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Community participation in the management of the urban environment in Rufisque (Senegal)

Malick Gaye and Fodé Diallo

SUMMARY: *This paper describes how problems of inadequate provision for water, sanitation, drainage and the collection and disposal of garbage were tackled in nine low-income communities in Rufisque, Senegal. This was done largely by the inhabitants themselves but in partnership with an NGO (ENDA-Tiers Monde), with local authorities and with support from other agencies. The paper emphasizes how the approach taken - with local problems addressed by local groups working together with technologies they control and with environmental goals integrated from the outset - is one that is far more appropriate to Africa's urban problems. The paper also discusses how these works were funded including how the need for external funding was kept down and the role of a revolving fund.*

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I. INTRODUCTION

WITH THE STIMULUS of the UN Conference Habitat II in Istanbul in June 1996 and with the knowledge that soon more than half of the world's population will be concentrated in towns and cities, there is a growing awareness that urban problems must be confronted. In Africa today, the urban population is growing at a rate of over 5 per cent a year. More than 70 per cent of the urban areas in Africa are completely excluded from the urban public service network of drinking water distribution, liquid waste drainage or household refuse collection. Local communities suffer from very high levels of unemployment; above all, they suffer from a sense of powerlessness for not being able to address such problems.

But within this bleak picture are some elements of hope. An alternative approach is slowly emerging, in answer to the urban challenge, based on ideas such as decentralization, democracy, community empowerment, appropriate and appropriable technology, sustainability and integrated development. This new approach sees protecting the environment as an integral part of development rather than an obstacle to economic progress and stresses that local problems can be solved by local communities, by all groups in the community, including women and young people, working and taking decisions together.

There is nothing isolationist about this approach. The newly empowered local community, through democratic decision-making and problem-solving, matures into a body capable of interacting productively with the local authority and even with agencies from higher levels of government. Micro-solutions can be integrated into the national action plan.

The new approach places technology at its proper level in human affairs; at the service of human beings, as a tool which they master rather than a dominating, alien force which they buy from other cultures at prices they cannot afford. The new approach seeks to establish a friendly, familiar technology that even poor people can afford and can control, and that can be replicated from community to community, creating new jobs, new skills, a new self-confidence and faith in the future. We feel that the case study in Rufisque presented here is part of this new approach.

Rufisque is a small township just outside the Senegalese capital, Dakar. It was given its name, Rio Fresco (freshwater river) by Portuguese sailors over 500 years ago. But in 1990, Rufisque had the appearance not of a site of freshwater but of a depressing place with serious problems of sanitation and refuse. Most of the compounds in which the population lived had inadequate or no piped water or provision for sanitation and, because of a lack of urban planning, the official refuse collection lorries could not reach many areas. Waste water was thrown into the street; the beach was used as a public toilet and an unofficial refuse dump; diarrhoeal diseases were the most commonly reported health problems at the health centres.

Today, through the efforts of eight low-income communities aided by ENDA-Third World and the Canadian Host Country Participation Fund, and in collaboration with the Rufisque local authority, these problems are well on the way to being solved. An integrated and holistic approach collects rubbish with horse-drawn carts (a common local form of transport) and disposes of waste water and sewage using low-cost narrow plumbing pipes that are unsuitable in Europe but perfect for the ice-free African climate. Sewage, waste water and refuse all end up in a purification and recycling centre where young people treat and combine them to form compost for use in market gardens. The purification system, using water lettuce (which is abundant in the area), is very cheap and has been used in Africa for over 1,000 years.

The scheme is run by local management committees which are democratically elected. The technical aspect is handled by local people and is therefore both sustainable, as no external expertise is needed, and replicable. Women and young people are active at all levels, from sorting the refuse to decision-making. Most of the funding comes from the community itself; credit initially provided by international funders will soon no longer be needed and will be replaced by a completely local revolving credit system.

The Rufisque experience shows that a public nuisance and health hazard can, through community effort, be turned into a public asset. The best recommendation for the scheme is that

it is now being replicated by other communities. Finally, a note on urban indicators. We suggest that a relevant indicator of the democratic level of local management and of real impact of an initiative is the proportion of the overall population involved. In Rufisque, this is very high: one-third of the total population.

II. SANITATION PROBLEMS IN RUFISQUE

THE DIOKOUL AND Surrounding Districts Sanitation Scheme (PADE)⁽¹⁾ began in October 1990 as an attempt to find at least a partial solution to the sanitation problem, first in Diokoul and later in other low-income districts of Rufisque. Rufisque is situated 25 kilometres outside Dakar and is one of the five local government areas of Dakar Urban Authority. When the project started, Rufisque had a population of 120,000. By now, it is likely to have grown to 200,000 or more.

a. General Problems

The inhabitants of Rufisque have very serious problems with sanitation. These problems are partly geographical in origin since many areas are almost at sea-level and the ground water level is very close to the surface. But the main problem is the inadequacy or lack of sanitation infrastructure.

The collection of solid waste is irregular. It was previously done by a company on contract to the Dakar Urban Authority and is now done by private lorries hired by its Works Department. The lorries are few in number and they often break down. Even more important, they can only supply a minimum service because most of the streets they are supposed to serve are too narrow for them to enter.

Table 1 shows the various types of residential districts in Rufisque. Most of the population live in regular unplanned, irregular unplanned and village-type districts. These are also low-income districts with hardly any provision for water supply or sanitation. Water consumption per person is between 10 and 30 litres per day, far below the minimum required for good health. Rapid population growth (which average 3.5 per cent per year) makes it impossible for the urban authorities to respond adequately to the ever-increasing demand for facilities and services.

Table 1: Types of Residential District in Rufisque

Type of district	Surface area (hectares)	Number of inhabitants	Population density (persons per hectare)
1. Semi-luxury	13.5	443	33
2. Old colonial partly residential	54.0	5 848	108
3. Planned	27.5	4 502	164
4. Regular unplanned	97.4	19 636	202
5. Irregular unplanned	426.0	79 090	186
6. Village type	128.0	8 526	67
7. Vacant lots	19.4	-	-
TOTAL	765.7	118 045	154

SOURCE: Based on research carried out by SONED (*Société Nationale d'Etudes pour le Développement* - National Association for Development Studies), 1986.

1. *Programme d'Assainissement de Diokoul et Quartiers Environnants*

The vast majority of households in Rufisque have individual sanitation systems for the disposal of waste water and sewage. Each individual system collects the waste water from the individual compound and passes it into the street and the open drains, onto waste ground or the beach, or into the sea. The use of conventional plumbing is minimal and is limited to the few planned areas such as the commercial area (Escale), the old colonial area, Castors SOCOCIM and some planned low-cost housing (Cité HLM). Even in these areas, individual systems are common.

b. Sanitation in Diokoul and Other Low-income Districts

There are nine districts in Rufisque which are covered by the PADE Sanitation Scheme. Table 2 gives their names, population and population density. In 1990, these nine districts had a total of 52,338 inhabitants, living in 5,225 households and which accounted for 44 per cent of the population of Rufisque local government area. Of the 52,000, 51 per cent are women and 49 per cent men; 30 per cent are illiterate. Each inhabitant produces about 0.60 kilogrammes of waste per day⁽²⁾ and total waste for the nine districts is 30 tonnes per day.

2. Department of Urbanization and Housing, 1994.

Table 2: Main Features of the Districts covered by the PADE Sanitation Scheme

Name of district	Surface area (hectares)	Number of inhabitants	Population density (persons per hectare)	Type of district
1. Castors SOCOCIM	1.2	227	197	3 - planned
2. Colobane I	23.0	4,747	170	5 - irregular unplanned
3. Dangou	2.5	563	225	5 - irregular unplanned
4. Cité Filaos	4.3	664	156	3 - planned
5. Médine	8.0	1,516	190	4 - regular unplanned
6. Diokoul	57.8	12,509	217	5 - irregular unplanned
7. Arafat 1, 2, 3	99.0	16,083	162	5 - irregular unplanned
8. Colobane II	90.8	14,621	161	5 - irregular unplanned
9. Champ de Course	6.5	1,408	217	5 - irregular unplanned
TOTAL	293	52,338	179	

SOURCE: *Plan Directeur d'Urbanisme: Urban Master Plan, 1990. PADE - Programme d'Assainissement de Diokoul et Quartiers Environnants*.

Of the nine districts, only two are “planned” areas: Castors SOCOCIM and Cité Filaos. These have relatively low densities compared to the other areas and an above average level of water consumption of 35 litres per person per day. At Castors SOCOCIM, most households used to empty their waste water into a system connected to a sealed septic tank. But given the geological problems mentioned earlier, and the poorly constructed tanks, these had to be emptied frequently, which was expensive, or dirty water and sewage had to be emptied into the bush.

Diokoul is an old Lebu fishing village which has retained much of its traditional, village appearance. Most of the streets are not

3. ENDP-RUP survey, 1993.

laid out in a grid pattern and are narrow and winding. Although there has been a water supply system in Diokoul since the 1930s, most households get their water from the public tap and the piped system is totally inadequate.

A number of studies in particular districts have shown the extremely insanitary conditions in Rufisque, especially in the poorer districts. For instance, a study in Champ de Course (Race Course) in 1993 found that none of the family compounds was connected to a sewer system; 54 per cent of the sample had water-closets linked to private septic tanks with 27 per cent with pit latrines and 15 per cent using the bush for defaecation.⁽³⁾ This same study found that only 19 per cent of compounds had taps - the rest relied on public taps. Virtually all solid waste was dumped in the bush. Table 3 shows the extreme deficiencies in the provision of water, sanitation and solid waste disposal in the nine districts, drawing data from the 1988 census.

Table 3: Water Supply and Sanitation in the Nine Districts covered by the PADE Sanitation Scheme

Type of supply	Percentage of all households
Water supply	
- Tap in compound	35.0
- Public tap	64.0
- Well	1.0
Excreta disposal	
- WC connected to central plumbing system	5.5
- Use of bush and waste land	11.5
- Combination septic tank, pit latrine, use of public toilet	83.0
Disposal of Domestic Liquid Waste	
- beach, waste ground, rainwater drains	96.0
- proper facilities	4.0
Disposal of Solid Waste	
- unofficial dumps	65.0
- Dakar local authority's concessionary societies refuse containers	35.0

SOURCE: Senegal Habitat Population Census, 1988.

NB: There were 5,225 households in all. At least two households share a family compound. Each household has eight members.

Pollution of the beach and of open spaces by excrement, dirty water and sewage has had a devastating effect on the health of the population, especially the children. Statistics prior to 1990 show that 75 per cent of the patients treated in the Diokoul dispensary suffered from diarrhoea, dysentery or skin diseases and most were children. The Director of the Mother and Child Protection Service noted the frequent recurrence of diarrhoea in the children she was treating and attributed this to the lack of sanitation and the dirty surroundings.

III. THE DIOKOUL AND SURROUNDING DISTRICTS SANITATION SCHEME (PADE)

a. Background

4. According to P. Freiburghaus et al. (1981).

AT RUFISQUE, THE sea is eroding the coast. The damage caused by the waves during storms is a regular topic of conversation. In Diokoul, especially during the rainy season (July to September), the sea eats into the coastline. Between 1950 and 1981, the beach shrank from 300 metres to 20 metres due to the advance of the sea.⁽⁴⁾ Already, some houses, a mosque and part of the cemeteries have been destroyed. ENDA-Third World first became involved with the people of Diokoul in 1980 concerning a project to deal with this problem.

The project drew up a plan for the construction of a series of 12 parallel dykes jutting into the sea, 47 metres long and 85 metres apart, to break the current and allow sand to build up on the beach. By 1988, nine of the 12 dykes had been built with financial aid from French and Finnish cooperation, technical assistance from ENDA and the active participation of local communities, local authorities and the Public Works Department. Already after the 1983 rainy season, the first dykes were found to make a great difference.

During the building of the dykes, it became clear that the people of Diokoul were capable of organizing to do something to improve their area. It was also during this exercise that ENDA became aware of the extent to which the beach was used as a rubbish dump and toilet, and of how unhealthy this was for the people. This led to a discussion with the local community on what could be done. Plans were drawn up and a new project came into being in 1991: the PADE (Diokoul and Surrounding Districts Sanitation Scheme).

b. Aims of the Sanitation Scheme

The Scheme operates on a number of levels :

- **economic:** job-creation and income generation;
- **social:** to improve the quality of life and the social status of participants, increase the family budget and reduce women's workload;
- **ecology and health:** the safe disposal of rubbish, the elimination of excrement as a source of disease, the reduction of flies and mosquitoes and their accompanying diseases including malaria;
- **community:** to reinforce the independence of the community and give people a sense of citizenship, through training and interaction between various groups.

c. Achievements

- **private sanitation:** 420 family compounds have benefited from the private sanitation scheme. This includes 250 in the Diokoul district which were provided with the conventional

5. Translators note: We use the term "local authority" throughout this paper to translate the French word *commune*. The Senegalese administrative system divides the country into regions which, in turn, are divided into *départements*. The latter contain *communes* (urban) and *communautés rurales*. The urban *commune* is sub-divided into *quartiers* which we have translated as districts.

system: a Turkish hole-in-the ground (squatting) toilet, shower, waste water tank (into which the waste water goes for filtering and removal of grease), tank for water from all sources, filter system. Also, 30 houses in Diokoul and 140 houses in Castors SOCOCIM were connected to purification plants using a series of small reservoirs with a natural purifier in the form of water lettuce.

- **renovation of public lavatories:** a list of public toilets for renovation was drawn up by the local authorities and ENDA, and these were refurbished. Work to clean up and improve the areas around public taps had only just begun when it had to be cut short due to a change in management. The Rufisque local authority⁽⁵⁾ brought in a new policy in 1992 which replaced the public taps with a private water supply system or turned the taps over to private companies.
- **refuse collection:** 20 horse and cart units were provided for door-to-door collection of domestic refuse. The rubbish collected is deposited at official collection points from where it is transferred by lorries on contract to the local authority either for incineration or, a new idea, recycling into compost.
- **purification of waste water** (domestic waste water and sewage) transferred from the private sanitation systems to the reservoirs in the purification plant. There are two plants, in Castors and in Diokoul. In the Castors plant, water lettuce is used to remove sediment and purify the water. This lettuce is the *Pistia stratiotes* which grows abundantly around Dakar. The vegetable biomass collected in the reservoirs and the biodegradable waste, when combined with the purified water produce a rich compost for use in urban agriculture. In the Diokoul plant, water is purified by bacteria and micro-algae (microphytes).
- **sanitation loans:** the money contributed by individuals to pay for the installation of private sanitation systems goes into a revolving fund guaranteed by the local management committees and this is used to promote self-financing sanitation for the low-income districts. At the end of 1995, assets amounted to 25m Fcfa (US\$ 50,000).

The project involves three new ideas :

- **the use of the horse-and-cart for refuse collection:** although horse-drawn transport is very common in Rufisque and Dakar, this is the first time the system has been used for refuse collection. The idea has been so successful that private entrepreneurs are now beginning to use it.
- **the use of water lettuce for purification:** this was not so much a new idea as the revival of a traditional practice in use in Sudan for over 1,000 years. This is a good example of low-cost, appropriate and ecologically sound technology.

- **the use of narrow pipes in the sanitation system:** these are particularly suited to a climate where the temperature never drops to water's freezing point and they are much cheaper than conventional sewer pipes.

IV. GETTING LOCAL SUPPORT

a. Local Groups

THE INTEGRATED APPROACH based on discussion and mutual agreement between all parties. In this case, the following groups were involved:

- the Inspection and Assessment Committee, a democratic district body: this committee is made up of district representatives, mainly old men, patriarchs whose status is more traditional than political. In the few instances where a local representative's membership of a political party has influenced his/her behaviour, this has had a negative effect on people's sense of involvement.
- the Rufisque local authority and the Rufisque administrator who were involved in granting land for the purification plant and in supplying economic incentives for refuse collection.

The relationship between these groups is based on negotiation. What seemed to be most important is that the project should work, despite the somewhat unconventional technology which might have raised questions in terms of recognized standards of practice. PADE's aim was to show that projects based on community involvement could be replicated in as much as such projects bring about a new type of relationship between local government and local communities.

Although 40 per cent of the active population belong to some form of community organization such as women's and men's associations and youth groups, until 1990 there had been no collective community lobby for dealing with the authorities with respect to urban environmental problems. All that existed were individual actions and these were usually politically motivated and consequently opportunistic and short-lived.

When ENDA worked with the Diokoul people during the earlier erosion project, they had found that the beach was used as a dump for waste water and other domestic waste. Drawing on the experience acquired during the first project, they decided to use the most basic local community entity - the district⁽⁶⁾ and groups of districts - as a foundation for the scheme. Traditional and modern meetings, theatre and other events were used to discuss the plans and news of meetings was passed on through the existing community networks. In this way, a structure was created which drew representatives from a range of community associations (men's, women's and youth groups) and which was responsible for planning, monitoring and evaluating the PADE scheme. In keeping with the spirit of the whole enterprise, this

6. See reference 5.

7. CLG: *Comité Local de Gestion.*

8. CC: *Comité de Concertation.*

9. FOCAUP: *Fonds Communautaire pour l'Assainissement des Quartiers Urbains Pauvres.* The working of this Fund is described in some detail in Section VI.

10. *Fonds de Contrepartie Canado-Sénégalais.*

11. ASC: *Associations Sportives et Culturelles.*

structure is known as the Local Management Committee.⁽⁷⁾ It subsequently included representatives from various sections of the government at department level (such as health) and from the local authority head of the Office of Services.

By the end of 1994, three district health committees (Lazaret, Arafat and Diokoul) were involved in PADE. As a result of the scheme, the local district has begun to play a new role as initiator of relevant projects. It also took over responsibility for a vital aspect of public health, the relationship between health and environment or surroundings. In addition to the cooperation between PADE and the local authority at the local district level, ENDA launched the idea of a joint commission which would monitor the PADE on behalf of the local authority. In addition to its relationship with the Rufisque local authority, and in order to ensure the sustainability of the community management of the scheme, in November 1993 PADE set up a Joint Committee⁽⁸⁾ made up of representatives from all the health committees involved in the scheme. With equal numbers of male and female representatives, the aim of this Joint Committee, as specified in the resolutions of the PADE forum presided over by the Mayor of Rufisque, is to ensure the sustainability of the scheme by setting up FOCAUP - the Community Fund for Sanitation in Low-income Districts.⁽⁹⁾ The Fund's assets come from financial contributions from beneficiaries (see Section VI for more details). The process set in motion by the scheme means that in the future, local communities will be much more involved in managing local authority resources.

b. The Various Partners

The various partners involved include the Canadian-Senegalese Host Country Participation Fund (FCCS)⁽¹⁰⁾ and, since December 1994, the European Union; funding from FCCS ended in 1995. These two institutions financed the various stages of the scheme according to a timetable and a provisional budget drawn up by ENDA.

ENDA-Third World-RUP (*Relais pour le développement Urbain Participé*) is the ENDA team which acts as project manager and has overall responsibility for the scheme. ENDA-RUP is responsible to the funding bodies for running and coordinating all aspects of the scheme, and for keeping the local authority informed of progress and involving it in all major decisions. ENDA-RUP also runs practical training courses at the purification plant and recycling centre for the target groups, namely the young members of the sports and cultural associations,⁽¹¹⁾ the cart drivers and local authority workers. ENDA-RUP coordinates the activities of the inspection and assessment committees which are made up for the most part of members of the local community and members of the health committees.

ENDA-RUP also prepares trimestrial and annual progress and financial reports for international funders - first for the Canadian-Senegalese Host Country Participation Fund, then for the European Union. ENDA is also responsible for drawing up feasibility studies and works contracts. The RUP team leader, who

is responsible for the overall coordination and running of the scheme, is an architect and researcher. He negotiates between the local authority and the various local management committees and is responsible for organizing regular meetings of these committees. A permanent and part-time staff assists him in running the programme.

The Rufisque local authority participates with the ENDA-RUP team leader in deciding on the broad lines of the project at macro-economic level. The local authority is also involved in decision-making at local level, being represented on all the local management committees. The local authority has made available to ENDA all the documents related to urban planning and development policy which enables ENDA to ensure that the scheme fits in with the Rufisque Municipal Development Plan. The local authority also helps to link ENDA with government bodies at all levels, from local to regional, and shares responsibility with ENDA for organizing the collection of liquid and solid waste in the districts covered by the scheme thus ensuring that the collection system is sustained. The local authority also provides two workers who, like various members of the community, have been trained in recycling. The public services at local authority and department level are involved in the technical aspects of the scheme. They also make available to ENDA, on demand, all their documents on the town of Rufisque.

For the purposes of the scheme, ENDA signed an agreement with the Rufisque local authority. Similarly, in 1994, a local authority Joint Commission on Environment-Urbanization-Public Works was set up and this body represents the Rufisque local authority in all dealings with ENDA regarding the scheme. Another agreement between Rufisque city council, the Health Committee and ENDA, whereby the city council would contribute towards loan repayments for the plants, is in discussion.

At ministerial level, two meetings were arranged at the Water Department between the Urban Water Authority, SONED⁽¹²⁾ which is responsible for drawing up the master plan for sanitation in Rufisque, the sanitation department of SONEES,⁽¹³⁾ which is a concessionary company responsible for water supply and sanitation in Senegal, the representatives, young and old, of the communities covered by the scheme and ENDA, representing the PADE.

The Local Management Committee is made up of :

- the District Health Committee, a body based on a decentralized health service which was formed as a result of the Bamako commitment to involve local communities in public health management and in acquiring and distributing essential medicines. Its members are elected by the sports and cultural associations, the women's groups and the traditional associations;
- district representatives;
- the representative from the local authority services and of department bodies such as the Health Board.

The focal point of each local management committee is the

12. *Société Nationale d'Etude pour le Développement*: National Society for Development Studies.

13. SONEES: *Société Nationale d'Exploitation des Eaux du Sénégal*: Senegalese National Water Board. The sanitation department of SONEES is becoming the ONAS (Senegalese National Office of Sanitation : *Office National de l'Assainissement du Sénégal*). An active collaboration with the ONAS is being developed.

local health centre. The committee meets regularly to evaluate the running of the scheme. The Chair is the President of the Health Committee and is a signatory to the contracts between ENDA and people requesting private sanitation and thus jointly responsible with ENDA for the recovery of loans. The Chair is also a joint signatory, with the relevant district representative, of the refuse cart agreements between ENDA and the district on the one hand, and ENDA and the cart driver on the other. The Health Committee is responsible for seeing that refuse collection is properly organized. It makes free medical care available to the cart driver and his family. According to the tripartite agreement, the Health Committee is in charge of the management (exploitation and maintenance) of the sanitation system and the plants.

With regard to the private sector, a dozen small private businesses work on and off for the scheme in response to calls for tenders or to agreements. The Environmental Committee of the SOCOIM cement factory, impressed by the success of the scheme, is becoming increasingly involved. It has supplied harnesses for use in the refuse collection to some districts. It has also agreed to buy purified water from the Castors plant to water the trees being planted in old quarries as part of a reforestation programme.

With regard to the beneficiaries, the criteria used for selecting which compounds will benefit from the scheme is not purely economic but based on the nature of the request as expressed by the potential beneficiaries to the extent that bringing sanitation into a compound requires the goodwill of the head of the family. The requests are reviewed both by the Health Committee and the district representatives to prevent political considerations from sabotaging the above-board running of the scheme. The monthly meetings to discuss the running and evaluation of the scheme give every resident the opportunity to question those running the scheme. There has not been a single complaint or case of discrimination based on the economic criteria of the scheme. Every beneficiary makes it possible for someone else to benefit in another district. In contributing to the revolving fund, the beneficiaries are aware that they are sharing the scheme's resources with their fellow citizens in other parts of Rufisque.

c. How Community Involvement Works

The local community participates actively in the scheme at the following levels :

- women, local representatives, elders and young people are on the Inspection and Assessment Committee and the Joint Committee;
- community meetings and mosque discussions provide forums for discussion;
- district representatives participate in surveys and research to select beneficiaries of private sanitation and also in discussions and awareness campaigns, and in the management

- of materials and supplies;
- district representatives and elders help to collect loan repayments;
 - beneficiaries contribute 30-70 per cent (and, for a short time, 100 per cent) of the cost of sanitation and construct buildings to house the water closets and showers. Beneficiaries also finance infrastructure maintenance and a part (50 per cent) of the provision for depreciation;
 - water purification and household waste treatment plants are operated by youths (men and women) of the district. They are responsible for the maintenance of the sewer networks;
 - local people contribute directly to the refuse collection service through payments to the cart driver.

Women are prominent in all of this, just as they participate actively at the various committee meetings and make up about 30 per cent of the family heads benefiting from private sanitation. In a survey of decision makers involved in the PADE programme held in December 1994, 50 from a total of 90 were women.

Most of the scheme's active participants are women. Women are more involved in decision-making than men. For example, they have a decisive voice in determining how much the cart driver should be paid for waste collection. This participation is seen by the international funder as the host country's contribution. Ultimately, the international funder will withdraw and be replaced by the FOCAUP revolving fund mentioned above.

The most difficult work (collection of refuse, recycling of solid and liquid waste) is done by men although the financial reward is insignificant. The project has enormously reduced women's workload compared to the situation before the scheme began. Women participate in decision-making and oversee the maintenance of the infrastructures and the running of PADE services (including the maintenance of the tanks in the compounds into which the waste water is thrown for filtering and removal of grease).

Women also play an important role in the male headed households by encouraging the men to take part in the scheme and to get involved in improving their surroundings. Of households involved in the scheme, 30 per cent are headed by women. Improvements in living conditions are not merely qualitative, they are quantitative and economic to the extent that they free women to engage in other activities outside the home.

V. IMPACT OF THE PROGRAMME

a. Socio-cultural Impact

THE INTEGRATED APPROACH used to solve the waste water and refuse problem has made people aware of the connection between the two because, in practice, the two are disposed of together. According to an elder of the Diokoul community, ENDA's involvement in Diokoul brought about rapid and im-

portant changes in social life in the district and in the environment. At a public meeting, one speaker described the state of the beach before the programme and its use as a public toilet, and then appealed to the whole community to support ENDA's work and to make sure that the present improvements were maintained. In particular, he appealed to young people from the sports and cultural associations to become involved in other activities besides football.

With more and more families having a proper sanitation system and with an increasing number of carts collecting rubbish, fewer women and children are seen carrying waste water and refuse on their heads, especially since the elders now denounce these traditional practices. Availability of carts is by agreement between ENDA and the Health Committee. The Committee allocates a cart to each district and signs a contract with each cart driver. The contract is temporary and may be withdrawn if the work is not done satisfactorily. One driver has already lost his contract because of complaints from people in the district he served. His cart was taken away from him, repaired by the Health Committee and contracted out to another driver.

The Diokoul experience has inspired similar efforts in other districts of Dakar and Rufisque such as Dangou North and South. Private cart owners have started collecting rubbish. As a result, the fatalistic attitude and the mentality which expects the state to provide everything is beginning to give way to community mobilization and self-development. A consultant sent by Swiss Cooperation (DDA) to assess the project feels that the research-action approach of the RUP team, which has involved the local community in the scheme on an active, day to-day basis, has made full local appropriation of the scheme possible.⁽¹⁴⁾

14. Mr. Michel Séguier.

b. Socio-economic Impact

- Women's and children's workloads have been reduced mainly with regard to solid and liquid wastes;
- the cost of the drainage and sanitation systems used represent respectively 5 and 3 per cent of the cost of conventional systems;
- the programme created 58 permanent jobs - and, in addition, on average, over 24 temporary jobs were created each month. Given that temporary jobs last on average 10 days and that effective working days per year amount to 240, these temporary jobs are equivalent to 12 permanent jobs.

Table 4 gives an idea of the scheme's overall socio-economic impact. The private sanitation programme has also been a means of testing whether people would repay small-scale credit and what kind of amounts they could afford to repay. As of 31 December 1994, the rate of repayment of loans for private sanitation was 90 per cent.

Women's and children's work has also been reduced in that they no longer have to carry waste water. Many jobs have been created: digging in preparation for the installation of septic tanks,

Table 4: Economic Impact

Project	1990	1996	Remarks
Beneficiary compounds	—	420	Equivalent number on waiting list for individual/public sanitation
Number of compounds benefiting from daily refuse collection	—	3,000	
Percent of illnesses related to dirty environment	75%	50%	Decrease in illness
Recycling of waste water (cubic metres per day)	—	60	Sale of compost and 80% reduction of dumped waste
Recycling of domestic waste (tonnes daily)	—	3	
Annual household income in US\$	1,080	1,100	1.8% income increase
Annual facilities maintenance in US\$	108	58	86.2% decrease
Expenditure:income ratio	10%	5.3%	Households spend less with 65% subsidy
Cost of private conventional sanitation (Diokoul) in US\$ (based on market prices)	500	180	
Cost of domestic sanitation connected to purification plant - Castors in US\$	500	234	Post-devaluation of Fcfa
Average cost per head of Purification Plant system - Castors in US\$	20 -40 per head		Subsidy reduced from 65% to 35%
Average investment per head for refuse collection system in US\$	\$0.5 per head		Each beneficiary contributes US\$1 per annum

SOURCE: ENDA-Rup surveys

brick-making and brick-laying, metal-work, soldering and cart-driving. Running the purification reservoirs also provides jobs as does the re-use of the recycled water and compost-making. In the early stage, the scheme provided hundreds of jobs in the district for installing the private sanitation systems. The work is done by unskilled workers, providing employment and pay in a sector where these are rare. In addition, much of the material for the works was supplied by local small businesses.

Some compounds already had sealed septic tanks which had to be emptied every three to six months at a cost of 10,000 Fcfa (US\$20) a time. One subscriber to the system, a widow and family head, reported that with the old system she had to have the tank emptied every month but with the new private system, installed in July 1993, she has not had to empty the tank yet. Indeed, families who installed the private sanitation system in the first half of 1991 found that they still had not needed to empty their tanks three years later.

c. Political and Urban Impact

Directly or indirectly, the scheme has provided 20 carts for rubbish collection. Assuming that each cart collects one tonne of waste per day, this totals 20 tonnes each day. This is the equivalent of one-fifth of total waste production in Rufisque and two-thirds of waste production for the districts covered by PADE. The most visible impact of the scheme on urban policy is that it has demonstrated the feasibility of refuse collection by cart, not by employees on salary but by means of the cart drivers and the local people jointly taking over the service. The local authority has recognized that the alternative system works, especially for poor districts with layouts that do not allow motorized collection. The authority has even provided an incentive, in the form of tax exemption, for the cart drivers.

Similarly, the water purification scheme should encourage a new approach to the management of waste water and refuse which also yields valuable resources. The sanitation system which has made all this possible consists of 4,000 metres of narrow pipes, carrying approximately 70 cubic metres of waste water to the purification plants daily, for purification and re-use. This treated water has turned the areas around the purification plants into a green zone, full of agricultural activity. It also has craft centres where cement goods are made using the treated water.

d. Impact on the Environment

In line with its ecological and sanitary goals, the scheme has improved the quality of life and health standards in the poor districts: beaches and public places are no longer used as rubbish dumps and toilets. Table 5 shows a summary of the environmental impact of the Diokoul and the Castors SOCOCIM private sanitation schemes. Throughout the 36 months that the horse and cart refuse collection has been in existence, the local management committees have always discussed the environmental question during their regular review and assessment meetings.

Table 5. Impact on the Environment

Impact on the Environment of the Diokoul Private Sanitation Scheme			
	1990	1996	Increase
% of solid waste collected	35	46	11
% of compounds provided with private sanitation	50	79	29
Impact on the Environment of the Castors SOCOCIM Private Sanitation Scheme			
Project	1990	1996	Increase
% of waste collected	60	95	30
Volume of waste water treated (cubic metres daily)	0	70	70
% of waste water treated (Castors)	0	90	90
Value of water treated (US\$)	0	25	25

Waste water (60 cubic metres per day) is purified at treatment centres and this and the biodegradable elements of the solid waste collected are used to make compost for use in urban agriculture. What is needed now, if these activities are to develop further and to be integrated into the broader urban picture, is a three-way joint management agreement between the local authority, the local management committees and the youths at the treatment plants.

e. Impact on Health and on the Appropriation of Technology

Improvements in health standards have definitely reduced water borne and faeces borne diseases even if it is difficult to assess to what extent. The head of the Diokoul Health Centre, although not admitting a direct causal relationship, says that there has been a reduction in diarrhoea and skin diseases since 1990. The Arafat health officer reports a two-thirds fall in the incidence of malaria (which tends to be particularly common among households who live close to waste water) and not a single case of cholera has been recorded since the system was instituted.

Youths at the treatment plants are responsible for maintenance. Local workers have acquired the necessary skills to enable them to satisfy demand from other districts and even other towns. Already, this has enabled local people to take the initiative to extend the small-scale system installed in Ndiourène in 1992.

As Table 6 shows, the use of the horse and cart for refuse collection, and the use of narrow sewage pipes and plant purification, are within the financial reach of towns throughout Africa, Asia and Latin America. The monthly expenditure for a

Table 6: Comparing Costs for the Systems used in Rufisque and Conventional Systems in Solid Waste Collection, Sanitation and Waste Water Treatment

Monthly budget for a horse-and-cart refuse collection unit in Rufisque (in Fcfa).		
<i>Monthly expenditure</i>	<i>Monthly revenue</i>	
Fodder: 1,200 F/day x 30 days = 36,000	Refuse collection: 15 F x 80 bins x 30 = 36,000	
Maintenance costs: 150 F/day x 30 = 4,500	Other jobs: 1, 500 F x 30 = 45,000	
Loan repayment: 300,000 (annual loan repayment) divided by 12 months = 5,000		
TOTAL: 45,500 Fcfa (US\$91)	TOTAL: 81,000 Fcfa (US\$162)	
Cart driver's monthly income: Revenue - Expenditure = 35,500 Fcfa		
Comparing the unit costs for narrow (small bore) and conventional sewage pipes and for the purification system used against that of a standard purification system.		
<i>System</i>	<i>Unit cost in Fcfa</i>	<i>A/B as a %</i>
a) narrow pipes	2,500/metre	5
b) conventional sewers	5, 000/metre	
a) plant purification	15/cubic metre	30
b) standard purification	50/cubic metre	

horse and cart for refuse collection is the equivalent of US\$91 (including loan repayment) and the monthly revenue the equivalent of US\$162. A grant of 300,000 Fcfa (US\$600) creates an income of 35,000 Fcfa (US\$71) per month for a cart driver which is slightly more than the minimum wage in Senegal.

VI. HOW THE POOR PAY FOR THEIR OWN DEVELOPMENT⁽¹⁵⁾

15. This section is drawn from Gaye, Malick (1996), "Entrepreneurial Cities; Public Services at the Grassroots", Occasional Papers Nos. 184-185, ENDA:Dakar, 1996. This is available in English and in French from ENDA.

MONEY IS CENTRAL to the fight against poverty. But this does not mean that the poor cannot do anything. Rather than becoming mired in what outsiders often refer to as the vicious circle of poverty, they "get on up" (or "siggi!", a rallying cry in Wolof, the most widely spoken national language in Senegal) to find systems for self-financing which, amongst other things, stop the control over their initiatives from being taken away from them.

16. *Fonds Communautaire pour l'Assainissement de Quartiers Urbains Pauvres* or FOCAUP.

The popular urban management system in Rufisque relies on such a system - the Community Fund for Sanitation in Poor Urban Neighbourhoods - FOCAUP.⁽¹⁶⁾ This is a revolving fund which is responsible both for mobilization and management of local savings. In just one year, a few hundred compounds had amassed some 25 million Cfa - equivalent to some US\$50,000. This is self-sustaining, allowing for the reproduction of initiatives aimed at improving the environment on a wide scale and, as such, supporting a great number of disadvantaged people.

FOCAUP adds to the momentum of the popular urban economy by making available a popular credit fund to finance local environment and public health initiatives in disadvantaged urban areas. Households, communities and local authorities can all apply for credit from this fund to implement initiatives based on partnerships. *FOCAUP is more than a fund or a credit system - it is an institution for replicating initiatives.* It gives the population control over resources that would otherwise be dispersed and enables them to participate fully in deciding how these resources should be allocated.

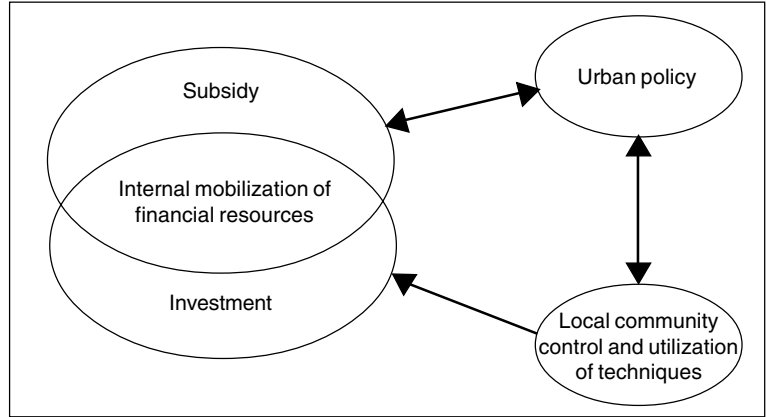
a. The FOCAUP Fund

FOCAUP gives credit to individual households who apply as part of a sanitation project. The Fund is made up of contributions by the population supported by subsidies from external partners⁽¹⁷⁾ as illustrated by Figure 1.

In the early stages of the project, most expenditure on sanitation was paid for by grants from the external partners, the rest being covered by the poor in the form of repayments on previous loans from the Fund. Now however, popular savings provide the bulk of the Fund's money and contributions from external partners serve only to increase the scope of its work. With regard to the allocation of the 92,500,000 Fcfa, when the system was being set up, loans received three-quarters of expenditure with the cost of developing the methodology (11.6 per cent) and managing the scheme (13.4 per cent) accounting for the

17. This fund benefited from the support of Canadian bilateral aid through the *Fonds de Contrepartie Canado-Sénégalais* and of the European Union.

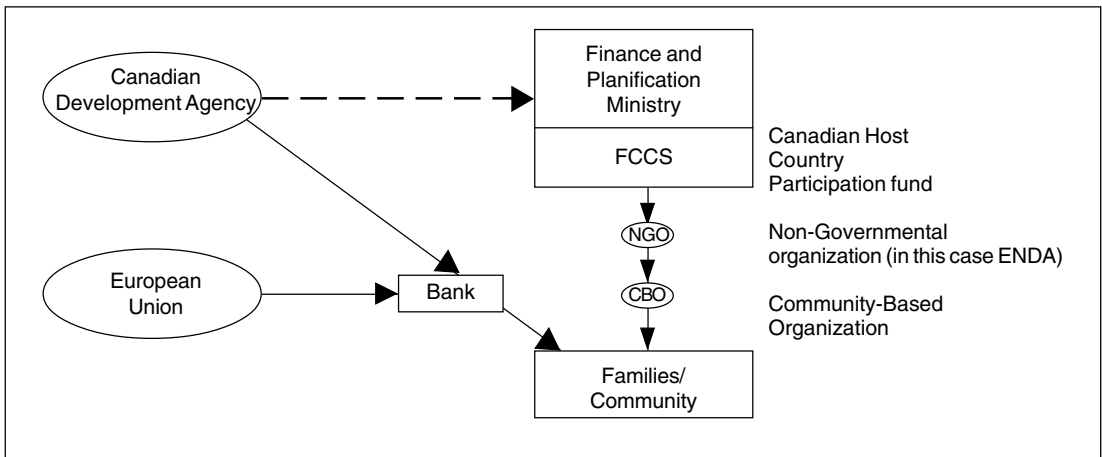
Figure 1: The origin of resources for sanitation projects



rest. Now, with the methodology in place, a much greater percentage can be used for popular credit and management costs amount to only 8 per cent of loans.

The mobilization of local resources is dependent on the capacity of communities to manage their finance to improve their environment. It also depends upon the political will to find new urban development strategies which will also shape the form of such strategies. The methodology and processes employed by FOCAUP are illustrated in Figure 2.

Figure 2: The process and methodology used in the FOCAUP Fund



b. Why People Repay

Repaying loans enables other members of the general community to benefit from new loans. It does not have direct advantages for those who take out loans. Utility-maximizing individuals might be slow to cooperate but the populations are quick to repay the loans. This is greatly helped by the fact that ben-

18. Now, the repayments by the beneficiaries cover the sewerage network as well as the costs of the purification plants.

efits from the system are rapid and visible. But there are really two key factors in the community commitment to cooperation. The first is that the household sanitation systems are financed by the community themselves through FOCAUP loans and the loans are negotiated by a contract between representatives from the local management committee⁽¹⁸⁾ and the heads of households themselves. Those who take out loans consider them to be loans to their own community. Secondly, it is the people's own representatives who are in charge of overseeing repayments by the local beneficiaries.

Repayment is also encouraged by the fact that continual efforts are made to keep down the costs of investment. Over time, as had been predicted by the Monitoring Evaluation and Planning Committee, capital investment costs have been radically reduced. This meant that over four years, cost recovery levels increased from 32 to 67 per cent (see Table 7). These cost reductions and cost recovery measures allow the fight against poverty being led by FOCAUP to become widespread.

Table 7: Time Period for Cost Recovery

Time period	Average value of each loan Fcfa (and US\$)	Average value of loan recovered, Fcfa (and US\$)	Levels of cost recovery	Monthly payment	Duration in months
PADE 1990-1992	271,569 (543.1)	87,470 (174.9)	32.2%	9,720	9
PADE 1992-1994	209,050 (418.1)	73,170 (146.3)	35%	7,317	10
PADE 1994-1995	175,725 (351.5)	117,260 (234.5)	66.7%	9,020	13
FOCAUP	175,725 (351.5)	190,369 (380.7)	108%	9,065	21

SOURCE: Enda-Tiers Monde-RUP.

19. It allows for 71 per cent of demand to be met; the shortfall is mainly due to various late payments.

The amount of money repaid each month has hardly changed since the project began (i.e. around 9,000 Fcfa) regardless of changes in the number or the duration of the loans. This optimal rate was set by the Monitoring, Evaluation and Planning Committee to make it both affordable to the residents and optimal in terms of the quality of the service⁽¹⁹⁾ provided.

In 1995, the Coordination Committee, which is made up of members of all the local management committees, decided that, in order to guarantee the sustainability of the process, it was necessary to recover all the costs of the public goods provision initiative. This did not mean just the initial sum invested but also the costs of managing the FOCAUP (set at 8 per cent of the Fund). This means that the local population is paying back 108 per cent of the investment costs at a time shortly after the de-

valuation of the CFA franc in January 1994 which was a serious setback for many. The devaluation hampered efforts to reduce the costs of this scheme but the decision to pay back 108 per cent did not have austere effects on the community: the monthly amount to be repaid remained at the same optimum level that the community had previously determined as optimal for themselves - but the duration of repayment was increased.

c. Wider Benefits and a Change in Scale

With these developments in the system of popular management, the residents of under-privileged neighbourhoods present further evidence of the *productive* capacity of urban environmental management. This can be clearly seen from the following statistics.

An investment of 19,037 Fcfa per compound (the equivalent of US\$ 38.1) covers sanitation services (sewerage system, purification plant, door to door refuse collection) in the neighbourhood. This same investment is productive in another way too since every time eight compounds connect to the sanitation system, one more permanent job is created. Five hundred and forty-four Fcfa (US\$1.09) per person serviced is all that is required to create a permanent job. This is one way in which small investments can enable genuine enterprise to bloom in poor urban environments. The poor are providing us with a new source of hope in cities.

Although, due to financial constraints, local authorities are not expected to contribute to the FOCAUP Fund, they do benefit greatly from its work. This explains the keen interest from local government in other parts of Senegal⁽²⁰⁾ to have the system taken up in their area, notably in Bignona, Foundiougne, Kaffrine, Pikine, Thiès and Fass Boye.⁽²¹⁾

The change of scale brought about by the FOCAUP takes place once the city council which has made the requests agrees to act as intermediary between the fund and local finance. Formal sources such as the *Crédit Communal* are willing to support communities to start up this kind of initiative and increase the Fund's ability to provide credit for the work.⁽²²⁾ Here is an interesting link between formal credit systems on the one hand and non-conventional "informal systems" on the other. Figure 3 shows the relations established through the FOCAUP Fund and their contribution to macro-level effects.

The FOCAUP Fund helps establish relationships between local initiatives (at the micro-political level) and urban policies (at a more macro-political level). Usually, the public and private sectors work on a macro-economic level and NGOs and CBOs on the micro-economic. The FOCAUP Fund encourages integration through the production of technology and a methodology based on local expertise but used on a wider scale and through constant dialogue between micro and macro levels (e.g. between the Monitoring, Evaluation and Planning Committee and local government).

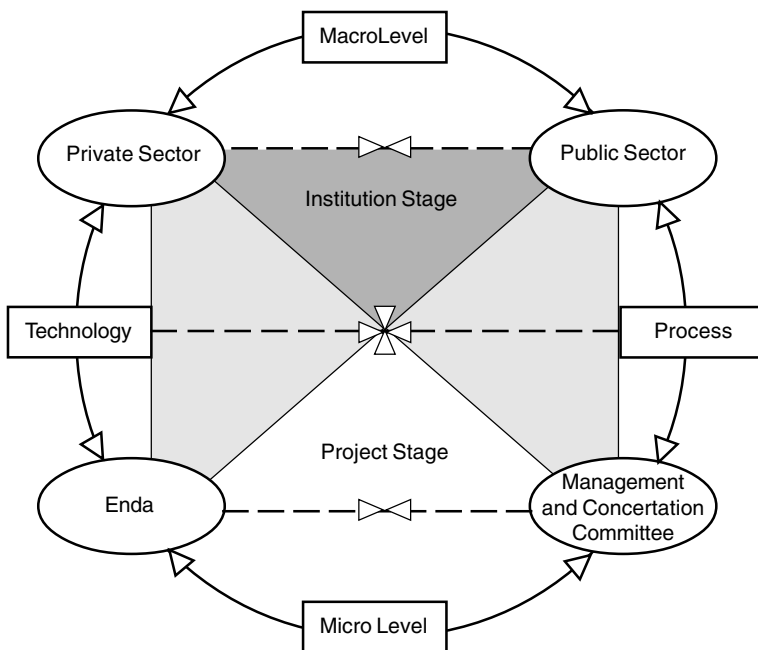
FOCAUP shows how local savings and credit initiatives can help compensate for the lack of local government fi-

20. And beyond, for example in Mali and in Latin America.

21. A village in a rural community in the Tivouane Department.

22. The Fund can help satisfy credit conditions laid down by financial institutions when the city councils are incapable of doing so, which is often the case.

Figure 3: The relations established through the FOCAUP Fund and their contribution to macro level effects



23. Literally as well as metaphorically: 80 per cent of buildings in Third World cities are non-commercially built.

nances. It is quite a change in roles when it is the population which steps in to help out local government financially for the provision of public goods. But through initiatives such as FOCAUP there is something bigger emerging. Now, to a great extent, it is the poor who are building their cities,⁽²³⁾ who are providing the sanitation services in more and more neighbourhoods and who are providing more and more public goods.

It is becoming increasingly clear that large sections of Third World cities are only surviving because of the input of their underprivileged citizens and that good governance can only be achieved if the traditional decision makers give the poor majorities who are building the city a seat at the negotiating table.

VII. CONCLUSION

THE ENDA-THIRD World experiment in Rufisque demonstrates:

- that the construction of appropriate and low-cost infrastructures and facilities provides jobs and income for numerous young city dwellers;
- that the value added - purified water and compost to cite but two examples - contributes to the struggle against poverty;
- that community involvement in the project resulted in increasing numbers of local people developing a civic sense;
- that women played a prominent role in improving the local environment; and
- above all, that the methods used are particularly suited to low-income areas.

