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Case studies cross analysis

# 15 alternative experiences in drinking water and sanitation in urban communities

English, French and Spanish versions



Habitat International Coalition



## C R E D I T S

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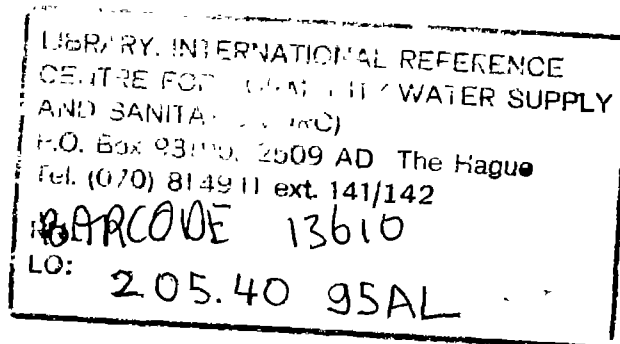
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Cover Photo by Malick Gaye, ENDA T.M: inhabitants in Rufisque, Senegal



## 15 alternative experiences in drinking water and sanitation in urban communities

### HIC/LIFE Project Case Studies Synthesis

*The experiences carried out in 15 popular neighborhoods were analyzed by the organizations involved (NGOs, CBOs, Universities) within the framework of the HIC/UNDP LIFE Project on drinking water and sanitation. The purpose of the LIFE program is to promote dialogue at the local level among the different actors involved in urban management: local government, NGOs, social organizations, etc. to improve the quality of the urban environment. Following are presented the principal conclusions and reflections inspired by the case studies carried out in the following cities: Tohoue, Nairobi, Bamako, Rufisque, Fortaleza, Bogota and Santa Marta, Cali, Quito, Naucalpan, Cuernavaca, Lima, Bombay, Ahmedabad, and Karachi (see list attached).*

#### 1. Institutional framework

All of the experiences studied involved the associated action of various actors; none of the experiences was carried out without the participation of at least two or three distinct agents. Contrary to actions carried out by the private sector, all the cases include the participation of the organized inhabitants, NGOs, and different local government bodies and dependencies. In some cases (La Sirena in Cali, Colombia; Baldia in Karachi, Pakistan) the universities had a primary role thanks to the initiative taken by students or professors, namely, a social work student at the University of Karachi, and sanitary engineers from the Universidad del Valle in Cali.

Some cases also had international technical or financial support (supporting institutions include Misereor, the Government of The Netherlands, the International Water Secretariat based in Montreal, Emmaus International, French Cooperation, and UNICEF).

The institutional scheme is tipified as follows:

#### **NGO + CBO + local government + international organization**

The most significant factor of this type of collaboration among distinct actors is the **creation of communication channels** among the public institutions, the organized inhabitants and the NGOs. The



projects allow a **mutual institutional recognition** both on the part of the municipalities and on the part of the decentralized public institutions towards the inhabitants of the popular neighborhoods in which the actions were carried out.

Nevertheless, these collaborations were not always carried out without confrontation. In some cases the inhabitants came into conflict with the local authorities on legal, technical, and/or social questions. For example, the inhabitants of Naucalpan, on the outskirts of Mexico City, had to carry out protests and marches against the municipal authorities before they were granted the legal authorization for the construction and collective management of a liquid waste dual treatment plant. In Nairobi, Kenya, the inhabitants of an irregular settlement were evicted several times before they were recognized as citizens and were then able to carry out sanitation actions for neighborhood improvement. In Lima the inhabitants of an outlying neighborhood had to fight with the municipality for access to subterranean water. And in Bombay, India, the inhabitants of a popular neighborhood (Dharavi) had to pressure the local government through marches, demonstrations and strikes in order to be granted access to drinking water.

## 2. Technological systems

A range of systems was used in the experiences documented, from very low-cost sanitary wells, such as the dual chamber latrine, to sewer and waste water treatment plants. The important factor in these cases is not so much the type of technology used - conventional or alternative - but rather the technical-social relationship established. Several experiences showed how the technical and social aspects are tightly related. For example, in Bogota the experience of ENDA A.L. with the women in the community kindergartens demonstrated how the water problem was linked to the social processes and how the technical water treatment solutions were appropriated by the women. In Fortaleza, Brasil, the implementation of a condominium drainage project revealed the strong interdependence between the technical considerations and the social organization since the system involves a secondary network along the interior of the plots of the organized inhabitants.

The technical system also has to do with the urban structure and the particular use of the land. For example, in high density settlements some systems which require considerable space can not be implemented, such as the compost latrines or individual waste water treatment systems (Sutrane type). Some collective systems, such as the Dual Plant in Xochicalli for sewer water treatment, use very little space and are more adaptable to medium density neighborhoods.





The majority of the systems used in the experiences both in water and sanitation are **low cost** systems in comparison with conventional high technology solutions such as chemical water treatment plants, biochemical urban residual water treatment plants, purification plants, automated and centralized monitor-controlled water distribution systems, conventional drainage, etc..

Some experiences focus more on the **Integral technological processes** closely linking water-sanitation and solid waste, such as the experiences in Rufisque, Senegal and in the Hamdallaye neighborhood in Bamako, both of which incorporate collection of waste waters and trash collection. These systems tend to evolve towards **integrated waste management** (trash + sanitation).

### 3. Social and cultural impacts

The majority of the drinking water and sanitation experiences were carried out with already existing social organizations: in other cases organizations were created for this purpose, and in others the existing organizations were strengthened by the results achieved. The **social organization appears to be a key actor** in the management and operation of the water supply and sanitation systems. When the organizations carried out an active role in the management and operation of the drinking water and sanitation systems the democratic control over the water was strengthened. Experiences such as those in Rufisque, Senegal; Naucalpan, Mexico and Lima, Peru demonstrate a reappropriation by the inhabitants of their own hydrolic basin and of their liquid and solid wastes through a **democratic decision-making process**. The experience in Lima also revealed the **management and finance capacity** of the population.

Some experiences highlighted the **role of the women** in the actions and the strengthening of the social organizations. The women of the Federation of Popular Neighborhoods of the Northwest of Quito (FBPNOQ) carried out planning, implementation, evaluation and follow-up activities. The women not only participate in the implementation of the projects through community work; they are interested in demonstrating an efficient management capacity in neighborhood improvement (CIUDAD).

Also, in Bogota, the women from the kindergartens have advanced in the field of the appropriation of the technological system and are able to explain the water filtering process, its components, how it works and its importance (ENDA A.L.). In Baldia, Karachi in Pakistan the women



again were the principal agents in the diffusion of the latrines in the *Katchi Abadi*.

Sustainable alternative technologies also opened the door to the establishment of **social relationships** among distant communities. In Real del Puente and Temixco, Morelos in Mexico, dialogue between a downriver community (Real del Puente) and an upriver community (Temixco) led to the construction of dry latrines instead of drainage. Having opted for the latter, those upriver would have contaminated waters below, putting the local crops at risk.

In some experiences, such as those in Nairobi, Kenya, and Fortaleza, Brazil, the impact on the education level of the populations provoked a change in their sanitary habits. Thus, the social impact has much to do with the socio-cultural and socio-economic level of the communities.

The experiences studied have facilitated the unfolding of the creativity from the bases for the affirmation of a collective identity, within the building of a **culture of diversity** (CIUDAD). This may constitute the greatest long-term cultural impact of the participative water management processes. An example of this culture of diversity is the practice of saving water through cultural mechanisms, creating an **ecological culture**. The decision to save water is thus a collective decision using a myriad of ways to do so, contributing to the creation of this culture of diversity. The experience of Quito is along these lines when the inhabitants worked directly within the **natural water cycle**, at the same time building water storage tanks and planting trees. In another example, the experience in Bogota carried out by ENDA A.L. shows that the women working in the kindergartens, without saying that they have a **water culture**, are advancing in this direction.

In Rufisque, Senegal, the Set Setal movement is linked to sanitation and hygiene. It is a movement of youth from the popular neighborhoods who carry out mural paintings whose themes focus on public health and hygiene.

#### 4. Economic impacts

As has been noted above, the majority of the technical solutions implemented in these experiences were **low cost**. The investment was always within the reach of the family. When the cost was higher, one of several types of systems was implemented, such as revolving funds (Naucalpan, Mexico); preferential bank credit (Villa El Salvador, Lima), etc..



Despite their low cost, some experiences carried out at the neighborhood level, such as those in Lima, managed budgets and technological, social or other complexities larger than those customarily handled by the municipalities themselves. These experiences highlight the **capacity of the inhabitants in the mobilization of resources** for community works, such as drainage networks, well digging, and water storage tank construction.

One economic impact mentioned in almost all the experiences was **job creation**. In Rufisque, Senegal, approximately 1000 jobs were created in one year in the installation of the individual sanitation system alone. Also, in Cuernavaca, Morelos, Mexico, the production of sanitary bowls for the dry toilets generated in the past six months full time employment for 50 craftsmen.

**Time and money savings** are also mentioned in many of the cases. This time saved (in some cases the inhabitants, especially women, no longer have to carry water from far away nor transport trash somewhere else) is important for the families of scarce resources as it allows them to develop other lucrative activities. Also, the urban residual water, after treated by oxygenation plants in lagoons or by dual treatment plants, can be used for irrigation in the **domestic production** of plants and the generation of income at the individual (Tohoue, Benin) or collective (Naucalpan, Mexico) level.

## 5. Political and urban impacts

Many of the experiences reveal that **sanitation is a space of power**. In some cases competition exists between the public services and the social organizations for the management and handling of the water. One part of the systems management can be **decentralized** at the neighborhood level as shown in the experience of Fortaleza, where the condominium drainage solution requires, for technical reasons, the organization and management of and by the community itself at the neighborhood level. Also, in the state of Morelos, Mexico, the communities where the dry latrines were installed no longer require centralized sanitation management. In Bombay, the results achieved by the base organization PROUD in Dharavi in obtaining drinking water strengthened the interdependence of the community and its posture and position with respect to the political parties and leaders.

Many of the experiences contributed elements for the **formulation of urban policies**. The experiences of Lima, Cuernavaca, and Fortaleza showed how various actors come together in water distribution and sanitation. For example, in the elaboration of its



National Housing Policy the Government of Benin invited CTOM Emmaus to participate in the work sessions. In another case, the District Governor of Bamako recognized the Coordination of the groups working on sanitation in Bamako (COTAS) as a privileged participant in the dialogue. In Rufisque, Senegal, the local authorities recognized the alternatives carried out and adapted to the poor neighborhoods in order to integrate them within the Rufisque Directive Sanitation Plan.

In the case of the improvement of precarious settlements such as in the experiences of Nairobi and Cali (La Sirena), the sanitation and water supply actions allowed the **administrative integration** of these irregular neighborhoods within the city, which implied a social recognition of their inhabitants as part of the "legal" city.

Even when the experiences did not directly influence national or local urban policies, they at least **generated debate** within the organizations themselves and at the municipal level. Such was the case in Fortaleza and in Bogota and Santa Marta.

## 6. Environmental impacts

After the experiences the inhabitants perceived the resource of water as a source of development and well-being and no longer as a simple necessary resource. This new vision implies a different relationship of the inhabitants with their environment. This change was achieved thanks to the participation of the people in the actions; receive a service and pay for it is not the same as involving oneself in its management and operation. In consequence, many people no longer perceive water as a scarce resource, but as a resource for the generation of productive development.

For example, thanks to soil production through organic waste and with water treated for irrigation, some communities could begin urban or peri-urban agriculture, generating additional incomes. Such is the case in Naucalpan, Mexico; Rufisque, Dakar and Tohoue, Benin. The sanitation system that appears to lend itself most to urban agriculture is the sewer water treatment plant.

On the other hand, taking into account that the sewer waters and waste are closely linked, given that in practice the two are thrown away at the same time, some groups, such as ENDA T.M. in Rufisque and GIE Gigui in Hamdallaye, Bamako, have taken the initiative to carry out actions focused on both types of waste. These last actions have a greater impact on the environment when at the end of the waste and sewer water collection process a treatment system has been foreseen.





In some cases such as that of La Sirena in Cali the water shortages are not due to population growth but to the improper use and management of the water reserves. For that reason the solutions presented with respect to the use and reuse of water require a joint vision which involves as a priority the **management of the water basins** through a process of cooperation and participation of the entire population. On the other hand, in the case of Ventanilla in Lima, it was important to internalize in the population the "**dis-territorialization**" of the **water resources** (to remove their cultural identification with the water of their basin) in order to avoid frictions among neighboring populations. We have here two opposite trends from which an interesting debate on water basin management could emerge.

In general, the actions presented favor **sustainable development**, specifically through the following factors:

- the systems used require less energy than whatever other high technology system built by public works companies;
- local resources were used as much as possible in order to lower costs;
- the water is considered a renewable resource: after its treatment it can be reused, contradicting the "law of scarcity of water"<sup>1</sup>;
- the use of appropriate technologies by the population implies the purchase of less imported and sophisticated technology.

## 7. Health Impacts

The analyses of the experiences coincide in the fact that the actions carried out have lowered the number of illnesses related to water and sanitation. Not only the improvement in the water quality influenced the results, but also the change in hygienic habits. Two cases show the results of surveys carried out after the improvement of the services. In Nairobi, the study shows a change in the hygiene habits of the population in relation with the improved services. In Hamdallaye, Bamako, the study shows an increase in the level of health in the plots after the implementation of waste collection services and the construction of sanitary wells for the used water.

Some experiences, such as those in Fortaleza and Bogota, carried out at the same time processes of sanitary education in addition to the implementation of the sanitation systems. These processes, without

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<sup>1</sup> See Jean Robert, Water is a commons, HIC 1994



replacing the construction of sanitary systems, allowed the achievement of a better appropriation of the systems.

In many cases the children are those most benefitting from the health impacts of the experiences, since the better sanitary and environmental conditions affect them more than they affect the adults.

On the other hand, in many cases it was difficult to scientifically determine the effect of the improvement of the water and sanitation services on the population since such a determination requires a specific survey carried out by epidemiologists through a population sample applied in each beneficiary neighborhood.

## 8. Replicability of the processes and technological systems

For some groups the replicability lies mainly in the **educational processes** through actual practice. Such is the opinion of the **Ecodevelopment Foundation Xochicalli** which has developed a specific educational method for this purpose: the ERCA method (experience, reflection, conceptualization and action). CIUDAD has also carried out sensitization campaigns and practical courses with the organized groups of northwest Quito. ENDA A.L. proposes in its case the educational dimension as a possibility to generate participative processes towards change, supported by mechanisms of knowledge, control and direct intervention by the beneficiaries. Such is the case in Bogota and Santa Marta with the kindergarten women's groups.

Other groups note the limits to the replicability of the actions. The Lima groups affirm that the possibilities for replication rest on the **degree of institutionality** achieved by the interrelation among different agents. In Benin, the CTOM Emmaus warns that the replicability of the treatment plant installed in Tohoue is limited by the **interests of the transnational companies** and the sellers of high technology biochemical treatment plants that come to West Africa mostly from France (CIE Générale des Eaux, Lyonnaise des Eaux, SOGEA, etc.).

Replicability also depends on the type of technology used. A non-conventional technology, such as the Dual Plant in Xochicalli, requires more time and training for its appropriation and subsequent replication than other more conventional techniques.

## 9. Methodological proposals for technological appropriation

Five methodological trends were identified by the promoting groups within the studies for technological appropriation. None of them



excludes any other, but rather they are complementary. More than anything else, they point out the methodological level which has been reached by many of the groups in the work with the social organizations, the majority of them being NGOs.

### **a) Structure and management capacity of the social organizations**

In Rufisque, Senegal, the management structure and the working mechanisms are communal. The structure consists in a "Health Committee" of elected members. A representative of the technical services of the municipality also participates in this Committee.

In Bamako, Mali, the GIE Gigui represents a similar example in affirming that the base structures (the Wiseperson Committees) created for the management of the sanitation system in a popular neighborhood, Hamdallaye, grow out of traditional organizational structures.

In Cali, Colombia, the CINARA group proposes the need to develop strategies that lead to the potentiation of the management capacity and autonomy of the community while avoiding conflict with the local cognitive structure and with the generation of new social relations.

In Lima, Peru, according to the Lima NGOs popular management may lead to the integration of the technical solutions adopted within local emergency plans and even metropolitan level action plans (Lima Development Plan).

In Bombay, India, the organization PROUD mobilized some 10 popular neighborhoods (Chawl) of Dharavi on the question of human rights focused towards the rights to land and to housing. The struggle for access to drinking water is thus inscribed within the struggle for the right to dignified housing.

### **b) Educational and participative processes**

ENDA A.L. notes that the methodology of technological appropriation for the women from the kindergartens is based in five dimensions: gender, scientific, technological, civic political and cultural, and that they should be elaborated in a process of participative observation.

In Naucalpan, Mexico, Xochicalli proposes an educational methodology for the transfer of alternative technologies (ERCA method, see above), and the creation of a revolving community fund



supported in "avalanch" training processes (every trained person can then train others).

In Fortaleza, Brasil, CEARAH Periferia affirms that it is necessary to integrate an educational and participative process in the urbanization actions such as the "back yard drainage".

In Baldia, Karachi in Pakistan, the promotion of double well latrines was carried out through community participation and training, especially with the women who participated also in the construction.

### **c) "Civil games": from the individual to the collective**

In Cuernavaca, Mexico, the promoter of the dry vietnam-type latrines, Cesar Anorve, asserts that it is only within an ecological-cultural-economic horizon that the alternative technologies can translate into practical options. But the alternative technologies can generate multiple "civil games" (social, institutional) only in a free space.

The proposal of the NGO CIUDAD in Quito for the Water-Development project is similar to that of Cesar Anorve when it defines a strategy that, respecting the individual, becomes involved in the collective, and working from the collective contributes to the satisfaction of individual needs.

### **d) Accessibility of the technologies**

The GIE Gigui in Bamako, Mali, affirms that technological appropriation is achieved through the search for local solutions that require a high labor intensity and the handling of technical solutions which are economically accessible to the populations.

In Tohoue, Benin, the CTOM Emmaus considers that the technology implemented has to be accessible to the populations, but, contrary to the Bamako experience, does not need to necessarily go through a neighborhood organization process.

### **e) Interactive process**

UNDUGU in Nairobi, Kenya, affirms that the implementation of a sustainable technology in the context of urban low-income groups is the result of a **multiple interaction** involving the environment, the economy, demographic considerations and socio-cultural and political factors.

## **10. Final reflections**





These 15 experiences were based within the perspective of instrumenting a **global strategy of rehabilitation of the environment and of reduction of poverty** in urban neighborhoods based on endogenous potentials. Some projects received international financial support, but considering the great limits of this support<sup>2</sup> such support rests nothing from these potentials.

The impact of the implemented technologies and capacity building of the communities appeared at the domestic and community levels through attitude changes with respect to water, through job creation, and through access to water, which in some cases led to the creation of income-generating activities.

Today the production of drinking water has been transformed into an economic activity based on the false principle of the "scarcity of water". These experiences have demonstrated that the inhabitants of the cities can themselves determine their future by appropriating sustainable systems if and when they are left a free space in which to act and organize. In addition, these experiences, all carried out in countries of the South, have shown that water and its treatment can be managed within "the commons" without involving international money-making industries.

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<sup>2</sup>In 1988, only 1% of the total expenditures carried out through donations by the United Nations bodies was applied to human settlements. (source: L'eau et la santé dans les quartiers défavorisés, Table ronde de Sophia Antipolis, Février 1994, GRET PSEau).



## **1. Case selection in Africa**

### **Benin, treatment plant of waste waters in Tohoué**

This project began in 1989 by the initiative of EMMAUS International in the City of Porto Novo. A treatment plant facilitated sewage and wastewater recycling through a system of lagoons. The project favored domestic alternatives given that the plant processed the contents of septic tanks.

### **Kenya: Kitui Pumwani Informal settlement of Nairobi**

This project was carried out in 1988 through the initiative of the local NGO UNDUGU in Nairobi. The community participates in the decision-making, in the control of the project and in the administration of the system (rain water collection, latrines and sewerage).

### **Mali: sanitation and protection of the environment at Hamdallaye in Bamako**

This project began in 1990 through the initiative of a youth group, and achieved the participation of the entire population of the neighborhood of Hamdallaye in Bamako in the construction of absorption wells for wastewaters.

### **Senegal, sanitation in Diokoul and surrounding area, Rufisque**

This project was carried out in 1990 through the initiative of ENDA RUP in a low-income neighborhood of Rufisque (Diokoul), and involved the development of an alternative wastewater ("grey waters" - serviced waters not including sewage) processing system via a system of lagoons. The population of Diokoul was directly involved in the project together with the NGO and the municipality, suggesting that this project has a high potential for expansion or reproduction.

## **2. Case selection in Latin America**

### **Brazil, shallow sewerage system in Fortaleza**

CEARAH Periferia, a Brazilian NGO, analyzes two projects carried out by public initiatives in Fortaleza using the technique of "backyard drainage". Backyard drainage is a typical Brazilian solution for serviced waters that lowers the infrastructure cost by passing the secondary network along the back of the plots. The study evaluates the possibilities and limits of the two projects and their potential for the strengthening of the local organizations



### **Colombia, women and water quality, Bogota and Santa Marta**

This project was carried out in 1989-1991 and again in 1991-1993 through the initiative of ENDA A.L. with women from the communal gardens (FUNDAC) in Bogota. The project developed an original method of training and dissemination. The purification of the water was achieved through slow sand filters. This project was selected for its originality and for being one of the few that directly and specifically involved women.

### **Colombia, Improvement of water in La Sirena, Cali**

This project, carried out in 1986 through the initiative of the organization Comunal, was selected to provide a balance between the free provision of water collected through aqueduct, and also due to the important role assumed by the social organization in water management.

### **Ecuador: community participation in water management and habitat**

This project was carried out in 1993 through the initiative of CIUDAD/REDES with support of the International Secretary of Water, Canada (ISW) and the participation of 43 neighborhoods of Quito and 30,000 persons. Training campaign, construction by self-help of a water tank, communitary works carried out by mutual aid, are the main actions.

### **Mexico: dual treatment plant in Naucalpan, Mexico State**

The project is involving a social organization (UPREZ) and an NGO (FEXAC) to carry out in 1993 a dual treatment plant for 1000 inhabitants. It is a non-conventional experience and it was difficult to get legal authorizations

### **Mexico, civil society and sanitation alternatives technology in Cuernavaca, Morelos**

This project, carried out beginning in 1983 by a professional with the support of the local government, was selected because it complied with almost all the criteria of environmental protection and sustainability. It is a dry sanitation system based on the design of the Vietnamese latrine.

### **Peru, water supply and sanitation in urban settlements, Lima**

Each of the 5 Lima cases presents a particular interest in water supply and sanitation. It is a global study of the 5 experiences of water supply and rationalized distribution, rich in lessons that have recently developed in the Lima metropolitan zone by 5 ONG (DESCO, CIPUR, CIDAP, CENCA, ALTERNATIVA). Many of the organizations are members of the HIC network.



### **3. Case selection In Asia**

#### **India: Waiting for water, the experiences of poor communities in Bombay.**

This is a study of 6 experiences of the urban poor in Bombay to get water, carried out by SPARC in 1994.

#### **India: Creating a voice to build a community: Dharavi in Bombay**

The involvement of the community based organization PROUD in improving basics services since 1979: formation of the Water Committee, the Drainage and Garbage Committee and the Latrine Committee.

#### **India: Water, River and the City, Ahmedabad, India.**

This case study is not a community project but a study on a city in western India: Ahmedabad. It show how a river (the Sabarmati river) which should have been a major resource for water and recreation due to neglect and mismanagement by the authorities, abuse by industry and apathy by the people has been polluted and rendered a liability. Its is the history of the sporadic efforts to develop the river front and the water supply system by the joint community-authority initiative to restore to the river its lost prestige and utility in organizing a sustainable effort.

#### **Pakistan: The Baldia Soakpit Pilot Project**

The Baldia Soakpit Pilot Project (BSPP) is one of two major community based sanitation projects in Karachi. In 1979, BSPP introduced the idea of low-cost, and long-life soakpits. By 1984, were built 200 pit latrines and 3,060 soakpits with UNICEF support. People themselves later built an additional 2,630 soakpit.







