

Community sanitation in Yoff, Senegal

Claudia Bockman Weisburd

Community sanitation in Yoff is as much about community as sanitation. As part of a strategy of sustainable urbanization, ecological sanitation systems have been integrated into the planning of a new housing area, not only to deal with waste, but also as a focus of community development.

1. Association pour la Promotion Économique, Culturelle et Sociale de Yoff

2. Serigne Mbaye Diene, Maguette Thiaw, Lamine Ndoye and Lamine Samb of APECSY, consultants
Claudia Bockman Weisburd, planner, and Jerry Weisburd, architect, with substantial participation of the EcoYoff Program of the NGO CRESP, Senegal.

Planning with scale models
(see following page)

Fifteen years ago, Yoff was a fishing village of 20,000 people outside Dakar. Families lived in concessions around a common yard, grouped within districts interlaced by paths. Today, the village is surrounded by a new autoroute, the deafening runways of the international airport, and sprawling subdivisions. Its area has tripled, population reached 50,000 in 1994, and the 'village' is now a part of Dakar. Population growth is estimated at 6.6%/annum.

The strains of rapid urbanization are evident in the mountains of garbage, sewage in the streets, pollution, erosion, desertification, erratic water supplies, and massive loss of vegetation. But the strains are also social and cultural, as families shift from concessions and village life to

new housing patterns, hobbled by inadequate infrastructure and high unemployment.

In a new sector of Yoff, the village association, APECSY,¹ is trying to create a sustainable path of development, emphasizing sanitation, environment, community, and capacity building. APECSY controls a tract of land, ('the Extension'), laid out in a grid of 1100, 150 m² plots, to house 12,000 people at a density of about 190 per acre. Parcels were made available on a non-profit basis, and were quickly built on. After hosting the Third International EcoCities Conference in 1996, APECSY put together a development team² to revisit the scheme from the perspective of sustainable development, and subsequently set aside a sub-section for a pilot *Cité Écologique* for approximately 1000 people. They also adopted changes to the larger Extension plan to accommodate new, integrated approaches to urbanization.

Resources and problems

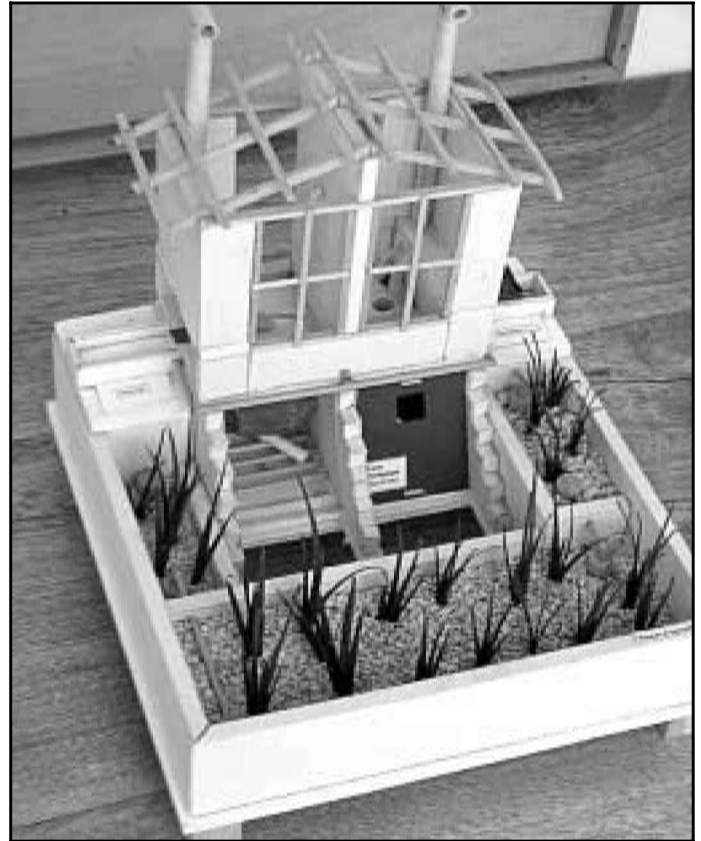
The goal of sustainable community demanded a commitment to process and to evolve a 'direction', rather than to deliver a 'solution.' The team began by looking at what worked, and didn't, in the village. Resources were quickly identified as including strong community networks, masonry skills, local cement block fabrication, and skilled, inexpensive labour. Problems included waste and sewage, expensive and erratic water supply, unemployment, disease (especially diarrhoea and



Scale models show how the dry toilet/reedbed systems work, and how sanitation planning is integrated with spatial and community planning

malaria), and general environmental deterioration.

Waste disposal became a central focus. Solid waste – often mixed with water – is dumped at the beach, in vacant lots, or at overflowing dumpsters. Water and human wastes are disposed of in a variety of ways. More well-to-do households have septic tanks, with or without leachfields (soakaways). Flush toilets (50% of households) are typically used as pour-flush because of the expense or lack of water. Because of the cost of pumping, unavailability of trucks, or inaccessibility, septic tanks are often emptied into pits in the streets, which remain open until the effluent



3. The Eco Yoff Program organizes internships in sustainable development, pairing local and foreign students.

subsidies. Less well-to-do households use a sand area in the yard for urinating, without toilet facilities. Water use ranges between 40 and 100 l/pp/pd, depending on income and water source. Even in households with septic tanks, girls carry household 'used' water off-site, often spending more than an hour a day, or crossing the autoroute to discard water.

The municipal sewer that borders the

Extension creates more problems than it can solve. It is over capacity and frequently blocks, spilling effluent into the streets. Sewage intended to pass through a pumping station pours onto the beach instead – the pump has been broken for years, creating a vast coastal sewage swamp surrounded by housing. With municipal sewerage unavailable, people put in septic tanks (or nothing). Leachfields are prohibited at the Extension because of density and a shallow aquifer, and small lots and large households force people to put undersized septic tanks under the house, leading to tank failures, more frequent pumping or street emptying, and more wastewater hauling.

Based on community research, it also became clear that the Extension plan was incompatible with social and cultural practices. A US intern and Yoffois partner³ had established that in the traditional village, community space is used for religious celebrations, baptisms, weddings, meetings, small-vendors, elders, and children. The network of pedestrian paths fosters continual social interaction and community cohesion. The Extension plan, with its long, straight streets, plots too small for courtyards, and lack of open space, undermines the active community life of the Yoffois.



Pilot dry toilet/shower block, with double pit, and reedbeds for sullage water, urine and shower water – it currently serves a 21-person household

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Merging community and environmental goals – houses grouped around a square, with shared sullage water treatment beds and open space

The Partnership: ecological sanitation, open space and community

Given the network of problems and resources, it seemed worthwhile to explore ecological sanitation. Household-level research was conducted by two women volunteers documenting quantities of water, uses, waste types and quantities, and daily practices of disposal. Pros and

cons of composting, biogas, lagoons, and composting/dry toilets were discussed with core community group members, and a concept developed. Ecological sanitation systems need space, and open space is a vital (but with population pressure, unaffordable) element of community. Why not bring the two together? The *Cité Écologique* plan was designed to encompass ecological sanitation,

“Ecological sanitation systems need space, and open space is a vital (but with population pressure, unaffordable) element of community. Why not bring the two together?”



The conventional sewer that serves one corner of 'new' Yoff blocks frequently, spewing sewage into the streets (and see overleaf)



Pilot twin-bin net system with surrounding reedbeds, for sullage water and disposal of organic wastes. The sheltered area is used for laundry and food preparation. Currently serves 11 households for water disposal



(Above and below) Sewage in the streets from the blocked conventional sewer.

environmental protection and regeneration, and community building.

Twelve to fifteen houses are grouped around a common open place, for social space, pedestrian circulation, and to create a face-to-face community to facilitate management by a place management committee (neighbourhood management committees are common in the traditional village).



Infrastructure is decentralized, to create standardized physical plants each of a manageable scale, reduce impacts of failures, and put responsibility squarely on users who know each other. People with plots at the *Cité Écologique* agreed to pay monthly fees for sanitation systems, and know they will determine the levels of service.

Subsurface-flow reedbeds for water disposal and treatment (without solid toilet wastes) are located in each place. Houses may be connected directly, or water can be carried to it (still an improvement for women and the environment, but with some technical and management complications).

Reedbeds themselves and any post-treatment water will be used to green the place and the surroundings (to be decided and detailed by the management committees).

Dry toilets, (or urinals only), with urine diversion to the water station, will be promoted, using processed faecal material for street trees, after further composting if necessary. The idea is that at best, many will build dry toilets; at worst, there will still be septic tanks, but the volume of septic liquid will be greatly reduced.

Committees will develop a horse-cart pre-collect system for solid wastes, possibly coupled with composting in the place.

Reedbeds and toilets are designed for construction with readily available materials and local skills, for simple maintenance with basic training, and to mesh as much as possible with current waste handling practices.

A local company will be created for construction, maintenance and operations, management, and training.

Work in progress

On the social side, the *Cité Écologique* plan is being implemented, and residents have begun to work in committees. On the technical side, a dry toilet/greywater treatment station was designed to

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develop and test the technology and cultural/practical suitability. Three pilots were built and put into operation in November, 1999. One, a twin-bin dry toilet and shower block, with adjacent reedbeds for wastewater, serves a 20-person very low-income household that had no toilet facilities previously. The toilet is part of the concrete floor slab, with a urinal and urine diversion channel. Yard sweepings or ashes are thrown in the pit after each use (further reducing waste hauling). Urine and shower water flow into the first of two settling tanks; other household water is carried and poured in. Reedbeds are gravel-filled (planted primarily with local *typha*) with an estimated capacity of 1000 l/day. Because this household uses less water than average, the elderly household head will soon allow neighbours to dump water for a small fee, creating some income and providing meaningful work. (This will also test semi-public use of a station at a small scale.) Water flows from the last reservoir by gravity to an area now planted with palms for weaving.

Testing the designs

The second pilot, at the home of a respected village leader, uses the same design, but instead of toilet wastes, the pits are used for organic kitchen wastes. The slab that would otherwise be the toilet/shower, serves as food prep and laundry area. Reedbeds are handling the water disposal for approximately 40 people. Water from the final reservoir is pumped by a 12v solar-powered pump to a garden area.

Technicians, (including a woman family technician), check the stations and talk with the users three times a week. For outreach and training, APECSY set up a small *Centre Écologique*. There, the third pilot, a 200-litre reedbed (no solids) was installed for testing, demonstration, and discussion. Detailed scale models show how a dry toilet may be built inside a new house or in an outdoor toilet block, and photos show the pilot stations at all stages. Local photographs illustrate current sanitation conditions and problems, and show the differences between conventional and ecological sanitation. The Centre is also used for residents' meetings, training, and other technology demonstrations.

The response to the pilots has been extremely positive – perhaps too positive



for the stage of results. But because the demand for stations is so great, APECSY agreed to provide design and technical support to a limited number of village or Extension households who can pay the cost of construction themselves. This will also test designs for integrating systems into existing village housing.

Information trickles up

Community funds, volunteer labour, vision, and commitment have carried the work to this point. The NGO CRESP Senegal has agreed to help APECSY find funds for subsequent phases, and the municipality has committed to a permanent *Centre Écologique*. With strong community demand for ecological sanitation and a solid strategy for its development, APECSY is starting to let information about the project 'trickle up' to relevant ministries, which has already begun to generate support. Further construction and maintenance training, evaluation, intensive committee work, and developing the next 2-year plan are scheduled for summer 2000. We hope also to build a pilot indoor urinal with greywater/urine treatment basins located on the roof to save ground space. Additional technical support will soon be needed to design common stations based on experience with the pilots, with the goal of starting construction of the first common station in early 2001.

Women have been eager to carry water to the nearby station instead of down to the beach or across the autoroute

about the author

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