

Chapter 6: Conclusions and Recommendations for Further studies

6.1. Conclusions

Physical sustainability of infrastructure projects has increased in importance and awareness. It can be understood as a way of effectively applying resources to achieve a worldwide healthier quality of life, decreasing inequalities and improving the interaction between human beings and the environment.

Previous reports suggest that efforts have been made towards the improvement of parameters for the identification, application and measurement of sustainable strategies. The study presented in this thesis investigated aspects considered relevant for the sustainability of low-cost sanitation programmes and, based on the data obtained, the following conclusions may be drawn:

1. Low-cost sanitation programmes must be designed taking into account specific characteristics of the sites and of the communities, and, this has to be done at all stages of the project: selection, designing, implementation and maintenance. A number of guidelines are available to drive the technology selection process. Nevertheless, the specific characteristics of a given community make the application of generalised “recipes” not always the best strategy.
2. The capacity of institutions (e.g. a water and sewerage company, a resident’s association, or even a household) to undertake successfully the O&M of the selected system should be strongly assessed during the technology selection process.
3. Condominial sewerage is in fact a system designed to overcome the main problems regarding the provision of sanitation in high-density urban areas. It can work well with minimum wastewater flows and can be physically well adapted to the crowded conditions of urban slums. As a sewerage option, the condominial system is culturally very well accepted among urban residents; and it can be cheaper than on-site systems in such high-density conditions. Nevertheless, the two main vulnerabilities for its sustainability are related to user awareness (and behavioural changes) towards the adequate utilisation of the system, and the reliability of the adopted O&M strategy.

4. Including the household connections in the timetable of the implementation of the programmes would be a better strategy than leaving it to the responsibility of the householders (unless the community is easy to manage and guarantees are taken for the connections). Particularly in programmes based on the condominial sewerage technology, a strategy where the connections of a block are provided during the system's execution phase, and under the supervision of trained personnel may improve the chances for both the appropriate quality of the construction and the provision of the connection itself.
5. Regardless of the institutional administrative level (community, local or estate), commitment and accomplishment of responsibilities are certainly two key factors for the institutions involved in the O&M of low-cost sanitation systems.
6. Community participation in O&M is a strong factor in the management of low-cost sanitation programmes. Nevertheless, realistic assumptions should be considered and financially sustainable mechanisms created to overcome eventual deficiencies.
7. Educational programmes need to be evaluated, monitored and continued. Therefore, they should also be carefully balanced without introducing more messages than the community can absorb at once.
8. Educational messages delivered for the post-implementation phase of the sanitation programmes must reach all households with clear messages to reinforce the main aspects of the O&M of the systems, as well as to stress the importance of behavioural changes focusing on health improvement.
9. As has been advocated, the provision of safe water and sanitation is an urgent need that has to be accomplished. Nevertheless, the solutions cannot be delivered in response to conditions of emergency or political transience. Therefore, the urgent need for sanitation (service delivery) must be solved, but in a way that the future requirements of the systems (for examples, reliable O&M arrangements and upgrading possibilities) are also addressed.

6.2. Recommendations for Further Studies

The present study investigated aspects influencing the sustainability of low-cost sanitation programmes; however, further knowledge is still necessary in order to improve the reliability of the systems, as well as acceptance among both funding agencies and users. Therefore, further studies are suggested to be undertaken, as follows:

- Detailed comparison of the different O&M strategies adopted in the various case studies reported herein, to establish which one or ones might be advantageously used more widely (perhaps as standard solution for different periurban or rural environments).
- Better information on the full costs of the low-cost sanitation programmes (including costs of the technical system and social interventions) in order to provide (or update) cost comparisons between the different technological options and data on the influence of community densities.
- To assess the operation of condominial sewerage in areas where the water supply is unreliable or intermittent.
- To address more closely the use of condominial sewers to receive, and their capacity to accept, stormwater flows.