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Urban environmental sanitation: What can be done to improve the living conditions of children in low-income urban settlements?

This issue of *WATERfront* focuses on urban environmental sanitation. In response to a call for documenting good working experiences with urban communities, UNICEF Water, Environment and Sanitation professionals sent articles about projects supported in their countries. In addition articles have been provided by institutions working in the sector.

The projects described take place in well-known cities, such as Harare and Acapulco, as well as in cities more difficult to locate on the map: Resistencia (Argentina), Nouakchott (Mauritania) and Santiago (Cape Verde). Whether they live in a metropolis or small town, the children and their families in the case studies all have something in common: they are poor and live in harsh conditions due to inadequacies in housing, water, sanitation, drainage, solid waste disposal and vector control—often in combination with poor health and education systems and environmental pollution

At the beginning of the 21st century, about half of the world's population lives in areas classified as urban. By 2025, it is expected to grow to almost two-thirds.[1] The most rapid changes in urban demographics will occur in developing countries, and the majority of these people will live in low-income urban settlements. From a rights-based perspective aiming 'to reach the unreached', governments, international agencies, donors and support organisations have but one choice: not to ignore these highly vulnerable children in such urban areas.

As far back as 1961,[2] UNICEF's position was very progressive: if need was the principal criterion for assistance, there was no justification for excluding urban children from its assistance. However it was not until 1971 that UNICEF's urban area activities fully started, with the development of the community-based Urban Basic Services (UBS) programmes. UNICEF's UBS programmes paved the way for many other agencies to take an approach that directly involved the communities. What was learned was that without the involvement of the community, water and sanitation service programmes of almost any type were doomed.

The most rapid changes in urban demographics will occur in developing countries, and the majority of these people will live in low-income urban settlements.

UBS programmes demanded that the community establish priorities and that facilitating

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[1] Source: World Bank, *Entering the 21st Century. World Development Report 1999/2000*, Oxford University Press, August 1999.

[2] Source: Cousins, William J., *Urban Basic Services in UNICEF: An Historical Overview*, UNICEF History Series, Monograph XIV, 1992.

partners, such as local governments and water authorities, respond on a flexible basis—making clear that the 'software' part was more important for the success of a project than the actual hardware installed. In spite of the good work done under the UBS programmes, there have always been problems getting others on stream to bring the urban programmes to scale. Even highly successful UBS projects such as the Tegucigalpa Model in Honduras and the 'El Mezquital' project in Guatemala have largely been failures in terms of large-scale replication in their respective countries.

Within the context of UNICEF's Future Global Agenda for Children,[3] describing the focus of UNICEF beyond 2000, three priority outcomes for children are that:

- infants start life healthy and young children are nurtured in a safe and caring environment that enables them to be physically healthy, mentally alert, emotionally secure, socially competent and intellectually able to learn;
- all children, including the poorest and most disadvantaged, have access to and complete basic education of good quality;
- adolescents have opportunities to fully develop their individual capacities in safe and enabling environments and are helped to participate and contribute to their societies.

The challenge of coping with urban water, environmental and sanitation problems beyond the year 2000 requires an integrated approach (leaving the 'sectors' and vertical approaches behind) and it cannot be accomplished without multiple partnerships. The way to proceed is by developing holistic approaches dealing with the specific characteristics of urban low-income areas rather than by developing isolated pilot projects.

The challenges are significant. However, the experiences of the UNICEF Water, Environment and Sanitation professionals, and the other partners in this issue, serve as reminders that even with limited funds, there are feasible, doable strategies that can be undertaken. As the following case studies vividly illustrate, many scenarios can address the subject.

[3] UNICEF Executive Board Document E/ICEF/1999/10, 13 April 1999.

UNICEF/90-0008/Ellen Tolmie

Due to limited space availability, we were not able to include all the UNICEF country experiences that we received for this issue. These articles will be published in future editions of WATERfront, and will be made available on www.unicef.org/programme/wes

- Nouakchott, Mauritania's capital, struggles for water. Its location at the edge of a desert makes water scarce, expensive and unfit for drinking purposes. At the request of the city's mayor, UNICEF supported the reorganisation of the stand-pipe management system, helping to improve living conditions for the urban poor by stabilizing water prices and improving the organisation of water vendors.

The way to proceed is by developing holistic approaches dealing with the specific characteristics of urban low-income areas rather than by developing isolated pilot projects.

- In peri-urban Harare, a participatory process was used, with community members themselves identifying the most significant problems in their living environment. Women and children saw inadequate water supply and full or unhygienic community latrines as their greatest concerns. After these priorities, they recognised the lack of formal employment and the need for full day pre-school centres.
- In northern Iraq, UNICEF was responsible for the rehabilitation of urban water-supply projects damaged by the Gulf War. The experiences gained, particularly regarding the process of planning, implementation and management, will be useful

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Strategic elements in water supply and sanitation services in urban low-income areas

By Madeleen Wegelin-Schuringa, IRC International Water and Sanitation Centre, Delft, the Netherlands

Introduction

In many cities and towns in developing countries, access to basic infrastructure services such as water supply, sanitation, solid-waste collection and drainage is inadequate for a majority of the residents, especially for those living in low-income urban areas. The rapid rate at which the populations in these areas are increasing compounds this situation and often leads to environmental living conditions that endanger the health of the residents, with consequent losses in productivity and quality of life.

Many governments have come to realise they will not be able to extend services to all urban residents with conventional strategies. It is to this end that innovative approaches are being introduced, not only with respect to technical solutions, but also in ways to involve different stakeholders. On the basis of the experiences built up over the years, a number of strategic elements can be identified that affect the viability and sustainability of all activities aimed at improving basic service provision in urban low-income areas. These elements are legal and regulatory framework, the social context, the institutional context, the financial context, the environmental context, technology and service levels.

Many governments have come to realise they will not be able to extend services to all urban residents with conventional strategies.

A short introduction to these elements is given below, as well as some key options for actions to address them in practice. Although it is clear that some of these options are beyond a particular programme to change, it may be possible to convince a municipality to adapt existing rules and regulations on a trial basis. If all have to wait until policies or management structures have changed, the conditions in low-income urban areas will deteriorate even further.

Madeleen Wegelin-Schuringa

Voluntary Health Group at work, Kibera Settlement, Nairobi, Kenya

Legal and regulatory framework

Security and/or legal recognition of tenure is often a prerequisite for the investment of resources in basic infrastructure services for both the residents and the municipal authorities. The residents will not spend their money on infrastructure if they are not sure they can stay in the settlement. Municipal authorities are often not allowed to provide services in areas that are considered illegal, even though a high percentage of their population may be living there. Yet, to obtain legal recognition not only requires lengthy formalities and complicated bureaucratic procedures, but is often also a hot political issue. In addition, it can easily result in increase in value of land and houses and therefore may lead to expulsion of tenants and poor homeowners. Luckily, in many cities it has been demonstrated that de facto security of tenure can be as functional as legal recognition in mobilising low-income communities for infrastructure improvements.

A second issue is that legal recognition of tenure may only be obtainable if housing and infrastructure services comply with the standards that are set in the regulatory framework. Often, these standards are set so high that they are neither functional nor beneficial to the residents and tend to stifle rather than to promote development. In Kenya, the

regulatory framework was changed to incorporate a 'deemed to satisfy' regulation, which enabled the municipality to lower its standards for these areas.

Options for action

- Find ways to ensure de facto security of tenure where legal recognition cannot easily be obtained,
- Introduce flexibility with regulations or other legal impediments that prevent service provision in illegal areas,
- Lower existing building and service standards to 'deemed to satisfy' solutions,
- Make it possible for communities to register as a legal entity, facilitating community management and ownership of WSS assets,
- Promote a regulatory framework that stimulates private-sector operators or public–private partnerships to provide services.

The social context

Just like in rural areas, basic infrastructure services in low-income urban communities have the best chance of being sustainable if the community is motivated to improve the services, has been involved in their planning from the start and has selected the technology and service level. For this to happen, a community needs to become organised and overcome internal differences. This can be very difficult in urban areas as a result of a heterogeneous composition in terms of ethnicity, religion, occupation and economic conditions. This not only can create a lot of distrust between the different groups, but the common leadership needed to overcome it, may well be lacking.

In areas where the proportion of tenants and absentee landlords is high, community organisation is very difficult because tenants do not feel responsible for improvements, while the absentee landlords do not suffer from poor environmental conditions. Motivation for improvement of basic services can be low, as the prime concern may well be a cheap and temporary place to live, the improvement of economic conditions or the increase of employment opportunities.

Another factor of influence on motivation is the degree of urbanisation of the residents. If primary attachment is to the rural home, any savings are likely to be spent in the rural areas. When the city is acknowledged to be the home base, especially for the future generation, residents and especially resident owners of structures are more inclined to spend effort and funds towards improving their neighbourhoods and adaptations to suit high-density living.

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In many cities, women head the majority of the households. These households usually also belong to the poorest households in the community. Yet males often dominate organisations and little effort is done to plan, implement, operate and maintain basic services in such a way that gender-specific and poverty-related concerns are taken into account. This may affect the priorities for development activities stated by the community and hence may affect the degree of participation by women, and therefore the sustainability of the systems.

Options for action

- Ensure that the different segments of the community (women, men, young, old, rich, poor, etc), their leaders and their organisations are identified
- Develop an information and communication strategy that addresses all segments
- Ensure that all segments are involved in planning
- Develop participatory hygiene-education activities based on self-assessment of existing conditions

The institutional context

Municipal authorities have the main responsibility for the provision, operation and maintenance of urban water-supply services. Their interest is the smooth functioning of the water-supply service, low operating cost, adequate revenues and the possibility to expand services if necessary. They are not necessarily concerned with the provision of services to low-income areas. Their often poor performance is caused by internal problems (lack of management, financial autonomy, decentralisation of decision making as well as lack of human resources and capacity) and external conditions (political influence, unclear and/or conflicting responsibilities at different government levels, centralisation of decision making).

Few municipalities have a section in their water and sanitation departments in which staff is trained to work with and for communities, while co-ordination with the departments that do have this staff is usually weak. Yet participatory approaches to infrastructure improvements require a specific attitude within the municipal authorities in which residents are seen as stakeholders and clients rather than as receivers of services. They also require longer time frames, more flexibility, a well-developed information and communication strategy and training for municipal staff, different from conventional programmes.

The lack of performance of the municipal authorities has led to a situation where a majority of residents in low-income areas is dependent on other service providers for their basic services. These may be formal private-sector providers but they usually are informal, such as individuals, families and small enterprises. They are engaged in similar activities as formal enterprises, but on a smaller scale and usually confined to service provision in low-income areas. The main interest of these enterprises is income generation. Because they are small, they are flexible and able to re-

spond to demand from the consumers, while profits made are often reinvested in the same area, therefore contributing to improvement of conditions.

A second form of informal service provision is generated through community-based organisations and/or NGOs, who themselves may either become service providers or assist the communities and their organisations in the development of a sustainable service. In many cities, NGOs have developed a function as a mediator between the communities and the municipal authorities. There is a whole range of different types of community-managed service provision ranging from group taps and community-managed kiosks to completely autonomous community-based systems. Some of these systems suffer from local politics that are characterised by patronage relationships between politicians and communities, in which provision of infrastructure becomes an attractive political power tool.

The lack of performance of the municipal authorities has led to a situation where a majority of residents in low-income areas is dependent on other service providers for their basic services.

Options for action

- Establish a special section in the municipality/utility to deal with service provision in low-income areas
- Promote training in municipal authorities on issues and approaches for service provision in low-income areas
- Assess roles, responsibilities and institutional relationships of all service providers and other stakeholders in the area, and involve and incorporate them in planning for improvements
- Promote establishment of public–private partnerships and informal sector operations
- Assess legal impediments for informal service provision and if dysfunctional, try to address them
- Promote environmental concerns and hygiene education activities with informal service providers

The financial context

An often-used argument reasoning why authorities cannot provide water in low-income areas is that the residents cannot sufficiently pay for their water to operate and maintain the system, let alone to get a return on the capital investment. This is not true in most cities, as most people in low-income areas depend on vendors for their water or buy water per bucket. The prices paid for this are considerably higher per unit than through a connection to the water-supply system. The differentials in the cost of water (ratio of price charged by water vendors to prices charged by the public utility) vary from city to city (from 5:1 to 100:1) and are dependent on various factors such as access to alternative sources and control and competition on the resale market.

A more valid reason why service provision in these areas is low is that most utilities charge tariffs that are not based on cost-recovery calculations, but are heavily subsidised. The determination of tariffs is a political issue and governments profess to regard water as a social good rather than an economic good. However, since the higher- and middle-income residents are more likely to be connected to the water network, the subsidies and the social good benefit them rather than the poor. The result is insufficient resources to extend the network, especially to the badly located low-income areas. Of influence as well on the resources—physical as well as financial—are the high rates of water unaccounted for, common in many cities in developing countries, reaching extreme levels of 40–60% of the water produced.

Other basic infrastructure services (drainage, sewage and solid waste collection) are commonly funded through taxes, which people in low-income areas often do not pay. The financing of these services is usually already a problem for the whole city and the lack of tax collection is therefore a welcome excuse for non-service.

At the community level, financing and cost-recovery mechanisms are influenced by the degree of demand responsiveness, but also by the mechanisms in place for payments and contribution. It needs to be noted that contribution in kind (labour or materials) may be difficult to organise because time is money and income opportunity lost.

Options for action

- Promote the concept of water as an economic good and the use of subsidies, if at all necessary, to improve access to services by the poor
- Promote a more equitable division of basic infrastructure services and adherence to cost recovery in principle and in action
- Remove impediments to an open, informal market as it drives up prices for the poor
- Develop payment systems together with the community representatives
- Ensure that there are mechanisms that allow access to services by the poorest
- Develop approaches that help communities to select a system and level of service that they want and can pay for

The environmental context

The environment in low-income urban areas is often characterised by high densities and location on land that is not very suitable for residential purposes, such as steep hills, riverbeds or swamps. The general lack of space in the areas stresses the interdependency and integrated nature of all infrastructure services. Improvement of water supply necessitates improvement of drainage, which requires improvement of solid-waste collection; off-site sanitation options require sufficiency of water supply. The condition and presence of roads, moreover, is connected to all these services. Yet authorities work sectorally,

which makes integrated planning at community level very difficult.

The hygienic disposal of wastes is more difficult than bringing in water, while the provision of the water supply has more priority with the residents and is therefore more likely to be facilitated by municipal authorities. The lack of attention for disposal results in environmental conditions that pose a threat to the residents' health, especially because systems installed by householders themselves often have a low technical quality and contribute to deterioration of environmental conditions.

While many aspects are more difficult to address than in rural areas, there are also aspects that make a sustainable provision easier.

At a municipal and even regional level, the issue of water-resources management is becoming more important as cities grow and demand surpasses supply. Water resources are threatened not only by increasing demand, but also by diminishing quality caused by pollution and saline intrusion, as well as reduced quantity caused by overexploitation of water catchment areas. They are also threatened by the competition for scarce water between industrial, agricultural and domestic use, which is becoming a political issue in many cities. This has led to a cry for water demand management (defined as a strategy to improve efficiency and sustainable use of water resources taking into account economic, social and environmental considerations) as the preferred alternative above the development of new sources to meet increasing water demand.

Options for action

- Establish co-ordination mechanisms between sectoral departments that work in the same low-income areas
- Assess what environmental problems are linked to the supply or non-supply of water and sanitation services
- Base activities on community assessment of their priority environmental issue
- Build on any activities that are already being undertaken by the community, or other actors, to ameliorate the problems

Technology and service levels

Technologies appropriate for low-income areas are those in which the technical and organisational characteristics of the infrastructure system are adapted to the socio-economic and environmental conditions in the community. The reverse is common as municipal service providers are focused on conventional systems. The prevailing technical standards and regulations often hinder the application of appropriate technologies, and the systems are not adapted to actual need and demand in low-income areas. Municipal engineers, moreover, are not trained in low-cost technologies and regard these as substandard.

Many so-called appropriate technologies have been developed for the rural areas, but their adaptability for use and operation in low-income urban areas is not always clear. Foremost, the type of land and the densities of these areas require specific technologies. Second, operation and maintenance requirements for these systems by the community may be more difficult to organise as a result of the nature of the urban communities. A third point is the environmental impact of technologies in the high-density conditions prevailing in most areas. Finally, appropriate technology options at community level will have to link up with the hierarchical network of the whole city and can therefore not be developed in isolation.

Options for action

- Develop an approach that ensures the community has a choice in the technology and the service level, while being aware of the cost implications
- Ensure that the technology selected can be managed by the community and does not have a negative impact on the environment
- Train local engineers and technicians in low-cost technologies
- Support the development of technologies appropriate for conditions in low-income areas
- Ensure that the technology and service provision links up with the municipal-level network

Epilogue

These strategic elements show how difficult service provision in low-income areas actually is. While many aspects are more difficult to address than in rural areas, there are also aspects that make a sustainable provision easier. For instance, there is a greater prevalence of NGOs, facilitating a mediation role between municipalities and communities, and more civic organisations that can be prevailed upon for the management of systems. A money economy, more access to spare parts and repair services and the existence of a private sector enhance sustainability in urban service provision. Finally, the existing municipal service network at least ensures one source of water supply.

Time, flexibility and effective communication in and between the municipality and the community is crucial. Moreover, capacity building is needed not only in the municipality and the community but also in sectoral organisations or NGOs to ensure that, with the help of participatory approaches, community-based development is stimulated and appropriate technologies are applied.

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Sanitation and child rights in poor urban areas of Harare

by Mark Henderson, WES-officer, UNICEF-Zimbabwe

Introduction

Informal settlements on the outskirts of Harare, the capital of Zimbabwe, have largely been fed by rural-urban migration during the 1990s. Such migration is expected to intensify throughout the country, but especially in Harare. While government commonly refers to these areas as 'temporary holding camps,' the Zimbabwe economy is in sharp decline, and alternative plans for these people are not in sight. In the meantime, basic services and infrastructure to meet the needs of this rapidly growing population are alarmingly insufficient and, in some cases, non-existent.

As part of its strategy to advocate with a wide range of partners for improvements in the lives of urban poor dwellers around the country, UNICEF Zimbabwe has been working with two local NGOs to take urgent action to address the needs of some of Harare's most disenfranchised residents.

In 1998, the UNICEF Hygiene, Education, Water and Sanitation (HEWASA) programme supported emergency efforts in the Porta Farm settlement to provide basic sanitation facilities where none existed. Mvuramanzi Trust, an NGO with expertise in the promotion of family wells, household latrines and low-cost technology development, built 20 double-pit composting latrines and involved the residents in their construction and continued maintenance. Mvuramanzi Trust also worked in cooperation with another NGO, Inter-Country People's Aid (IPA) in improving school sanitation and providing hygiene education in Porta Farm.

Despite the success of these service-delivery activities, the persistent environmental problems in Porta Farm and other urban poor settlements, and the clear need to address them, prompted HEWASA to propose an urban poor water and sanitation situation analysis that would shift the emergency focus of the intervention to one of development. With UNICEF in the process of developing Country Programme 2000–2004, there was also an opportunity for expanding the scope of the situation analysis so as to contribute to the thrust of community capacity building for child-rights protection. Three informal settlements were targeted for assessment and intervention.

None of the settlements have adequate sanitation.

Background

The targeted settlements, all having a majority of children, are:

- Porta Farm: 35 km. west of Harare; population 4,200
- Dzivarasekwa Extension: 18 km. west of Harare; population 3,200
- Hatcliffe Extension: 21 km. north of Harare; population 8,100

Porta Farm residents were forcibly moved from other 'spontaneous' neighbourhoods in 1991. In 1992, the city of Harare built wooden shacks at Dzivarasekwa Extension for those at Porta Farm who were working or able to pay rent. This was intended to be a three-month temporary solution to the overcrowding at Porta Farm while proper houses were built, but nobody has received houses to date.

Hatcliffe Extension was created in 1993 for people evicted from farms or other neighbourhoods. In 1997 the government built 803 log cabins, but this proved inadequate for the population of 8,100; a great number of people have now built homes consisting of poles, plastic sheeting, tin and thatch. In 1997, the Ministry of Housing removed 16 families to permanent housing sites on another scheme.

Situation analysis findings

IPA was contracted to research and produce a situation analysis of children and women in three urban poor settlements in which key problem areas were to be examined:

- Living environment (water, sanitation and environment)
- Health and nutrition
- Socio-economic environment of women and children
- Education
- Children with special protection needs

Research within the settlements was carried out between September 1998 and November 1998 by a team including investigators and assistants from the University of Zimbabwe. Research methodologies included a literature review, a structured questionnaire for heads of households and in-depth interviews with key informants from government, donors, NGOs and other stakeholders. PRA techniques enabled the communities to identify and rank their problems, to carry out mapping of their respective areas, to produce charts indicating seasonal activities and to document the daily activities of women and children. An average of 60 women and children in each settlement participated in the process.

Water and sanitation

Dzivarasekwa Extension and Porta Farm residents reported having an adequate water supply, although informants also complained of long queues when water points are down and of low pressure at communal taps. Hatcliffe Extension has only four boreholes working out of a possible 14. Residents at Hatcliffe Extension, therefore, endure long queues at water points and spend one hour or more fetching water at the expense of other chores and income-generating activities.

None of the settlements have adequate sanitation, in stark contrast to formal urban areas in Harare where coverage rates for flush toilets is 94%. Residents stated that communal latrines are too far away from their houses and have no lighting, making them impossible to use at night. Dzivarasekwa Extension and Hatcliffe Extension do not have latrines at their respective schools.

Practically all residents (99%) use communal VIP or pit latrines; only a few have their own latrine. Communal pits in Hatcliffe Extension are full and most are closed. Their utilisation is also reduced because elders are not comfortable using a squat hole next to a young person. Residents often defecate at home and discard the waste in plastic bags in open fields.

A majority of the heads of households wash their hands before a meal, but one third do not wash their hands after visiting the latrine. Three quarters wash hands using a communal bowl without soap and only 14% wash under running water.

The living environment of each settlement is poor. Dzivarasekwa Extension and Hatcliffe Extension do have council bins for refuse disposal, but the city of Harare only intermittently collects them. The population of Porta Farm depends entirely on communal pits, dumping or burning of refuse.

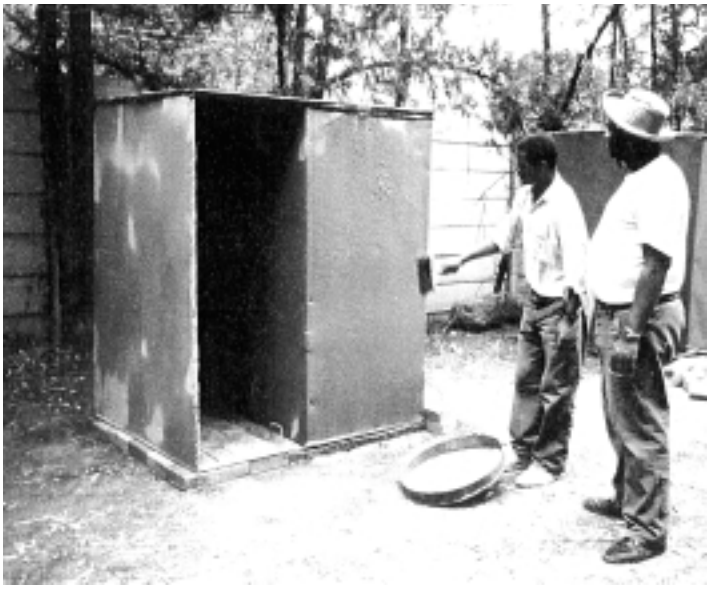
The top disease for children under 14 is acute respiratory infection.

Health

Two of the three settlements have clinics, but they are not fully staffed or functional. About 70% of the population in all three settlements stated that it takes between one and five hours to travel to the nearest clinic, receive treatment and travel back home. One fifth reported this time to be six to 10 hours.

The top disease for children under 14 is acute respiratory infection. The main others are diarrhoea, skin diseases, injuries and eye diseases. For those aged 15 years and above, STDs are the most common infection. Only 53% of households reported eating three meals a day.

Although health education is, or has been, provided in each community, more needs to be done to transform this knowledge into practice. Women requested more information on HIV and AIDS in order to protect themselves and their families.



Lightweight Blair-type latrines are light to lift when made of strong, thin-walled ferrocement.

Summary of other findings

Socio-economic

- 30% of inhabitants are not Zimbabwean
- 46% of heads of households are married and living with spouse and children
- 35% of heads of households are unemployed
- Girls, orphans and children living with step-parents were more burdened with labour
- 13% have access to TV and 43% own radios

Education

- Each settlement has a primary school that is not formally registered with the Ministry of Education
- Pre-school enrollment ranges as high as 400 children
- Majority of residents have attended at least primary school
- 45% cited lack of money for school fee and uniforms as the reason why some children are not in school
- None of the schools have adequate latrines

Existing development activities by NGOs and city of Harare

- Basic education; adult literacy classes
- Paper making; women's sewing group
- Staffing of clinic and community health workers
- Provision of birth certificate
- Training in nutrition gardens
- Mobile clinic service; HIV/AIDS education

Primary concerns of women and children

The most significant problems identified by women and children living in these urban poor settlements included:

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The link between indoor air pollution and acute respiratory infections in children

Acute respiratory infection (ARI) is the most important cause of death for children under five years in developing countries. The most serious type of ARI is acute lower respiratory infection, most of which is due to pneumonia. At present, the main strategy for the control of ARI is the promotion of community-based early detection and treatment, with follow-up.

Recently, more attention has been paid to the potential for prevention of ARI through interventions that address environmental risk factors such as air pollution, housing conditions, and overcrowding. One of these risk factors is indoor air pollution.

The Integrated Management for Childhood Illness (IMCI) strategy under leadership of UNICEF/WHO and others, has been developed to reduce child morbidity and mortality from five major childhood diseases including acute respiratory infections (ARI), diarrhoea, malaria, malnutrition and measles through prevention and treatment. It aims to improve the skills of health workers in case management improve health system delivery and strengthen family and community responses to childhood illness. IMCI emphasises prevention of disease through immunisation, careseeking behaviour, improved nutrition, exclusive breastfeeding and the use of insecticide impregnated bednets.

Health effects of indoor air pollution exposure

Studies in many parts of the world have confirmed that open fires and simple stoves used inside small, often poorly ventilated homes lead to some of the highest levels of air pollution in the world. While smoke from biomass and other domestic fuels contains thousands of chemical substances, total suspended particulate (TSP) is generally thought to provide a good indication of the health-damaging potential of air pollution.

TSP levels during cooking with biomass fuels typically range from several thousand to over 20,000µg/m^3. Particulates of less than 10 microns in diameter (PM_{10}) are able to penetrate into the lungs and are regarded as more representative measure of health risk. PM_{10} level in a poorly ventilated home using simple biomass fuel stove can be 50 times higher than the standard recommended by the World Health Organization.[1]

Growing evidence strongly suggests that indoor air pollution at these high levels of exposure is an important risk factor for ARI. There is reasonable consistency among various studies trying to link indoor air pollution with ARI, although some have not found an association. Most of the positive studies report that children exposed to a higher level of indoor air pollution were between 2-5 times more likely to develop ARI than those unexposed or exposed less.

A number of methodological weaknesses must be taken into account when assessing the findings. Few studies have directly measured exposure, using instead proxies such as type of fire, reported hours spent near the fire, or whether a child was carried on the mother's back during cooking. Also a number of the studies drew their samples from among already hospitalised children. Others did not deal adequately with confounding socio-economic factors.

Reducing exposure of children to indoor air pollution

Exposures can be reduced in four ways: by (1) modifying the stove, (2) improving ventilation, (3) using cleaner fuels, or (4) protecting the child from smoke. While these may appear straightforward, the central role that the fire or stove plays in the activities of the household, providing for cooking, warmth, light, and social functions, makes it a challenging task. Practical, financial, environmental and behaviour change issues must be considered when designing interventions to reduce human exposure to indoor air pollution. There is also a need to adopt a broader approach aimed at improving the whole home environment.

Indoor air pollution has not received sufficient research and policy attention, given the extent of exposure of so many of the world's most vulnerable populations. One explanation is that historically and in the media, air pollution is seen as arising from traffic and industry in the cities of the developed world. Another is that the scientific evidence on the health effects of indoor air pollution in developing countries has been regarded by many as insufficiently robust. In addition, the poor, in particular women and children, do not have a strong voice in forums where global environmental policy is determined.

As with policy in other aspects of environment and health, action on indoor air pollution control needs to be taken on the basis of imperfect evidence. The appropriate action shall include more applied health research, operational research, policy research, program strategy development, and concrete stove and cleaner fuel projects.

(Extracted from Lowering Exposure of Children to Indoor Air Pollution to Prevent ARI: The Need for Information and Action *by Nigel Bruce, Department of Public Health, University of Liverpool, Capsule Report no.3, Environmental Health Project, January 1999 and with input form the Health Section, Programme Division, UNICEF New York)*

[1] WHO recognizes that relatively small increases above the level of 20 µg/m^3 PM_{10} have an impact on health.

The struggle for water in poor urban areas of Nouakchott, Mauritania

by Arsène Azandossessi, WES-Officer, UNICEF-Mauritania

Water is scarce, expensive and unfit to drink in Nouakchott, the capital of Mauritania. The city is located on Africa's Atlantic coastline at the edge of a vast desert. A well about 60 km from Nouakchott supplies the city with water. The present capacity of the groundwater extraction station has not been adapted to the city's rapid geographical and demographic growth, which has been boosted by rural migration to urban areas because of a severe drought cycle.

From 1970 to 1995, Nouakchott expanded fourfold, to more than 8,500 hectares, and the city's population increased, from 5,000 inhabitants to 500,000. As a result, there is not only a capacity problem but also a shortage of distribution networks, especially in the city's urban poor areas. Access to water in urban poor communities is scarce and expensive. In addition the quality of that water is poor. Water availability in these communities is estimated at 10 litres per inhabitant/day, which covers less than 40% of the actual needs.

Assessment

Several factors make the water supply in these areas both precarious and expensive. They include availability, accessibility, organisation of the commercial network, and water quality.

Availability: The distribution network is in bad condition. The water pressure is too low given the water needs for industry and vegetable gardens.

Accessibility: Only 179 standpipes were installed to cover the entire urban poor area. This corresponds to a ratio of about one standpipe for 2,500 inhabitants; as compared to the national standard of one standpipe for 1,100 inhabitants. In addition the inefficient geographical distribution of the standpipes further worsens the situation.

Organisation: There are no mechanisms to regulate or to control water distribution in urban poor communities. Technical norms for the standpipes, regulations for the provision of services (authorisations, statutes, specifications), financing mechanisms (municipal taxes) and the modalities of intervention or of partnership with other actors are yet to be established. This lack of organisation affects both the management of standpipes and the price of water.

Price of water: Commercial speculation in drinking water is rampant in Nouakchott. As a result, the price of water is too expensive for poor people. Water sold by the National Water Society at US$ 0.37/m3 is sold at the end of the distribution chain by donkey-cart water vendors at US$ 3.71. A price that can even rise to US$ 17.32 when water shortage occurs. Water supply absorbs 14-20 % of the budget of a low-income household.

Water quality: Control and monitoring of water quality, an essential health factor, is not given much attention. Storage and transportation conditions are generally poor.

In view of the above, the municipality of Nouakchott and the local administrations involved—with the support of other partners, including UNICEF—decided in 1998 to entirely reorganise the management system of standpipes. The experience of pilot projects previously initiated by UNICEF in the neighbourhood of Dar Naïm was used as a reference model.

Standpipes were selected on the basis of geographical accessibility, water quality and production capacity. The project was initially programmed to rehabilitate 25 standpipes. The higher volume of donor contributions than expected, made that 51 standpipes spread over eight of the city's communities could be rehabilitated.

The project had two objectives: (1) to contribute to poverty alleviation in Nouakchott's urban poor communities; and (2) to ensure the access to water conforming to technical, sanitary, social and economic standards.

Strategies

With this in mind, two strategies were implemented:

- the choice of intermediaries structures (NGOs, unemployed graduates) as relays between institutional actors and beneficiary communities;
- the establishment of User Committees at the community level, representing the communities involved and monitoring the cost and quality of water.

The results

Management system

A new standpipe management system was established. New managers replaced the previous owners and managers, who were solely interested in making profits. The new managers are young previously unemployed university graduates, mostly with an economics background. In touch with the population's daily priorities, the new managers are eager to serve the interests of the community. In addition, they are eager to demonstrate their abilities to future potential employers. This management system is supervised by the Commission on Human Rights, Poverty Control and Insertion (CHRPCI).


A. Arsène

Prices

Prices are controlled at the source. Despite the increased cost of water extraction (use of new equipment, ensuring an improved water quality), the price of water was maintained and efforts are being made to lower it further. Where storage tanks were constructed to compensate for the absence of standpipes, the price of water remains stable.

Organisation of the water distribution in the communities

Water-selling activities were organised, and roles were defined with more precision. Young managers now have a clearer picture of the poverty profile. They are aware of the conditions and tripartite chains of distribution (standpipe, donkey-cart water vendors and households), and they are familiar with the various political and social actors of the target communities. They have, for example, developed a social dimension in the water distribution system by relying on the network of local associations. 'Water houses', serving as local reference and concentration centres on the vital question of water, were established in all of the communities involved. NGOs became involved in the training and supervision of new managers during the first six months of the project's implementation.

Lobbying

The successes, so far, are the results of a four-year negotiations between donors and the traditional water vendors. There were three stages in this process:

1. Initially, pilot projects were established in the newest urban poor areas. Far from the merchants' 'territories'. In these projects, a participatory approach was implemented, with management and operation of the infrastructure being the direct responsibility of the community. This led to a sense of ownership for the users and to a growing distance between them and a full array of intermediaries.

2. Next, significant changes were observed concerning the cost of water. The price of a cubic metre of water decreased. This led to an increase in water consumption. To ensure this result, a huge advocacy effort had to be undertaken at all levels: decision makers, donors and communities.

   The strategy was based on studying the water-supply mechanisms in Nouakchott's urban poor communities. The conclusions have shed light on the existing management system and on the interests associated with it, generating much discussion among development partners.

3. In the last stage, the strategy consisted of establishing a water lobby at the donor level (French Development Agency, WHO, German Agency for Technical Cooperation, UNICEF) and at the national decision-maker level (National Water and Electricity Society, National Hygiene Centre, Municipality of Nouakchott, CHRPCI). The aim was to spread one message: 'Clean water at an affordable price for Nouakchott's poor communities'.

The strong will of national authorities to improve drinking water supply in urban poor communities, as part of the strategy to control poverty, was a determinant factor in the extension of the approach.

Lessons learned

Stakeholders' logic versus Project's logic

A major obstacle to extending the approach was that the interests of all stakeholders of the current distribution system (standpipe owners or managers, donkey-cart water vendors, users) did not merge with the project's objectives.

While owners and managers clearly understood and accepted the objectives of price and quality, donkey-cart water vendors, for their part, have no interest in joining in an effort that would considerably reduce their profit margin. The only possible arbitrators in this debate are the users in urban poor areas, who, unfortunately, are difficult to mobilise. Even when user associations manage to establish themselves, they often become the prey of politicians more eager to defend their own interests than those of the majority. It is obvious that, if users do not get involved in regulating the price of water, results will remain partial and merely limited to the standpipe.

The standpipe: A strong alternative

The strategy of the household water connection—allowing a larger number of poor households to subscribe to the National Water and Electricity Society—guarantees an improved water quality and allows control of the price of water. However, it is not adapted to the current

urban dynamics, characterised by a rising and uncontrollable spatial and demographic growth, or to the economic and financial incapacities of poor households.

With this in mind, the standpipe represents an interesting alternative for poor households: The investment costs it requires are modest and it concretely improves drinking water distribution services in the city's poorest areas. Indeed, low retail prices are most adapted to the limited savings capacity of poor households.

The results recorded so far may not be entirely satisfactory for the entire distribution system, where the cost of drinking water remains too high at the household level. Yet, the new dynamic initiated around the issue of drinking water in urban poor areas—the establishment of new standpipes, the new management system, the control of water quality involving users—represents significant steps towards progressive regulation of prices and control over the distribution network.

Since the greatest challenge is the control of user prices, it is crucial to develop large-scale awareness activities and to gradually eliminate intermediaries, such as donkey-cart water vendors or private intermediaries whose only motivation is making profit, even if it seems detrimental to the poor urban populations. Hence, there are reasons to be hopeful that at the end of this ongoing effort, the struggle for water, so crucial in arid Mauritania, will finally be won.

Aichétou: Women solving their water problems

"Here, water is a major urban issue," says Aichétou, a woman shaped by the passage of time and the harsh realities of a poor urban life with the almost total absence of basic social services. Aichétou is the president of a co-operative association of 100 female heads of households. The association was initiated by UNICEF in Dar Naïm, an area in the suburbs of Nouakchott.

Dar Naïm, located northeast of the city, mushroomed after the 1980s, which had been years of drought marked by a large rural exodus. Today, the area has almost 80,000 inhabitants with six primary schools, one junior high school and two health centres. By organising themselves, the women of the co-operative have decided to alter the course of their destiny by taking into their own hands the area's main problem: supplying drinking water to their families.

Aichétou, her face serene and dreamy, likes to tell the story: "In the beginning, we did not know exactly why we should get together to sell water, which did not yield much direct profit for our members. But from early on, we understood that the future of our households depended on selling water. For example, prior to the project, my expenses for water for my five-member family were US$ 1.25, every two days. This was about a quarter of the total family budget. Even worse, not only was the water insufficient for my needs, it was also unhealthy and contaminated.

"Today, thanks to the project managed by our association, I can obtain good quality water at a reasonable price. We buy a 200 litre barrel of water for US$ 0.35. It used to cost US$1.38. Which makes it possible for us to save money. For example, I can go into town more often by using the money saved for transportation."

Her smiling face bursts with satisfaction as she takes out her calculator, loses herself for a moment in discussion with her vice president, then triumphantly declares: "I save $0.40 per day, or $144 per year. Apart from these savings, from now on I can count on the solidarity of 99 women, for our fire hydrant project. There are no longer isolated problems. The group can address all problems. If we do not find the solutions, we send a delegation to speak with the mayor."

Filled with pride, she says: "The mayor receives us anytime it's necessary. It's good to be organised. Right now, despite the absence of direct profit on the water, we are already mobilised to begin other activities." She then lists the endeavours:

- **Shops.** "We can sell basic necessities (tea, milk, sugar, oil, rice, wheat). We will sell these products cheaper than the local merchants, who take no pity on poor households like ours. And besides, having more shops will make it possible for us to sell traditional toiletry articles."
- **Community latrines and showers:** "Here, in our community, it is difficult to find a household with a decent shower." She bursts out laughing, "We are of the desert, but a nomad who stops wandering has to stop…and begin to adapt to his new environment."
- **Garden:** "The children's garden will not only give education to our children but will free us up to do more interesting, valuable work."

She continues, "This is why we think it is necessary to construct these infrastructures here, in order to enable the women in our group to improve their standard of living."

When asked if everything is perfect in the co-operative, Aichétou seems to lose her earlier eloquence and pauses before saying, more convincingly, "Our main problem at the moment is that the women's level of knowledge is very low. I have a secondary school education, and I can write more or less properly. But that is not the case for my sisters, who have only known Koran schools and, even then, only a few have enjoyed this privilege. I think that when all women can read and write, they will better understand their duties and rights with regard to the co-operative."

Services for the urban poor: lessons learned

by Eduardo Perez, Urban Environmental Sanitation Specialist, USAID-Environmental Health Project

The Environmental Health Project (EHP) continues to advocate for more attention to peri-urban environmental health and plays a leadership role in the Water Supply and Sanitation Collaborative Council's Working Group on Services for the Urban Poor. Both EHP and its predecessor WASH have published reports documenting their project experience and providing guidance and encouragement for other external support agencies involved in the challenging peri-urban environment. In peri-urban environmental health EHP has foccussed on capacity-building for institutions positioned to play an important role in delivering environmental health services in such communities. This article relates lessons learned so far.

Environment threatens life and health

In 1990, an estimated 600 million people in the developing world lived in urban environments that constantly threatened their lives and health, according to the United Nations Conference on Human Settlements (Habitat). Inadequacies in housing, water, sanitation, drainage, solid waste disposal and vector control, combined with poor health care, create harsh conditions and contribute to a heavy disease burden in such communities. The toll from infections and parasitic diseases is particularly extreme, perhaps as much as 50 times that of industrialized countries. Providing basic urban environmental health services—water supply, excreta collection and disposal, solid waste management, and drainage—to poor families living in peri-urban areas of the developing world has remained an elusive goal. Yet, the number of families living in peri-urban areas without basic services continues to increase.

Through work with USAID missions in Jamaica, Haiti and Peru, EHP has had the opportunity to apply principles and approaches for work with the urban poor to field conditions. In each location, demonstration projects provided urban environmental services to families living in peri-urban areas. The projects assisted in a range of environmental services, including water supply, sanitation, solid waste management and drainage. In addition to furnishing technical assistance during project implementation, EHP contributed to monitoring and evaluation efforts. EHP technical assistance to these projects has ended, but the project activities continue.

UNICEF/Marcus Halevi

These projects have shown that it is feasible to provide cost-effective urban environmental services and that urban environmental health conditions, even the most dire, can be improved. In addition to these three projects, EHP has helped communities and local authorities in Tunisia, Zambia, Benin and elsewhere to adopt a more broad-based, participative approach to urban environmental management.

Lessons learned

Lesson One: *NGOs can play an effective role in providing environmental health services in peri-urban areas where municipal structures are weak or absent.*

A major constraint to providing environmental services to the urban poor is the disconnection that exists between the urgent needs of peri-urban communities and the political will, the legal mandate, and the technical and institutional capacity of municipalities. EHP experiences show that NGOs can often fill the gap. They are socially committed, flexible and able to improve their ability to work effectively with poor urban communities. Key to this success is the willingness they have demonstrated to set aside their normal NGO role as 'implementor' for a new role as 'facilitator', or broker, between the informal communities and the formal private and public sectors. In all cases, EHP assisted the NGOs to experiment with their approach, to monitor their effectiveness and to develop a sustainable model to serve as an example for the municipalities. Along the way, the NGOs were able to identify policies and regulations in need of reform for NGO efforts to be replicated and scaled up.

Lesson Two: ***Providing environmental health services to peri-urban communities requires a range of disciplines.***

The traditional urbanization paradigm is based on the use of national or municipal utilities overwhelmingly dominated by engineers. Too often, a problem is considered as fundamentally a technical services delivery problem requiring an engineering solution. Experience has shown, though, that this paradigm does not apply to peri-urban areas. The urbanization process in such areas is more complicated. For example, families settle (often illegally) on poor-quality land and put up houses before urban infrastructure is in place; in formal urban areas, the process is reversed. In peri-urban areas, families generally earn their living in the informal economy and may be unable to afford infrastructure and service levels designed for formal settlements. In order to provide environmental services in the peri-urban setting, planners must draw from a wide range of disciplines, including institutional development, public health, social science, law, urban planning, and finance, in addition to engineering.

Lesson Three: ***Communities will provide the support needed to make community-based institutions effective if the NGO gives them full-partner status.***

Significant time was spent at the start of each project consulting with the communities about their needs, anticipated problems and ideas about realistic solutions. The process insured that the solutions were appropriate. And, more importantly, the process created an effective relationship between the NGOs and the communities, helping to develop among the residents a sense of ownership for solutions.

Lesson Four: ***Community-based institutions can provide quality environmental health services in peri-urban areas at a competitive price.***

In Haiti, a careful pre-project analysis revealed that households were paying significant amounts of cash for water from private vendors. Calculations showed that the special water district being established could charge the same amount, or even less, and provide more reliable and better-quality water, and it could also operate and maintain the water distribution system. When implemented, the resulting surplus was used to finance other critical environmental health services, such as solid waste collection.

Lesson Five: ***The level of environmental health services in peri-urban areas should be appropriate to income levels.***

NGOs in all three locations carried out careful analysis of the community demand and willingness to pay for services and then provided services at those levels. Charging for their services allowed all three institutions to recover costs and become financially self-sufficient.

Lesson Six: ***Demand for environmental health services can be created among residents of peri-urban areas.***

Environmental health experts generally agree that service levels should be consistent with community demand and willingness to pay for them, but they are sceptical that demand can be created. EHP's experience shows that, if an attempt is made to understand and respond to the perceptions and priorities of the community, it is possible to create demand. In each of the three EHP projects, the NGOs provided information on the effect of environmental conditions on the health of families and, in particular, on children. Information was made available on possibilities for improving those conditions and what it would cost. Demand for environmental services was thus created—even for services usually considered low-priority, such as solid waste collection and sanitation.

Lucas Clavijo

Challenges to success

Existing policies and regulations are constraints to providing services to the urban poor. While these EHP projects show that services could be effectively provided, most NGOs had to reveal creativity and boldness in 'bending' the rules to achieve results. Political will to lower such barriers posed by municipal or national policies or regulations is often lacking. The ultimate goal is to change policies, not to bend them.

Legal land title is the most prominent policy constraint because of the unwillingness of formal authorities to address the question. Typically, peri-urban dwellers are considered squatters and they have no prospect for obtaining legal title to the land on which they have built. Thus, a sense of impermanence reduces household incentive to make improvements, such as latrines.

Access to credit is still denied the urban poor. In spite of repeated demonstrations that the urban poor operate in the cash economy and are willing to pay for the services they want, ready access to credit remains a major obstacle. The successful project activity in Jamaica provided households with market-rate credit for the capital to build their sanitary solutions. Nevertheless, this was an exceptional case, and it is unclear whether new sources of credit will be made available in the future.

Formal institutions must change significantly if they are to be able to serve the urban poor. Even as municipalities and utilities begin to recognize the effectiveness of a more flexible, interdisciplinary, community-based approach in peri-urban areas, they still resist devel-

oping the skills and management systems needed to serve the urban poor.

Disaggregated health data is necessary. Data on peri-urban or informal urban areas should be separated from data on formal urban areas. Increasingly, anecdotal evidence suggests that health conditions are significantly worse in peri-urban areas than in formal urban areas, yet health and municipal officials devote little attention to peri-urban areas. A partial explanation for this inconsistency is that health and environmental data on peri-urban areas are rarely disaggregated from urban data, or that data-collection systems may miss peri-urban areas entirely because they are neither rural nor urban. So long as the urban poor and their health conditions continue to be 'invisible', their problems will not be effectively addressed.

'New' EHP

In July 1999, the U.S. Agency for International Development (USAID) awarded the continuation of EHP to the consortium led by Camp Dresser and McKee International Inc. The 'new' EHP, implemented through USAID's Population, Health and Nutrition Center, conducts operations research and promotes policies and new approaches to support USAID objectives in child health and infectious diseases. There is an emphasis on reducing the burden of diarrhoeal diseases, malaria and acute respiratory infections in children under the age of five. The five-year project will also provide technical assistance to USAID programmes, addressing a range of environmental health problems—from lead pollution to occupational health to air pollution—depending upon mission and bureau requests.

USAID has charged the new EHP with implementing and promoting new or improved cost-effective and scaled-up environmental health interventions. The challenge is to develop interventions that lead to maximal health results for each dollar spend.

Continuity and innovation will characterize the new EHP. Basic approaches for community-based activities and behaviour change will continue to be employed and refined. Water, sanitation, hygiene behaviour and tropical disease control will carry on as primary technical areas. The new EHP contract, however, leads off in new directions, with more attention paid to acute respiratory infections, infectious disease surveillance, and the relationship between natural resource management and environmental health, including a component that will award small grants to developing country NGOs.

Several firms in the Camp Dresser and Mckee consortium have been part of the team since EHP's pedecessor, the WASH Project, began in 1980 and ended in 1994. These are Associates in Rural Development (ARD), International Science and Technology Institute (ISTI), Research Triangle Institute (RTI), and Training Resources Group (TRG). The EHP team also includes John Snow Inc. (JSI); the Manoff Group, Inc.; Tulane University, School of Public Health and Tropical Medicine; and a newcomer, the Harvard Institute for International Development (HIID).

A new EHP Home Page is being developed on line and part of it is already up and running. Visit the site to keep up to date on EHP plans and directions for the future: *www.ehproject.org*

UNICEF and EHP worked together in the elaboration of the Handbook on Better Sanitation Programming. At the moment, they are investigating new areas of possible future cooperation.

Urban poor Harare from page 8

- Lack of formal employment
- Lack of latrines, causing disease and a polluted environment
- Inadequate water supply
- Need for full-day pre-school centres
- High levels of violence against women, and prostitution

Advocacy and action on child's rights

Launch of situation analysis

Guided by the UNICEF Monitoring and Evaluation Unit, the situation analysis was reviewed, finalised and printed during the first half of 1999. It will be used to publicize the plight of these marginalised urban poor residents to decision makers and help mobilise resources for the improvement of their health, education and environment. A launch is being organised for late 1999 for representatives from a broad spectrum of government and NGO partners: City of Harare Health Services, Ministry of Local Government, Ministry of Health, community organisations, rights groups and churches.

While the Blair VIP latrine has long been the standard in Zimbabwe, the special conditions found in these three settlements, particularly the limited space available and low income, have posed a challenge for innovation in waste-disposal technology.

Sanitation and child-rights project

Concurrently to the situation analysis, a project was developed to implement some of its most urgent recommendations, that is, to address poor sanitation conditions and to support community initiatives for child protection. Financed by the UNICEF Child Rights Protection Unit under an existing agreement with

continued on page 21

Rehabilitation of urban water supply projects—experience from Northern Iraq

By B.B. Samantha, WES-officer, UNICEF, Erbil, Northern Iraq

Background

The years of military conflict leading up to the Gulf War in 1991 and the subsequent civil unrest caused considerable damage to all basic infrastructures, including water supply in northern Iraq. Even before the Gulf War there was widespread damage to a large number of villages, and new towns were created to accommodate this population. There were large-scale migrations of people to the cities. This resulted in a skewed urban-rural population, with the urban population constituting over 70 % of an estimated 3 million total population. This, in turn, put a lot of pressure on the urban basic services. The pressure was greater in three cities, viz. Erbil, Dohuk and Sulemaniyah, where more than three fourths of the urban population lived.

The urban water supply scenario in northern Iraq in 1996

While the number of urban centers increased from 79 in 1990 to 157 in 1996, the estimated water supply from water projects dwindled from 297,000 m3 to 254,000 m3 per day. As per the multiple indicator cluster surveys (MICS) of 1996, over 95% of urban dwellers (encompassing both urban and semi-urban) in north Iraq, consisting of three governorates, viz. Erbil, Dohuk and Sulemaniyah, had access to safe water. However, a lowering of the water supply indicated a low per capita availability of water in 1996 when compared to that in 1990. Due to the UN sanctions, there was a ban on import of machinery and equipment for water projects (new and for replacement), and also on materials for the distribution network. Many of the pumps were old and worn out and were working much below their capacity. Lack of repairs to the existing water distribution network resulted in an increase of up to 35% to 40% water loss due to leakage, further reducing the quantity of water ultimately available to the people. Water quality also suffered due to the absence of adequate water treatment facilities and damage to the installations. Non-availability of water treatment chemicals like aluminium sulfate, chlorine gas and chlorine powder added to the problem.

Why the WES Programme in northern Iraq is unique:

Although UNICEF has been working in northern Iraq since 1991, its activities in water and environmental sanitation (WES) have grown both in terms of magnitude and complexity in recent years. As part of the humanitarian programme established by SCR 986 in 1995, UNICEF has been identified as the leading UN agency in WES sector; the other partners are UNCHS/Habitat and WHO. Unlike central and southern Iraq, where the UN agencies are expected to play the role of an observer, their role in the north is that of an implementing agency. This is unique for UNICEF in WES when compared to most other

Status of Urban Water Supply in 1996 and 1999 (Northern Iraq)

Type of Scheme	1996	1999
Deep well		
No. working	709	737
Total supply (m3/day)	13,712	17,319
% using chlorinator	36	64
Water treatment plants		
No. of treatment plants	10	10
No. of working pumps (intake)	24	41
No. standby	7	11
Intake (cum/day)	170,345	228,299
No. of booster pumps working	28	33
Total supply (cum/day)	156,558	211,538
Gravity		
No. existing	23	26
Total supply (cum/day)	21,072	23,232
% having facility for treatment	100	100
Others (surface/shallow well)		
No. existing	7	7
No. of pumps working	39	44
Total supply (cum/day)	49,300	53,750
% having facility for chlorination	100	100

Source: Local authorities

countries. Due to the embargo, every item to be imported to this region needs the approval of the sanctions committee at the UN in New York, which makes planning more complex. Under SCR 986, the amount allotted to UNICEF for WES has been close to US$125 million up to mid-1999. This constituted around 60% of the total allocation made to UNICEF so far under SCR 986 and makes the WES programme in northern Iraq probably the largest in the world. Around 70% of this amount is earmarked for activities in the urban sector that includes semi-urban areas as well; urban water supply accounts for three fourths of this with an estimated budget of US$80 million.

The rehabilitation strategy in urban water supply

Keeping in mind high coverage in terms of access to safe water and the worn-out machinery, equipment and the distribution network that need replacement and repair, the focus of UNICEF interventions in northern Iraq has been to rehabilitate the existing projects. This is to not only sustain the high coverage but also to increase the per capita availability of water by increasing the intake capacity of the existing water projects. Simultaneously, care has to be taken to ensure water quality through the provision of water treatment facilities and by plugging the leakage in the distribution network. Strengthening the capacity of the local authorities for greater sustainability also formed an important part of the strategy.

Water production and distribution: A need-based approach

There were difficulties in the planning processes for water supply in urban areas during the initial period. There were three major reasons for this: First, the local authority had no development plan, which was mainly due to the fluid political situation. Second, due to the short-term nature of each phase under SCR (each phase is of six months duration), it was difficult to take even a medium-term perspective of the urban water supply. Third, under SCR 986 the focus was more on the distribution of humanitarian supplies like food, medicine and books, and initially it was not realised that for WES, distribution of materials is not enough.

In order to overcome these difficulties, at the beginning of phase IV UNICEF undertook a quick assessment and prepared a distribution plan based on the need instead of an action plan based on the supplies received, as was done in the first three phases. The distribution plan for each phase was linked with that of the previous phase to have a synergistic impact. For water production, a two-pronged approach was adopted. First, an assessment was done of the potential for increasing the intake and the scope for phasing out the old and worn-out pumps. Second, the engineering college of the local university was commissioned to carry out a mapping exercise of the water distribution network to identify the areas needing repair and extension. These efforts have resulted in more systematic planning and speedier implementation, as may be seen below.

As of 31 August 1999, a total of 345 pumps have been installed, 95% of these during a period of 15 months preceding this date. The population benefiting from this is close to 1 million. Similarly, over 200 kilometers of the water distribution network has been repaired or extended during the same period, covering around 600,000 people. In addition, 146 pumphouses have been constructed or rehabilitated, increasing the pumps' efficiency by reducing the breakdown time and improving water treatment facilities by providing space for the chlorinators. Keeping in mind the erratic power supply, UNICEF has also provided generators to certain strategic locations. All these efforts have resulted in increasing the supply of water from 254,000 m3 per day in 1996 to over 320,000 m3 per day at the beginning of 1999, an increase of 25%. This was possible due an increase in the number of deep wells from 709 to 737 and the number of low-lift pumps (for intake) from 31 to 52. These achievements were possible due to careful planning, close rapport with the local authorities, proper monitoring and following up.

Water quality improvement: A multi-pronged strategy

During the first phase (1997), UNICEF was responsible for not only providing the water treatment chemicals but also monitoring the water quality, for which it had to procure chemicals for water testing as well. Subsequently, from the second phase onwards, WHO took the responsibility of water testing while UNICEF continued to take the responsibility of providing water treatment chemicals.

In 1996, before the SCR 986 programme was introduced, the percentage of water samples in the urban areas (including semi-urban) reporting bacteriological contamination varied from 16% in Dohuk to 30% in Erbil governorates; Sulemaniyah reported 22% contaminated water samples. Therefore, improving the water quality became a priority for UNICEF. The interventions included supply of water-purifying agents such as aluminium sulfate, chlorine gas and chlorine powder and installation of powder chlorinators. Once the supplies arrived in early 1998, attempts were made to use these in a phased manner. During the initial few months—although these interventions had a positive impact in reducing contamination in all the three governorates—the impact was more pronounced in Dohuk (from 16% to 6%) and Sulemaniyah (from 22% to 11%).

As there was only a marginal decline in the level of contamination in Erbil (from 30% to 26%), an investigation was made to find out the reasons. It turned out that a multiplicity of sources, illegal connections, lack of an adequate number of pump operators, together with the worn-out distribution network and inadequate monitoring of the water purification, had contributed to a high level of contamination. Of the 737 deep-well pumps existing in all of northern Iraq, around 450 (more than 60%) are in Erbil governorate and half of these pumps are in Erbil city. The governor of Erbil organised an inter-agency work-

shop in June 1998, at the request of UNICEF, to discuss the problems of water contamination. Based on the deliberations of this workshop, the governor introduced several measures to check contamination that included involvement of the religious leaders to educate people on water conservation, the adverse impact of illegal connections, punishment for illegal connections, the creation of around 200 pump operator posts and wide publicity in print and electronic media. UNICEF provided mobility support to the DWS for better monitoring of chlorination by the pump operators and ensured that all chlorinators received were installed. A programme was also launched to replace a sizeable length of leaking pipes.

All these measures had the desired effect of reducing the level of water contamination in Erbil city from 38% in June 1998 to less than 5% by March 1999. This was possible due to proper identification of the causes of contamination, timely corrective action and strong coordination between UNICEF and WHO, along with the local authorities. A similar approach has also been adopted in Dohuk and Sulemaniyah governorates with successful results. As of 31 August 1999, UNICEF supplied over 1,100 tons of aluminium sulfate, 450 tons of chlorine gas and installed 390 powder chlorinators in deep-well pumping stations. All the installations have now adequate water purifying agents.

Maintenance of water systems: A move towards sustainability

As mentioned earlier, most of the urban water systems are very old and need frequent maintenance, repair and sometimes complete replacement. Also, most of the equipment and machinery were of foreign origin. Non-availability of genuine spare parts in the local market and the formalities for importing spares were a big problem. At times, items requested for old equipment were reportedly out of production.

An analysis of the expenditure available from two governorates, Erbil and Dohuk, indicates that in 1990, the Ministry of Municipalities and Tourism (which is the nodal ministry for water supply and sanitation in urban areas) spent less than US$300,000 on repair and maintenance of both water and sanitation systems. This was reduced to a paltry US$120,000 in 1996. As part of its strategy to sustain the water systems, UNICEF embarked upon a plan to import essential spares and also provided the required cash for repair of water systems. The total amount earmarked for this purpose was close to US$3 million In addition, it was instrumental in persuading the local authorities to increase the number of maintenance teams to look after water treatment plants, chlorinators, deep wells and the water distribution network. As a result, the number of maintenance teams increased from 32 in 1996 to 40 in 1999. The increase in the number of engineers and technicians handling repair and maintenance is more impressive, from 78 to 118.

Simultaneously, a massive training programme for pump operators was taken up in 1999. So far, around 300 operators have been trained in pump operation and maintenance and in the use of chlorinators. Training on the use of computers to facilitate project planning and monitoring has been imparted to the concerned engineers. Arrangements have also been made to provide service training to engineers and technicians in the operation and maintenance of pumps and control panels in collaboration with the pump manufacturer. All these efforts will contribute to sustaining the gains already achieved.

Summing up

The humanitarian programme implemented by the UN in northern Iraq is unique both in context and complexity. As a lead agency for water and sanitation, UNICEF is handling a large number of urban water supply projects, with an investment exceeding US$80 million. In spite of the fact that this is relatively a new area for UNICEF, the progress achieved within a short span of 15 months has been considerable. While the rehabilitation strategy for water systems, both production and distribution, has proved effective in maintaining the high coverage, the coordinated approach adopted for improving water quality has paid rich dividends in reducing water contamination. Strengthening the maintenance system is expected to contribute significantly to greater sustainability. Considering the requirements of the region, a lot of things are still to be done. This makes the future tasks of UNICEF equally challenging.

Status of Maintenance Teams for Urban Water Projects

Project	1996	1998
Water treatment plants		
No. of Teams	4	6
Engineers	7	9
Technicians	10	17
Workers	37	57
Chlorinator/laboratory		
No. of Teams	5	8
Engineers	2	3
Technicians	15	20
Workers	12	13
Deep well/gravity		
No. of Teams	6	8
Engineers	5	11
Technicians	19	24
Workers	25	37
Water distribution network		
No. of Teams	17	18
Engineers	9	13
Technicians	11	21
Workers	134	166

Source: Local authorities

Plight of poor living in Brazil's dump areas

by UNICEF-Brazil

In 1998, 1,500 Brazilian children and adolescents moved from a life in Brazil's dump areas to a life that includes schooling. How did this happen? For one thing, a startling incident took place in the early 1990s. And more recently, an awareness process under way at the country's national level, concerning the problem of waste disposal with a broader perspective, has the social dimension as a key element. UNICEF is at the centre of this unprecedented phenomenon.

Background

Research indicates that nearly 45,000 children and young persons live and work in dump areas all over Brazil. Many were born in these places, to parents who themselves were born in them. From an early age, these youngsters have been exposed to the movement of trucks and heavy machines, to dust, to fire, to perforated and contaminated objects, and to rotten food. Most of these boys and girls do not attend school. The dump area is their classroom, their entertainment, their food and their source of income. Thousands of families eat what they find in dump areas. And where there are families, there are children.

Two studies were carried out over the past two years. The first, by UNICEF, was organized by Institute of Water and Life and concluded in September 1998. The second is the compilation of questionnaires sent to all mayors in Brazil, upon the launching of the campaign called 'Children in Waste Dump Areas, Never Again'. 1,956 municipalities acknowledge having children and teenagers living and working in dump areas. Half are in Brazil's Northeast region, 18% in the Southeast, 14% in the North, 7% in the Centre West and 12% in the South. Sixty percent of them live in cities with up to 50,000 inhabitants.

UNICEF's work in the area of waste disposal dates back to 1992 and resulted from an incident that drew the attention of the entire country. Several people working in the dump area of Aguazinha, in Olinda City, were poisoned and hospitalized after eating hospital waste. There was suspicion that human flesh was amidst the outdoor garbage, together with other kinds of waste. Five municipal projects were developed, three in the Northeast (Olinda, Palmeira dos Indios and Petrolina) and two in the North (Manaus and Rio Branco).

UNICEF/HQ97-0996/Jeremy Horner

The lessons learned after half a decade of substantive work, are found in the publication *Child, Trash-Picker, Citizen,* published by UNICEF-Brazil in 1998. Reflection on this experience has consolidated into the approach called 'Participatory Management of Urban Waste'. The difference from simple urban cleaning services, which are purely an engineering service, is a far more comprehensive intervention that involves the components of education, health, environment, housing, income and employment generation, and the promotion of rights. The actions this approach takes can only succeed in the presence of strong coordination among various interrelated sectors: federal, state and municipal governments; NGOs; companies; workers' unions; associations; and other segments of society.

Taking children and their families away from dump areas without additional interventions is useless, concluded the National Forum 'From Waste to Citizenship': Either they return or others replace them.

'Children in Waste Dump Areas, Never Again'

The Forum, which consists of 42 NGOs and Government Agencies working in waste, started in June 1998, one year before the launching of the 'Children in Waste Dump Areas, Never Again' campaign. Coordination for the creation of the Forum and the launching of the campaign to fulfil the goals of the Forum were headed by UNICEF. The idea to estanlish a Forum was the result of the work UNICEF was carrying out in the Northeast and North.

The National Forum has the following goals:

- eradicate child labour from dump areas;

- enroll all children living in dump areas at school;
- reduce child mortality;
- generate employment and income for families living in dump areas;
- recuperate regions degraded by dump areas;
- elect trash-pickers as priority partners for selective waste collection;
- eradicate dump areas.

To achieve these goals, the Forum focussed on nine activities: a national mobilization campaign; contest of experiences; coordination with the Prosecutor's Office; creation of a data bank; creation of a national training programme; coordination with funding agencies; identification and recommendation of solutions for social and educational inclusion; qualification of the demand and diagnosis.

The national mobilization campaign launched in June 1999 was very successful. The media gave unprecedented broad coverage to the question of sanitation, with the subject appearing in the headlines of the largest Brazilian newspapers and the issue discussed by the media. As part of the 'Children in Waste Dump Areas, Never Again' campaign, all of Brazil's mayors received a questionnaire on the situation of waste disposal in their city, as well as a Letter of Commitment by which they could adhere to the campaign. The mayors who returned the questionnaire and signed the letter then received a kit containing five publications:

- *The Mayor's Manual;*
- *Child, Trash-Picker, Citizen* (the publication mentioned above);
- *The Trash-Picker's Manual* (produced by the 'Entrepreneurial Commitment' for Recycling, CEMPRE);
- *The Selective Waste Collection Manual* (produced by Institute Polis);
- *The Prosecutor's Manual* (produced by the Federal Prosecutor's Office).

Of the 5,507 mayors, about 25% filled out and returned the questionnaire and signed the Letter of Commitment. Most of them manage cities with up to 25,000 inhabitants, which, taken together, comprise 11,244 children and adolescents working and living in dump areas. Of these, 62% of the returned questionnaires came from the South and Southeast regions, the most developed in the country.

An overall assessment of the campaign indicates that the mobilization was successful, especially due to the following reasons:

1. The question of waste disposal is closely related to everyone, as everyone generates waste.
2. A child in a dump area presents a picture that raises indignation, regardless of a person's place and political vision.
3. UNICEF has high credibility both in the sphere of public opinion and of the government and non-government sectors working in the social field.

Campaign results

During the 12 months leading up to the writing of this article, UNICEF has supported 10 projects of the 'From Waste to Citizenship' campaign, mostly in the Northeast region, at a cost of US$ 360,000.00. As a direct result of project activities, it is estimated that 1,500 children and adolescents were taken out of dump areas, given their birth certificates and enrolled at school.

In addition to implementing communication activities, disseminating experiences, and meeting the demand, the UNICEF Office in Brasília organized in August 1999, as part of the National Forum Workplan, the National Training Programme in Urban Management in Brazil and a Monitoring and Evaluation System for the Programme.

The innovative aspect of the training programme lies in its coordination with the various sectors involved in waste management. Thus, each part continues to take on specific share of responsibility but also acquires an overall vision of the problem. For example, an engineer who prepares a plan for a sanitary waste deposit is supposed to alert the local authorities about the situation of families living there.

No monitoring and evaluation instrument has yet been applied in accordance to the proposed model, and for this reason it has not been possible to determine the actual results achieved.

Representatives of the institutions that are members of the National Forum 'From Waste to Citizenship' are enthusiastic about the results achieved so far and the perspective that this type of coordination represents. There is general agreement about the innovative manner in which this work is being consolidated. The disputes that would have otherwise hindered the coordination of this group have given way to collaboration and the gathering of efforts to implement the work proposed by the Forum.

UNICEF's role of maintaining the focus on children is seen as a key one, thanks to its neutral position and high credibility. This approach facilitates professionals from various government areas to work together, as they know beforehand that credit will not be given to one specific ministry only, or to another. It can thus be stated that the National Forum 'From Waste to Citizenship' is actually managing to break a rooted taboo and implementing a national plan in a smooth way.

At the request of the National Forum, the Brazilian Institute of Geography and Statistics will include a number of questions about solid waste management in the year 2000 census, set to begin in April 2000. The census is expected to begin producing results during the first quarter of 2001. Therefore, important and detailed information will become available about exactly how many and which municipalities have dump areas, the number and ages of children and adolescents who work and live in them, the living conditions, and so on.

Meanwhile, state and municipal 'From Waste to Citizenship' forums are taking shape in various parts of Brazil, with different characteristics from place to place. In the state of Ceará, the programme started as a UNICEF initiative.

In the state of Santa Catarina, the Children's Court made the first step towards coordinating the institutions in support of municipal governments. In the states of Rio Grande do Sul and Minas Gerais, the initiative was taken by the respective Secretariats of the Environment. In every case, two underlying principles form the basis for work: an integrated vision of the problem involving various sectors, and the assurance of political support from the local government.

Challenges due to demand

The movement is expanding, and the present challenge is to face the demand generated by the campaign. A minimum infrastructure has to be formed to meet the demand and coordinate the internal and external actions of the National Forum. The government staff who are members of the Executive Secretariat of the National Forum are there because they were authorized, albeit informally, by their supervisors to perform tasks other than their regular ones. There is recognition that UNICEF has carried out most of the activities, ranging from coordination at various levels to routine office tasks. But the mobilization resulting from the activities of the National Forum 'From Waste to Citizenship' has generated an increasing level of demand for which UNICEF is not prepared. There is no central office, administrative support, or efficient communication system among the Forum members, the ongoing projects and the public at large.

Conclusions

The main lessons learned during this process are summarized as follows:

1. The approach to the question of waste management—with the focus on children and adolescents and involving various sectors in an integrated manner—has been very well received by government authorities and institutions dealing in the issue. The press and public opinion also noted the approach, due to the importance of the theme, the ethical dimension of the presence of children in dump areas, and UNICEF's widespread credibility. There is thus a favourable environment for a basic cultural change in the country insofar as social questions are concerned, based on an experience that resulted from combating the permanence and work of children and adolescents in dump areas.
2. In addition to its valuable technical cooperation, UNICEF plays an important role in the establishment of forums and programme implementation: It implements political coordination. Being politically neutral with no partisan viewpoint, and having unquestionable credibility throughout the country, UNICEF has the mobilization capacity that is fundamental to the elaboration of a plan whose main goal is to put into practice: 'Children in Waste Dump Areas, Never Again'.

■ **Urban poor Harare** from page 15

the city of Harare, the project again draws upon the expertise of Mvuramanzi Trust in sanitation technology and hygiene education and of IPA in PRA and child-rights promotion. The project period is to be July 1999 through December 1999.

The project has two parts:

1. Child-rights promotion in Hatcliffe Extension, including:
   - PRA research to understand existing community structures that promote child rights, and community workshops for planning child rights interventions
   - Training of community leaders and rights committee members in leadership skills and child rights
   - Promotion of child rights in the wider community
2. Sanitation, participatory health and hygiene education in Dzivarasekwa Extension and Hatcliffe Extension, including:
   - PRA research of key issues surrounding water, waste disposal and community health, and community workshops for planning implementation
   - Training of community members in environmental health issues
   - Latrine design, testing and construction
   - Water point rehabilitation and training of management committees

Innovative latrine designs are a key component of this project. While the Blair VIP latrine has long been the standard in Zimbabwe, the special conditions found in these three settlements, particularly the limited space available and low income, have posed a challenge for innovation in waste-disposal technology. Concepts of eco-san for recycling waste as a precious fertilizer have also directed the work.

During project implementation in Dzivarasekwa Extension and Hatcliffe Extension, several low-cost designs for households will be built and tested using a variety of materials. Community acceptance, convenience and durability will determine which options will be in most demand.

Conclusion

This project has incorporated the best principles of good programming: assessment and analysis of the situation of children, participatory approaches, internal and external partnerships, intersectoral collaboration, advocacy, community capacity building and empowerment. It is hoped that such participatory approaches can be modeled for use in other marginalised communities throughout Zimbabwe.

The shift to poor urban areas: A strategic approach to cost-effectiveness in water, environment and sanitation

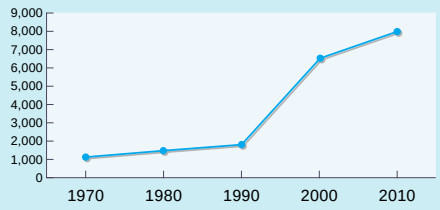
By Antero de Pina, Assistant Project Officer, UNICEF-Cape Verde

Background

An archipelago of volcanic islands off the Atlantic coast of West Africa, Cape Verde has a population of approximately 417,000 people (1998). About 50 percent live in urban areas. The population growth rate for the entire country is estimated at about 2.5 percent. However, the growth rate for urban areas stands at 4.5 percent.

Water supply and sanitation coverage in rural areas has always lagged behind the urban areas of the country. The situation has reached critical proportions on Santiago, the most populated island of the archipelago and home to more than 50 percent of the country's population.

Population growth and projection in Chao Bom (1970–2010)

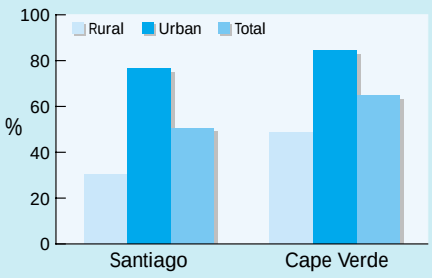


The government of Cape Verde and UNICEF established the rural and poor urban areas on the island of Santiago as priorities in the current Programme Cycle (1995–1999). So far, more than 20,000 people, mainly in Santiago's rural areas, have gained access to drinking water.

Intervention strategy

High per capita costs have presented major obstacles in efforts to increase the coverage in the widely dispersed rural areas. Because of the large migration of people from rural areas to cities, the government and UNICEF have started to pay more attention to the poor urban areas.

Water coverage (1996)



The project implemented in the community of Chao Bom in the District of Tarrafal in Santiago is a good example of effective partnership among the government, UNICEF, the municipality and NGOs. Chao Bom is a urban poor community located about one kilometer from the main urban centre of the Tarrafal District. A large community, Chao Bom's population, bigger even than the urban center, numbers an estimated 6,500 people in the year 2000 and is expected to rise to about 8,000 in 2010.

From the project's inception, in 1997, the municipalities, the NGOs representing the community, the central government and UNICEF were involved in the discussion of the Terms of Reference for the preparation of plans to execute the project. The process progressed slowly, as many interests were at stake. At first, UNICEF was very concerned about the costing of the project, because the costing would allow for project sustainability. However, the discussion process was so successful that all partners were convinced that the preconditions existed to start the largest single community project supported by UNICEF-Cape Verde.

The project, which concluded in April 1999, included the following components:

- Equipment for a bore hole (capacity of 30 m^3/hr) with a 40 KVA generator and a submersible pump (SP 27-282).
- Construction of a reservoir with a storage capacity of 300 m^3 (two cells) with control chamber.
- Network of about 4.5 km of water lines.
- Construction of two major water distribution points; rehabilitation of one water point and connection to two old water points.
- Water connection to two primary schools and one kindergarten.

The project...is a good example of effective partnership among the government, UNICEF, the municipality and NGOs.

A public state enterprise and the National Water Resources Management Institute constructed the project. The municipality of Tarrafal, UNICEF and NGOs monitored the implementation.

Community participation in the project took place in the planning stage through two local NGOs (Association for Promotion of Women/MORABI and Association of Friends of Chao Bom/AACB). The two NGOs then represented the community in all the stages of the project. MORABI was able to gather

funds to construct a new water distribution point, and AACB provided voluntary labour on weekends in the rehabilitation and enlargement of one major water distribution point in cooperation with the municipality.

Community participation in the operation and maintenance costs will integrate a scheme to allow the NGOs to manage directly some water points under a special contract with the municipal waterworks services. What's more, the community is willing to pay for the water production costs (water tariffs are estimated at US$1-$1.5/m^3).

Direct investment costs of the project totalled approximately $300,000.[1] UNICEF contributed $85,000 (28 percent); the government, $200,000 (67 percent); and NGOs, $15,000 (5 percent).

[1] All dollars are US.

Typical water distribution point that includes washing stands and showers.

Considering the actual and the potential coverage, per capita cost is estimated at about $100, very low, considering that most of the water projects supported by UNICEF-Cape Verde need per capita investments of more than $200. The high population concentration was one of the major factors in the cost reduction. In addition, the effective participation of other partners in all the project phases—planning, construction, monitoring—was a major motivating factor to speed up the implementation.

...there is great potential to improve coverage in urban poor areas of Santiago at lower than traditional costs.

Results and impact

Five public water points now serve the community. The municipality, in cooperation with the NGOs, takes care of the operation and maintenance of the system. A contractual agreement with NGOs for water-point operation and maintenance is under consideration. The drinking water provided to the community has increased from 60 m^3/day to about 200 m^3/day. Hence, per capita consumption has the potential to increase from 10 to 30 lpd. In addition, water connection in two major primary schools stands to benefit some 1,200 school children and to strengthen hygiene education efforts.

Due to the high operation and maintenance costs of the existing system, the municipality has now established as a priority the implementation of household connections. The community is willing to pay for water production costs, estimated at between $1 and $1.5 per m^3 on average. The waiting list for household connection is so long that the municipality is preparing a specific implementation plan.

Conclusion

This experience has shown that there is great potential to improve coverage in urban poor areas of Santiago at lower than traditional costs. Furthermore, while the involvement of various partners might slow down the planning phase of the project, it is instrumental in the construction and monitoring stages, as there is a synergistic and gap-fitting effect that creates an inertia during the construction. This holistic approach to water projects in urban poor areas has given UNICEF a higher visibility with other major donors, and an opportunity to leverage resources and take on the experience in the next Country Programme (2000–2004).

Urban environmental sanitation from page 2

in handling urban water projects in other areas with similar socio-economic and political environments.

- The Integrated Management of Solid Waste Project taking place in Istminia, Colombia, has succeeded to empower women and generate an income for them. The programme was implemented with the participation of local and national authorities and the community, in particular women.
- Despite its notoriety as a tourist destination, Acapulco is a city with many disparities between rich and poor, and it is one of the most polluted cities in the world. Through the implementation of an ecological sanitation project for the urban poor, UNICEF has shown an alternative solution to alleviating the environmental health problem.
- In one of the poorest regions of Argentina, UNICEF promoted the implementation of programmes in basic integrated health, including the provision of drinking water, environmental health and housing improvement, and training programmes.
- In Santiago, Cape Verde, the Government 'learned' through UNICEF's example that water coverage in peri-urban areas can be increased and

continued on page 30

Integrated sanitation and housing improvement in low-income communities in Argentina

by Martin Delucchi, Consultant, UNICEF Argentina

Background

Chaco Province, located in the northeast part of the country, is one of the poorest parts of Argentina. The province was in the grip of a widespread crisis that was increasing already existing structural poverty. The crisis further worsened the living conditions of large sectors of the population, particularly the most vulnerable: women and children. According to current indicators, 48% of the population does not have access to drinking water and 86% does not have acceptable sanitation systems.

Faced with this situation and armed with the objective of seeking alternatives in order to improve living conditions and reduce health risks of these populations, UNICEF, at the end of 1994, signed co-operation agreements to promote solutions with particular attention to children. The first was signed with the Chaco Lottery and subsequently with the provincial government. In this context from 1995 to 1998, UNICEF encouraged implementing a number of community experiences—in basic integrated health, including the provision of drinking water supply systems, environmental health, housing improvement and training programmes—in suburban areas in the southern zone of Resistencia, capital of Chaco Province.

Proposal criteria

From a child rights perspective, the activities developed are aimed at generating social, economic, physical and environmental conditions that promote child health, both at the family level (the home) and in the child's immediate environment (the neighbourhood and community). These activities make it possible to establish adequate conditions for the child's growth in harmony with the environment and give particular attention to the influence that water and sanitation have on child health.

...the projects to provide drinking water and environmental sanitation to low-income suburban settlements [were] set out in an innovative proposal with a traditional focus...

The provision of basic sanitation services, and adequate domestic equipment to make the most appropriate use of them, was identified as the most appropriate strategy in light of the high level of unsatisfied demand and chronically inadequate resources.

The development of the projects to provide drinking water and environmental sanitation to low-income suburban settlements was set out in an innovative proposal with a traditional focus, making it possible to generate a progressive and sustainable process to improve living conditions.

The projects presented here were undertaken with the basic intention of establishing a gradually evolving productive process for housing and the environment. They begin with the necessary territorial consolidation of the population by means of land and urban regularisation mechanisms in order to achieve the necessary legal tenure of land and the optimum spatial organisation for use of the networks and services.

Through collective actions, the community gains the ability to organise and manage so that it can participate and make decisions to improve the neighbourhood (the provision of basic infrastructures). The community subsequently operates and maintains the services installed according to the capacity and skills developed.

From the organisational structure that develops through implementing the basic sanitation project, it becomes possible to extend these improvements to the neighbourhood and family unit by introducing these services to every home and by constructing adequate sanitation and environmental installations for the most appropriate daily family and domestic use of the water recipients. This will be the source of housing improvement and sustainable social development.

PRODUCTION PROCESS FOR PROGRESSIVE HABITAT

PHASES	LEGALIZATION OF LAND RIGHTS	URBAN IMRPOVEMENT	HOUSING IMPROVEMENT
LEVEL	Informal settlements	Under-serviced suburban neighbourhoods	Community and family groups
MAIN OBJECTIVES	Urban consolidation of land and populations	Provision of basic sanitation and environmental repair	Home sanitation and progressive housing development
SECONDARY OBJECTIVES	Development of particip. management guidelines Land and urban regularization Neighbourhood and community organization Development of training mechanisms	Community organization for construction Articulation of actors and resources Self-management by the community for the provision of the services Health and environmental training	Construction of integrated sanitation systems by the community Community improvement and facilities for social services Solidary mechanisms to improve housing Productive, sustainable development
ACTORS	Organization of residents Municipality Land legalization Programme/NGOs Private owners	Local committees Municipality Public services company Ministry for health Secretary for social development/NGOs Employment programme	Local associations Municipality Financial organizations Housing department Private companies NGOs/university Employment programme

Methodology guidelines

A series of basic theoretical premises underpin the development of a strategy to meet objectives that adequately address the state of chronic resource insufficiencies and the historical

characteristics of the social context giving rise to such situations. The principal premises are the mobilisation of funding sources and the integrated participation of all of those involved.

Present conditions in society make it necessary to promote actions that will have a high impact on the life of its members so that all sectors can develop by undertaking the construction of housing through shared efforts, participation, co-responsibility, sufficient information and active participation. The main objective—an acceptable quality of life—is achieved in two simultaneous, interactive ways: by satisfying basic physical needs and by strengthening the capacity of those involved to take action appropriately according to the rules of a democratic society.

The organisational and operational structure of the projects was developed with this general direction. The structure also serves as an experimental framework for a model of organisational management, with a view to promoting the participation of the actors and the mobilisation and optimisation of resources on a community, public and private level.

The organisational model was developed on three interrelated levels—financing, co-ordination and implementation—with the different actors interacting according to their skill and competency levels in a participatory management process to develop the various phases of the projects.

The Inter-Institutional Board, in which the model finds its most complete expression, integrates all the actors involved (technical, institutional and community representatives). It is responsible for conducting project operations, channelling communications and management among the institutional and social participants, resolving conflicts and promoting agreement among those involved.

The basis of an operational structure to best accomplish the established objectives is found in a methodological plan aiming to create among the different actors involved the maximum space possible for concerted and mutually agreed action on an equal level.

The underlying aim of the programme is to use the experience from these projects to replicate and generate local projects. This will make it possible, using the organisational structure, to establish a suitable technical and administrative network to respond to the needs identified, promoting efficient institutional operational decentralisation and better use of social investments.

The organisational model was developed on three interrelated levels—financing, co-ordination and implementation....

A preliminary survey of the area where over 4,000 inhabitants had no access to safe drinking water or purchased it from private vendors made it possible to identify different situations in the settlements with varying degrees of complexity. These were land ownership; places where the environment had been contaminated by excavation pits serving as dumps; the heterogeneous socio-economic profiles of the families; contrasting levels of representation in existing formal organisations; various forms of inter-community conflict; and varying degrees of need and available resources in the communities.

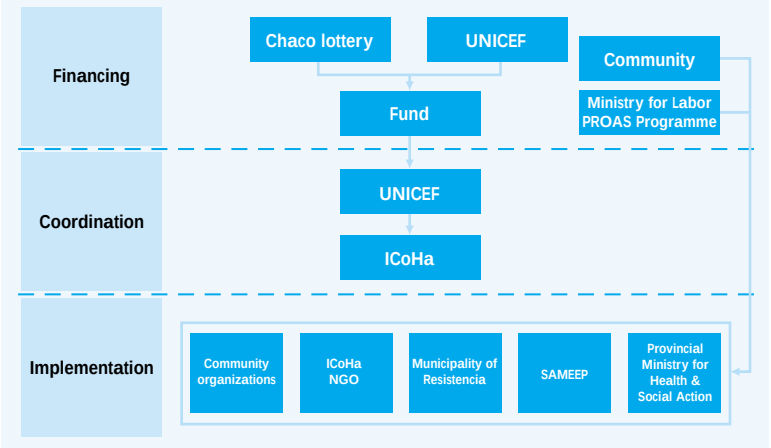
The project started in mid-1995 with the installation of a drinking water network in the five neighbourhoods. This involved the extension of water networks to integrate the area into the urban infrastructure, the adaptation of family dwellings from unsafe methods of getting and using water, and personal and domestic hygiene training.

From a social operations point of view, the intervention method applied linked the components of the process in an interactive manner as follows: inter-institutional participation, inter-community organisation (given the scarce existing links among the neighbourhood committees) and undertaking public works projects. The strategy of establishing an inter-community organisation made it possible to increase the participation of the rest of the inhabitants in the various project components; to increase the inhabitants' confidence and credibility with regard to implementation, such as in community and inter-community representation; to decrease party political participation in the development of the project; and to incorporate more democratic mechanisms established among the neighbours and the *Manzeras* ('woman in charge of the block') Inter-Community Committee.

The existence of a settlement on illegally occupied government lands and the existence of a garbage excavation pit containing a high degree of environmental contamination were the determining factors for initiating land regularisation and the elimination (landfill) of the dump. On the one hand, it made it possible to carry out a redesign experiment of the settlement; and on the other, to complete the water network and house connections.

Based on the premise of maximum participation and using the inter-neighbourhood organisational structure established in the first

Management Model for Drinking Water Network Neighbourhoods: Don Alberto, Fecundo, Peron, Villa Nueva and Palermo 2



project, the task of regularisation of the neighbourhood was carried out. Using participatory techniques, the necessary space for negotiation was created between the inhabitants and the technicians (by the Municipality and IcoHa) in which priorities, necessities and hopes were brought into line with spatial possibilities (number of families to be placed and land available) and legal possibilities (municipal regulations for the sale of government lands).

The outcome of the participatory design was: all families were mapped, as agreed between the inhabitants and the technicians, and the resulting mapping was subsequently submitted to the Municipality for its approval. The Municipality of Resistencia carried out the survey at the start of a second project, with community participation in management and monitoring. Once this was completed, steps were taken to legalise the process.

The project's objective was to develop a pilot experiment in integrated (family and community) sanitation and to contribute to a progressive housing solution, based on the criteria of gradual development of the habitat through the reinforcement of grassroots organisations managed in the first project.

Throughout the process, acquiring the tools and skills to participate in making important project decisions strengthened the community's organisation capacity. In this way, the people and technicians involved were able to carry out a joint evaluation of the area. This made it possible to create space for the relationships necessary to negotiate and develop the proposal in order to bring needs and hopes into line with possibilities and financial realities. The result was a proposal for physical intervention on two levels: the family and the neighbourhood.

At the family level, a proposal was developed based on the criterion of equality in finding solutions. It involved an effort to balance the situations observed so that all could arrive at a common solution. The proposal was also based on progressive solutions. It enabled families who had one or more dwellings constructed to build a small sanitary unit (indoor bathroom). This would contribute to the dwelling's development in a way that would have been impossible for the families to achieve with their own resources. A decision was also taken to build houses with indoor bathrooms for families living in unsafe dwellings.

The neighbourhood improvement scheme was based on the treatment and elimination of liquid sewerage, which, together with the house-to-house installations, made it possible to integrate the water circuit, introducing an innovation from a technological point of view. The innovation was the design and implementation of a small-scale sewerage network with home septic tanks, whose upkeep is the community's responsibility.

Now, the community is in charge of the internal collection to pay for the service.

With regard to social organisation, it was possible to strengthen the channels and mechanisms for participation and organisation as a way of continuing the process initiated in the first project through an interactive and dynamic system of group cohesion. This was adapted for the inhabitants of each block and their block representative, who worked together at different levels of action and responsibility in the framework of an inter-community organisational structure and who had active participation in decision-making, management and project implementation.

Community representation on the inter-institutional level assigned participation according to the skills and dexterity acquired in decision-making, negotiation strategies and reaching compromises. As a corollary, the community undertook responsibility for maintaining the sewerage network through the collection and monthly administration of an established minimum quota earmarked for the operation and maintenance of the system.

On completion of the project, as a further step in consolidating the community's development of social organisation based on demand from neighbourhood inhabitants, UNICEF, using donated financial resources, established a centre for child development. The neighbourhood community was actively involved in its management and construction.

An area close to the previous intervention site was chosen because of the completion of the installation of the drinking water network in the southern zone of the city and the territorial proximity of all parties involved. This intervention site presented physical characteristics similar to those of the first project.

A preliminary study carried out in the first phase of the project revealed many similarities in land ownership: the majority were, or were about to become, tenant-owners; the remainder were non-owner tenants; and a small proportion were occupying government lands that were about to be resolved. These similarities were also apparent in the socio-economic profile of the population—relatively young and having few resources, with most of the population actively employed, yet a high percentage unemployed.

The development of a social project similar to the first project was made possible by applying an intervention method. It brought together processes related to social organisation, inter-institutional co-ordination and the construction of a drinking water network. However, this experience differed from the first projects in that the operational work units were established through the participation of 'sector representatives' (identified based on norms and criteria of physical proximity adopted by their own neighbours) replacing the 'block committee representative'. They became a link between each resident, the inter-neighbourhood organisation and the project.

Because of this community's organisation, co-responsibility with the Water Company was possible by developing a system of macro measuring. Now, the community is in charge of the internal collection to pay for the service. This

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User perceptions in urban sanitation provision: a briefing paper

by Darren Saywell and Andrew Cotton, Water Engineering & Development Centre, Loughborough University, United Kingdom

In 1998, the Water, Engineering and Development Centre (WEDC) published the findings from three years investigation into on-plot sanitation[1] in low income urban communities. This work raised some interesting points regarding discrepancies between user and sector professionals' assumptions about the appropriateness and efficacy of household latrine sanitation systems. This article discusses some of these issues.

Background

The most important feature of the investigation was that it focused on the *perceptions* of the users of on-plot sanitation. All too often, assessments and judgements on effectiveness and appropriateness are made from a technologically biased and purely external perspective. One can observe that many evaluations are done by those who are hardly likely to themselves be regular users of improved pit latrines. Thus, most attention has focused on an attempt to establish what the concerns of the users of on-plot systems were in urban areas and to reflect these in guidelines for selection.

Key Findings

User satisfaction

- Householders' decisions to invest in domestic sanitation are typically driven by socio-cultural rather than health factors;
- In all but one case, users express high degrees of satisfaction with their latrine (in excess of 80% recording 'satisfied' or 'very satisfied'). Bucket/pan latrines record by far the highest levels of dissatisfaction;
- Many users do not perceive there to be a problem with their latrine. Where problems are recorded, the most common include 'emptying', 'smell' and 'insects', although absolute figures are low;
- Of these three problems, 'emptying' and 'smell' have the most impact on satisfaction levels and ability for the user to use the latrine.

Householders' decisions to invest in domestic sanitation are typically driven by socio-cultural rather than health factors.

Odour and insect nuisance

- Only small percentages of households perceive odour and insect nuisance to be a common problem with their latrine (although nuisance of this kind does have a significant impact on satisfaction levels);
- Bucket/pan latrines register the highest nuisance levels of all latrine types.
- Relative to other latrine types, VIP's record higher than anticipated levels of odour and insect nuisance. There is little conclusive evidence to suggest a link between odour and insect nuisance and height of vent above roof line, presence of fly screens, vent pipe colour and diameter of pipe;
- Anecdotal evidence raises doubts about domestic latrines as the primary source of insect nuisance on-plot.

Absence of household latrines

- A key reason for the lack of household latrines is poverty, rather than lack of available space on-plot. Poverty, and/or the inability to save funds to invest in longer term sanitation facilities are key constraints;

Plot size

- Levels of user satisfaction were not significantly affected by the incidence of small plot size;
- There is little indication that plot size is associated with particular operational problems. Where the most common latrine problems were noted, they were spread across all size categories.

Discussion

The assertion that on plot sanitation systems are inappropriate for low income urban areas does not match with experience from the field. Findings from this research indicate that a variety of lower cost systems are found to be performing well on small plot sizes, with limited odour/insect nuisance, without significant operational problems and to the satisfaction of the end user. However, there still exists a significant gulf between the perceptions of sector professionals and those of the community when regarding the appropriateness of on-plot sanitation in the urban context. This in turn may limit the opportunities for widening sanitation options at the local level. The findings from this work show that professionals' understanding of key issues such as insect/odour nuisance, or the operational problems associated with on-plot systems must be advised by the opinions and perceptions of those who actually use the system.

Clearly a participative exchange of opinions and experiences is required between communities and local authori-

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[1] On-plot sanitation systems are those which are contained within the plot occupied by the dwelling. On-plot sanitation is associated with household latrines, but also includes facilities which are shared by several households living together on the same plot.

'Prosperous' Acapulco plagued by unplanned growth

Environmental sanitation project turns into a multisectoral programme

By Dirk Glas, WES Consultant, UNICEF-Mexico

Introduction

Acapulco: the city known worldwide as a prosperous holiday resort like many others suffers problems of unplanned population growth. The migration of indigenous people from rural areas to Acapulco is one of the major causes. In search of a better place to live and an income that averages about US$80 per month, 'thanks' to the tourist sector, they often end up residing in a house made of tree branches and leaves, without access to safe drinking water or sanitary services. This article relates a first experience in a periurban ecological sanitation project developed and implemented in Acapulco, in the state of Guerrero, one of the poorest and most marginalised of Mexico.

The municipality of Acapulco is a fast-growing city with more than 1 million inhabitants. Divided into 52 urban districts, it has about 130 rural communities. In 25 of the 52 districts, one can observe a growing and expanding territory of indigenous immigrants from other states. Local citizens and governments have traditionally closed their eyes to the problem.

Background

UNICEF entered the picture in 1995, when it implemented a pilot project, today referred to as a 'learning project'. The objective was to draw the attention of governments as well as Mexican society as a whole to Acapulco's problems. In one low-income urban district of Acapulco, in cooperation with the local health jurisdiction and the State Health Ministry, UNICEF planned and organized the construction of 100 ecological latrines to improve the living conditions of families there. When this pilot project was executed in January 1996, a small group of counterparts formed a Municipality Committee to work together with UNICEF on a second phase of the project. The committee was made up of local entrepreneurs, hotel owners, schoolteachers and representatives of the Municipality Office.

UNICEF wanted this private-sector group's involvement since it was the only guarantee of continuity for the project, because Guerrero has proved to be politically unstable. In the previous four years, three different governors took the highest position in the state, and Acapulco changed mayors three times, each with his own priorities.

The project came to the attention of the media when a reporter published a story of two families who saved their lives by hiding in one of the latrines during the hurricane.

The project's second phase gained more urgency when it was decided that $24 million would be invested in the construction of periurban sewerage. The impact of this system on the local natural habitat and its ecosystems in general would be disastrous, and it was concluded not to be a long-term sustainable solution. In addition, a sewerage system of that dimension requires:

- a complex and cost-intensive infrastructure for its construction, functioning, maintenance and operation; and
- a continuous flow of maintenance and rehabilitation costs.

Furthermore, the system would keep on contaminating the bays of Acapulco and need water to function, which is becoming scarcer.

The second phase

After the pilot project was evaluated—looking at the costs per beneficiary of each latrine (US$50), the community organization and the hygiene education aspects—UNICEF produced a promotional video for fund-raising and dissemination purposes. During a state meeting where the results were presented to the media, the Working Group officially announced the start of the project's second phase, showing a video and making an appeal to Mexican society to donate funds to execute the project, which comprises:

- construction of 10,000 ecological latrines in 25 target districts over a three-year period;
- education of 50,000 people in domestic hygiene;
- training of local bricklayers;
- organizing of local committees to help organize community participation and to be focal points for hygiene education.

Additional objectives are:

- design and implementation of a model, which could be duplicated in other cities with similar characteristics;
- reallocation of federal, state and municipality funds.

Important project strategies are:

- social mobilization and communication content for the project's self-financing; *continued on next page*

- strengthening of the decentralization process of the health sector;
- citizen participation in the organization, execution and evaluation of the project;
- active private-sector participation in fund-raising and dissemination actions;
- institutional capacity-building, because of the infrastructure and because the internal organization of the health jurisdiction is not able to coordinate the project.

The chronology of the different activities within the project cycle:

- Analysis of the situation, data interpretation and problem setting.
- Identification of possible solutions, design, implementation and evaluation of the pilot scheme.
- Decision to continue the initiative, formulation of a second phase and programming of start-up funds.
- Dissemination of results and organization of a multisectoral working group.
- Agreement for collaboration with local university of medicine to place 'disposal' students at the projects, who will assist in the education at community level (seven district committees were created) and at family level.
- Initiation of the second phase and dissemination of this initiative.
- Constant process of monitoring by community and district health promoters, who are responsible for analysing the impact of the project on the health status of the target population.

The support of universities in social development processes in general is invaluable...

Hurricane delays

In 1997, hurricane Pauline blew through the area, interrupting the project and leaving behind much destruction in the coastal zone of Guerrero and Oaxaca. The project came to the attention of the media when a reporter published a story of two families who saved their lives by hiding in one of the latrines during the hurricane. Project delays lasted for more than six months. Due to the misdeeds of important politicians during the post-emergency situation, local and state governments changed and, again, local and state governments had to be convinced to allocate funds to the project. Thanks to the private-sector committee and their influence in the municipality organization, it was agreed that the municipality would buy cement and other construction materials and that the State Secretary for Social Development would obtain funds for manual labour and for education.

By the end of 1997, the project extended its target areas to some damaged rural communities. Ecological latrines were built, water purification systems were installed, open shallow water wells were protected and improved. A strong domestic hygiene education programme called 'Health Starts at Home' began, and a domestic waste campaign to sensitize the people on how and why to process domestic waste was organized. Another important factor took place: the local government decided to invest more

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ties. The participation of communities in the development process has become a critical element in contemporary project design and management. In some cases, project financing is conditional on the application of participatory processe. However, it is clear that achieving effective participation, and bringing about a closer alignment of perspectives is more difficult to achieve.

The reasons for this are diverse, and have been documented elsewhere (Wright, 1997; Abbot, 1996; UNCHS/ CityNet, 1997). A key constraint is the practical problem of integrating two stakeholders with different defining characteristics (i.e., the formal/rigid procedural nature of local authorities, and the relatively more flexible and dynamic nature of community based organisations) (Siddiqui and Rashid, 1997). These interfaces, or points at which different stakeholders interact, are critical to engendering wider stakeholder participation. Frequently, however, the institutional arrangements and working culture of local government can conspire against effective communication between different partners. For instance, the capacity of local authorities as institutions may be constrained by factors including a lack of legislative or administrative authority, limited political support, inappropriate organisational structure, skills, staff or systems to effectively integrate participation into the process of delivering infrastructure services. To compound this situation, many local authority officials may fail to accept or misperceive the role and value of community participation in what was previously the domain of technical staff.

The assertion that on-plot sanitation systems are inappropriate for low income urban areas does not match with experience from the field.

The identification of differences between user and sector professional perceptions of technology choice and performance is instructive as a reminder of the need to constantly question in-built assumptions. Beyond this, there are wider and potentially more challenging questions to be asked about the most effective way in which the gulf between these perceptions can be spanned.

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money in the investigation and monitoring of the project to be assured that the latrines constructed were being used properly. Step by step, the project that started as an environmental sanitation project for periurban zones turned into a multisectoral programme.

Lessons learned

- Environmental sanitation is a multisectoral issue: Aspects such as social-cultural environment, economic environment, health environment and domestic environment are indicators one can apply for feasibility studies.
- Dry ecological sanitation is becoming an important rival for conventional solutions such as sewerage systems.
- Dry ecological sanitation is an appropriate answer for sanitation problems of low-income urban areas and responds to the needs of the local population.
- Evaluation and the dissemination of the results is an important tool for creating political will. Special agreements with local media companies facilitate this process.
- The support of universities in social development processes in general is invaluable, and they are normally willing to cooperate. Having been involved in a UNICEF project often means a step ahead for students who are at the point of finishing their studies and applying for jobs.
- Private-sector involvement in the project, as well as in the dissemination and fund-raising activities, is a key strategy for the sustainability of the project.

Conclusions

Although the project will not finish according to its time schedule and some objectives will not be reached, the project is considered a success. It achieved the involvement of an ample representation of Mexican society, a strong collaboration with local universities, reallocation of state and municipality funds, expansion to other target areas and, last but not least, it generated a demand from the local population for the latrines.

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made much less costly when using 'non-traditional' approaches. The joint country programme now reflects this shift in focus.

- In Hyderabad, India, UNICEF urban basic services projects were so successful that the local municipal corporations and the state government of Andhra Pradesh developed statewide urban area projects along those lines to be implemented in all the cities and towns.

These are just some examples. Clearly, there remains a long way to go before we will be able to address all the needs of the millions of people living in urban slums in a constructive manner.

Also this issue

Other articles in this issue come from the USAID-Environmental Health Project (EHP, USA), the International Water and Sanitation Centre (IRC, the Netherlands), and the Water Engineering & Development Centre (WEDC, UK). These institutions are important sources for new developments in urban environmental sanitation. EHP's article focuses on the opportunities and constraints of working in services for the urban poor and writes about six lessons learned through field testing of their approaches and principles. IRC highlights strategic elements for water and sanitation services in urban low-income areas. And WEDC describes user perceptions in the provision of urban environmental sanitation.

UNICEF and Urban Environmental Sanitation

During the New York UNICEF Workshop on Environmental Sanitation and Hygiene, in June 1998, urban environmental sanitation was one of four focus areas. Three important lessons learned for the success of urban environmental sanitation projects were identified as the following:

- Community management of sanitation systems, deciding on technology, tariffs, speed of repayment and operation and maintenance.
- Recognition of local solutions.
- Funding by a mixture of public subsidy and private funding.

Workshop participants made a recommendation to intensify the collection, compilation and dissemination of experiences and best practices to build a knowledge base on the subject of urban environmental sanitation. This issue of *WATERfront* represents part of that effort and should be seen as a step towards increasing the attention given to children living in high-risk circumstances in the cities of the developing world.

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allows the company to reduce administrative costs, which benefits inhabitants, and allows the community to maintain the capacity it acquired for organisation.

*This article is a short version of the very detailed article written by Martin Delucchi. For the complete version, contact the WES-section in UNICEF-New York (*wesinfo@unicef.org*)*

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approval of the project re-awakened a long-standing dream in the municipality with regard to waste management and recycling, which were fundamental components of the basic sanitation work being carried out.

Training, name change and pilot phase

So it was that in March, shortly after the project was approved, a large meeting took place and the training of 90 women was begun, with the support of SENA. Then, between June and July, Guillermo Lozano, an expert in the field with experience in similar projects implemented in Ecuador, came to help outline the project, which was re-christened Núcleos Empresariales de Limpieza Pública (NELP) (Public Sanitation Management Groups). The NELPs, as they are known, are small private companies with a community spirit. The members of the groups are owners and workers. They all carry out the fieldwork and also perform administrative duties (management, company representation, human resource management, finances) on a rotation basis. No capitalist members

The approval of the project re-awakened a long-standing dream in the municipality with regard to waste management and recycling...

are not allowed, nor are absentee or inactive members. The sustainability of the NELP depends on their ability to provide a quality service to their own communities.

In conjunction with the training of women, a widespread initiative was carried out among the community to increase public awareness, with talks in primary schools and junior high schools, presentations at meetings and radio announcements. At the end of 1997, the women of NELP, with their yellow blouses, aprons and blue slacks, hats and rubber boots, began the pilot collection phase in the Cubis neighbourhood.

In the pilot phase, each collection truck was assigned to a clearly defined area, a collection route, collection days and a timetable. In each area a collection site was identified, where bags of waste were deposited for subsequent placement in the truck. Once the truck was full, it would proceed to the sanitary landfill. Each collection site was kept spotlessly clean to avoid its becoming a rubbish dump. The neighbours, acting as civil vigilantes, helped to keep it clean. As a result of their increased awareness, they strictly enforced the recommendation that garbage be kept in plastic bags (in the beginning, they provided them free of charge, to encourage the habit among their neighbours), since the system is not designed to cope with heavy waste such as building debris, or rubble from excavations, or heavy volume items such as mattresses and furniture.

The sanitary landfill

The final disposal of waste in a technical and acceptable form, from an environmental point of view, is the last stage in the integrated management of the solid waste and the people of Istmina chose a sanitary landfill. Because we were dealing with a small population, the landfill was largely maintained manually, and heavy equipment was only used to adapt the site for the excavation of protective material, an operation that is carried out periodically, in accordance with material requirements and the availability of machinery.

The Istmina landfill is called El Borojó, named after a typical fruit in the region, and is an Area Type landfill with stair-like banks and ditches that collect rain water and draw it away from the landfill area. The ditches serve as drainage channels when the waste reaches a certain level and vent pipes were also constructed to allow gases to escape. The channels are filled with round stones (boulders) and sealed with dry ferns to prevent the waste from obstructing them and impeding the flow of the percolated liquids. To complete the site's adaptation, the area was also fenced off to prevent livestock from gaining access, the hut's design was adapted to make it possible to keep tools there, and so that the workers could change their clothes, and a shower unit with a lavatory and sink were installed. The site was also sign-posted clearly. Three men, in shifts of 6 hours per day, manage the landfill.

"...they solved the two biggest problems in the municipality: lack of income and inadequate waste management."

Comments

The population takes a positive view of the experiment. The most frequent, simple and convincing comment is the following: the waste that formerly clogged up the river and the streets is now in a place where we can contain it. The women involved in the project have a wider vision: "The NELPs have been very important because they solved the two biggest problems in the municipality: lack of income and inadequate waste management. Many of us are heads of households and we think that if the mother brings more income into the home, her children will enjoy a better standard of living. There is also a very strong desire to contribute to local development. We are beginning to get training in cooperation and we are holding workshops to learn how to make materials from glass and other recyclable products." One of the young landfill workers concludes: "With the collection of waste, we are all winners. The river wins because there is less pollution. The people win because we have fewer diseases and less waste in the streets. And we win because it's another source of income, and we have work, thank god."

This is one of the three articles UNICEF-Colombia prepared on their experiences with Urban Environmental Sanitation. Due to space limitations, only one could be printed in this issue. The other two articles can be obtained through wesinfo@unicef.org *or can be found at www.unicef.org/programme/wes*

In Istmina, we women have changed a lot

by UNICEF-Colombia

Before, I did not speak to anyone directly, and now, as you can see, I talk to everyone and have am not afraid to say what I feel. The training makes you stronger….” Like someone looking in a mirror and taking stock of the changes that have occurred, Rosa Cruz Murillo tells her story of personal transformation, which took place in tandem with the formation and consolidation of her community group.

Rosa lives in Istmina, a municipality in the Department of Chocó on the banks of the San Juan river, in a jungle region that is one of the rainiest in the world. The municipality has 45,000 inhabitants, 12,000 of whom live in the inner city. They are mostly black, though there are some indigenous people, some of mixed race and whites who come from the interior. 165 years ago, Istmina was a slave settlement. Today it is the second largest city in the Department. It is 75 km by well-kept road from Quibdó, the departmental capital, and 780 km from Bogotá, the far-off capital of the Republic. The San Juan river flows into the Pacific ocean, and travelling by both waterways, one arrives at Buenaventura, another key destination for the men and women of Istmina, and the country’s most important Pacific port.

Istimina’s inhabitants are mostly poor. The majority cannot read or write, there are few sources of work and the workforce is poorly trained. Many children die from preventable diseases. There are many female heads of households in situations of poverty and for most of the population there is an abundance of unsatisfied basic needs. Business—controlled by “paisas”, or people from the interior—agriculture and mining, are the principal economic activities. Plantains, maize, yuca, yams, pineapples, *borojó* (a local fruit) and *chontaduro* (an abundant local plant) are grown.

This article describes how, over the past few years, a large group of female heads of households in Istmina changed the face of the town, and in the process, took control of their own lives in order to improve them.

New women’s matters

Since 1996, the Program for Local Development, sponsored by UNICEF and started by Cimder[1], has been working with women in the poorest parts of the municipality, providing training to help them to take better decisions to benefit their health and personal growth, and to find ways to increase their income. This is a new experience for many of them,

…a large group of female heads of households in Istmina changed the face of the town…

who are not used to leaving their homes to attend meetings, much less talking to other women about their situation and seeking a solution to their problems. Despite this, women from other neighbourhoods gradually joined the initial group of women from San Agustín: they came from Eduardo Santos, Primero de Mayo, Diego Luis Córdova, Cubis and Camellón.

“So”, they say, “we began to work both from the inside and outside of the group. With other groups in the neighbourhood and the municipality, we took part in a workshop to analyze health indicators, comparing the general situation of Istmina with that of the San Agustín neighbourhood. We also worked jointly with other groups, to discover the history of the neighbourhood. We then took part in more workshops: communication for assertiveness; human relations; and prevention of drug dependency and alcoholism were some of the issues discussed. In February 1997, in collaboration with the UNICEF Water and Sanitation Programme and the Mayor’s office, we presented an urban cleaning and solid waste management project, which we named the Núcleo Empresarial de Limpieza Pública (NELP) (Public Sanitation Management Group) to the Solidarity Network.

Plans on the table

In a participatory exercise initiated mainly by the Progamme for Local Development, eleven employment generating projects were presented to the municipal board of the Solidarity Network, among which was one called “Generation of Employment through Sanitation and Recycling”, presented by this group of women, with the support of Miguel Angel Guerrero, Coordinator of the Programme for Drinking Water and Sanitation. The garbage collection component of the project was the first to be approved, with the following plan for institutional support: contributions from the Network would be used to pay salaries, the mayor’s office would supply the necessary materials (uniforms, bicycles, bags and brooms) and UNICEF would provide training and technical support for the remaining activities considered in the sanitation project. The

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[1] Centro de Investigaciones Multidisciplinarias de la Facultad de Salud de la Universidad del Valle

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