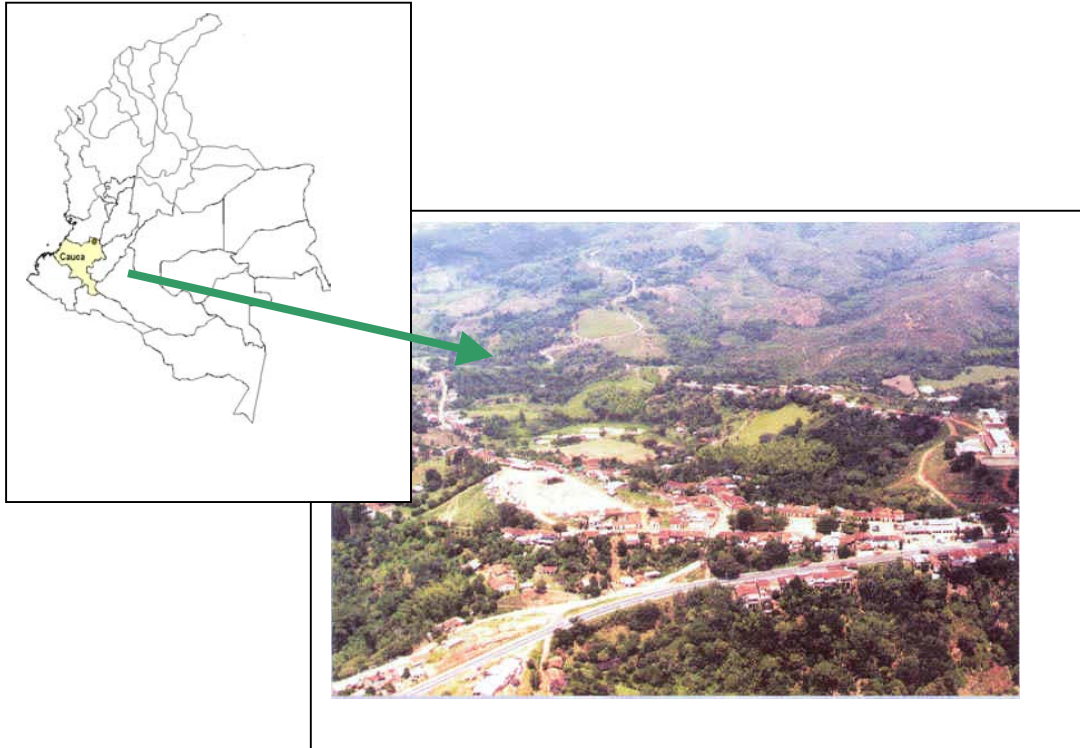
This non-profit organisation wants to deliver a good water service without causing any risk to sustainability.

Luis Velasco, President of ASOMONDOMO

8.1.1.1 *Description*

Mondomo is a concentrated rural settlement of 3,800 inhabitants in the municipality of Santander de Quilichao, in the north of the Cauca Department (Photograph 34). The main economic activities are agriculture and livestock, where *yuca* is the main product. The average family income is US\$ 195 per month. The general area received emergency relief following an earthquake in 1994 but Mondomo did get any of this help. To improve the situation, private enterprises from the north of Cauca Department joined to help the villagers and established a Committee known as the *Comité Empresarial Permanente*. The Comité Empresarial met the community leaders to identify their most urgent needs. Their unanimous answer was an improvement to the water supply, which was almost useless following the earthquake. The Departmental Health Secretary already had a design for a new water system, which had been drawn up years earlier. The community did not have enough money to go ahead with this scheme so the Propal Foundation, who represented the Comité Empresarial, and the community began to look for the necessary resources. When they presented the proposal to FINDETER, this institution evaluated the design and informed them of its many inconsistencies and the inappropriateness of the technology for rural settlements. CINARA, which had worked in the Cauca Department on the TRANSCOL project, was contracted to re-

design the water system and proposed to develop a TLP with the participation of the Propal Foundation, the municipal and departmental institutions and the community.



Photograph 34 **Mondomo (Cauca)**

Source: ASOMONDOMO (1999)

8.1.1.2 *The TLP*

The activities carried out under the TLP are shown in Table 45 and the participants in Table 46. The community had a very long tradition of participation, but the private-sector institutions have never participated in any community projects; they had only financed them. Both national and international organisations participated in the project. A strategic alliance was established between Propal and the Comité Empresarial; Arcila&Gutierrez Ltda, a private construction firm; the Municipality of Santander de Quilichao; Users Association of Mondomo (ASOMONDOMO ESP), the new WS community-based organisation; and UniValle/CINARA. The technical committee met once a week during the first two years, until construction was

complete. During the management service phase, the committee met every two weeks for the following two years, until periodic evaluations showed that the sustainability indicators had stabilised and that the water service was achieving its expected performance.

Table 45 TLP activities in Mondomo

PHASE	ACTIVITY
PLANNING	• Pre-diagnosis
	• Participatory diagnosis
	• Workshop to jointly analyse the results of the diagnosis
DEVELOPMENT	• Establishment of the WS organisation
	• Participatory pre-design
	• Technical design
	• Workshop on tariff definition
	• Census
	• Selection of the private construction firm
	• Technical committees
	• Technical visits
	• Technical studies
	• Training in administration and O&M
	• Workshop with the school community on control of water wastage
	• Study of the water network
	• Establishment of community support groups for community supervision
	• Construction
	• Community supervision of construction
SERVICE MANAGEMENT	• Commissioning
	• Training in O&M for operators and WS organisation
	• Training in monitoring the quality of the service
	• Monitoring
EVALUATION	• Participatory evaluation
OTHERS	• Participation in training courses in administration of water services
	• Participation in the AGUA 98 and AGUA 2000 events
	• Visits to other settlements and projects

Source: CINARA (1998)

Table 46 Participants in the Mondomo TLP

GROUP	PARTICIPANT
Community	Water Committee
	Community leaders
	School community
	Community support groups
	Users
Government	Municipal Authorities
	WSS public enterprise at Santander de Quilichao
	Departmental government
	FINDETER-FIU-European Union Office
NGOs	Nasa Kiwe
	Plan Internacional
Private sector	Propal and the Comité Empresarial (10 private companies)
	Arcila&Gutierrez Ltda
International organisations	UNICEF
Facilitator	CINARA team

Source: CINARA (1998)

The diagnosis showed that:

- The system had several problems even before the earthquake, which had exacerbated those problems,
- The population had grown due to the arrival of displaced people,
- There were over 45% of bad debtors,
- There were conflicts with the people who lived in the supply watershed,
- The infrastructure had deteriorated,
- There was no wastewater system,
- Drinking water was contaminated,
- The water committee functioned almost informally,
- The total number of users was unknown,

- There was water wastage,
- The caretaker had wide experience in operating the system, and
- The community did not know its own water system.

The first activity was the establishment of the water service organisation, following Act 142/94. The users chose the form of the organisation (Photograph 32) and its Board was elected in a General Assembly. The Board was very active and open-minded and was one of the keys to the success of this TLP. The private sector, which was in overall charge of the project and its resources, was honest and committed to every activity. The private sector was the most interested of the parties in continuing monitoring after the construction was completed, and they allocated resources for the monitoring phase. The construction firm that had participated in some of the projects in the TRANSCOL programme joined the alliance to evaluate the design, giving recommendations to facilitate the construction process and community supervision. A MSF treatment plant was selected (Photograph 35). The community selected the site and negotiated the land purchase. The construction was carried out without problems and with full understanding between the construction firm, the community supervision groups and the private controller. Workshops involving the people of Mondomo and the communities located in the watershed were held to resolve the pre-existing conflicts. Training was given to the users, the caretaker and the Board of ASOMONDOMO. A monitoring system was established based on the proposals presented in this research. Based on the results of this monitoring, the General Assembly of Users decided to carry out micro-measurements. The tools developed in the TLPs in Cali were used to train women in repairing household plumbing fixtures, leaks from which was the main cause of water wastage.

8.1.1.3 Results

This TLP was selected as the best example in Colombia of building “Strategic Alliances to Eradicate Poverty” by the WB, the Corona Foundation and the Inter-american Foundation. ASOMONDOMO has achieved many things:

- ✓ The water network has been totally replaced,

- ✓ Bad debtors are now less than 1%,
- ✓ ASOMONDOMO has a surplus of US\$ 4,500 per year. This is invested in improvements to the WSS systems, including the watershed,
- ✓ The caretaker has an educational certificate as operator of treatment plants,
- ✓ O&M are completely covered by income from the tariffs, and
- ✓ The monitoring system is working as expected.

At present, ASOMONDOMO is preparing a proposal to solve the settlement's wastewater management problem.



Photograph 35 **MSF plant in Mondomo**

Source: ASOMONDOMO (1999)

8.1.1.4 **Lessons learnt**

- ✓ Legitimacy is a way to facilitate legality. The national institutions had considered that having a legally recognised organisation was sufficient to improve the WSS services. However, legitimacy was the key for the users in supporting the acts proposed by the organisation.
- ✓ Beyond the selection of the appropriate technology, it is essential to guarantee the best quality construction and to include community supervision as a key factor for success.
- ✓ Partnership between the community, the public sector and the private sector can be successful if participants are equal in status, the role of each is respected, and decisions are made by consensus.

8.1.2 Children as the guardians of water resources

We have to respond to the so-called 'El Niño phenomenon', because we, the children, are not bad. The phenomenon should be called 'The older', because the elders, in their desire to build cities, make roads, and get money, forgot their children, contaminated the water, and killed the trees...

Child's speech at the end of the TLP, CINARA et al. (1997h)

The TLP strategy was validated in two projects in rural settlements in Cali Municipality. The projects focused on children's involvement in protecting the water sources that supplied the settlements. The projects were financed by UNICEF and the Department of Valle del Cauca. Under Colombian law, their status as environmental educational projects (EEP) brought automatic support from the education sector. Most EEPs are on subjects such as global warming, which have little practical relevance to school children or their parents. There was therefore an opportunity to develop a way to link EEPs with the day-to-day realities of settlement life.

8.1.2.1 Description

La Elvira and Los Andes are rural settlements in the western mountains of Cali municipality (Figure 38). La Elvira has 1,500 inhabitants and Los Andes just 250 inhabitants. Both settlements were established at the end of the 19th century. La Elvira is located in a Forest Reserve, and Los Andes is inside the Los Farallones National Park. These protected areas were established after the settlements themselves, yet their administration takes not account of the needs of the villagers of La Elvira and Los Andes, or of any of the other settlements in these areas. As a result, there was a history of conflict between the villagers, the departmental environmental authority (CVC), and the Ministry of Environment. Each settlement has a basic school. There are 108 students and three teachers in La Elvira, and 35 students and two teachers in Los Andes.

8.1.2.2 The TLP

The processes followed in the TLP in La Elvira and Los Andes were taken from the final reports by CINARA *et al.* (1997g and 1997h). The activities carried out under the TLP are shown in Table 47 and the participants in Table 48.

In each of the settlements, the first activity was carried out with the participation of the community organisations, teachers, and parents. Subsequent activities also involved the school students. Both settlements identified the problems in the supply watersheds and developed a form of field workshop called *lecturaleza*. Working in groups, the *lecturaleza* participants tried to “read” what nature was saying and establish analogies with human behaviour. Students drew pictures of what they considered to be the most important aspects. Among other things, the *lecturaleza* showed that children did not know the animal and plant species in their region.

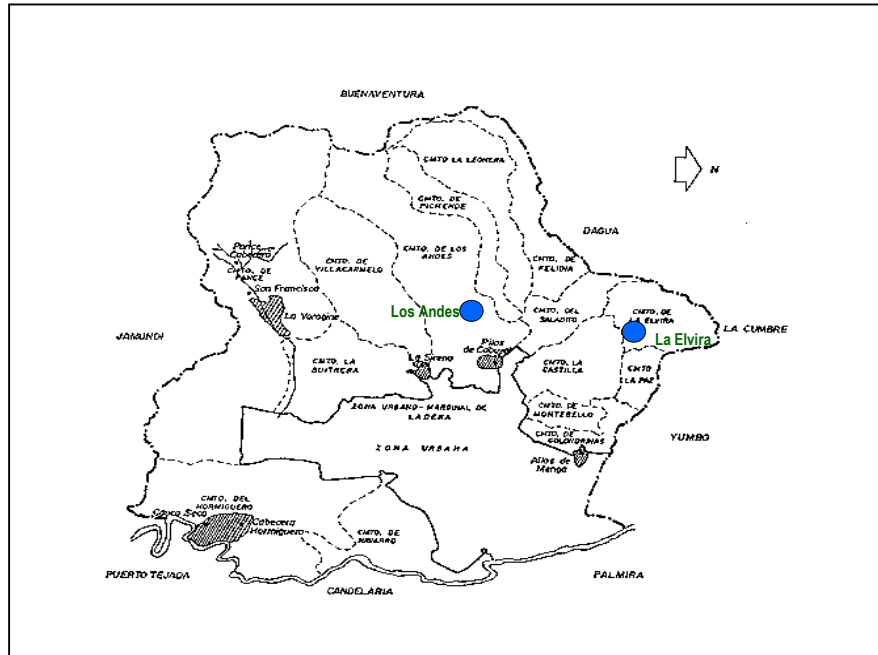


Figure 38 Location of the TLP in La Elvira and Los Andes

Source: CINARA *et al.* (1997g and 1997h)

Table 47 TLP activities in La Elvira and Los Andes

PHASE	ACTIVITY
PLANNING	Project presentation to the community and institutions
	Participatory diagnosis
	Identification of problems in the supply watersheds
	Participatory identification of water resources with the school community
	Fieldwork <i>Lecturaleza</i>
DEVELOPMENT	Identification of ecological transects (<i>transectos</i>) in the supply watersheds
	Inventory of animals and plants
	Preparation of the <i>herbario escolar</i>
	Investigation of the uses of each kind of plant
	Identification of sustainability indicators for the <i>transectos</i>
	Monitoring
	Preparation of educational material
EVALUATION	Participatory evaluation

Source: CINARA *et al.* (1997g and 1997h)

Table 48 Participants in the TLP in La Elvira and Los Andes

GROUP	PARTICIPANT
Community	Community organisations
	Primary school students
	Parents
	Teachers
Municipality government	Secretary of Economic Development and Competitiveness
	Health Secretary
	Education Secretary
Departmental government	<i>Agua Pura</i> programme of the Departmental Health Secretary
	CVC
National government	Ministry of Environment
NGOs	PROCUENCAS
	UniValle Botanical Garden
Facilitator	CINARA team

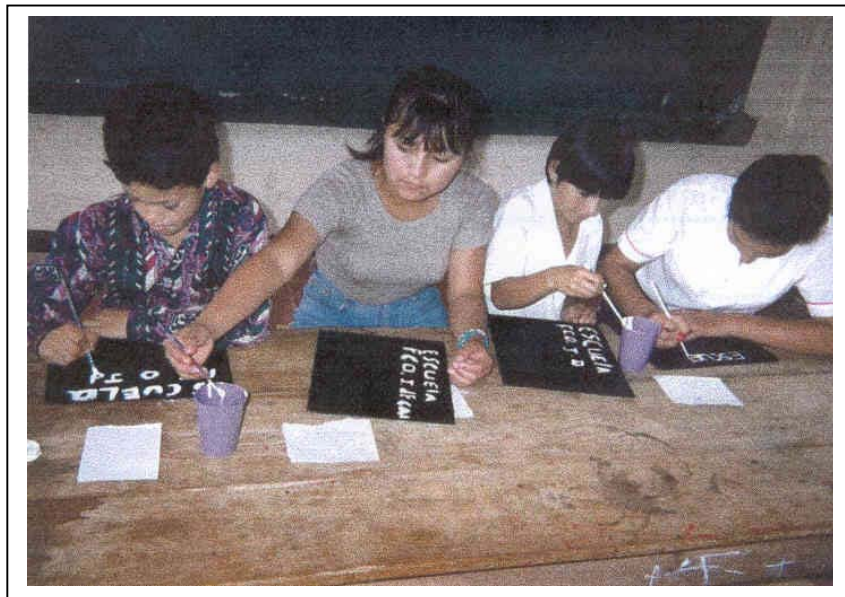
Source: CINARA *et al.* (1997g and 1997h)

The project used the concept of transects for their ecological investigation. Transects –small areas chosen to be representative of the larger areas that surround them- are used in biological science to characterise animal or plant populations. In the TLP, the transects converted the watershed into laboratories for the students and their teachers, and provided a mechanism for protecting water resources. The transects, which measured 10m x 10m, were marked out using wooden planks. Each transect was named and looked after by a group of students. The Los Andes students used four transects, named respectively were “water guardians”, “bird fields”, “nature guardians”, and “kings of nature”. Three of these transects were in the El Cedro watershed and the one in the La Soledad watershed. La Elvira used four transects - “mushrooms”, “palms”, “scorpions”, and “snails”- in the Agua Clara watershed. Community members who were familiar with the animal and plant species in the region helped the students catalogue the species in each transect (Photograph 36 and Photograph 37). The children took samples of each of the plants, characterised them, and incorporated them in the *herbario escolar*, which is a collection of dried plants they created in each settlement. The samples were dried and scientifically classified in the laboratories of the Botanical Garden in UniValle. In all, 523 plant species were characterised. The children drew pictures of their transects, and highlighted the most enjoyable aspects of the project in a workshop analysing the results.



Photograph 36 **Inventory of plant species in the transects**

Source: CINARA *et al.* (1997h)



Photograph 37 **The students identified each species living in the transects**

Source: CINARA *et al.* (1997g)

With help of their parents, the students investigated the uses of the plants they had collected in the *herbario*. This homework showed the students and parents that their

communities' history and knowledge were being lost; only the settlement elders knew almost every species and its uses. The children chose two types of indicators to help them monitor their transects:

- ☛ Measurement indicators: the number of plant of each species in the transect, and the heights and diameters of the plants, and
- ☛ Phenological indicators: these included data on flowering and the index of fructification.

The children defined four ways of working:

- ✓ Individual work in the transect: each student adopted one or two plants and took responsibility for measuring their indicators,
- ✓ Pairs of students worked together and shared their results,
- ✓ Group work: the whole groups studying their transect met to share and analyse information, and
- ✓ Plenary work: the teachers co-ordinated plenary sessions covering all the transects.

8.1.2.3 Results

For each type of monitoring, instruments were developed using simple language and painting tools. Other educational material was based on proposals from the students and their teachers. The first such examples were the *herbarios escolares*, which were part of the original concept for this project. They used re-cycled paper produced by a women's micro-enterprise in La Elvira. Later in the project, the children recorded their knowledge of the local ecology and water systems in the form of an illustrated diagram called The Ecological Route. The Ecological Route was converted into a board game and a puzzle. The participants also created an Environmental Lottery using the species found in the watersheds and a manual on how best to protect plant species. The TLP project won an award for its contribution to research on methodologies to protect local water resources.

8.1.2.4 Lessons learnt

- ✓ The success of the project lay in its process. Throughout the academic year, the two school communities were involved in activities that showed them their natural resources.
- ✓ Children are very receptive and creative in their work on the environment. The potential for working with children in community development issues is not sufficiently explored in WSS projects.
- ✓ Children are very interested in participating in community projects.

8.1.3 Including wastewater management in the reconstruction of Armenia

When Armenia has its 125th birthday, we hope that our children, adults in 2014, have good and cheaper public services and drinking water in the tap, and that the water returns very clean to the environment.

Collective dream of Armenian people, CINARA –EDAR (2000b)

8.1.3.1 Description

The city of Armenia has 270,000 inhabitants and is the capital of Quindío Department. It is located in Colombia's coffee region, in the Central mountain range (Photograph 38). The city is the source of approximately 52 streams and rivers, making it as site of national hydrological importance (Figure 39). Armenia is located in a zone of high seismic hazard and on 25 January 1999, the city was devastated by an earthquake that affected the centre and west of the country (Photograph 39). About 1,200 people died and 5,300 were injured. Two hundred thousand people are estimated to have lost their homes or workplaces. The earthquake also damaged WSS systems throughout the coffee region included those in Armenia. The national government created a fund called Fund for the Re-construction of the Coffee Region (FOREC) to rebuild the city. The national government divided the city into 15 zones and made the reconstruction of each zone the responsibility of one national NGO or private enterprise. The Mayor of Armenia also created a local work team known as the *Taller de la ciudad*, composed of 17 local institutions, to plan the reconstruction. By the end of 1999,

the public services were functioning and the roads and parks had been restored, but no new houses had been built. Many people were still living in temporary camps, in very precarious conditions. The problem that had impeded the construction of new houses was the wastewater management. The wastewater flowed from the sewers downhill causing landslides and contaminating watercourses. As a result, the environmental authority (CRQ) forbade the building of new houses until the city had new, safe systems for collecting and treating wastewater.

Photograph 38 **Armenia (Quindío)**



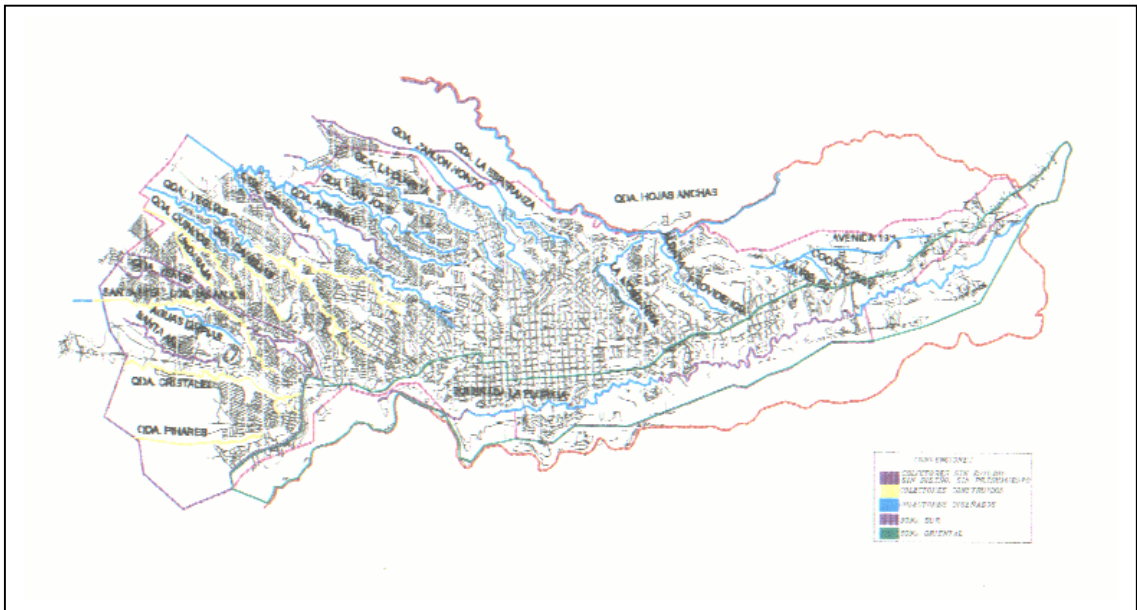


Figure 39 The main rivers in Armenia

Source: CINARA – EDAR (2000b)

Water sewerage and solid waste disposal in Armenia are handled by a public institution known as EPA. The city has another public institution -called Wastewater Treatment Management Agency (EDAR)- in charge of wastewater treatment, the only body in Colombia with this exclusive function. At the time of the earthquake, EDAR was a weak institution with little influence on decisions made in the city, though CINARA had been working on a plan to strengthen it. After the earthquake, wastewater treatment should have been a priority instead, however, the politicians wanted to wind up EDAR and wastewater management was neglected in the reconstruction plans in the 15 zones. A plan for decontaminating the rivers – the wastewater treatment plan (PDAR)- did exist, dating back 7 years before the earthquake, but FOREC allocated no resources to its implementation. To correct this situation, a TLP was designed to increase municipal recognition of EDAR and to promote wastewater management in the reconstruction plans and on the political agenda.



Photograph 39 **The effects of the earthquake in Armenia**

8.1.3.2 *The TLP*

EDAR established an internal team dedicated full time to the TLP. Students from the regional university, Universidad del Quindío, began their degree work on this project. Together, EDAR and CINARA worked to define the current situation and plan future activities. Table 49 shows these activities and Table 50 the participants.

Table 49 TLP activities in Armenia

PHASE	ACTIVITY
PLANNING	• Planning activities
	• Workshop to identify problems of wastewater management
	• Training in project formulation
	• Formulation of the projects needed in each zone and in the city itself
DEVELOPMENT	• Participation in the <i>Taller de la ciudad</i>
	• Presentation of the projects to FOREC
	• Review of the Wastewater Treatment Plan (PDAR)
	• Training in sanitation options
	• Training in wastewater treatment concepts
	• Fieldwork
	• Identification of the technological configuration for treating the wastewater in the city
	• Definition of preliminary costs of the technological configuration
	• Development of a general framework for the updated Plan
	• Workshop to define the action plan
	• Development of an Action Plan
	• Establishment of the EDAR-EPA-CRQ inter-institutional team
	• Signing formal agreements for the inter-institutional work
• Meetings with external national advisors and international advisors	
EVALUATION	• Inter-institutional evaluation
	• EDAR evaluation
OTHERS	• EDAR participation in a short course on 'condominial' sewerage in Bolivia
	• EDAR participation in AGUA 2000

Source: CINARA – EDAR (2000a)

The TLP began by identifying problems in the sewerage system and the main collector sewers that were EDAR's responsibility. The main problems were (CINARA – EDAR, 2000a and 2000b):

- The sewerage system was very old and did not follow any long-term plan. It was built in ad-hoc manner by the same private firms that built the city's houses. In some places where the sewers crossed between watersheds, they were buried as deep as 28 m, despite the fact that Armenia is a hilly city and so shallow sewers should be able to supply the necessary gradient,

- EPA (the water and sewerage body) did not have records of the subsequent development of the sewerage system,
- There was no relationship between water supply and sewerage within EPA and with the decontamination plan drawn up by EDAR,
- The construction methods used by EDAR for the main collector sewers helped to destabilise the hills, and
- The geological fault that crossed the city centre and divided the city in two parts had not been taken into account.

Table 50 Participants in the TLP in Armenia

GROUP	PARTICIPANT
Local government	Mayor
	<i>Taller de la ciudad</i> (17 local institutions)
	EDAR
	EPA
Departmental government	CRQ
NGOs-private sector	The 15 organisations in charge of each zone in Armenia
Facilitator	CINARA team
Others	National advisers
	International advisers

Source: CINARA –EDAR (2000a)

8.1.3.3 Results

Once the necessary investment projects had been identified, training was provided to help the EDAR team formulate the projects and present them to FOREC. FOREC allocated US\$ 2,500,000 to the wastewater budget and it was agreed that this money would be used according to how the projects were prioritised by EDAR. Not one of the reconstruction plans for the 15 zones had taken into account wastewater collection and treatment. The decontamination plan (PDAR) had already been drawn up, but after the earthquake EDAR could not tell the Mayor how much this would cost to implement until the plan had been

corrected to take account of the geological changes caused by the earthquake. When the PDAR was reviewed, the main problems identified were (CINARA-EDAR, 2000a):

- Not enough attention to institutional aspects, especially the relationship between EPA, EDAR and CRQ,
- No mention of the relationship between EDAR and its users, nor the recovery costs and tariffs to be paid by users,
- No proposals for any city policies for wastewater,
- A lack of up-to date thinking on environmental concepts, no analysis of scenarios and no proposals for monitoring the mobilising forces between scenarios,
- Monitoring by EDAR was not included,
- No mention of the organisational changes within EDAR needed to execute the plan,
- The technological options selected did not take into account the social, economic and environmental conditions in the city,
- The treatment objectives and goals were not defined, and
- The technical specifications and criteria were inadequate.

Because of the hydrological complexity of the city, several possible configurations for the treatment system had to be analysed. Based on the sewerage areas and the 52 watersheds, three general alternatives were identified (CINARA-EDAR, 2000b):

- To do nothing (Option 0),
- To use streams and smaller rivers act as a natural drainage system for wastewater, and to treat their water upstream of their junctions with the larger rivers, and
- To treat the wastewater before it is discharge into any of the streams and rivers.

The two first options were considered inadequate because they did not satisfy Colombian law on wastewater treatment and the Local Development Plan that highlighted the importance of the hydrological system. For the third option, the team identified 41 configurations for the main sewers and treatment plants (CINARA-EDAR, 2000b). Through an inter-institutional workshop, these options were ranked according to criteria previously defined by EPA, EDAR and CRQ. Four options were selected as the most promising, plus three further options for which no information was available to generate rankings. These seven options were all considered for the updated PDAR. All seven options were flexible, operated in medium-term and took a middle ground between centralised and completely decentralised systems. All would allow EDAR to show immediate results, and would help to keep wastewater management issues high on the political agenda. They were also designed to make best use of the financial management regimen likely to be imposed under the updated PDAR. After the TLP ended, EPA, EDAR and CRQ together prepared the terms of reference for updating the PDAR. On 1st January 2001 a new Mayor took office. Although the Director of EDAR was replaced at this time, EDAR's technical team continued their efforts to keep wastewater management on the political agenda.

8.1.3.4 Lessons learnt

- ✓ There was a contradiction between the political commitment to the environment expressed in the Local Development Plan and the way wastewater management was treated by the local institutions after the earthquake. A healthy environment seemed an abstract concept that the local institutions found difficult to put into practice.
- ✓ Great effort is needed to strengthen the institutions in charge of wastewater management because this area is neglected in institutional support, planning and the allocation of resources.
- ✓ Because of their inter-institutional and inter-disciplinary nature, the project teams were able to identify many options and take into account criteria covering economical, social and environmental issues.

8.2. INSTITUTIONALISATION: ENACAL-GAR-UNICEF'S PROJECTS IN NICARAGUA

8.2.1 Description

Nicaragua is the largest Central American country (Figure 40). It has 5.1 million people, and its capital, Managua, has one million inhabitants. Nicaragua has three distinct geographic regions: the Pacific coast, the north-central mountains and the Caribbean lowlands. Most of the population is concentrated on the Pacific coast (61.5%) and in the central mountains (32.6%), in spite of the fact that the mountains include around 40 volcanoes. Table 51 shows some indicators for Nicaragua. The country is divided into eight administrative regions and sub-divide into 15 Departments. The country was devastated by Hurricane Mitch in November 1998 and a series of earthquakes and volcanic eruptions in autumn 1999. During the last three years, many institutions have helped to reconstruct the country. One of these is UNICEF, which is active in three of the eight regions.



Figure 40 Nicaragua's location

UNICEF has been working in Nicaragua on rural WSS projects run jointly with ENACAL-GAR, the national institution responsible for WSS services. However, evaluations in 2000 showed that many of the WSS projects funded by UNICEF did not work. Most of the WSS systems were communal wells with hand pumps called rope pumps (*bombas de mecate*) and sanitary units containing two showers and a washbasin (Photograph 40). Additionally, VIP or compost latrines had been built in each household.



Photograph 40 **The usual communal WSS facilities built by UNICEF and other institutions**

Source: EHP (2001)

8.2.2 The project

As an initial step to increase the effectiveness of its investments, UNICEF asked CINARA to improve its Annual Operation Plans (POAs) in three regions in which it had funded WSS projects. These regions were Region I (Departments of Esteli, Madriz, and Nueva Segovia), Region V (Departments of Boaco and Chontales) and Region VI (Departments of

Matagalpa and Jinotega). Initial visits to some of the projects in each region were backed up by discussions with UNICEF and ENACAL-GAR staff in the regional offices. The visits showed that:

Table 51 **Some Nicaraguan indicators**

Population	5.1 millions
Urban (%)	54.9
Rural (%)	45.1
INDICATOR	VALUE
Life expectancy at birth (years)	68.4
Infant mortality (per 1,000 live births)	47
Mortality under 5 years of age (per 1,000 live births)	66
Drinking-water coverage (%)	79
Urban coverage (%)	95
Rural coverage (%)	59
Sanitation coverage (%)	84
Urban coverage (%)	96
Rural coverage (%)	68

Source: PAHO (2001), WSSCC (2000b)

- The communal WSS facilities were generally well-constructed, well-used and properly cared for by the communities,
- Not one of the compost latrines visited was working,
- Some households had two or more latrines built by different organisations,
- The drilling effectiveness -the well had water- was only 28%,
- Most of the latrines did not have an adequate superstructure, and others were not used because people did not have resources to build the superstructure,
- The poorest did not have latrines because they did not fulfil the programme requirements. and they have no water connections even where the pipe network was available,

- Regional staff were from regional GARs were committed to their work in the communities, but staff working conditions in the rural areas were difficult,
- The villages had water committees,
- The ENACAL-GAR regional and central staff were weak in technical and social knowledge,
- The support given to the regional offices by the ENACAL-GAR central staff was weak, and
- UNICEF had indicators regarding infrastructure to evaluate its investments.

In each region, new POAs were prepared with the participation of most of the ENACAL-GAR regional staff and one central ENACAL-GAR professional. Based on previous experiences in Colombia (the Cali programme and the National Programme for the Sustainability of WSS systems), the WSS project cycle followed by the regions was analysed. The main findings were:

- ☛ Although a document explaining the ENACAL-GAR project cycle existed, the regional staff were not aware of it. The document specified the necessary activities in planning investments and defined the development of these activities in the ENACAL-GAR's projects (Table 52). However, most of the guidelines were not followed,
- ☛ Each project had a folder where the information was kept,
- ☛ Water, sanitation and hygiene were not linked in any of the projects,
- ☛ Only houses were included in the projects,
- ☛ A single infrastructure model was applied everywhere,
- ☛ The drilling team worked in isolation; they drilled wells when requested and had no contact with the institutions responsible for the local groundwater,
- ☛ Community participation meant free labour,

Table 52 ENACAL-GAR's project cycle

PHASE	ACTIVITY
FORMULATION	• Initial contact
	• Programme presentation
	• Field study
	• Land legalisation
	• Technical pre-feasibility
	• Negotiation
	• Adjustments
	• Establishment of the Water Committee (CAP)
	• Signing of agreements
	• Evaluation phase
DEVELOPMENT	• CAP training in hygiene education, project management, O&M and protection of water sources
	• Protection of water sources
	• construction planning
	• Construction
	• CAP training in hygiene education and O&M
	• Technical supervision
	• Monitoring CAP operation
	• CAP re-organisation
	• CAP training in administrative procedures and water quality
	• Evaluation of the WSS systems
	• Acceptance of the project by the O&M Unit (UNOM)
	• Community evaluation by UNOM
	• Evaluation phase
MANTAINANCE	• Acceptance of the infrastructure by the community
	• Classification of the communities according to their requirements for support
	• O&M by the community
	• Technical service by UNOM
	• Operational evaluation by UNOM

Source: ENACAL-GAR (1999)

- ☛ Generally, the projects showed that the UNICEF's indicators were largely fulfilled,
- ☛ Communities had to look for resources from other organisations, since only part of the materials were supplied by the programme. If the community's requirements were not approved, the infrastructure remained unfinished, and
- ☛ The poorest amongst the poor -the elderly and households headed by women- could not meet the programme requirements for cash contributions, materials, and labour for construction. The programme provided no alternative to these contributions.

My sister and I live together, whilst she works, I look after our seven children. I would like too much to have a latrine, especially because of the children, but we do not have any man who excavates the pit. In addition, although the materials were given, we do not have money to build the superstructure.

Each project had to be formally requested by the community through a letter sent to the regional ENACAL-GAR. Purpose-designed tools for each project phase were specified by the overall project plan and were available to the project workers. Some of these tools, such as a socio-economic survey in the field study phase, were actually used. Many other tools such as groundwater surveys in applicable projects, were neglected. Training was given to as many CAPs as possible, at one-day meetings in the nearest urban centre. No evaluation or monitoring had been carried out in any of the projects. UNOM was kept completely out of the projects until the handover once the construction phase was complete. During development of the new POAs, the project cycle actually followed by the regional GARs was identified and adapted according to the project cycle proposed by this research (See item 7.3). Table 53 shows the modified project cycle and Table 54 shows the new proposals for training which were included in the modified project cycle. Each POA was presented in a workshop organised by UNICEF in Managua.

After this first step, 15 ENACAL-GAR staff from both regional and central offices spent two weeks in Cali, Colombia, on a study visit sponsored by UNICEF. Their objective was to learn about the Colombian TLPs, visit some of them, plan the evaluation of 45 ENACAL-GAR-UNICEF projects, and develop of at least three TLPs in Nicaragua, one in each UNICEF region. The Nicaraguan TLPs had to put into practice the concepts of sustainability, participation, and learning that had been developed by CINARA and incorporated into the project cycle (See item 7.3). It was also expected that new tools and instruments would be developed to help run the projects, and this work is currently in progress. Some of the conclusions from the evaluation of the 45 projects were:

Table 53 New project cycle in the Nicaraguan POAs

PHASE	ACTIVITY	DOCUMENTS IN FOLDER
PLANNING	Participatory pre-diagnosis	<ul style="list-style-type: none"> • Formal community request • Community characterisation (including hand-made map, community history and health indicators) • Census • Socio-economic survey • Consolidated survey • Sanitary inspection (identifying sanitary risks)
	Auto-diagnosis	<ul style="list-style-type: none"> • List of participants • Workshop memoirs
	Initial training	<ul style="list-style-type: none"> • List of participants • Workshop memories
	Establishment of CAPs	<ul style="list-style-type: none"> • List of participants • Workshop memoirs • Minutes • Agreement signed by ENACAL and the CAP
	Evaluation of the planning phase	<ul style="list-style-type: none"> • List of participants • Evaluation memoirs
FINANCIAL MANAGEMENT	Community presentation of the project to other institutions and organisations	<ul style="list-style-type: none"> • Copy of the letter sent • Copy of the response sent
DEVELOPMENT	Training	<ul style="list-style-type: none"> • List of participants • Workshop memoirs
	Infrastructure development	<ul style="list-style-type: none"> • Technical studies (topographic studies, groundwater studies, drilling technical sheet)
	Land legalisation	<ul style="list-style-type: none"> • Legal document
	Construction	<ul style="list-style-type: none"> • Copy of the document for materials reception • Minute of community acceptance
	Supervision	<ul style="list-style-type: none"> • "Bitácora" book for community supervision
	Inter-institutional co-ordination	<ul style="list-style-type: none"> • Meeting minutes
	Evaluation of the construction phase	<ul style="list-style-type: none"> • List of participants • Evaluation memoirs
TRANSITION	Final training	<ul style="list-style-type: none"> • List of participants • Workshop Memoirs
	Project acceptance by UNOM	<ul style="list-style-type: none"> • Acceptance minute • Any other agreements
	Establishment of community monitoring	<ul style="list-style-type: none"> • List of participants in community support groups • Monitoring forms
OPERATION	Community monitoring	<ul style="list-style-type: none"> • Forms sent by the CAP
	UNOM support	<ul style="list-style-type: none"> • List of participants and memoirs of any additional training • Record of any activity
EVALUATION	Efficiency	<ul style="list-style-type: none"> • Products and final costs
	Efficacy	<ul style="list-style-type: none"> • Memoirs of participatory evaluation
	Effectiveness	<ul style="list-style-type: none"> • List of households who benefit • Health indicators, if they exist

Source: ENACAL – GAR –Region V (2001)

Table 54 Training throughout the project cycle

SUBJECT	TOPICS
Planning phase	
Gender issues	Leadership and self-confidence Importance of women's participation in WSS projects
Community organisation	Human relationships and communication CAP structure and functioning Planning, monitoring and evaluation
Health education	Behaviours, habits and beliefs about WSS WSS-related diseases
Protection of water sources	Natural and human water cycles Importance of water resources
Development phase	
Gender issues	Differences between gender and sex issues Gender division of work
Construction	Technical aspects of the WSS technology Installing the rope pump
Community management	Teamwork Human relationships and communication UNOM and its functions Control of community contributions Control of tariffs, users, funds, and communication with the community
Health education	WSS-related diseases Solid waste disposal
Protection of water sources	Importance of water protection Actions to protect water sources Establishment of nurseries
Transition	
Community management	Financial management and accounting Operation and maintenance Plumbing
Gender issues	Self-confidence
Hygiene education	Domestic water management Well use and maintenance Latrine use and maintenance Sullage disposal
Protection of water sources	Reforestation Controlling sanitary risks
Operation	
Workshops according to community's needs	Assembly and disassembly the rope pump O&M Management and accounting Plumbing Community management Planning and evaluation Tariff definition Water protection WSS-related diseases Gender issues

Source: ENACAL-GAR – Region V (2001)

- Integrated solutions had not been implemented in 33% of the settlements,
- The technological option was not agreed with the community in every case,
- Only 5 % of the communities had participated in the technology selection process,
- Community participated in both the planning phase (by sending a request to ENACAL-GAR) and the construction phase of the projects,
- Although the CAPs were functioning in 91% of the settlements, their operation was limited. Reasons included low levels of technical and managerial knowledge, low rates of participation by women and lack of regulations, and
- The risk of damage to health from inadequate drinking water was very high in 90% of the settlements, and the health risk from poor sanitation was very high in 95% of the settlements.

8.2.3 Lessons learnt

- ✓ Performance indicators set by external agencies tend to place great importance on the physical infrastructure, regardless of whether this actually works.
- ✓ The project process is a fundamental part of any WSS project. Using the wrong process undermines the sustainability of the project.
- ✓ Lack of knowledge among professional people is the first problem to be solved in improving the performance of WSS projects.

8.3. CONCLUSIONS

The Nicaraguan project showed the potential of TLPs to contribute to the sustainability of WSS services in different contexts and in other subjects related to WSS, especially research topics with human and social components. Although the Nicaraguan project is still in progress, the first phase showed that the problems previously experienced in the institutional project cycle were similar to those found in Colombia. In Nicaragua, as in Colombia, there was

an institutional definition of the project cycle, but it was supply-driven and was not generally followed at regional level. The participants succeeded in identifying the real project cycle as actually carried out in the regions, and adapting it to match the project cycle proposed in this research. The regional staff then added new activities as a response to the concepts developed in this study. For the future, UNICEF and the central office of ENACAL-GAR agreed to go ahead with further TLPs, in which the modified project cycle could be further refined and new tools and instruments to institutionalise it.