Alternative sewerage systems for the provision of sanitation services

Main learning from a study in Africa, Asia and Latin America

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WHAT DO WE MEAN BY "ALTERNATIVE SEWERAGE?"

Different from "conventional" sewerage because of :

- their technical features (small diameter pipes, short length, decentralised, etc.)

  or

- the decentralized-driven approach for the management of the service

Small bore sewers, simplified sewerage, condominial sewerage …

Always considered in this study as a solution that encompasses the three segments of the sanitation chain

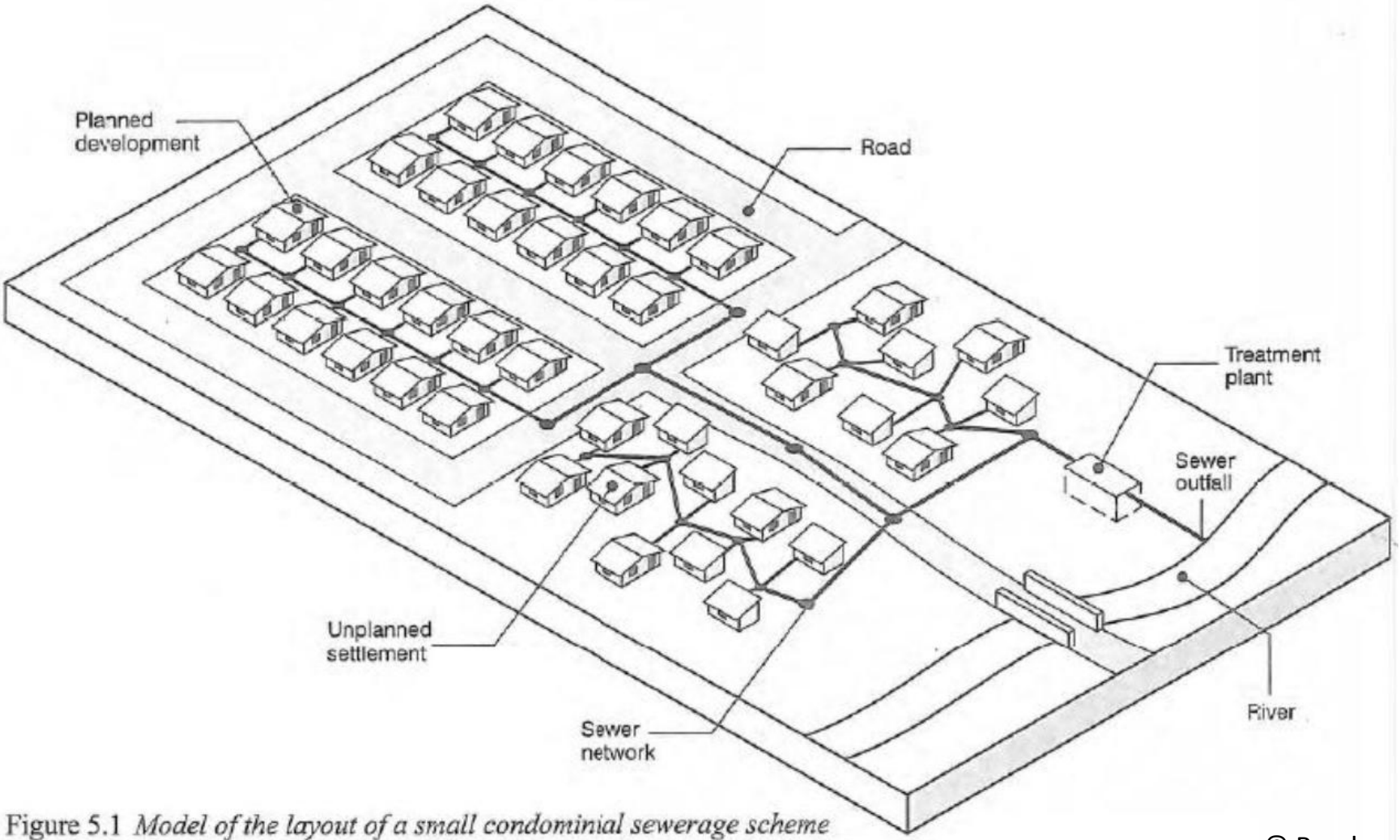


Figure 5.1 *Model of the layout of a small condominial sewerage scheme similar to the one used for demonstrations in Rio Grande do Norte, Brazil*

Aims of our study

- **Identifying strengths and weaknesses**, regarding technical, financial and management issues
- **In which context** small-bore sewers are relevant?
- Which **recommendations** for implementation?

Case studies and littérature review

The study was based on

- case studies, done with the support of national consultant:
  - Ramagundam, India, with Asit Nema, Foundation for Greentech Technologies
  - Salvador, Recife and Brasilié, Brazil, with Antonio da Costa Miranda Nieto
  - Kumasi, Ghana, with Lukman Y. Salifu, WasteCare Associates
  - Bamake and Mopti, Mali, with Assétou Sokona and Youssouf Cissé, Water and Sanitation for Africa
  - Dakar and Saint-Louis, Senegal

  + visit in Vietnam
- literature review

Why to focus on management issues

Alternative sewerage systems are widely disseminated all over the world

But lot of them face difficulties

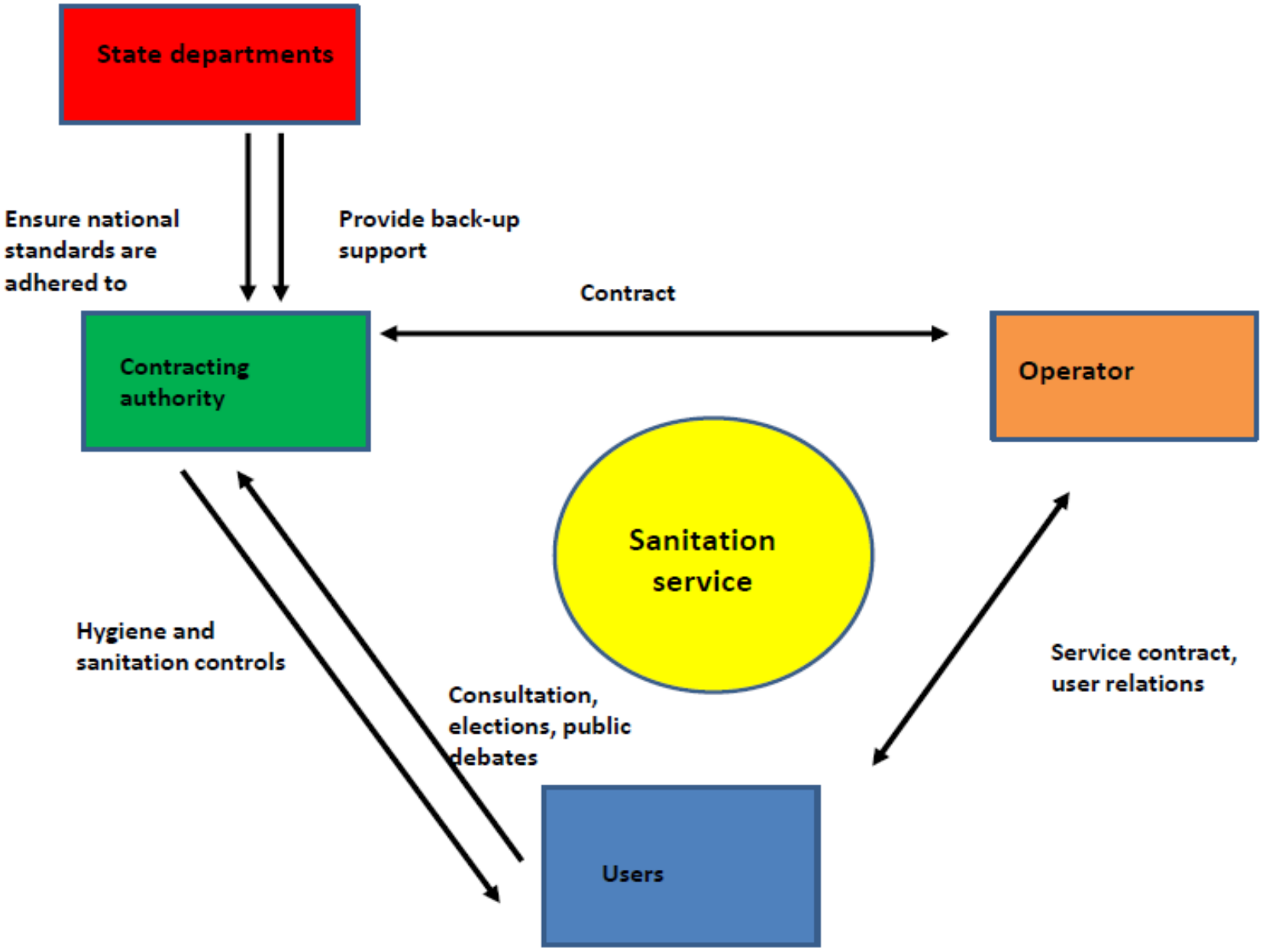
- **Linked to the conception and dimensioning** (not enough slope, Pipes level higher than household sanitation facilities level, etc.)
- **But the main issue is linked to the question of Management of the services :**
  - **Institutional management**: unclear responsibilities and missing contractual framework and monitoring
  - **O&M management**: O&M skills are missing, operator is not clearly identified for each level of maintenance
  - **Financial management**: recurring operating costs are under-estimated, too few connexions , low collection rate of the sanitation fee, etc.
  - **User relation management**

Main learning:

Small sewer system does not mean small management!

Institutional management

- Clear role and responsibility of each stakeholders
- Contractual framework
- Real ownership by the Public authority (contracting authority)
- Monitoring and regulation mechanisms

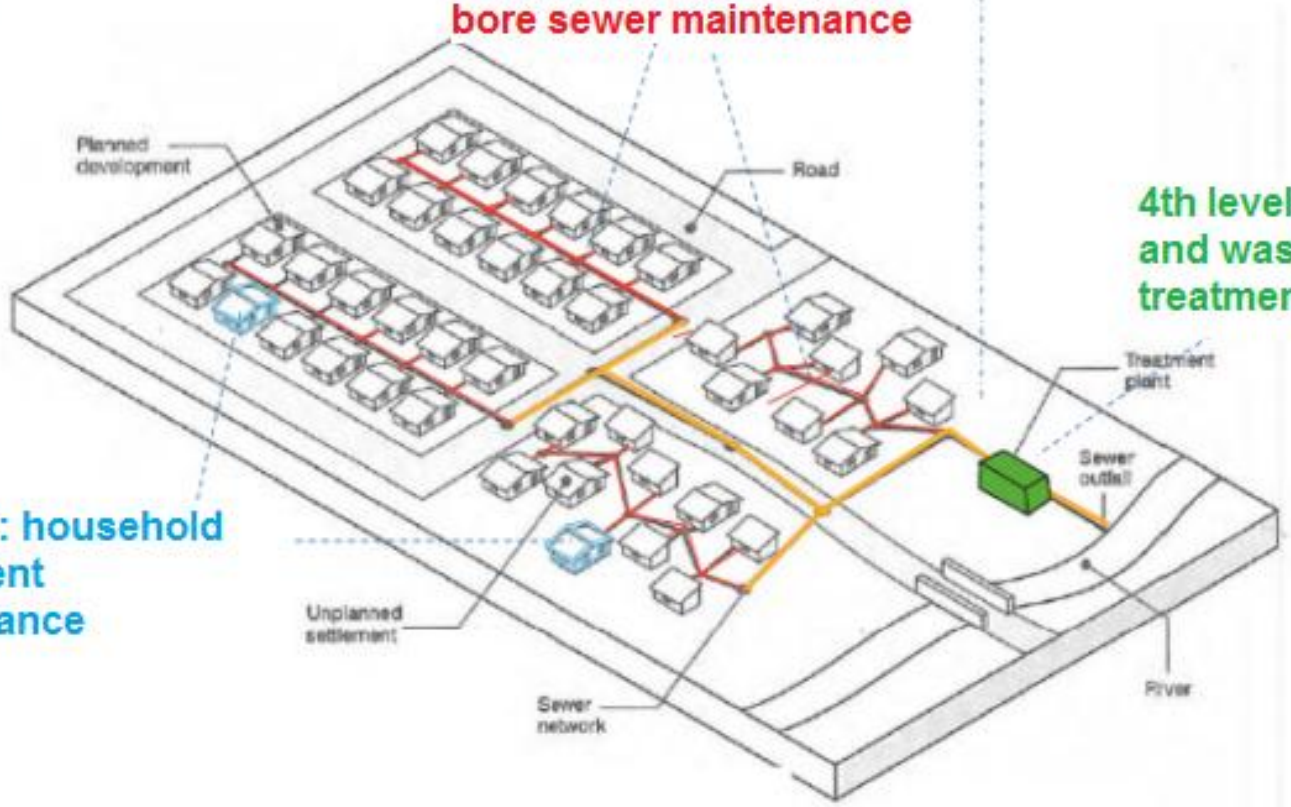

State departments
Ensure national standards are adhered to
Provide back-up support
Contract
Contracting authority
Operator
Sanitation service
Hygiene and sanitation controls
Consultation, elections, public debates
Service contract, user relations
Users

O&M management

- A clear responsible identified for each levels of O&M:
  - 1st level: household equipment maintenance
  - 2nd level: routine small-bore sewer maintenance
  - 3rd level: maintenance of the entire system and routine maintenance of the main sewer lines
  - 4th level: lift pump and wastewater treatment plant O&M
- Service providers have the required capacity

3rd level: maintenance of the entire system and routine maintenance of the main sewer lines

2nd level: routine small-bore sewer maintenance



4th level: lift pump and wastewater treatment plant O&M

1st level: household equipment maintenance

1st level: household sewer equipment maintenance

Task description	Who is responsible for the task?	Who carries out the task (provider)?	Equipment and tools required
Deal with blockages and leaks (plumbing)	The users	The users themselves or a small informal private provider (plumber)	Picks, brushes
Clean the grease trap and connection boxes	The users	The users themselves or a small informal private provider (plumber)	Picks, brushes, trowels, shovels
Settled sewerage: check the level of the settling tank and have this emptied if necessary	The users	Informal private sector (manual or mechanical pit emptier)	Vacutug or vacuum truck
Settled sewerage: check the level of the condominial settling tank and have the domestic tank emptied when necessary	The users or Sewer operator under contract: Private operator or Community-based operator or National public or local public operator	Operator under contract or one of their contractors (Private pit emptying companies)	Vacuum truck

2nd level: routine small-bore sewer maintenance

Task description	Who is responsible for the task?	Who carries out the task (provider)?	Equipment and tools required
Clean the sewer and manholes and remove (frequent) minor blockages *(except main sewer lines)*	The users themselves or Sewer operator under contract: Private operator under contract or Community-based operator or National public or local public operator	The users themselves or a small informal private provider (plumber, pit emptier, garbage) or sewer operator under contract: Private operator or Community-based operator or Public operator	Hand tools: Picks, brushes, flexible rods, spades, cleaning balls Mechanical equipment: High-pressure ewer cleaning equipment (Brazil)
Carry out corrective maintenance on the upstream section of the sewer: illegal connections, cracks, breakages	Sewer operator under contract: Private operator under contract or Community-based operator or National public or local public operator	Sewer operator	Visual (surface) inspection Inspection camera (Brazil)

3rd level: heavy maintenance, maintenance of the entire system and routine maintenance of the main sewer lines

Task description	Who is responsible for the task?	Who carries out the task (provider)?	Equipment and tools required
Remove major blockages on the upstream section of the sewer (small diameter pipes)	Users or Sewer operator under contract: Private operator under contract or Community-based operator or National public or local public operator	Sewer operator or A service provider (pit emptying company, for instance, as in Brazil)	Sewer cleaning pump (truck or pick-up)
Clean out the main sewer lines and their manholes and remove blockages	Sewer operator under contract: Private operator or Community-based operator or National public or local public operator	Sewer operator or A service provider (pit emptying company, for instance, as in Brazil)	Sewer cleaning pump (truck or pick-up)
Carry out corrective maintenance on the upstream section of the sewer: illegal connections, cracks, breakages	Sewer operator under contract: Private operator under contract or Community-based operator or National public or local public operator	Sewer operator	Visual (surface) inspection Inspection camera (Brazil) Other inspection tools Internal inspection by technicians on sewers with access
Undertake maintenance: replace damaged pipework, manholes and covers	Sewer operator under contract: Private operator under contract or National public or local public operator	Sewer operator or A service provider contracted by the sewer operator (public works company, for example)	Hand or mechanical digging tools Transport truck Lifting equipment, if required

4th level: lift pump and wastewater treatment plant repair and maintenance

Task description	Who is responsible for the task?	Who carries out the task (provider)?	Equipment and tools required
Routine operation and maintenance of the pumping station: mechanical, electrical and hydraulic equipment, fuel supply, etc.	Sewer operator: under contract Private operator or National public or local public operator	Sewer operator	Possibly a permanent on-site technician (both caretaker and electromechanic)
Heavy maintenance of the pumping station Emptying the lift station (removing sludge and sediment) (about once a year)	Sewer operator: under contract Private operator or National public or local public operator	Sewer operator or specialist electromechanical or hydraulic contractor	Engineer or high-level technician specializing in electromechanics Lifting equipment, if required (if no gantry above the station) Pump
Routine operation and maintenance of the decentralized treatment plant Monitor the quality of wastewater discharges Bypass in the event of heavy rains	Sewer operator: under contract Private operator or National public or local public operator	Sewer operator (or conventional sewerage operator if different)	Possibly a permanent caretaker-technician Dedicated engineer for overall monitoring of the WWTP
Heavy maintenance of the treatment plant Empty or clean the treatment plant (every 1 to 5 years, depending on the type of WWTP)	Sewer operator: under contract Private operator or National public or local public operator	Sewer operator (or conventional sewerage operator if different) or specialist contractor (WWTP emptying company)	Specialist technicians Cleaning and pumping equipment

Financial management

- Revenue collection
  - collecting contributions to the connection fee from new users;
  - collecting the sanitation fee from users to finance operations (paid directly to the operator or via the water operator if the sanitation fee is levied on the water bill);
  - identify users that have defaulted on payment, issue reminders, then implement debt recovery measures;
  - collect any additional funding (for instance, a municipal operating grant to finance operations. However, this type of funding is not recommended as it is rarely reliable over the long-term).
- Management of the disbursing expenses
- Monitoring operating income

User relations management

- Listening the expectations of the users and their difficulties regarding the service
- “Awareness-raising”

  to foster the assimilation of a range of good practices among users (hygiene, maintenance of household facilities, payment of fees and charges).
- Marketting and “Promotion”

  In order to stimulate demand

Conclusions

- **Alternative sewerage systems are appropriated to specific contexts**
- **There are strong constraints in terms of management**
  - **→Clarification of roles and responsibilities is needed**
  - **→Professional capacities for the service provider is required**

Thank You!

Available in the next few days:

→ Country case studies and Analysis report

Coming soon:

→ a guidebook

www.pseau.org/mini-egouts

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