Preparation of Development Plans for Environmental Sanitation in Developing Countries

A Reference and Brief

Japan International Cooperation Agency

(JICA)

June 1997

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Preface

The Social Development Study Department of JICA has been conducting research on effective planning and methodology, to carry out efficient development studies. As part of such research, we have completed this "Preparation of Development Plans for Environmental Sanitation in Developing Countries - A Reference and Brief -."

The reference summarizes the basic principle for formulating programs and important issues in sanitation and relevant sectors, with particular emphasis on night-soil and household wastewater management.

It took three years to complete this research. In the first year, we focused mainly on the principles and the methodology of other donors: UNDP, UNICEF, WHO, PAHO, the World Bank, IDB, CIDA, BMZ, GTZ, KfW, DGIS, SIDA, SDC, ODA, USAID and the others. In the second year, the research compared and analyzed the planning methodology being taken in Japan and other donors, and summarized the points which Japan's ODA should take into account. In the third year, based on these comparison and analysis, overall discussions for appropriate planning and methodology were made. Consecutive seminars were held with the attendants from various agencies and academic concerned. In this process, valuable comments and views were incorporated.

The needs for sanitation are expanding, reflecting the deteriorating conditions in developing countries, and it certainly increases the needs to strengthen the aid to this sector. We hope that this reference will be widely used by those who are involved in the sector and have intention to contribute to the effective program formulation.

We would like to express our sincere thanks to Dr. Bernd H. Dieterich (Former Director, Division of Environmental Health, WHO) and Mr. Takaharu Ikeda, IC Net Limited, who were intensively involved in finalizing this research, to Dr. Hidetoshi Kitawaki of Tokyo University, who supervised the research and to those who cooperated and supported the research.

June, 1997

Tatsuhiko IKEDA
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Abbreviations and Terms

AID	see US/AID
APIC	Association for the Promotion of International Cooperation, Ministry of Foreign Affairs of Japan
BID	Intr-American Development Bank, Washington, D.C.
BMZ	Bundesministerium für Wirtschaftliche Zusammenarbeit, Germany
BOT	Balance of Trade
CC	Water Supply and Sanitation Collaborative Council, Geneva
CEC	Commission of the European Communities
CIDA	Canadian International Development Agency, Ottawa, Canada
DAC	Development Assistance Committee (OECD)
Decade	See International Decade
Development Study	Studies supported by JICA to prepare projects for decision (see also Annex 3)
DGIS	Directorate-General for International Development, Netherlands
EDI	Economic Development Institute, The World Bank
EIA	Environmental Impact Assessment
EU	European Union
FASID	Foundation for Advanced Studies on International Development
FIRR	Financial Internal Rate of Return
F/S	Feasibility study
FY	Fiscal Year
GTZ	Gesellschaft für Technische Zusammenarbeit, Germany
"Hard"	Refers to physical works, *e.g.* pipes and pumps (also "hardware")
Hardware	See "Hard", above
HEP	Health and Environment Project of US/AID
IBRD	International Bank for Reconstruction and Development (The World Bank)
IDCJ	International Development Center of Japan
IDRC	International Development Research Center, Ottawa, Canada

IDWSSD	International Drinking Water Supply and Sanitation Decade
IEE	Initial Environmental Evaluation
IFIC	Institute for International Cooperation, JICA
INTEP	International Environmental Planning Center, Tokyo, Japan
International Decade	International Drinking Water Supply and Sanitation Decade, 1981-1990
IRC	International Reference Center
IRCWSC	International Reference Center (Water and Sanitation Center), The Hague, The Netherlands
IRCWD	International Reference Center (Waste Disposal), Zürich, Switzerland
JICA	Japan International Cooperation Agency, Tokyo, Japan
JICWELS	Japan International Corporation of Welfare Services
Jokaso	A Japanese technology for on-site environmental sanitation
KfW	Kreditanstalt für Wiederaufbau, Frankfurt, Germany
LLDC	Least Developed of the Developing Countries
Logframe	Logical Framework
Low-cost sewerage	A waterborne sewerage system based on low-cost design standards
MOC	Ministry of Construction, Japan, Japan
MOHW	Ministry of Health and Welfare, Japan
M/P	Master plan
NGO	Nongovernmental organization
NIE	National Income Expenditure
O&M	Operation and maintenance
ODA	Overseas Development Administration, London, UK
ODA	Overseas development assistance
OECD	Organization for European Cooperation and Development, Paris
OECF	The Overseas Economic Cooperation Fund, Tokyo, Japan
On-site sanitation	A sanitation system for a lot or a plot which is not connected to an off-site system
PCM	Project Cycle Management

PDM	Project Design Matrix
Project	An investment project, normally in need of project support measures to ensure sustainability of the investment
PRA	Participatory Rural Analysis
Project Study or Studies	The study of studies undertaken to develop projects for environmental sanitation
PSM	Project Support Measures to ensure effectiveness and sustainability of the investment
SDC	Swiss Development Cooperation, Berne, Switzerland
SIDA	Swedish International Development Agency, Stockholm, Sweden
"Soft"	Refers to the sum of supporting measures to make projects effective and sustainable (also "software" and/or "project-support measures")
Software	See "Soft", above
SOW	Scope of Work
STC	Short Term Consultant
TOR	Terms of Reference
UNCED	United Nations Conference on Environment and Development, Rio de Janeiro, 1992
UNDP	United Nations Development Programme, New York, USA
UNICEF	United Nations Children's Fund, New York, USA
US/AID	Agency for International Development of the United States of America
WORLD BANK	The World Bank
WHO	World Health Organization, Geneva, Switzerland
WID	Women in Development

1

Introduction

1.1 General

All people in the developing countries should be able to enjoy living conditions which are conducive to their individual and community health and well-being. This is one of the basic premises of Japanese economic cooperation and is consistent with recognition that economic and social development, and the stability of the developing countries, is vital to the peace and prosperity of the entire world.

By the same token, Japanese ODA pursues the goal of sustainable development and the preservation of the environment, not only at the global level where the effects of human activities on climate, the ozone layer and bio-diversity are matters of concern, but also locally where the conditions of the environment have a direct impact on the people's health and well-being. Broadly speaking, the human environment cannot be safe as long as the surrounding air, water and soil are polluted, and people have no access to adequate amounts of safe drinking water, and are threatened by the waste originating in every home and community.

Of the problems that might be listed, the disposal of night-soil and wastewater is of particular concern because, according to information provided by the World Health Organization, 1,385 million of the people living in developing countries are still without adequate disposal facilities[1]. This dilemma was attacked during the International Drinking Water Supply and Sanitation Decade but was not resolved, although the money invested to improve water supply and sanitation during these ten years (1981 to 1990) exceeded all previous levels.

While the conditions of drinking water supplies have substantially improved during and after the Decade, the disposal of wastewater and the provision of basic environmental sanitation has frequently been neglected. The people living in semi-, peri-urban and rural areas are particularly affected. Because of the difficulties encountered during the past, which seem — especially for low-income populations — to defy any rapid improvement of sanitation, their needs for better environmental sanitation are challenging both governments and the aid community, including Japan's official ODA. All concerned, both beneficiaries and aid

[1] World Health Organization, The International Drinking Water Supply and Sanitation Decade, Document WHO/CWS/92.12, 1995, WHO, Geneva

providers, should give higher priority to sanitation and not shy away from their responsibility.

Basic environmental sanitation, as the subject of the present publication is defined, includes the collection, purification and, ultimately, disposal of night-soil and graywater, without creating public health and environmental hazards. It is targeted principally at improving conditions in developing countries, mainly for those groups whose needs are greatest and whose resources, if any, are the scantiest and most diverse. It follows, therefore, that the methods used to provide environmental sanitation must be tailor-made to address each community's requirements, and must be innovative. If the task were easy, it would have been done long ago.

The most pertinent lesson from the International Decade is that environmental sanitation in the developing countries cannot be improved by merely adapting the high-tech solutions of the industrialized countries. In developed countries, wastewater is carried away by capital-intensive sewerage systems and discharged into the environment after an ever-increasing degree of purification. In the developing countries, this type of technology is not normally recommended, except for the central core areas of large cities and towns, where infrastructural requirements so command and the people can pay for it. Even under such conditions, however, high-tech systems often fail to perform because of neglect in operation and maintenance.

Everywhere else, three requirements must be met, i.e. (i) a less costly technology must be used, (ii) sustainable operation of the systems must be assured for after they have been built, and (iii) participation "in kind", and cost-sharing by the beneficiaries, is indispensable, including the low-income population. The choice of technology becomes a primary consideration in this context; contrary to the conditions in most of the rich countries, environmental sanitation for the high-risk, semi- and peri-urban and rural areas will depend heavily on the use of low-cost sewerage or on-site technologies for the disposal of nightsoil and graywater.

The lessons learned during the International Decade are not all new to the Japanese people. About fifty years ago, only a small fraction of Japan's communities were sewered. Most people relied on pit latrines (and the use of nightsoil as fertilizer) and on-site *Jokaso*[2] systems for the disposal of night-soil and graywater. Even today, some 40% of the population still use on-site systems — substantially improved, however. In consequence, the societal aspects of environmental sanitation are well known and understood in Japan. We face the challenge, then, of using the experience available from our own history. Although high-tech is desirable where infrastructure requirements so demand, and income levels and the state of the

[2] The Japanese *Jokaso* Law defines the *Jokaso* as follows: (i) equipment or facilities that are directly connected to toilets to treat nightsoil or graywater combined with nightsoil; and (ii) equipment or facilities designed to discharge the above-mentioned wastewater to locations other than public or basin-wide sewerage systems.

economy so allow, we must not merely apply to very different situations the same technology which we use in Japan today in our highly congested cities and towns.

1.2 Proposed Content of this Reference

The task ahead in Japanese overseas cooperation for environmental sanitation is to assist the developing countries to help themselves, especially in the planning, design and implementation of projects which meet the above-mentioned three basic requirements: (i) the use of an affordable technology, (ii) sustainable operation, and (iii) participation and cost-sharing by the beneficiaries.

As a practical approach to informing all parties involved, JICA decided to compile the present publication as a reference and for briefing. It has as objectives to (i) raise issues and questions, (ii) exhibit Japanese and other experience to date, and (iii) discuss the major actions to be taken in the planning and design of projects for environmental sanitation. The guiding principles in preparing this reference were that (i) each project will be different and, accordingly, there cannot be only one model for general application, and (ii) the Consultants engaged in the preparation of project Development Studies, and the Experts dispatched to the countries, must not be "straight-jacketed", but rather given a large degree of latitude in adapting the information contained in the reference to the circumstances of the specific project to which they are assigned. Therefore, the "Discussion" at the end of each Chapter is not a technical prescription. Rather, it intends to explain what is needed to make a project effective and sustainable but leave the actual project design to the Consultants and/or the Experts. For instance, in Chapter 8.3.4, many subjects are listed which are deemed essential Project Support Measures (PSMs) — without, however, trying to suggest their content, timing and cost, all of which the Consultants and/or the Expert will have to propose.

Projects for environmental sanitation must fit squarely into the countries' development efforts. The resources for development are limited and every project receiving a share of these resources must be "part and parcel" of that country's development programme, and comply with its priorities. This implies that projects must be people-oriented rather than be abstract engineering solutions, and this requires that projects, to the extent possible, recognize and contribute to, i.e. the alleviation of poverty, to "empowerment", to women's issues (WID), and to good governance — which are the major objectives of development policy today world-wide — in addition to furthering market mechanisms and role sharing between the public and private sectors. Accordingly, projects must aim at distributing the benefits of sanitation to all people, not just to the privileged few, even if this implies lower standards of service at affordable cost. Thus, it should become standard procedure to develop projects on the basis of studies and investigations of not only their technical but also their socio-cultural, economic, and institutional features, as well as operation and maintenance, user's participation and cost recovery.

By the same token, projects must be environment-oriented, which calls for environmental protection, re-cycling of materials and the best use of resources generally, including water

and waste materials. And, last but not least, a lasting developmental impact for every project is an overriding criteria. This implies effectiveness and sustainability — both of which cannot be achieved until and unless the beneficiaries accept cost-sharing and other forms of participation.

In light of the foregoing, projects consisting of "hardware" alone will not be successful by today's standards. Hardware may include sewer pipes, tanks and ponds for the treatment of wastewater, *Jokaso*, septic tanks, and latrines — depending on the technology chosen. These hardware components must be supported, however, by additional measures that will make the project successful. Since investment projects are mainly "hardware", it has become customary to call the supporting measures "software". Hardware is needed to collect, transport and dispose of wastewater, whereas software addresses the "environment" of the project, e.g. policy, law and standards, institutional development, operation and maintenance, participation, capacity building, and measures to assure cost recovery. The software will "make or break" the project. However, software alone will not provide sanitation; hardware is essential to meet people's sanitation needs, whereas the software will make the hardware effective and sustainable.

The translation of these principles into actual practice will be facilitated by "Approach for the Future", which is presented in Chapter 4 and provides policy guidance and practical advice to all parties involved in undertaking Development Studies for projects for environmental sanitation. The Approach for the Future is based on the past experience of Japanese ODA and on the experience accumulated during the International Decade and the years which followed, including research undertaken by some of the national and international technical and scientific bodies and aid organizations. This experience is extensive. By a conservative estimate, some 5,000 volumes and perhaps the same number of articles would fill a library on the subject, and it would be futile to try to assemble all of this information in any one data-base or exhibit.

Thus, the present publication includes the following Chapters:

Chapter 1: Introduction.

Chapter 2: Background.

Chapter 3: Japan's Overseas Cooperation in Environmental Sanitation.

A summary of the past and current cooperation in the sector as regards loans, Grant Aid and Technical Cooperation: principles, criteria and levels of cooperation.

The following Chapters 5 through 8 exhibit how projects for environmental sanitation should be planned and designed in the future — with a view to meeting and implementing the principles and approaches set out in Chapter 4.

Chapter 4: Approach for the Future.

An approach for projects in environmental sanitation is outlined against the background of the general approach of Japanese overseas cooperation, cooperation principles for environmental sanitation, and the significance of development studies in Japanese cooperation.

Chapter 5: Planning Process

The planning of projects for environmental sanitation is reviewed in the context of today's methods for the planning of development projects. Lessons learned during the International Decade, project cycle priorities, the critical importance of project appraisal and the outlook for the future are discussed.

Chapter 6: Objectives of a Project

The extension of coverage and other objectives of projects for environmental sanitation are reviewed and recent experience is discussed.

Chapter 7: What Makes a Project Successful?

The effectiveness and sustainability of a project are reviewed as the ultimate yardstick, and means are discussed to meet these basic requirements.

Chapter 8: Preparation of Projects for Subsequent Funding

This Chapter reviews the implication of the sources of funding a project, the general approach to project preparation, compatibility with the situation in the country and the sector, and the information which must be created during the project's study to make the it appraisable, i.e. the basic project features, measures to ensure effectiveness and sustainability, the estimation of the project's impact and of the risks involved.

Chapter 9: Management of Project Studies

Approaches and measures are reviewed which guide the management of the studies undertaken to develop projects in the field of environmental sanitation.

Eight annexes contain details as regards the health-environment relationship, JICA's development studies, the choice of technology, social and financial studies, and some of the parameters used for the appraisal and evaluation of programmes for environmental sanitation by some of the other aid organizations. Annex 8 describes case studies in Bangladesh, Brazil, Ethiopia, Ghana, India, Lesotho and Pakistan.

The "Notes" contain selected references related to Japanese publications and to documents made available by the other aid organizations that were consulted.

The emphasis throughout the document is on the planning and design of projects intended for subsequent ODA funding, either through an official ODA loan, or Grant Aid, or a combination of both. However, the role of Technical Cooperation cannot be overemphasized for all types of projects for environmental sanitation, including those developed for subsequent funding; consideration of Technical Cooperation may indeed be critical before a funding proposal can be appraised by the funding agency; therefore, it is discussed in detail, especially in Chapter 8.

Thus, the present publication is intended to be of help to government officials participating in Japan's overseas development cooperation in the field of environmental sanitation, to local organizations, both governmental and non-governmental, to Consultants and experts, and to JICA's own staff and that of other Japanese aid organizations. It is also intended to inform other bi-, multi-lateral and international aid organizations, technical groups and research institutions.

The publication is a draft. It was prepared by JICA's Second Social Development Study Division and does not commit JICA or any other Japanese aid organization. Comments and suggestions will be welcome, together with material and information which can be usefully incorporated into a future version. In the course of preparation of the reference, other aid organizations were visited for discussions of their experience and approaches. Their cooperation was essential and is gratefully acknowledged.

2

Background

Late in 1994, JICA's Second Social Development Study Division concluded that the outlook in the field of environmental sanitation should be made the subject of discussion. Until then, the Division had undertaken a whole series of Development Studies for environmental sanitation that were complementary to other JICA activities, i.e. the dispatch of experts, project-type Technical Cooperation, and — although to a lesser degree — Grant Aid. Of course, a direct purpose of the Development Studies was, and always is, to serve as the basis for investment decisions and ODA financial support, both from Japanese and/or any other sources of funding. A summary of these activities is contained in Chapter 3, and a description of JICA's Development Study Service is in Annex 3.

The Division's initiative was prompted by several considerations, e.g.:

- The focus of overseas development cooperation in the field of environmental sanitation was increasingly shifting from center-urban to semi-, peri-urban and rural populations, as being the most critical target groups.

- Low-cost sewerage and the on-site disposal of night-soil and graywater were emerging as valid and important technological alternatives for serving lower-income population groups in many developing countries.

- As the focus shifted to semi-, peri-urban and rural areas, the need to complement the traditional hardware approach by an increasing variety of Project Support Measures was universally accepted.

- Projects for environmental sanitation were increasingly expected to make a contribution to overall development rather than to achieve their limited sectoral objectives only, e.g. to refer to the alleviation of poverty, governance and/or women in development.

Accordingly:

- The planning process would benefit from (i) a broader approach to project identification and formation and (ii) a more diversified approach to the design of each project in itself. This was in contrast to the traditional approach of focusing on master plans and feasibility studies.

- Every project for environmental sanitation would further benefit from (i) inter-sectoral considerations and possibly integration into other projects for social and water development and (ii) coordination and cooperation with other bi-lateral and multi-lateral and international aid organizations.

- Participatory planning would be needed, emphasizing a strong role for the recipient in the planning process — with the view of enhancing the developmental impact of the projects, and making them as effective and sustainable as possible.

In this context, a "project" is defined as an investment project funded with a component of either an ODA loan or Grant Aid, or any combination of the two. But in light of the factors listed above, it was evident that the planning of such "projects" for environmental sanitation was more and more linked, inextricably, with other forms of JICA's overseas development cooperation, i.e. project-type Technical Cooperation, the dispatch of experts, and training and capacity building. In other words, successful projects for environmental sanitation could offer new opportunities for linking all three types of funding with the view of enhancing the project's impact and sustainability, i.e. ODA loans, Grant Aid and Technical Cooperation Funds. This is discussed in detail in Chapter 8 (see Figure 8.2 and explanatory text).

Therefore, the matter was discussed at several levels during 1995, i.e.:

- Within JICA's Second Development Study Division and with other Departments of JICA.

- With other Japanese organizations engaged in the overseas development cooperation of Japan, including the Japanese line-Ministries most actively involved domestically and overseas, the Ministry of Construction and the Ministry of Public Health and Welfare. These ministries already participate in JICA's programme for environmental sanitation by seconding their technical experts, by making available programme information and directives, and by drafting technical guidance material such as a manual for the preparation of master plans for environmental sanitation.

- Concerned Japanese professional organizations and, especially, the International Environmental Planning Center of the University of Tokyo, which also took on the responsibility of advising JICA during the course of the discussions.

- Other bi-lateral, multi-lateral and international aid organizations with active programmes and experience in environmental sanitation, i.e. the World Bank, UNICEF, UNDP, the Inter-American Bank, The World Health Organization, the Water Supply and Sanitation Collaborative Council, OECD, the European Union, and the bi-lateral aid organizations of Canada, Germany, the Netherlands, Sweden, Switzerland, the United Kingdom and the United States of America.

- International and national research institutions, i.e. IDRC, the two International Reference Centers — IRCWSC and IRCWD, the London School of Hygiene and

Tropical Medicine, and the Water Engineering & Development Centre, Loughborough, United Kingdom.

All those consulted in the process were sympathetic to the purpose of the discussion, and were forthcoming with information and experience, which proved invaluable.

As a result of the discussions and consultations described above, perceptions changed — and there was a shift in the expectations for the outcome of the exercise. While, at the outset, it was thought that the preparation of additional technical manuals might be most important, it was becoming convincingly clear that all parties involved in the planning and design of projects for environmental sanitation (i.e. the recipients, the implementation agency or organization, the beneficiaries, the concerned Japanese aid organizations, JICA's own staff and, most importantly, JICA's Consultants and Experts) would indeed welcome general briefing on the subject rather than a rigid technical text. Thus, the idea of the present publication emerged.

It was understood further that a noncommittal exposition of a new approach for the future was also required, and this is now included as Chapter 4.

Otherwise, this publication summarizes in brief the experience to date accumulated in Japan's own overseas cooperation and by many of the other aid organizations. On that basis, it discusses what are believed to be the essential aspects of the planning and design of a successful project for environmental sanitation today.

3

Japan's Overseas Cooperation in Environmental Sanitation

Japan's ODA funds for the development of environmental sanitation comprise loans, Grant Aid (including small-scale Grant Aid and subsidies for NGO projects) and Technical Cooperation. The attention given to environmental sanitation is well described in the Annual Report of the Ministry of Foreign Affairs entitled "Japan's ODA". Cooperation in environment-related matters focuses on the living environment, disaster prevention, forest conservation and afforestation, pollution control, and the conservation of the natural environment. In this context, the living environment is the first priority, and it includes the subjects of water supply and wastewater management. 129.6 Billion JY, or 54.9% of the total Japanese ODA for the environment in FY 1995, was allocated to loans, Grant Aid and Technical Cooperation for the living environment (see Tables 3.1 and 3.2). Flow charts, with explanations intended for the approval of Japanese ODA, are contained in Chapter 8.1.2.

1. Loans

Most Japanese ODA loans are made through the Overseas Economic Cooperation Fund (OECF). Bilateral lending amounted to 1,115 billion JY in FY 1995. An additional US $ 41 million (for 16 small projects) was provided in 1995 through JICA at the very low interest rate of 0.75% as part of a programme aiming at stimulating Japanese corporations to undertake development programmes in the developing countries.

The conditions of Japanese official loans through OECF are:

- Low and fixed interest rates (at 2.8% in 1996);
- Long repayment periods may be allowed, of up to 20 to 30 years;
- Sovereign risk may substitute for the loan; and
- No risk hedge is allowed in case of changes in exchange rates of the JY.

As of today, few loans have been made for wastewater management, and those were for traditional sewerage projects; they amounted to about 3 billion JY, on average. In contrast, many projects for water supply received loans through OECF. It is expected that lending will

increase for several sectors, including environmental sanitation, whenever a suitable borrower can be identified, e.g. for low-cost, small-bore, off-site sewerage.

Table 3.1 Bilateral and Multilateral Aid in the Environment Sector

Bilateral and Multilateral Aid in the Environment Sector					
Year	Grants	Loans	Technical	Multi-national	Total (%)
91	24.2 (23.4)	66.7 (7.0)	13.1 (11.6)	7.8 (2.7)	112.7 (7.1)
92	31.1 (26.7)	221.3 (24.3)	17.4 (13.5)	10.6 (2.9)	280.3 (16.9)
93	37.7 (29.6)	152.7 (15.3)	21.4 (16.3)	16.2 (4.4)	228.0 (12.8)
94	41.4 (31.0)	105.6 (12.4)	21.9 (15.9)	25.3 (6.5)	194.2 (14.1)
95	42.8 (31.3)	170.8 (15.3)	22.3 (15.8)	40.0 (10.2)	276.0 (19.9)

Notes:
1. In columns other than Total, values in parentheses represent the share of total ODA for each individual type.
2. In the Total column, values in parentheses represent the share of Japan's total ODA.
3. In Billion JY.

Source: Ministry of Foreign Affairs, Japan's ODA 1996

Table 3.2 Bilateral Aid in the Environmental Sector by Sub-Sector

Bilateral Aid in the Environmental Sector by Sub-Sector						
Year	Living Environment	Forest Preservation	Pollution Control	Disaster Prevention	Others	Total
91	60.5 (53.7)	15.8 (14.0)	5.1 (4.5)	19.6 (17.4)	3.9 (3.5)	104.9
92	163.3 (58.2)	18.0 (6.4)	30.2 (10.8)	54.6 (19.5)	3.7 (1.3)	269.8
93	137.4 (60.3)	16.9 (7.4)	39.1 (17.2)	13.6 (6.0)	4.8 (2.0)	211.8
94	112.8 (66.9)	8.7 (5.2)	36.2 (21.5)	5.8 (3.4)	5.2 (3.1)	168.7
95	129.6 (54.9)	25.2 (10.7)	18.3 (7.7)	45.3 (19.2)	17.6 (7.5)	236.0

Notes:
1. Values in parentheses represent the share of total environmental ODA for that year.
2. The Others column includes items such as natural environment, environmental administration and ocean pollution.
3. In Billion JY

Source: Ministry of Foreign Affairs, Japan's ODA 1996

2. Grant Aid

The total bilateral Grant Aid allocated in FY 1995 amounted to 255.9 billion JY. Grant Aid may be provided for:

- General project Grant Aid.
- Grant Aid for debt relief.
- Nonproject Grant Aid for structural adjustment support.
- Grant Aid for grassroots projects.
- Grant Aid for fisheries.
- Cultural Grant Aid.
- Grant Aid for disaster relief.
- Food aid.
- Aid for increased food production.

Among the above categories, general project Grant Aid is provided for projects for health care, improvement of the environment, improvement of living standards for the general public, education and research, village development, transportation and communications. The central characteristics of such projects would be that, on the one hand, they will not produce any direct financial benefit, but, on the other hand, are directly linked to an improvement in the environment or living standards of the general public, or contribute to human-resources development.

Among such programmes or projects, environmental sanitation is highly relevant in terms of health, environmental protection *per se*, and improvement of living conditions for the general public. The planner of projects for environmental sanitation is challenged to demonstrate just how the projects meet the requirements of the various Grant Aid principles. And of particular importance for both low-cost off-site, and on-site, environmental sanitation is the design of management systems for the handling of funds which may be allocated; this matter will be discussed in Chapters 4, 6 and 7, and 8.

Japanese Grant Aid for wastewater management includes the construction and rehabilitation of sewerage systems and some projects in combination with water supply development, in the total amount, on average, of about 1.1 billion JY.

In the case of Grant Aid, the recipient country's government provides maintenance of the facilities, equipment and materials supplied, using Grant Aid. However, if a country does not assign resources sufficient for such maintenance, or if the facilities are damaged by unforseen events (e.g. natural disasters), JICA carries out followup field studies, and provides equipment and materials and sometimes emergency repair work should the recipient country be unable to do so.

Table 3.3 Number of JICA's Development Studies (1994)

Number of JICA's Development Studies (1994)							
Field in Environmental Sanitation	Asia	Middle East	Africa	Latin America	Oceania	Europe	Total
Water Supply Development	5	2 (1)				1	8
Ground Water Development	4 (2)	1	1	2 (1)	1 (1)		9 (4)
Waste Water Treatment	2		1	2			5
Solid Waste Management				3		2	5
Waste Water & Solid Waste	1						1
Water supply & Sanitation	2		1 (1)				3 (1)
Total	14 (2)	3	3 (1)	7 (1)	1 (1)	3	31 (5)

Note: The value in the parentheses represents the number of Studies centered on rural developments.

Source: JICA Annual Report 1995

3. Technical Cooperation

Technical Cooperation carried out by JICA (extended pursuant to intergovernmental commitment) includes the dispatch of experts, acceptance of trainees, development studies, and the dispatch of Japan Overseas Cooperation Volunteers (JOCV), *etc.* Other Technical Cooperation funded by ODA funds covers the acceptance of study-abroad students from developing countries and studies and research undertaken jointly by auxiliary organizations attached to ministries, agencies and aid-receiving organizations of the countries.

Japan's Technical Cooperation aims at the widest possible coverage of recipient countries. Yet, 42.4% involves countries of Asia (as with all Japanese ODA). Latin American countries receive 21.8%; in light of their per-capita GNP and large foreign debts, these countries are not normally recipients of Japanese loans or Grant Aid. On the other hand, a comparatively large number of Japanese Overseas Cooperation Volunteers have been sent to Africa — 334 (28.2%) of the total of 1,203 in FY 1995. The ASEAN countries are the largest recipients of project-type Technical Cooperation.

Project-type Technical Cooperation is a special case. It integrates all elements of Technical Cooperation and the provision of equipment in the context of a specific project. The recipient countries for their part provide buildings and land, and pay operational costs. The

objectives of each case are achieved within agreed terms of cooperation (usually five years), and the number of experts sent to any one project ranges from several to about a dozen.

JICA's Development Studies are an essential part of Technical Cooperation. These studies are intended to assist the recipient to make plans for investment, often covering an extended period of time. The Social Development Studies relate to socially relevant projects, including those for environmental sanitation. Annex 3 describes the studies in full detail and should be consulted.

Before a Development Study is planned, JICA agrees with the recipient on the Scope of Work. The SOW stipulates the objective of the study and its relation to the country's overall and sector development, and identifies subject coverage, the study area, the scope and depth of the study, certain technical or socio-cultural criteria or constraints (e.g. reference to available information and data, prior investigations, environmental constraints), the schedule of work, the kind and number of reports to be produced, and important project management matters. Preliminary or project-formation surveys may be conducted with the recipient prior to agreement on the SOW, and their results summarized. JICA's prospective Consultants may receive additional information on the proposed project to enable them to make their proposal. In principle, however, the SOW is kept rather general so as to allow flexibility during the execution of the study.

In 1995, 306 Development Studies were carried out, of which 144 were in the field of social development, 60 in agriculture, forestry and fisheries, and 102 in mining and industry. In Asia, 156 studies were undertaken, 38 in the Middle and Near East, 37 in Africa, 44 in Central and South America, five in Oceania and 26 in Europe. Table 3.3 shows the number of Development Studies carried out by JICA in environmental sanitation in 1994. Wastewater management is increasingly a priority in JICA's Development Studies, whereas studies in rural environmental sanitation have just been launched.

4

Approach for the Future

Projects for environmental sanitation must implement the general approach of Japanese cooperation with the developing countries.

Accordingly, the overall goal of environmental sanitation is to make a contribution to the broad objectives of the socio-economic development of the country.

Development studies lay the groundwork for targeted cooperation.

The future approach to environmental sanitation aims at implementing effective and sustainable projects.

4.1 General Approach of Japanese Cooperation

4.1.1 Overall Goals and Types of Japanese Economic Cooperation

Japanese economic cooperation aims at the alleviation of poverty, hunger and other problems that threaten the basic living conditions of people in developing countries, and it recognizes that the interdependence of economic and social development and stability in all countries is vital to the peace and prosperity of the entire world. Environmental conservation and development should be emphasized in tandem. Other important benchmarks are democratization, the introduction of a market-oriented economy, and basic human rights and freedoms in the recipient countries.

Japanese economic cooperation takes various forms and can be carried out by a variety of organizations and bodies. It includes financial and Technical Cooperation with the governments of developing countries through several Japanese organizations, such as JICA and OECF. Financial cooperation may involve official loans and/or Grant Aid, and Technical Cooperation may extend to development studies, project-type Technical Cooperation, dispatch of experts, and capacity building, including training and institutional development.

4.1.2 Priority for Self-help

Japan's consistent principle for overseas cooperation is that the recipient countries can attain economic independence only if development policy is based on self-help. Thus, in their requests for Japanese cooperation, countries stress how the cooperation will help in support of self-help. This policy reflects Japan's experience as a recipient country in the past, and also its experience as a donor to East-Asian countries, which attained rapid economic growth in part with the support of Japanese overseas cooperation.

This policy does not imply a passive attitude on the part of the Japanese aid organizations. Rather, it aims at raising awareness and implementing development strategies which serve the best purposes of the recipient countries. Therefore, as part of this policy, Japan encourages close consultation with the recipient countries at the stage of project formation and the full participation of the recipient during the implementation of the project.

4.1.3 Three Operational Approaches of Japanese Cooperation

There are three types of operational approaches of Japanese Cooperation, i.e.:

Differentiated Approach: This approach emphasizes an organic and effective linkage among aid tools according to the needs associated with the stage of development of recipient countries.

Comprehensive Approach: This approach includes, in addition to ODA, the development of trade with, and encouragement of direct investment in, recipient countries.

Balanced Approach: Japan pays close attention to maintaining a balance between different aspects of its aid, i.e. between (i) conventional areas and new areas of assistance, (ii) aid of the "hardware" type and of the "software" type, and (iii) large projects and small-scale grassroots aid projects.

4.2 Cooperation Principles for Environmental Sanitation

4.2.1 Japanese Cooperation for Environment

The attainment of sustainable development compatible with preservation of the environment is one of the most important principles of Japanese cooperation, e.g. maintenance and strengthening of international peace, attainment of democracy, promotion of a market economy and improvement of human rights.

Japanese ODA in the field of environment includes improvement of the residential environment, forest preservation, disaster protection, pollution control and conservation of the natural environment. Japan supports efforts to make the global and local problems of the environment compatible with the needs of the future, e.g. ecology and people, long and short-term measures of development, North-South interdependency and country programmes. Accordingly, Japanese ODA in these fields is expanding, and more consideration is given to the environment in the implementing of each cooperation and development project.

During the United Nations Conference on Environment and Development (UNCED) held in July of 1992, global environmental issues were discussed, e.g. global warming, bio-diversity and prevention of desertification. Japan pledged to implement active environmental cooperation in relation to such problems. The Conference also confirmed the great need of people in the developing countries for environmental sanitation , especially the many unserved people not having even minimal levels of sanitation, and the serious damage to human health and productivity which results from this situation.. There are urgent needs in developing countries to secure safe drinking water and the sanitary disposal of nightsoil, graywater and solid waste. The alleviation of these problems is in full accord with the principles of Japan's overseas cooperation.

4.2.2 Goals of Environmental Sanitation

The ultimate goal of a project for environmental sanitation is, obviously, to contribute to more general development objectives, e.g.:

- poverty alleviation;
- empowerment;
- women in development (WID);
- good governance;
- business-like management; and
- protection of the environment.

These broad development goals cannot be attained through cooperation of a single donor alone. Thus, all donors should adopt them and agree to contribute resources for their achievement. In the past, Japanese cooperation was targeted on pragmatic sectoral objectives. Now, the specific objective of environmental sanitation is linked to health and the protection of the environment, and cooperation with other aid organization is promoted to enhance the impact of each project in this field.

4.3 Development Studies and their Significance in Japanese Cooperation

4.3.1 Japanese Development Studies

As described in Chapter 3, Japanese ODA comprises three types of bilateral cooperation, i.e. official Loans, Grant Aid and Technical Cooperation. The Development Studies, which are the main concern of the present document, are a part of JICA's Technical Cooperation, and are undertaken to prepare public development plans or assemble basic information facilitating the planning of social and economic infrastructure projects, including projects for environmental sanitation. The studies form an important guideline for implementation by the recipient government thereafter. It also serves as a basic reference when financial or Technical Cooperation is requested to implement the plan. Thus, a Development Study is an important stage during the preparation of a project and will continue to be useful up through the implementation stage.

JICA's Development Studies do not commit Japan's ODA to implement the project, even though, for the sake of carrying out effective cooperation, active liaison or coordination with Japanese financial and Technical Cooperation continuing after the Study will be very useful.

Development Studies are based on a Scope of Work (SOW) which is agreed upon by JICA and the government of the recipient country, and undertaken by Consultants chosen by JICA. Under the direction and supervision of JICA, the Consultants prepare a report in cooperation with the recipient country's Government. During the Study, there is a technology transfer with respect to planning methods and techniques for the study and analysis of the situation.

The types and fields of JICA's Development Studies are shown in Annex 3.

The future orientation of JICA's Development Studies can be described as follows:

Response to Increasingly Diverse Needs

In addition to the development of infrastructures, JICA is also engaged in studies of management-related problems — focussing on policy advice, strengthening organizational systems, and supporting transitions to market economies — as well as conducting studies on poverty alleviation, the environment, health care and medicine, and the social sector.

Balance Between the Environment and Development

The importance of alleviating poverty without damaging the environment has become an imperative which is now established internationally. JICA is also trying to lead the way through environmental preservation policies and by the assignment of experts to be in charge

of environmental assessments for development projects whenever necessary. Strategies for avoiding or mitigating adverse effects may be created when such effects are anticipated.

Wider Area for Aid

There has been an increase in the countries receiving cooperation, e.g. the former Communist countries of Eastern Europe and Central Asia, and also Mongolia and the countries of Indochina. In many of these countries, efforts are being made to introduce and establish a market economy, and there has been an increasing number of requests for "policy support" programmes. Studies are also being carried out to support the recovery of the countries of Indochina from the ravages of civil war.

Coordination with International, Regional and Bilateral Organizations

In order to respond more appropriately to requests, JICA coordinates its activities with international financial institutions such as the World Bank, regional financial institutions such as the Asian Development Bank, and bilateral aid organizations and NGOs.

4.3.2 What Follows after the Study?

The Development Studies of JICA, which are the target of the present publication, are undertaken for the establishment of a public development plan, or to compile the basic information for such a plan. The Study is an important guideline when the government implements the plan. It is also intended that the report serves as a basic reference when financial or Technical Cooperation to support the implementation of the plan is requested from any other donor, not merely from Japan, depending on the preferences of the government. To facilitate technical or financial support from ODAs other than Japan, the requirements posed for the appraisal of projects by the presumed ODA should be taken into account during the preparation of the Study. For instance, if it is assumed that the World Bank may be approached to fund the implementation of the project, the criteria of the Bank should be the basis of the plan. Thus the prospective source of finance must be considered from the earliest possible stage of the project, and, during the course of the Study, close coordination should be sought with the respective financial institution.

4.3.3 Liaison with Other Donors

It is very important to liaise and coordinate with other bilateral and international donors with the view to (i) using limited resources effectively, (ii) sharing methods and know-how, and (iii) planning cooperation for specific projects. The best mix of cooperation resources may be (i) a Study by JICA with funding of the implementation from another donor, and (ii) a joint Study with another donor. In any case, information on cooperation for environmental

sanitation should be shared between the donors as openly as possible for the benefit of the recipient countries.

4.3.4 New Experience and Developments

Some donors use innovative approaches in the planning and development of projects for environmental sanitation which are considered to be of interest for Japan's future overseas cooperation, e.g.:

- The (minimum) initial cost of operation and maintenance may be provided for a limited number of years.
- Motivation at central and local government levels will create political will to mobilize the community and make projects effective.
- Infrastructure development can be undertaken as part of official loans, even for a BOT scheme, with the condition of using a two-step loan.
- Cooperation may be flexible and extend over long periods of time, which enables a step-wise plan. The aim is to improve sanitation incrementally, based on local beliefs and practices, and achieving small but lasting improvements which are sustainable at each step, rather than the wholesale introduction of new systems.
- User's ownership is emphasized. Ownership is vital to sustainability.
- Empowerment is necessary to create a sense of ownership and responsibility for sanitary improvement. Privately owned facilities may be included as part of official loans by (i) combining sanitation with drinking water supply, and, taking advantage of the institutional setting, and/or (ii) creating a credit bank, union or similar mechanism which can act as the recipient.

In Japanese ODA, such new developments are carefully studied. Currently, cooperation excludes the funding of the cost of O&M, and the costs of privately owned facilities. New types of cooperation are under discussion, e.g. the donation of parts, two-step loans, mergers with project-type cooperation, *etc.*, depending on the "pros and cons" of these systems and approaches

4.4 Recommended Approach for Projects for Environmental Sanitation

In this Chapter, lessons learned in Japanese overseas cooperation and the experience of the organizations of the United Nations and other aid organizations are analyzed, especially:

- Issues in urban *versus* rural environmental sanitation;
- Technology, institutions, cost and cost recovery, and
- Intersectoral and other structural problems.

A recommended approach for projects for environmental sanitation will be presented on the basis of this experience.

4.4.1 Basic Considerations

Wrong Assumptions

First of all, the problem of environmental sanitation and the ways and means of improving it are viewed in many different ways by different parties. Often, unfortunately, both donors and the implementing agencies hold views which are either outdated, uninformed or simply wrong, and many such views have been at the roots of wrong decisions in the past. The matter has been studied extensively, using experience accumulated during the International Decade. The following is a summary as contained in the report of a Working Group on Promotion of Sanitation of the Water Supply and Sanitation Collaborative Council (1995), which found that the following views are still held widely, although they are basically wrong:

- "Urban development automatically includes environmental sanitation".
- "Improved water supply alone leads to better health. There is no need for sanitation."
- "Safe and adequate water supply is a precondition of good sanitation".
- "All good sanitation options are expensive and difficult to implement".
- "There are minimal health benefits and no socio-economic benefits to sanitation improvements".
- "Water, air and soil are free goods and therefore we should not have to pay for improving them".
- "Design and construction of a latrine is simple and does not require any expertise".
- "There are universally applicable standard formulas and quick fixes to achieve sanitation".
- "Water-supply institutions will automatically be suitable for managing the development of sanitation".
- "The private sector is not interested in sanitation".

- "Facilities for sanitation do not need cultural consideration. "Sanitation improvements" simply means building latrines."
- "Messages alone will change behaviors and automatically create demand".
- "People are not willing to pay for sanitation improvements".
- "Traditional cultural attitudes are a barrier to good sanitation practices".
- "People are not able to implement programme goals".

The beneficiaries, as well, commonly hold wrong assumptions, such as:

- "There is no immediate benefit in improved sanitation".
- "Sanitation systems are never reliable".
- "Responsibility for sanitation lies somewhere else".
- "Children's faeces are harmless".

Informed Approaches

The above-mentioned commonly held wrong assumptions have resulted in projects which failed to meet the criteria of effectiveness and sustainability in the past. For the future, an informed approach must be applied in the planning of projects for environmental sanitation. The Working Group referred to above suggests:

- All people in the target area should have at least some basic sanitation.
- Programmes and projects should be based on understanding of their social and cultural circumstances.
- Development needs are enormous and improvements will have to be incremental.
- A sound institutional approach and business-like management will help in the best use of limited resources and will motivate and stimulate participation and self-help by the people.

The informed approach should emphasize:

- A choice of technical options that can be afforded by most people without subsidy.

- Schools and children are entry points for mobilizing the community.
- The programme or project builds on existing capacity for community management rather than blindly creating new management schemes.
- The programme or project includes a component for training and human-resources development at all levels.
- Take a learning approach. Demand creation should be emphasized.
- New technological options can be introduced for the wealthier and higher-status people in the community, as an incentive for change.
- Community groups are encouraged to formulate their own hygiene-education programmes, including messages and methods.
- Both male and female extension workers are used in rural areas.
- The introduction of physical facilities must be combined with behavior change.
- Social marketing and participatory approaches are to be used in combination.
- The programme will create an environment whereby private producers can thrive.
- Political support must come from the very top. Community members are more likely to want to follow programmes that are endorsed at the top level of government.
- Local specialists should be included in the planning and design of programmes and projects, helping with local knowledge and learning improved techniques from the Consultants from donor countries.

4.4.2 Lessons and Reflections on the Experience of International Cooperation for Environmental Sanitation

Based on the experiences of Japanese ODA and other aid organizations in the preparation of Development Studies for environmental sanitation, the following can be summed up, and should be the subject of continuing policy development:

Target Group

It must not be assumed that the introduction of water-borne off-site sanitation in the urban centers will automatically lead to an extension of the system to semi- and peri-urban, and,

eventually, the rural areas. These are the most deprived areas in most developing countries, and their low-income populations are most at risk for health problems due to environmental factors. The continuing absence of environmental sanitation will perpetuate existing inequities.

The future approach of "Some for All rather than More for Some" should be fundamental, meaning that All people should benefit from at least some improvement in environmental sanitation. But the same quality of service is not attainable for all people at one moment in time. Step-by-step improvements must be planned to cope with limited resources. And it is also essential to promote and use appropriate low-cost technology.

Further, programmes and projects should be prioritized for high-risk vulnerable groups, e.g. children and women. Whenever Grant Aid is involved, priority should always be given to under-served and low-income populations.

Cost Recovery

Financial constraints are critical in many developing countries, and most projects for environmental sanitation are actually operated by subsidy. Accordingly, the sector is weak and progress is slow. Two approaches are available to expand sanitation, i.e.: (i) subsidization on a continuing basis, and (ii) adequate cost recovery and cost sharing by beneficiaries, e.g. charges for sanitation either singly or combined with charges for drinking water supply.

There are differences in this respect between sanitation and drinking water supply which must be considered. In the case of sanitation, it is not possible to simply apply the "beneficiary-pays" principle. For one thing, the beneficiary and the borrower are not always the same. For another, the sanitation facility may be owned by an individual or family and must be paid for fully at the time of construction rather than gradually in the form of charges for water used.

The principle of cost recovery as a long-term objective is acceptable and recommended. However, in the short run and in the case of on-site sanitation, at least, this principle may be relaxed for some time with regard to construction costs, although the O&M costs should always be recovered even if Grant Aid is involved. Recovering the cost of O&M from the beneficiaries will create programme reserves for the expansion of the service in the future; in such cases, revolving funds have been proven useful.

To assume that people are not willing to pay for sanitation improvements is not recommended. It is considered commensurate with sound development policy that the beneficiaries should be prepared to "buy" enhanced environmental sanitation as a contribution to their health and well-being. Thus, programmes and projects for sanitation should also be focussed on demand creation. In practical terms, wealthier and higher-status people in the community might be provided progressive coverage on a step-by-step basis whenever they are willing to take risks, pay for the service , and want to be among the first

to try a new technology. In such cases, cost recovery may be introduced and/or increased in pace with each step.

Cost recovery for low-cost technology may involve cash or in-kind contributions for the construction of facilities and for maintenance — aiming at adding resources to government finance, and at promoting responsibility of the beneficiaries to maintain the facilities after they have been constructed.

Low-cost Technology

In the past, Japanese cooperation for environmental sanitation was centered on the provision of conventional sewerage through public organizations. The extension of "coverage" was the primary objective of projects. The need for low-cost technologies emerged when the large number of under-served people and the need for improvements in their health were recognized as new priorities. The provision of environmental sanitation to the low-income population will be a long-term and step-by-step process. Concurrently, the social factors involved in environmental sanitation call for more flexible approaches to the choice of technology and imply that in many cases, not just one technology but rather a mix of several options might be the best technological solution for a specific situation, taking socio-cultural and income levels of the population into account.

Extending sanitation to all people implies the use of on-site sanitation in very many cases. Off-site sanitation is expensive and cannot be afforded by most of the low-income populations. On the other hand, on-site sanitation involves ownership and financial participation, both of which are vital for sustainability. The best method for the funding of such systems are yet to be researched, but experience is now available from a number of projects involving Grant Aid and loans by Japanese and other aid organizations (see Chapters 7 and 8, and Annex 8).

In accordance with the above, the choice of technology must not merely be a technical matter but involve users' participation, socio-cultural and socio-economic investigation and consideration of expectations and acceptance on the part of beneficiaries.

Role of Government

Environmental sanitation should be treated as a priority issue in its own right. Sanitation requires its own resources and its own time-frame to achieve optimal results. The role of government is of paramount importance. Political will at all levels is necessary for sanitation programmes to be effective. Communities are more motivated to change when they know that a political will exists.

Private Sector and Local Production

Sanitation programmes should be based upon generating demand, with all of its implications for education and participation, rather than being provided free or as part of subsidized infrastructure. Governments should be responsible for protecting and enhancing partnership among the private sector, NGOs, community-based organizations and local authorities, and for removing obstacles in the path of each household in the achievement of improvements.

For instance, septic tanks and latrines are consumer products and their design and promotion should follow good marketing principles, including a range of options, designs attractive to consumers and therefore based upon consumer preferences, and affordability. They should be appropriate to the local environment and other conditions. Basic marketing research and participation in the design of latrines and septic tanks should be considered in the planning of programmes and projects. Market forces are best understood by the private sector.

Good Management

The objective of environmental sanitation is to provide satisfactory services effectively to as many people as possible and to maintain them in good operating condition. Good management is a condition *sine qua non*. Among other things, the efficiency of a project depends on incentives to reduce the cost, incentives to increase the coverage of service, linkage of benefits and cost sharing, and the participation of the beneficiaries.

During the preparation of Development Studies, close cooperation between the people, people's organization, central and local government, NGOs, and other community-based organizations must be assured so that the Study will be followed by investment and implementation, and, ultimately, sustainable operation. On the other hand, the donor and recipient jointly must take action during the preparation of the project with a view to improving management by way of capacity building for management and strengthening O&M mechanisms and institutions.

With this in mind, information should be fully accessible and as free as possible from the earliest stage of planning, especially for the people in the project area.

Capacity Building

To maintain and sustain the operation of a project as soundly as it was planned, capacity building should be an explicit part of project preparation, possibly in conjunction with the Development Study. Capacity building will include institutional development, management training, and the education and training of personnel at all levels.

Children and Women

Sanitation programmes should address the needs, preference and behaviors of everyone — children, elderly, women and men. Programmes and projects should take a gender-sensitive approach but, learning from the mistakes of other sectors, should guard against directing messages only to women or placing the burden of improved sanitation primarily upon women.

Health Education

Suitable methods are available for health education, the promotion of participation, social marketing, social mobilization, and for furthering the promotion of participation through programmes for schools and children. The need for health education should be carefully studied and programmes carried out before or during the Development Study, whenever appropriate.

Women in Development (WID)

Women can be important agents in the improvement of sanitation in many cultures. Their participation is strongly recommended. Poor sanitation makes the life of women more difficult and, accordingly, they want to play important roles in maintaining good sanitation at the level of the home and the community. They can facilitate and popularize sanitary education. Thus, during the planning of environmental sanitation it is important to explore the views of both men and women, to strengthen women's role in maintaining sanitary conditions, and to undertake measures to disseminate information concerning these roles and to popularize them.

Operation and Maintenance (O&M)

Operation and maintenance is extremely important because it makes a project sustainable. The prime body for operation and maintenance may be the central or local government, the private sector, the beneficiaries, local workers, or expatriate staff serving the community or the government. Whatever may be the case, the prime requirement is that the financial and human resources for operation and maintenance are continuously assured, with the sharing of the costs by beneficiaries.

Rehabilitation of Existing Systems

The planning of projects for environmental sanitation must not only relate to new construction. Every time a new system is proposed, the rehabilitation of existing systems must be taken into account on the basis of a study of the costs and benefits of rehabilitation, financial resources available to cover initial costs, and the beneficiaries' ability to operate and

maintain the facilities. Whenever rehabilitation is possible and feasible, a step-by-step programme may be proposed.

Relation to Drinking Water Supply

Many developing countries allocate their limited resources to projects considered most beneficial economically. Normally, this approach results in priority for drinking water supply and neglect of environmental sanitation. The situation was similar during the development of the now industrialized countries. These countries had to pay a heavy price to remedy the damage caused by that neglect, in terms of the costs of weakened public health, rehabilitation of the environment and costs to the general economy caused by pollution of the environment.

It is important to advise the developing countries to avoid repeating the mistakes the industrial countries made. If drinking water supply is extended to more and more people without attention to the disposal of the wastewater created, drinking water sources will be contaminated, especially groundwater, and hazards created to public health. Yet, official ODA loans for environmental sanitation are the exception rather than the rule, whereas, for drinking water supply, most lending institutions are now prepared to extend credit.

While Grant Aid is available for projects for environmental sanitation, it is nevertheless recommended to investigate and explore options for making projects or some parts of projects for sanitation suitable for funding through ODA loans. Several possibilities may need to be investigated, e.g. combining projects for sanitation with projects for water supply or housing, infrastructure and regional or water resources development, or separating suitable project components that may be funded through a loan while proposing the rest for Grant Aid, especially in the case of projects for semi- and peri-urban and rural areas, where low-cost and often on-site technologies are the only solution.

Environmental Impact

The environmental impact of projects should be evaluated, based on the screening, scoping, Initial Environmental Evaluation (IEE) and Environmental Impact Assessment (EIA), by the method determined in the recipient country, and/or JICA's guideline for the evaluation of environmental impact in close consultation with the government of the recipient country.

NGOs

Nongovernmental organizations have many roles to play in the planning, implementation, and, especially, subsequent operation and maintenance projects. During the Development Study, these roles should be studied and investigated. Among other things, NGOs may be important actors in the promotion of participation by the beneficiaries. They may organize and/or run the operation and maintenance of semi- and peri-urban and rural schemes, and may act as recipient and manager of funds. Or they may serve as a credit institution for the

funding of privately owned on-site systems or house connections to a public sewer, as has been described in other chapters.

4.4.3 Implications for Development Studies

The Development Studies are undertaken in most cases by Consultants on the basis of Terms of Reference (TOR). In the preparation of the TOR for Studies for environmental sanitation, the following aspects have normally been included and reflect the experience of Japanese overseas cooperation to date:

- The Study should rigidly meet the requirements of the potential funding organization and satisfy the prescribed level of detail.
- Assessment of the effects of the project, and how the beneficiaries will benefit from the Study.
- The study and selection of alternatives.
- Assessment of the organization and the institutions based on the actual situation.
- Costs and benefits of the project.
- Method of evaluation.
- Proposals for Technical Cooperation.
- Proposals for capacity building.

However, in the light of recommendations contained in Chapter 4.4, the scope of Development Studies in the field of environmental sanitation will expand and become more diversified. This will be further discussed in Chapters 5 to 7 and, especially, in Chapter 8.

5

The Planning Process

In considering the planning process, three matters deserve particular attention:

- Planning is a process and not merely the preparation of a report. The process has several stages, none of which should be ignored.
- Planning should be a participatory process, with the full involvement of the beneficiaries.
- Planning costs time and money. The type and magnitude of the project, and the likely method of funding, should be kept in mind constantly to ensure that an appropriate process is being initiated for a specific project.

5.1 Japanese Experience

The planning of projects receiving Japanese overseas cooperation proceeds in accordance with a project cycle including, *inter alia*, project formation, project preparation, implementation and evaluation. Figure 5.1 exhibits the cycle in its entirety as a continuing process, moving from one stage of the project to the next, and/or to a followup project, as appropriate. The cycle starts with a Country Study, and includes preliminary studies, if necessary, before the Scope of Work (SOW) is established.

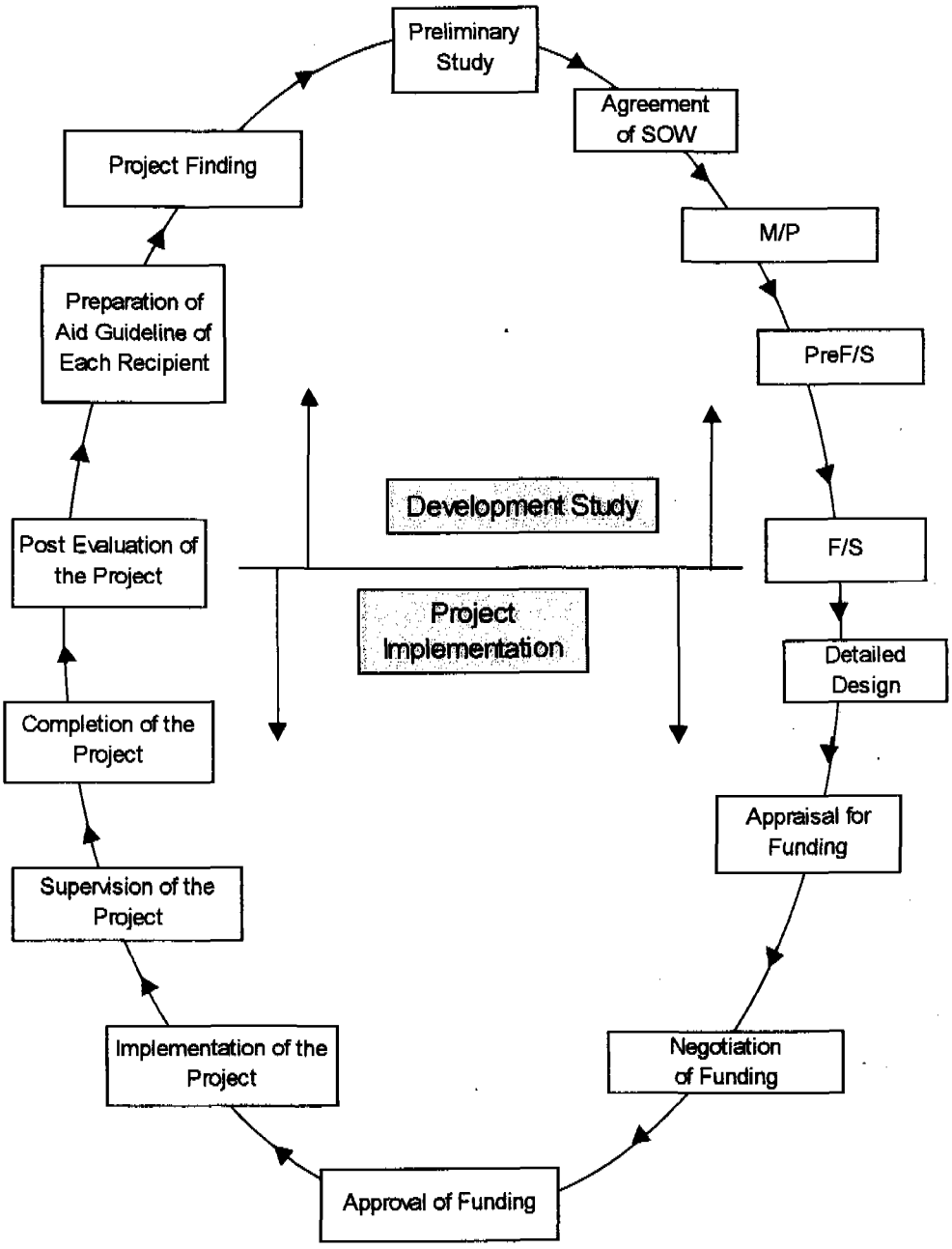
The recipient assumes the leading role in the planning and implementation of the project.

The project must be compatible with national development and consistent with the existing institutional setting.

Inter-agency coordination and participatory planning are essential.

Particular attention must be given to project formation and preliminary surveys, comprehensive SOWs, master plans and feasibility studies.

Figure 5.1 — Project Cycle in Japanese Cooperation



Source: IDCJ (1992) Final Report of the Project Study for the Preparation of a Guideline for Social Analysis for Development Studies, Main Volume

In accordance with the above-listed principles, Japanese cooperation always proceeds along the following lines:

5.1.1 Roles in the Planning Process

In Japanese ODA, the leading role of the recipient is emphasized throughout the planning process — in close cooperation with the involved Japanese agencies (JICA and OECF), both at the level of national and local government and with respect to the participation of the beneficiaries. Accordingly, Japanese overseas cooperation depends primarily on a request from the recipient, although often the request is a result of prior country programming. The major actors and their respective roles are exhibited in Figure 5.2.

5.1.2 Compatibility with Existing Development Planning

Care is taken in the formation of projects so that they are fully compatible with and contribute to the achievement of the National Development Plan and its priorities and policies.

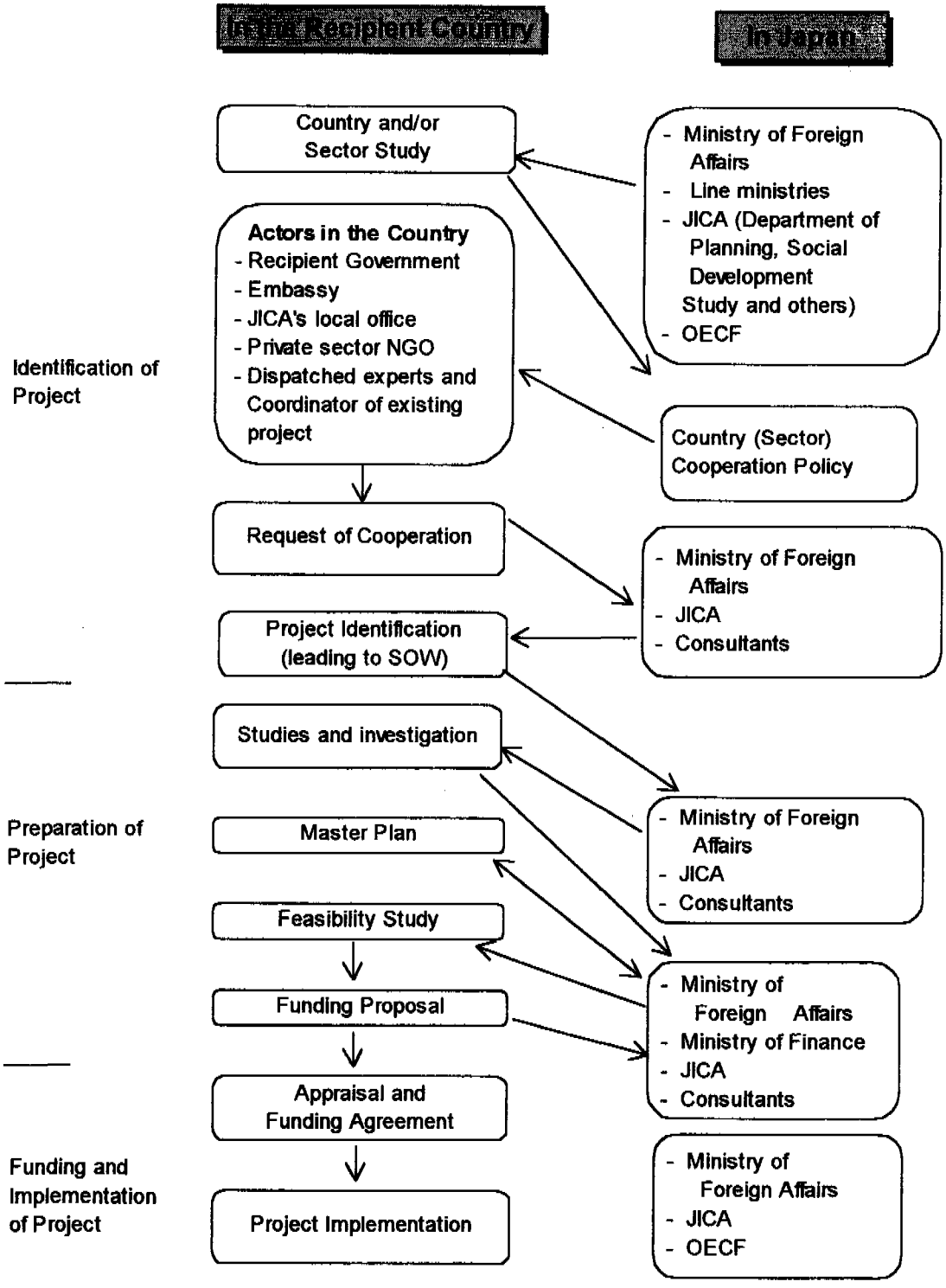
It is also stipulated that close adherence to existing institutional arrangements will enhance the quality of projects; because these institutions have access to much of the available information, they are responsible for the establishment and implementation of national sector strategies and their interaction with national development strategies, and they have qualified manpower and managerial experience. In this respect, the institutional presence at the local level is an important consideration.

5.1.3 Interagency Coordination, Participation and Liaison

To benefit from the knowledge and the programmes of other national organizations, special arrangements are sought that involve, *inter alia*, the water supply, water resources and regional development agencies. A preferred approach is to achieve this coordination through a Steering Committee established for the project. The Committee normally is comprised of ministries and other organizations, local government, community organizations and other NGOs. By the same token, participation will be assured, i.e., target groups are identified early in the planning process and their awareness determined and/or promoted, so that their participation will be assured.

Liaison and coordination with other donors includes the exchange of information and of general and project-specific experience, with the view of enhancing the database for the project. Additionally, close liaison may also indicate potential interest of other donors in supporting the project or some of its components, as well as the requirements and/or appraisal criteria which they would apply. The latter is an essential condition if co-financing the project is thought to be advantageous.

Figure 5.2 — Process and Actors in Japanese Corporation for the Development of Projects for Subsequent Funding



Source: JICA

5.1.4 Master Plans and Feasibility Studies

In Japanese overseas cooperation for environmental sanitation, the Development Studies of JICA focus on master planning and feasibility studies carried out by Consultants, with JICA being the client. Details concerning the Development Studies are exhibited in Annex 3.

Master Plans

Master plans are prepared prior to the elaboration of feasibility studies for most JICA projects for environmental sanitation. They comprise a considerable body of information on the sector, especially if no sector or regional development plan exists. On this basis, they propose a step-wise programme for reaching the objective over a period of, normally, 15 to 20 years. As well, they deal with managerial and organizational questions and, increasingly, address software aspects such as health education and other socio-economic matters. The master plans also investigate technology options, the use of suitable materials and their relation to costs, and the financing of the project. The time needed for the preparation of a master plan is kept as short as possible, bearing in mind that by the time of the appraisal of the project, the information contained in the plan must still be up-to-date. However, if the scope of plan is wide, the time needed to prepare it may be long. For details, see Chapter 8.1.

Feasibility Studies

In contrast to master plans, JICA's feasibility studies for environmental sanitation aim at laying the ground for, and/or will contain, a funding proposal. Thus, the financial resources to implement the project are examined, although at that stage the project is not tailored to the criteria of any one of the potential funding agencies except if funding is likely to come from Japanese official ODA, i.e. an official loan by OECF or Grant Aid from JICA. In the latter case, Japanese financing criteria and the process of the approval of requests for a loan or Grant Aid must be taken into account (see Annex 6 and Figures 8.1 and 8.2). The feasibility study also identifies needs for subsequent Technical Cooperation for the strengthening of managerial and institutional capacity, *etc.* Uncertainty factors must be addressed and, as required, social studies undertaken to put the project on a sound and sustainable basis. Feasibility studies may be prepared within about one year. For more details, see Chapter 8.1.

5.2 Summary of the Experience of Other Aid Organizations

Project cycle management is used by many of the other organizations, but for on-site sanitation new approaches are still being tested.

The key lesson learned during the International Decade was that the planning process for environmental sanitation should be strengthened.

Sector and feasibility studies and software development are considered priorities in planning for environmental sanitation.

The parameters used by the other organizations for the appraisal of projects are considered the best "guideline" for their planning.

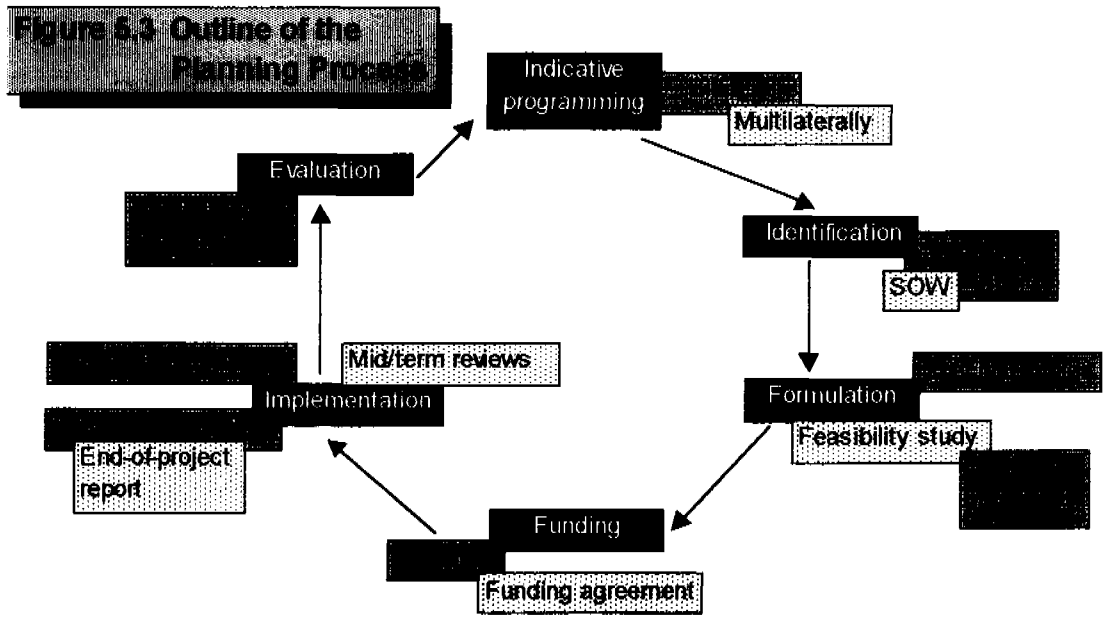
Cooperation and coordination among the donors will enhance funding opportunities.

5.2.1 The Project Cycle

Most of the other aid organizations plan their projects in line with the Project Cycle exhibited in Figure 5.3, but apply a flexible approach in accordance with the type and size of the project and its proposed funding. According to Figure 5.3, the process begins with Indicative Programming, which the bilateral or multilateral ODAs undertake with the recipient. Indicative Programming serves to identify the priorities and scope of cooperation with the recipient. In the case of Japanese ODA, Country Studies are normally undertaken as a basis for Programming. Programming is followed by the Identification of the project and culminates in the SOW[3].

The subsequent Formulation (or Project Preparation) involves the actual preparation of the project, as discussed in considerable detail in Chapter 8. Its endpoint is a proposal for funding through a loan or Grant Aid. After the funding proposal has passed the test of appraisal, Funding is agreed upon between the ODA and the recipient, and is followed by Implementation and Evaluation. Of course, many subsidiary steps may be included, depending on the nature and scope or size of the project. Project cycle priorities are discussed below, and the most important features of the managerial approach to be taken in the preparation of a project for subsequent funding are exhibited in Chapter 9.

[3] The term, "SOW", is used with reference to Japanese terminology, although the other organizations use different terms for essentially the same type of documents.



Source: adapted from Project Cycle Management, Commission of the European Community, February 1993, Brussels

The model of Figure 5.3 originated from the planning of capital-intensive projects such as projects for off-site environmental sanitation, and the other aid organizations are prepared to pay the amounts needed to prepare a good project along these lines even if they are large. But they are aware that new or modified approaches must be found for the planning of environmental sanitation for low-income populations and/or for areas where on-site sanitation must be applied, and Grant Aid may be the only feasible method of funding in the medium-term. No clear-cut planning process has yet emerged, but to a large extent the other organizations feel that the actual preparation of a project for on-site sanitation may proceed along the lines of Figure 5.4. Whenever Grant Aid is involved, they further reduce the planning process to the bare minimum so as to save time and money.

5.2.2 The Lessons Learned

During the International Decade, all aid organizations learned that the identification and formulation of projects for environmental sanitation must be improved through better planning.

Projects must be planned to implement broader development priorities; sound sector information is essential for good planning; special attention is given to SOW and TOR; and, the advantages of integration with other water resources developments should be explored.

All concerned organizations should be involved, not just the sector organization; planning must be a participatory process; substantial software project components must be introduced in addition to hardware; and, innovative approaches are to be explored for the planning of on-site sanitation.

In the work of the other organizations, this implies:

Relation to General and Sectoral Policy

Projects for environmental sanitation must implement general and sectoral development policy and priorities so as to achieve the expected development impact. Thus, planning must dovetail with the indicative country programming which all aid organizations undertake in cooperation with the recipients.

Careful attention is therefore given to the early stages of the project cycle, especially sectoral studies, and to the identification of priorities and principal operational approaches. Preliminary studies concerning the project may be undertaken, e.g. for the establishment of the project's objectives, and the setting of criteria and parameters for the planning of the project (see also the Project Cycle Priorities, below).

In light of the foregoing, high priority is given to reaching agreement with the recipient on the SOW and TOR for the Project Study — as early as possible. Often this requires repeated missions to the country. Ultimately, the drafting of the SOW and TOR is the responsibility of the recipient, but the other aid organizations will always assist the recipient in the task, if necessary.

Integration

Integration of environmental sanitation with water supply and/or general water resources development and with other environmental health developments is generally advocated, with the view of optimizing the effectiveness of projects and their management and funding. While there is not yet a clear policy, the SOWs and TORs for projects for environmental sanitation have become broader — enough so to consider, at least, the degree of integration, and those special studies which may be undertaken.

Therefore, the planning process involves not only the organization directly responsible for environmental sanitation. Inter-sectoral coordination is pursued with the sectors of water supply, water resources, urban and rural development, and health.

Participation of the beneficiaries and cooperation among all parties involved in the project is an additional feature that is emphasized by all of the other aid organizations. The aim is to commit both the beneficiaries and the borrower(s) to the project's objectives, to pursue capacity building for operation and maintenance comprehensively, and to adjust project design to local perceptions and capacity. An interesting model is under discussion in the World Bank for a new approach to planning. It emphasizes consultation with the borrower and beneficiaries, exploring local leadership, local technologies, and the relevant social, ecological and institutional aspects — with the aim of adapting concepts to local conditions, reducing costs and risks, and, ultimately, laying the ground for self-sustained projects and programmes at both the local and national levels.

On-site Sanitation

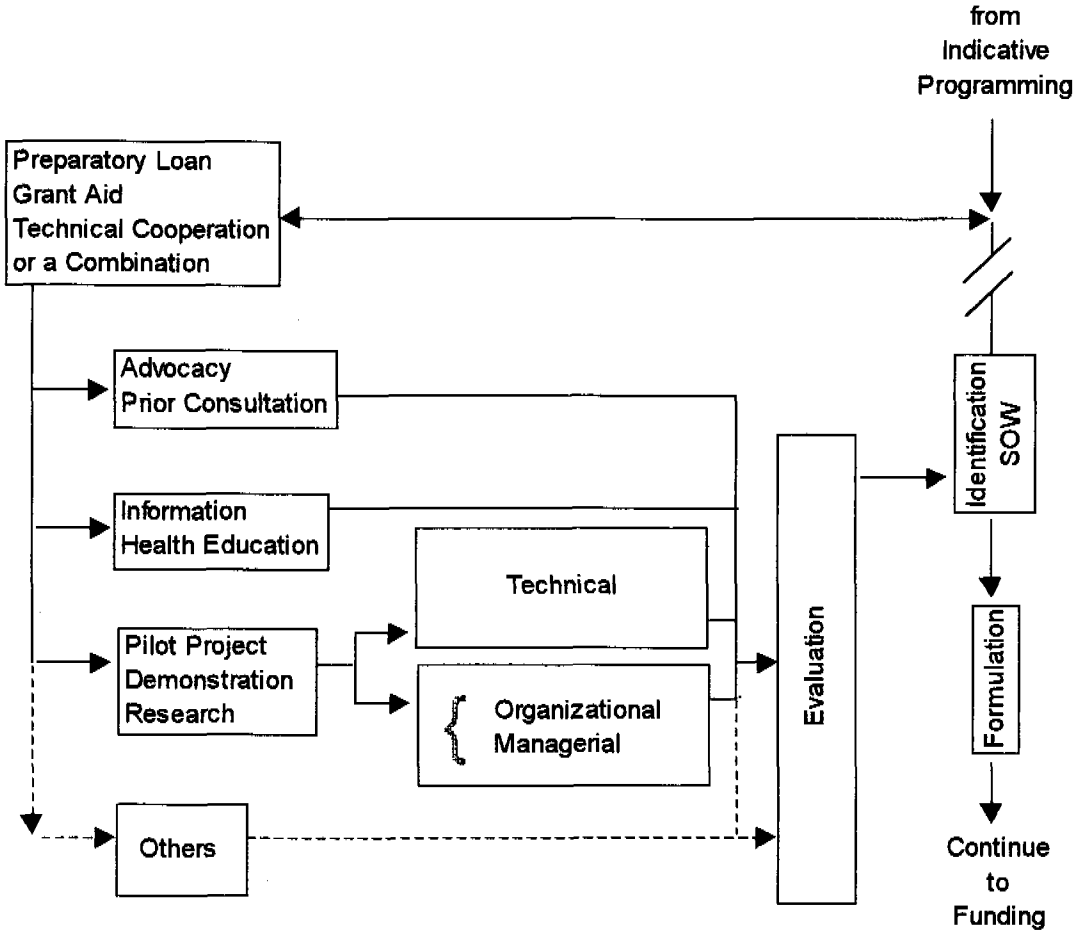
On-site sanitation is now accepted as a technical solution for rural and semi-urban areas. Projects will largely depend on Grant Aid in the medium-term. Participation is of paramount importance and the trend is that planning should be (i) area-wide, with a view to involving a large number of people, (ii) integrated with other measures for social development (e.g., health), or for water supply and/or water resources, and (iii) supported by special programmes for the promotion of participation, capacity-building, and community management.

As indicated above, a new approach to the planning of projects for on-site sanitation is needed. One such possibility is exhibited in Figure 5.4, which reflects the experience of some of the other organizations.

In a nutshell, a new approach for the planning of on-site sanitation would be (i) much more flexible, and (ii) give more attention to preliminary activities (than would be the case with off-site projects) before a fully fledged project could be identified, e.g.:

- Considerable time may be allocated to advocacy and prior consultation with the beneficiaries, and to supporting measures to inform and motivate them;
- Pilot or demonstration projects may be undertaken and evaluated before a fully-fledged project is developed;
- In many ways, each project would be a research undertaking; and
- Linkages with other sectors would be a strong feature and explored during the pilot or demonstration phase.

Figure 5.4 — An Option for the Planning of On-site Sanitation



5.2.3 The Project Cycle Priorities

Since very few projects start "from scratch", the other aid organizations give priority to sector studies or preliminary studies, pre-feasibility and feasibility studies, and special studies and support measures.

Sector studies or preliminary studies are carried out to clarify the relation of the project to its earlier phases, or to other projects in that sector or other sectors, and to make evaluations and record lessons learned. At this stage, available data on environmental sanitation and its impact on the health and well-being of the people is assessed, new strategies elaborated, earlier sector studies updated, and overall or sectoral policies and priorities and operational approaches reviewed and revised. These considerations might include health priorities in

relation to environmental sanitation at the national or sub-national level, matters of urban *versus* semi-urban and rural sanitation in the national or sub-national context, institutional, fiscal or participatory matters, and aspects of privatization.

Prefeasibility and feasibility studies are always required, especially in the planning of investment projects funded from loans or Grant Aid. The outcome of the studies is direct input for the preparation of the appraisal reports, on the basis of which the lending or grant institutions take the decision to support or not to support the project. The other organizations have not issued guidelines for the preparation of feasibility studies; rather, they depend on the expertise of their technical staff to develop detailed TOR and on the qualifications of the Consultants who will undertake the feasibility study.

Master planning is no longer carried out before every feasibility study, since most recipient countries have assessed the sector during the International Decade and identified their major priorities. When it is undertaken in spite of this consideration, it normally is because of a need to update earlier information or to promote a cross-sectoral or multi-purpose approach.

Special studies cover subjects for which research or policy input is needed, or any subject requiring clarification and/or additional information, with a view (i) to facilitating the establishment of SOW, and (ii) to identifying Project Support Measures (PSMs) at an early stage (see also Chapter 8.3.4). The identification of a need for special studies is a continuing process prior to and during the Project Study itself, and is incumbent to all parties involved. On-site sanitation projects are considered special cases and due allowances are made during the planning process to deal with their specific requirements (see also Figure 5.4).

5.2.4 The Appraisal Stage

> The ability to pass its appraisal by the funding agency is widely considered the ultimate test for the quality of a project. There are many sets of appraisal criteria used by the funding agencies.

Annex 7 contains selected parameters used by seven funding agencies for the appraisal and evaluation of projects. Of the seven agencies, four are bilateral, two multilateral, and one — the World Bank — is international in character.

Each of the seven agencies has its own mandates and orientations and, therefore, the parameters used by the seven agencies vary in content and depth. It will be noted further that most of the parameters are generic. Notable exceptions are the parameters used specifically for the appraisal of projects for environmental sanitation by the European Community (EU) and the KfW of Germany.

It would be presumptuous to insist that any one of the sets of parameters is the most useful. However, in actual practice, the method and the parameters used by the World Bank are always considered a reference point, especially when projects are either financed jointly by the Bank and a bilateral agency, or cofunded by several bilateral ODAs.

5.2.5 Prior Consultation and Coordination

> Considerable attention should be given — prior to and during the feasibility study — to the closest possible consultation and coordination between the aid organization sponsoring the study and the potential funding organization(s), as well as with regard to other Technical Cooperation agencies.

Several mechanisms are used by the other aid organizations to achieve this type of coordination in the field of water supply and sanitation, e.g. the Water Supply and Sanitation Collaborative Council (WSCC), the World Bank/UNDP Water Supply and Sanitation Programme, and, of course, bilateral consultations and the Development Assistance Committee of the OECD (DAC). In Chapter 9, a number of suggestions are made as to how consultation and coordination can be promoted during the various stages of the planning process.

5.3 Discussion

From the reviews in sub-Chapters 5.1 and 5.2, it would appear that the methods used by the ODA organizations, including those of Japan, are fairly uniform. In practice, this is not so, especially as regards the consideration of software aspects, special studies and investigations, and of Project Support Measures.

5.3.1 A Practical Approach to the Planning Process

All Japanese and other aid organizations endeavour to rationalize the planning of projects for environmental sanitation. The following discussion is intended to crystallize past experience and offer a number of suggestions.

Before rushing into a sophisticated planning process, in-depth consultations with all concerned should be conducted to assemble and appraise all information and data available.

The appraisal is a critical stage of the planning process. Appraisal criteria are needed and should be published since they are the best guideline for the planning of a project by the Consultants.

Participation is a "must".

During the planning process, close consultation and coordination with the potential funding agency or agencies will enhance the project's chances of success.

Projects for environmental sanitation are very practical propositions and their planning should not be overburdened with a sophisticated methodology. This is the message derived from the experience of the other aid organizations. On the other hand, shortcuts in the planning process often lead to wrong decisions and are therefore not recommended. We are challenged to take a middle road:

- It should be accepted that very few projects "start from scratch". This implies that before designing the planning process for a specific project, a careful analysis should be made of the information and data available from programmes and other projects in the sector, previous studies concerning the project, and, always, actual experience in the project area. Consultations with the recipient, beneficiaries, and other ODAs should be held, with the aim of identifying any gaps in information which must be closed during the planning of the project. Thereafter, the appropriate planning process should be designed on this basis.

- It is clearly evident from the experience of the other aid organizations that the appraisal is one of the most critical stages of the project cycle. Thus, in the design of the planning process for a specific project it is important to explore, as early as possible, which agency or agencies may later be approached for the funding of the project. The best time to do so is during the negotiation of the SOW.

- Moreover, the criteria and procedures used in the appraisal should be made known to the Consultants so that they will be able to anticipate how and on which basis their recommendations will be appraised. More ODAs should establish specific appraisal criteria for projects for environmental sanitation.

- We must not merely pay lip service to the principle that planning must be a participatory process. This has been happening too often. Naturally, participatory planning may be difficult and more time-consuming. Nevertheless, it really should be a "must". Accordingly, in designing the planning process, due allowance in time (and money!) should be made for genuine participation in all stages of the process,

i.e.: the SOW, sector and project studies — especially in the choice of technology and the planning for operation and maintenance — and in the study of the potential for cost-recovery.

- By the same token, consultation and coordination with other ODAs and the potential funding agency or agencies may cost time and money. But again, this aspect should be a "must", and a number of proposals to this effect are contained in Chapter 9. The aim of consultation and coordination would be to ensure (i) that the project dovetails with the programmes and projects of the other lending agency or agencies; and (ii) that the project meets as many appraisal criteria as possible, so that it can benefit from the experience of the other aid organizations, and so that its funding and co-funding potentials are enhanced.

5.3.2 The Focus

Sector information is of paramount importance.

The SOW needs more details.

Master plans may be the exception for the sake of expediency.

Feasibility studies are always required.

Special studies and investigations will be on the increase.

On-site sanitation projects will pose additional requirements.

Where should the focus be — from the beginning of the planning process up to the appraisal of the project proposal? The experience of the other aid organizations gives important clues for answering the question:

Information

Most countries have accumulated a wealth of sector information on environmental sanitation during the last few decades, among other things from previous sector studies, actual programmes and projects, during the International Decade, from the preparation of the countries' economic development plans and annual budgets, and from sector plans and project proposals.

In some cases, this information may need updating so as to better respond to changes in overall priorities within the country's development policy. Should this be the case, an

updated sector study or project formation survey may be needed. The focus may be on the following, e.g:

- The current status of environmental sanitation in the country and its regions (this, indeed, is rudimentary information);
- Priority needs to be filled in the national or regional context, i.e.: public and individual health, convenience and well-being, housing, protection of the environment, urban and rural development, water resources;
- The interrelation of environmental sanitation and other sectors, e..g. water supply, water resources, protection of the environment, other sectors, and the country's overall development;
- Resources for the sector in the national development plan, and the annual budgets at the levels of government and the community;
- Factors constraining programmes and projects for environmental sanitation in the country, e.g. technology, resources, institutions and their capacity, management, participation, operation and maintenance, and other socio-economic and socio-cultural factors.
- Support structure such as law, governance, financial policy, community management, other sectors' participation and the role of the private sector.

Scope of Work

The SOW should be as specific as possible. Adequate sector information and a clear definition of the objectives and results to be achieved by the project are essential (see Chapter 6). But more specific information on the proposed project is also needed although often not available, and must therefore be created before the SOW is negotiated; e.g.:

- The scope and gamut of the studies to be undertaken to achieve the project's objectives (see Chapter 8);
- Databases which should be created during the Project Study, e.g. indicators for measuring results and the achievement of objectives, and for project monitoring and evaluation. Health and environmental indicators are of special importance in the case of environmental sanitation (see Chapter 8); and
- Methods, and the distribution of responsibilities for, the management and implementation of the study (see Chapter 9).

Master Plans

Master plans are basic documents which set the stage for the subsequent development of a project, and are intended to facilitate the preparation of a feasibility study. Master plans are needed if the information required to develop a specific project proposal is not yet available. In actual practice, however, this type of information is usually available from previous planning by government (with or without the participation of external support agencies), or from earlier project phases, or other sector programmes. Therefore, the position taken by the other aid organizations — not to undertake master planning unless specifically needed — is sound, and should always be considered. In other words, master planning will not be the top priority in many cases. However, whenever master planning is needed, the following priority items may be addressed:

- The proposed project in relation to the country's and region's changing overall development priorities and programmes;
- Demographic, socio-economic and socio-cultural developments in the project area;
- Experience from other programmes and projects, e.g. water supply, water resources, and environment; and
- The long-term needs in the project area and a phased approach to meeting them, including the implications arising from technology, management needs, participation, cost and cost recovery and, in general, making projects sustainable.

Master planning for environmental sanitation may take two years or more. By the time the feasibility study is ready for appraisal, the information contained in the master plan may no longer be up-to-date. A practical approach to solving this problem is to telescope master planning and limit it to the few critical subjects rather than make it comprehensive. In this manner, much time can be saved and the information base brought up to date within one year or less.

Feasibility Studies

In contrast to master plans, a feasibility study is required for every project for which funding is sought. The study will be the crux of the preparation of the project, and is particularly important for projects proposed for funding through loans.

Projects proposed for Grant Aid also need a feasibility study, although shortcuts may be used for the sake of expediency. Implementation design may be carried out rather than preliminary engineering alone, since Grant Aid for projects in environmental sanitation is often approved on an annual basis and the time for implementation is limited (see below).

The feasibility study should in all cases:

- Tailor the project to the overall situation of the country, and make it compatible with sector policy and development, and with local conditions;
- Include a preliminary engineering design and lay the groundwork for subsequent implementation design; and
- Also include the following:
  - An estimation of the capital and recurrent costs;
  - Plan and implementation schedules for project-support measures;
  - An analysis of the management institution;
  - An estimation of the project's benefits;
  - An implementation schedule for the project;
  - Funding and cost-recovery proposals; and
  - An assessment of the risks involved.

Special Studies

Depending on the type of project and its funding, different kinds of special studies may be needed before the project can be proposed and its supporting measures designed and implemented. Details are discussed in Chapters 7 and 8, and the special case of social studies is reviewed in Annex 5.

On-site Sanitation

The need for special studies for projects for on-site sanitation cannot be overemphasized. Much is yet to be learned. The experience of the other aid organizations can provide valuable clues, especially that of UNICEF, the UNDP-World Bank Water Supply and Sanitation Programme, IDRC, and the two IRCs (see also Figure 5.4). The basic tasks to be performed are:

- More time is needed during the early stages of the planning process than in the case of off-site sanitation, so that the full understanding of the beneficiaries, and their participation, is assured before the formation of the project starts.
- The funding and technical assistance organizations should work together closely — if possible, before the SOW is agreed upon.
- Project support measures will be a dominant feature of the process.
- Pilot or demonstration projects may be inserted.
- The dominant role of local organizations should be recognized.

More details are reviewed in Chapters 7 and 8.

5.3.3 Time and Money

Careful consideration should be given to the costs of the planning process in terms of time and money.

Whenever a loan for environmental sanitation is sought, cutting down on time and money will be the wrong approach.

Several special features of projects for environmental sanitation may prolong the planning process and make it more expensive than in other fields.

For Grant Aid, shortcuts may be necessary even though this is basically undesirable. But, in any case, Grant Aid projects too must be planned without sacrificing the quality of the proposal.

All too often, the cost of planning in terms of time and money is not given enough attention — among other things, because planners insist that planning must not be compromised. But it is our responsibility to make planning practical and to adjust its costs to the type and size of the project and to the likely method of its funding.

The time and money which can reasonably be allocated to the planning of a project for environmental sanitation is an important question. The recipient will always be more interested in a loan or Grant Aid than in a time-consuming study. Yet, for the planning of large-scale projects funded through loans, considerable time and money must be allocated — more, normally, than when Grant Aid is involved. Often, this may take two years or more, and the study may cost anywhere between one and two million US Dollars. In the case of Grant Aid, planning **and** implementation may need to be telescoped into one year; and, obviously, this will severely limit the time and the amount of money which can be spent for the planning of a project.

Even when the funding of the project includes an ODA loan, the amount of money allocated to planning should be flexible — compatible with the size of the project. It would make little sense under conditions found in developing countries to insist on a standard fixed percentage of the total investment to be made.

For projects for environmental sanitation, consideration should be given to the following:

- Additional time and money is needed to address a number of aspects, e.g. the choice of technology, the promotion and planning for participation, and the identification and planning of project-support measures; and
- Special allowances may also be required for environmental impact studies, risk assessments and prospective research.

The planning for Grant Aid projects for environmental sanitation is difficult, considering the limited amount of money involved in any one year, and that a time limit of one year is often imposed for all planning **and** implementation. Shortcuts may be considered, although they are not basically desirable. An alternative would be the separation of planning from implementation, i.e., carry out long-term planning for a whole series of annual components in advance, with actual implementation divided appropriately between each of the following years. This type of planning would focus on:

- Reaching agreement on the essential features of a long-term and area-wide programme, and the development of an adequate support structure;
- Long-term constraints to be overcome through continuing technical assistance; and
- A forecast of annual budgets needed to implement the programme.
- Where shortcuts in the planning for Grant Aid are indeed necessary, they may involve:
  - Relaxing the requirements for financial analysis as discussed in Annex 6;
  - Limiting investigations to the bare minimum — however, **not** those concerning the beneficiaries and participation, demand forecasts, choice of technology, management and O&M, and other essential social studies.
  - Focusing Project Support Measures (PSMs) on participation, institutions, O&M, cost recovery, and awareness of the beneficiaries.

5.3.4 Outlook

The outlook for Japan's overseas cooperation in environmental sanitation appears to be:

(1) A trend to: more detailed SOWs and TORs, greater emphasis on special studies **and** investigation, and planning for Project Support Measures (PSMs);

(2) Grant Aid will be called upon increasingly;

(3) An integrated approach will be pursued; and

(4) The special challenges posed by projects for on-site sanitation must be met.

The planning process is likely to involve:

- More detailed SOWs and TORs;
- More special studies and investigations rather than long-term planning; emphasis will be on the beneficiaries and participation, the choice of technology and service levels and design standards, cost recovery, management and O&M, social studies, and risk assessment; and
- Participation.

Planning for Grant Aid is likely to increase in the medium-term in accordance with the "Approach for the Future" presented in Chapter 4.

By the same token, the integration of environmental sanitation with drinking water supply and other projects for water resources development is likely to become a regular planning feature.

On-site sanitation will be applied increasingly, in keeping with the Approach for the Future of Chapter 4. Different planning approaches will emphasize substantially increased pre-project activities, including advocacy, and information and motivation of the beneficiaries, pilot projects and research.

6

Objectives of the Project

Clearly defined objectives are an essential precondition for:

- Determining which studies and Project Support Measures must be carried out during the planning and implementation of a project;
- Ensuring that all involved parties have a common understanding of the project;
- Allowing the appraisal of the proposal for the project's funding; and
- Laying the ground for subsequent evaluation.

Thus, the setting of objectives is not merely the identification of needs; rather, it involves consideration of the many constraints which the project will face in the light of its technical, social, economic and financial, institutional and managerial circumstances.

6.1 Japanese Experience

> "Some for All rather than More for Some".
>
> Projects should contribute to integrated water resources development and to the achievement of overall development goals.
>
> A project design matrix is prepared as an instrument for appraisal and evaluation, and as a means of communication among all parties involved in the project.

In a short summary, the experience of Japanese ODA is as follows:

6.1.1 Some for All rather than More for Some

Before and during the International Decade, the objectives of Japanese ODA loans were still focused on the criteria of financial feasibility, although, gradually, other objectives were added, i.e. social impact and sustainability. This approach gave priority to environmental sanitation in urban and, in some cases, semi-urban areas. In its Technical Cooperation, Japan has focused on advice in technical matters, training and institution-building, research into low-cost technology, and information and health education — all of which were relevant to urban and rural populations.

The Approach for the Future outlined in Chapter 4 implies that, in the future, projects should benefit all people rather than only a few — even if this will call for more modest levels of service — on a step-by-step basis. This approach is in line with the common understanding among the donors that some improvements must be achieved for all, giving priority to the underserved low-income populations. Accordingly, the objectives of future projects will be focused strongly on the semi-, peri-urban and rural areas. However, this will not prevent projects from also providing "More for Some" in higher-income areas — so long as the people there will support full cost recovery, without causing any detriment to the funding of systems for low-income target groups.

6.1.2 Widening Objectives

In the Approach for the Future, the objective of future projects is not limited to the improvement of environmental sanitation alone. Projects for the development of water resources and sanitation projects are closely linked; i.e. they share the resource water and both are part and parcel of the human environment. Thus, the rational development of a country's or region's water resources has become an additional objective.

By the same token, the objectives of future projects for environmental sanitation should be compatible with and contribute to the achievement of the overall development goals established for the country or region. In many cases, these include: poverty alleviation, empowerment, women in development and protection of the environment.

6.1.3 Project Design Matrix

A Project Design Matrix for the use of Consultants is under preparation for projects for environmental sanitation, especially at the rural and community level (see Table 6.1). The matrix is compatible with the formats used by some of the other organizations, and will be discussed in more detail in Chapter 6.3.

Table 6.1 Project Design Matrix for a Project in Ethiopia

Project Design Matrix for a Project in Ethiopia			
Narrative Summary	**Verifiable Indicators**	**Means of Verification**	**Important Assumptions**
Overall Goal —Service of water supply is improved. —Water/borne diseases are subdued	—By year 2010, water is served to the target coverage with amount of more than 70% of the water demand without interruption more than two weeks a year —By year 2010, diseases are reduced by 20%	—WSS operation record —Records in medical institutions	—WSS management is stabilized —Medical institutions are involved
Project Purpose —Water service coverage is improved with required water demand —Sanitary facilities are improved	—By year 2005, water is served to the target coverage with amount of more than 50% of the water demand —Toilet coverage is increased by 30% —Drainage coverage is increased by 40%.	—WSS operation record —Municipality records or sampling survey	—Electricity is not interrupted —Trained technicians continue working —Population growth meets that projected —Number of hotels/ restaurants is not increased rapidly
Outputs —New wells are constructed with new distribution system —Aged facilities are renewed —System failure is reduced —WSS account is improved —Public fountain is managed by community —Toilets can be serviced —Stagnant water reduced	—Complaints against WSS are reduced —No. of interruptions reduced by 50% —The account becomes black —Toilet coverage is improved by 20% —Toilet coverage is improved by 20% —Drainage coverage is improved by 30%	—Complaints records or sampling interviewed —WSS operation record —Accounting book —Municipality records or sampling survey	—Fuel or electricity driving the system fully supplied —Trained technicians continue working —Population growth meets that projected
Activities —Construct newly required facilities —Rehabilitate and/or replace aged facilities —Introduce new O&M system —Train mechanics —Introduce new tariff/ accounting system —Make arrangement for community participation —Make arrangements for toilet-construction subsidy —Construct public toilets as required —Construct and/or renovate drainage system	**Inputs** Construction equipment and machinery Materials Submergible pump Generator Casing Distribution pipes & connections Concrete materials ¤ Details are described in each center's report		—Materials, equipment and machinery are made in time —Land acquisition is made in time **Precondition** —Residents don't object to the Project

Source: Project Cycle Management for Development Cooperation, Foundations for Advanced Studies on International Development (FASID), 1994, Tokyo

The matrix serves several purposes, i.e.:

- It is a tool for the appraisal and subsequent evaluation of the project.
- It enables a common understanding among all parties participating in the project, and facilitates the "handover" of the project to the recipient and the potential funding agency or agencies.
- It serves as a permanent record and, thus, also helps to assure continuity whenever someone joins the planning or implementation process, e.g. newly assigned government officials, Consultants, and/or funding institutions.

6.2 Summary of the Experience of Other Aid Organizations

In many of the other organizations, new types of objectives are emerging in addition to the traditional objective of increasing the number (or percentage) of people with access to adequate sanitation.

> Sanitation projects have multiple objectives. They must tally with overall developments goals and contribute to their achievement.
>
> Sector objectives are also undergoing change.
>
> The challenge ahead is to prepare projects in line with these new requirements.

6.2.1 Sanitation Has Multiple Objectives

The other aid organizations have concluded that projects for environmental sanitation should attain objectives at several levels. At the highest level, the projects would contribute to the achievement of the overall development goals of the country and/or area; at the lowest, the purpose of the project may be to build a treatment plant or a system for the disposal of graywater and nightsoil from a public housing estate. At intermediate levels, the improvement of public health, or the reuse of waste water, may be the essential objectives. Each case will be different. The Consultants are responsible for spelling out their hierarchy of objectives in a specified format, e.g. the "logical framework", or adapted versions such as the ZOPP of the GTZ of Germany. Details will be discussed in Chapter 6.3.

Most of the organizations have adapted the following overall development goals and have issued policy statements to that effect (although not uniformly in this order): the alleviation

of poverty, empowerment, women and development, human rights and governance, better and increasingly business-like management, and environment. There is agreement that environmental sanitation can make an important contribution to advancing these goals, e.g.:

- Sanitation partially alleviates poverty.
- Participatory sanitation has the potential to promote empowerment and depends on empowerment, especially in peri-urban and rural areas.
- Sanitation will always improve conditions for women.
- It requires good government and decentralization.
- In many cases, sanitation can be managed in a business-like manner if properly planned.
- It will contribute to protecting the environment.

However, many of the other organizations are still grappling with the implications of the points made above.

6.2.2 Sectoral Objectives Are Changing

Traditionally, the over-riding and often only sectoral objective was to increase "coverage", i.e. the number of people or the percentage of people served. This objective is still valid, of course, but has been supplemented during and after the International Decade. Today, the sectoral objectives are multiple:

- Covering all people with the basic sanitation they need while aiming at further improvements whenever income levels and institutional conditions allow.
- Integrating water development, i.e. emphasizing water and sanitation, health and environment.
- Building partnership between the beneficiaries and the implementing agency or organization.
- Mobilizing community management and resources.

Some of the other organizations have issued policies to articulate the new sectoral objectives. The Technical Cooperation organizations and UNICEF move rapidly towards the implementation of the policies; the lending institutions proceed prudently because they must carefully adapt their appraisal procedures to the implications of these changing policies.

6.3 Discussion

The logical framework is the appropriate method to develop, present and analyze the objectives of a sanitation project.

Sanitation projects never have only one objective.

Measuring the achievement of a project's objective may be one of the most difficult problems in using the logical framework.

The information needed to use the logical framework results from the Consultants' studies and investigations.

A log-frame matrix should be proposed for every project.

6.3.1 The Logical Framework

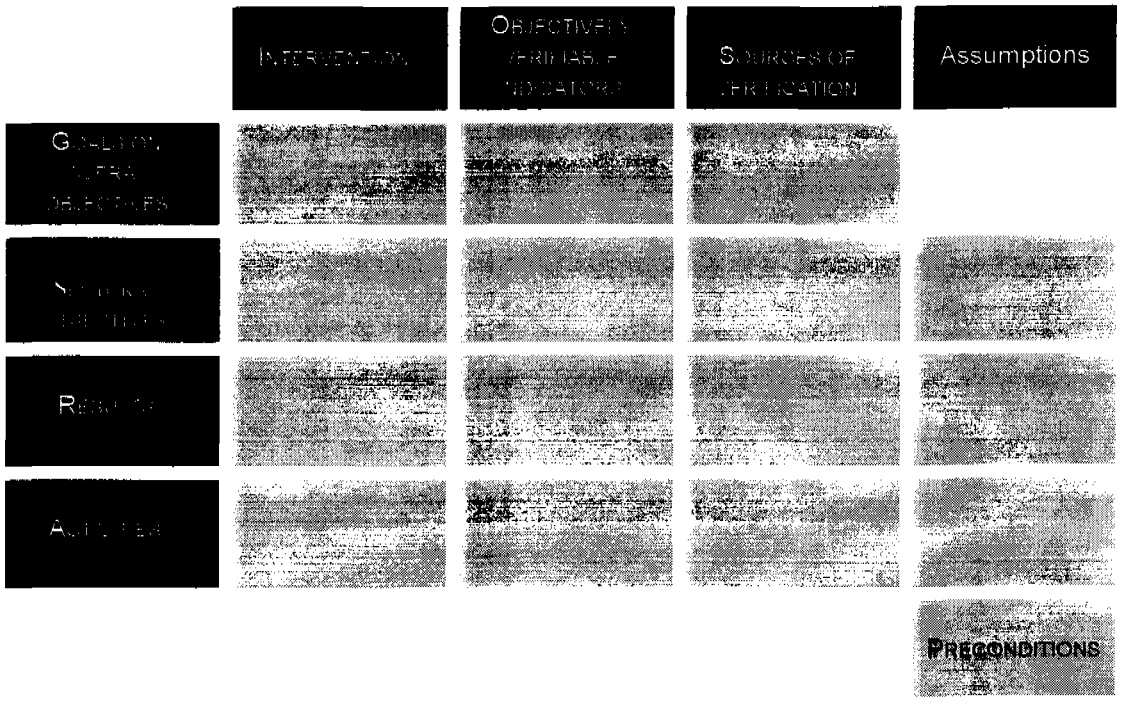
The Logical Framework is a suitable method for developing, presenting and analyzing the objectives of the project. For easy understanding, a diagrammatic presentation is contained in Figure 6.1. Rationalizing the objectives can be carried out downwards from the top and/or upwards from the bottom, or probably both; it should always be kept in mind that planning is a back-and-forth process.

The most important features of the format are:

- As regards column 1 (Intervention), and beginning at the bottom, the *activities* of the project are the discrete tasks or components executed as part of the project, and depend on physical and non-physical means to undertake them. An activity may be the construction of a sewer line or of a sewage-treatment facility, but it can also be the establishment of tariffs or a public relation campaign for explaining the tariffs to the beneficiaries. In fact, a project may be composed of many and very different activities which the Consultants identifies and designs.

- Through the activities, output — or results — are produced, e.g. (to follow the example) that sewage will be conveyed from point A to point B, or that it will be treated, or that tariffs will be instituted, or that the beneficiaries will accept the tariffs.

Figure 6.1 — The Logical Framework



Source: Project Study for Preparation of Guideline for Social Analyses for Development Studies, International Development Center of Japan (IDCJ), 1992, Tokyo

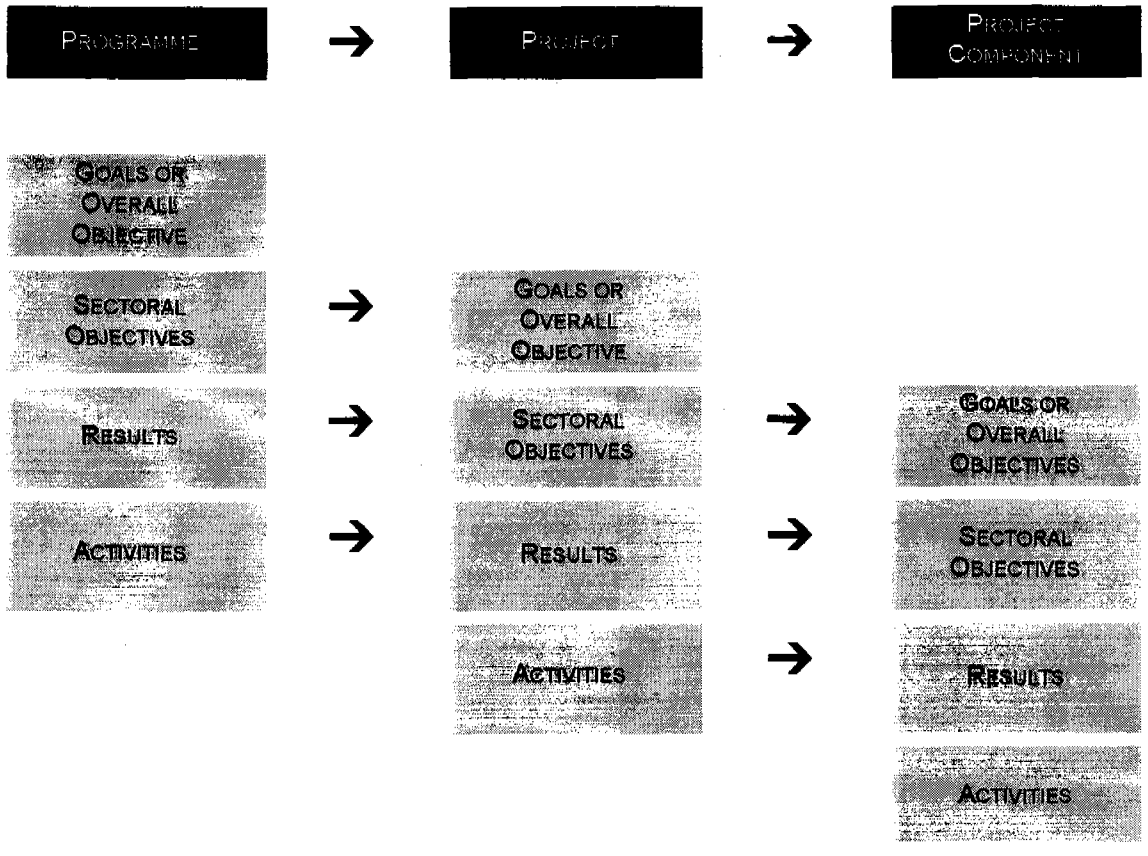
- The next step is to rationalize how the results will lead to the achievement of the *project's sectoral objectives* and, in turn, how this ultimately leads to the achievement of the *overall objectives or goals* of the project. For instance, the sectoral objective of the project may be to sewer a town or a part of the town; the overall goal may be the improvement of living conditions or the reduction of public health risks. Obviously, there may be multiple sectoral objectives as well as goals, especially the latter (e.g. environmental protection, slum clearance, *etc.*). In practice, and if the goal(s) and objective(s) of the project have been properly identified, the process of rationalizing the system should start at the top and proceed downwards;

- Assumptions have to be made in the log-frame analysis regarding external factors which may or may not contribute at all levels to the success of the total plan. For instance, assumptions have to be made regarding the achievement of the activities. If the assumptions were correct, the expected results will then be achieved, *etc.*

- Figure 6.2 shows that the logical framework is equally valid for the analysis of a programme, a project or a project component. For instance, in Chapter 8.3, Project Support Measures (PSMs) will be discussed; they can be considered a project

component in light of Figure 6.2, and accordingly, planned as if they were a project themselves.

Figure 6.2 — The Logical Framework for Different levels of Intervention



Source: Adapted from Project Cycle Management, Commission of the European Community, February 1993, Brussels

It may be difficult sometimes to decide whether to present an item as an activity, a result, or a sectoral objective. For instance, if a project includes health education of the public with the aim of creating a better understanding of the health problems associated with poor sanitation, the intention was certainly to motivate the beneficiaries to assume responsibility for the maintenance of their latrines or to accept the necessity of contributing money to help fund a low-cost sewerage system for their neighborhood. In this case, health education will be the activity, and the result will be that the people will understand and accept, respectively, keeping their latrines in good condition, or else contributing money to the project.

These results would contribute to achieving the objectives either of sustainable operation and maintenance, or of cost recovery. However, adopting another point of view, the results could

be presented as, respectively, sustainable operation and maintenance, or as cost recovery — both of which would serve the objective of effectiveness. In choosing between the two options for the presentation of the analysis, the planner decides in which way his proposals will be more "logical" and more convincing, and, in making this decision, he will rationalize and plan the measures which he will ultimately propose as components of the total project.

Under the heading that follows, goals and sectoral objectives — and the expected results of projects for environmental sanitation — are presented in a manner which corresponds to the Approach for the Future of Chapter 4, and to the principal experiences of the other aid organizations. However, the presentation should not be considered a strict model, since every project will be different and require adaptation.

6.3.2 Never Only One Objective

The extension of coverage is not the only objective of projects for environmental sanitation, although it may be the bottom line.

An important lesson of the International Decade was that projects for environmental sanitation never have only one objective. Often in the past, the one and only objective was simply to build a sanitation system. This has led to a whole series of problems, e.g.:

- Planning was not properly targeted and, accordingly, the money was not spent according to the most pressing needs.
- Projects did not make the most of the possible contributions to the country's or region's development.
- Evaluation of the project's effectiveness and developmental impact was not possible.

Some of the reasons:

- Projects were often not planned in the general development context, or in response to the most pressing health needs, nor in line with the sectoral development framework. In many cases, they were isolated activities, and often identified without adequate prior research.
- Benefits for other sectors or projects were not considered adequately during the planning, nor how the projects could have benefitted from other development activities.

There is a large measure of agreement between the Approach for the Future to environmental sanitation in the programme of JICA and the experience of the other aid organizations, which may be generalized as follows without prejudice to the individual project:

Frequent Overall Goals:	Poverty alleviation Health Empowerment Women in Development Governance Good management Infrastructure (including sanitation) Private sector and market economy Integrated development Environment
Frequent Sector Objectives:	"Some for All" Extension of coverage Needs of special target groups Specific health improvements Safeguarding water resources Protection of drinking water sources Wastewater reuse Sustainable operation and maintenance Sustainable finance Community management Intersectoral coordination
Typical Results:	Physical facilities built Sustainable technology identified Operation and maintenance assured Willingness to pay and/or cost recovery in place Gender issues considered Participation assured Sanitary behavior changed Community organization built Local production in place Many others, depending on circumstances

6.3.3 The Problem of Measurement

An essential part of the logical framework is a Log-Frame Matrix, as shown in Table 6.2. This matrix is a tool for exhibiting the objectives of a project and measuring their achievement. The Consultants engaged by some — though not all — of the other organizations are responsible for preparing such a matrix in the course of their feasibility studies. The Design Matrix presented in Table 6.1 is still based on a rather traditional approach; the Overall Goal is mainly sectoral. The Log-Frame Matrix of Table 6.2 is more up-to-date, and stipulates increased foreign exchange earnings through expanding tourism, as an overall goal of a project for environmental sanitation.

Table 6.2 A Log-Frame Matrix for a Project in Jamaica

A Log-Frame Matrix for a Project in Jamaica				
	Intervention Logic	**Objectively verifiable indicators**	**Source of verification**	**Assumptions**
Overall Objective	Increased foreign exchange earnings through expanding tourism	Increasing tourist arrivals, length of stay and expenditures	Tourist Board statistics	
Project Purpose Sustainable benefits for target groups	Protected health of residents, tourists, marine and river environment	—No outbreaks of water-related diseases from sewerage discharge —Quality of sea, river waters within government standards —Reduced sewerage-related deterioration of coral reefs	Ministry of Health statistics Twelve months environmental monitoring programme	Social stability No prolonged recession in tourist industry Continued govt. commitment to tourism development
Results	—Reduced pollution from sewerage. —Improved operation and maintenance of sewerage systems —VIP latrines introduced to Negr II —Increased environmental awareness by public achieved	—24 km of trunk/ interceptor sewerage, 18 lift stations —4.5 km of pumping main —2 sewerage treatment plants —1 river outfall, 1 sea outfall and VIP latrines constructed —40 personnel trained —Spare parts supplied	Supervising engineers reports Final handover of operating facilities NWC records on connections	NWC undertakes reform and maintains affordable tariffs Consumers connect and pay tariffs NWC collects adequate revenue to operate and maintain plant

A Log-Frame Matrix for a Project in Jamaica

Intervention Logic	Objectively verifiable indicators	Source of verification	Assumptions
Activities —Construct and supervise sewers, pumping stations, pumping mains and sewage treatment works —Hand over to NWC the existing facilities —Retire or incorporate existing facilities —Introduce VIP latrines (Negril) —Train personnel, supply spare parts —Use media to inform public of connection possibilities and encourage participation —Obtain statutory approvals —Carry out environmental monitoring		ECU (000)	—Adequate perfor-mance of engineers, contractors and suppliers —Govt. secures public participation, consumer connections and statutory approvals for environmental standards —Ground conditions no worse than foreseen.
	Construction (including training, supplies, spare parts, boundary connection, environmental monitoring, access to treatment sites	19,855	
	Supervision	1,100	
	Contingencies	4.045	**Preconditions** Government has budget to purchase land and grants right-of-way
	Total	25,000	

Source: European Union

How is the achievement of a project's objectives to be measured in light of the new developments described above? As long as coverage was the over-riding objective, the measurement was accomplished by maintaining statistical information on the number of people in the community, and the number of people served. This type of measurement is still undertaken today, and allows some evaluation of progress, at the level of the traditional sectoral objectives. But how to measure the contribution of environmental sanitation to the achievement of overall development goals and some of the new sector objectives referred to above? The answer is not easy and can only be given in the context of a specific project.

In Table 6.3, possible indicators are listed for the measurement and evaluation of some randomly selected expected results, project purposes (or objectives) and goals. There is no intention to imply that these indicators or the intervention will fit any specific project; they are listed by way of example. The Consultants charged with the planning and design of a project,

together with the implementing agency and the beneficiaries, must identify both the intervention and the indicators best suited to measuring the achievement of the specifically expected results, project purposes and goals. In many ways, the identification of these variables is the bottom line of project planning and design, and will be the basis for the preparation of the project for subsequent funding, which will be discussed in Chapter 8.

Table 6.3: Possible Indicators for Measuring the Achievement of Expected Results, Project Purposes (or Objectives), and Goals

Possible Indicators for Measuring the Achievement of Expected Results, Project Purposes, or Objectives and Goals		
	Intervention Logic	Objectively Verifiable Indicators
Overall Goals	Poverty	Employment opportunities created by the project Local production resulting from the project
	Health	Problems identified and standards and indicators established Integration of sanitation into water supply and health education Extension of coverage Monitoring data and assessment Compliance with standards
	Empowerment	Local institutions strengthened and/or created to assume functions for identification of target group, resource mobilization and O&M for sanitation, e.g. village committees Ratio between local and central/external resources for the project Sanitation as part of capacity building Community ownership of systems Access to information, e.g. technology, health implications Participatory Rural Analysis (PRA)
	WID	Women as players and actors
	Governance	Policy, e.g. funding, the distribution of responsibilities, empowerment, cost recovery, and O&M for sanitation District level support to sanitation projects at the level of the community Participation of the private sector and NGOs Accountability of the service organization (if any) to the community Monitoring of programmes for sanitation
	Infrastructure Development (including the extension of coverage of sanitation	Environmental sanitation as component of infrastructure programmes Degree of integration of sanitation with other infrastructure development projects Targets established/reached Impact of sanitation on the overall management and finances of infrastructure development

Possible Indicators for Measuring the Achievement of Expected Results, Project Purposes, or Objectives and Goals

	Intervention Logic	Objectively Verifiable Indicators
Project Purposes or Objectives	Integrated Development	Integrated programmes, e.g. water/sanitation/health/education/ nutrition Coordination mechanisms include environmental sanitation Data and information links include environmental sanitation
	Environment	Sanitation as part of strategies for sustainable development Sanitation as part of the health policy Standards for sanitation as part of environmental standards Contribution of sanitation to the protection of the environment
	"Some for All"	Distribution of resources allocated among population groups Distribution of the coverage and service levels achieved
	Extension of Coverage	Targets established and progress achieved
	Needs of Special Groups	Groups and their needs identified Special targets established and progress achieved Share of resources allocated to special groups Special: software programmes and results achieved
	Safeguarding Water Resources	Problems identified and standards and indicators established Monitoring data and assessments Compliance with standards
	Protection of Drinking Water	Number of drinking water sources affected and percentage protected Monitoring data and assessment
	O&M	Institutional and managerial improvements made O&M capacity Operational defects reported
Results	Extension of Coverage	Information on coverage
	Technology Identified	Standardization of equipment and material Acceptance
	Cost Recovery	Accounts of self sufficiency Degree of cost sharing by the beneficiaries Ownership
	Participation	Are there any self evaluations Advocacy materials and programmes Community-based O&M Expressions of public awareness Educational programmes for women and children

Possible Indicators for Measuring the Achievement of Expected Results, Project Purposes, or Objectives and Goals	
Intervention Logic	**Objectively Verifiable Indicators**
Changes in Sanitary Behaviour	Budget for health education, and programmes delivered Links with primary health care Old tabus overcome Changes at the level of the family Use of public latrines

Four comments must be added at this stage with respect to both the intervention and the indicators:

- They may be quantitative or qualitative, depending on the case.
- They may relate to hardware or software.
- The intervention may be stated simply as major categories (as in Table 6.3), or may be spelled out in specifics. By the same token, there may be just one indicator for each intervention, or several.
- There is nothing sacrosanct as to what is an intervention and what is an indicator, nor also as to whether an intervention pursues the achievement of a goal, or project purposes or objectives, or simply a result. For instance, the "extension of coverage" has been listed as a project purpose/objective in Chapter 6.3.3. But the extension of coverage may also be the goal under certain circumstances, or considered as a result. Yet, the extension of coverage can also be taken as an indicator, for instance, if the purpose/objective is "Some for All". The logical framework, as do all methods of systems analysis, gives freedom to the analyst to decide how to conceptualize the system for its subsequent planning and design.

The four comments underline the statement made above that the Consultants must in each case propose a log-frame matrix which, according to their best judgement, will (i) respond to the circumstances and objectives of the project, and (ii) satisfy the requirements of the prospective funding agency or agencies when they undertake the appraisal of the project proposed.

6.3.4 Risk Assessment

Risks of projects for environmental sanitation should also be assessed using the Logical Framework on the basis of information obtained during the preparation of projects for subsequent funding. They may involve (see Chapter 8.3):

- Technology not suitable;
- Planning and design errors, cost overruns;
- Delays in the implementation schedule;
- Shortfall in expected cost recovery;
- Inadequate operation and maintenance;
- Over-estimates of the ability and/or willingness of the beneficiaries to pay;
- Developmental impact; and
- Environmental impact and other undesirable side effects.

6.3.5 A Logframe Matrix Should Be Prepared for Every Project

In Chapter 8.3, it is suggested that every project proposal be accompanied by a log-frame matrix. Obviously, the matrix must be prepared by the Consultants. Guidance may be derived from the Approach for the Future in Chapter 4 and the SOW for the specific project, but the full Log-frame Analysis can only be undertaken by the Consultants on the basis of the studies and investigations that form part of the Project Study.

The Consultants should also exhibit the sources of information and data for the verification of the log-frame presentation. If such information and data are not yet available, the Consultants may make proposals for activities to create them, either during the implementation of the project or as part of preparatory activities or Project Support Measures (see Chapter 8.3).

7

What Makes a Project Successful?

The ultimate test for the success of a project is its development impact. To make this impact, the project must be effective and sustainable.

- Effectiveness: planning, design and the operation of the project must ensure that its broad and sectoral objectives can and will be fully achieved.

- Sustainability: the operation of the project is assured in the long term, without additional foreign aid after its completion.

Chapter 7 will focus on **What** is needed to make a project for environmental sanitation successful, whereas Chapter 8 will deal with the **How**.

7.1 Japanese Experience

The conventional and efficiency-oriented approach used in the industrial countries fails to make projects for environmental sanitation in the developing countries effective and sustainable.

Based on new experience, the planning of projects includes consideration of participation, of health education and of the socio-cultural factors involved in the choice of technology (see text box in Chapter 7.1.2).

7.1.1 Traditional Approach

The conventional approach taken in Japan and many other countries was to plan projects on the basis of good engineering. This implied that the projects would be designed to dispose of a certain amount of waste water, estimated for a period of, say, 15 years. Good engineering also assumed that the least-cost solution was the best, and applied proven criteria for materials and materials' strength and life, hydraulic performance, good construction and protecting surface or groundwater.

By the same token, conventional projects relied on management, operation and maintenance to be performed by the institutions of government, although often centralized and far removed from the users.

Accordingly, the training of the human resources required for the planning and management of projects focused on engineers of different levels of qualification. Responsibility for management of the facilities was often vested in engineers who were trained for the specific tasks involved.

This conventional approach has produced acceptable results in the industrial countries whenever off-site sanitation was involved. But in the developing countries, the situation is different; i.e., the financial constraints are overwhelming, so that the institutions cannot cope with the magnitude of the problem, and are unable to manage, operate and maintain the facilities. The situation is further complicated by the use of on-site technology which may be the only possible alternative, and in itself poses many challenges, e.g. users' involvement, and the need to mobilize innovative types of funding. Some of these challenges are discussed in Chapter 4.

In summary, the conventional approach to environmental sanitation in the developing countries has not been very successful.

7.1.2 New Experience

The changing approach in Japanese ODA is to plan projects for environmental sanitation with due consideration of the socio-cultural, socio-economic, financial, managerial and funding conditions prevailing in the developing countries. How is this done?

- Technology is chosen through social, cultural, managerial and institutional analysis in addition to technical criteria. The aim is to gear it to the preferences of the target group and its potential to raise funds for the project. Gender issues and the participation of the beneficiaries (especially women) are considered, as is the ability of the beneficiaries to operate and maintain the system after completion.

- There is increasing emphasis on participation — consistent with Japan's own history. Environmental sanitation was successfully promoted in Japan through a participatory approach, which depended on prudent liaison and cooperation between Government and the local community, in the programme named, "Combat against flies and mosquitos". The programme was a national campaign in the 1960s to promote community participation to clean up and reduce the breeding places of flies and mosquitos. Particular attention was given to communications between users and providers, the clear identification of goals and objectives, the demonstration of the expected benefits and the allocation of responsibilities to the beneficiaries.

Methods of Social Analysis for Environmental Sanitation Used by JICA

There are several methods of social analysis that are recommended by JICA, for example:

- Group Meetings
- Rapid Rural Appraisal
- Social Investigation [illegible]
- Social Preparation
- Social Analysis using Project Cycle Management (PCM)

[illegible] to recommend these [illegible] recently. Social analysis cannot resolve all problems of development, but it is indispensable for every project preparation.

Group Meetings

[illegible] basic information by the beneficiaries [illegible] accessibility to facilities, sanitary consciousness, [illegible] of projects and gender/cultural background.

Rapid Rural Appraisal

Rapid Rural Appraisal is undertaken at an early stage of project preparation. It requires about three to five [illegible] It aims at grasping the general situation of habitats and predicting the impact to be made by the project. It also identifies the points [illegible] in detailed social investigations afterwards. Rapid Rural Appraisal provides information about social [illegible] of different social groups), socio-economic and cultural impact [illegible] demographic information, institutions, [illegible] and the classification [illegible] It is possible to predict the impact and level of satisfaction [illegible] each group in the project area.

[illegible]

[illegible] specific issues [illegible] They aim at the maximization of the social effects [illegible] of the project, confirmation of the [illegible] the project.

Social Preparation

Social Preparation [illegible] the view of increasing the receptivity of each group. The preparation may take [illegible] months to one year and is carried out first before the initiation of the project. Consequently, [illegible] is not related to the choice of technology. Social Preparation usually follows these steps: (1) [illegible] of target groups, (2) organization of target groups, (3) capacity building of community [illegible] and (4) [illegible] of community organizations.

Social Analysis using Project Cycle Management

[illegible] JICA used PCM as a tool of [illegible] e.g. in preliminary studies and [illegible] The beneficiaries [illegible] problems in their community through participatory discussion.

This approach is now widely promoted in Japanese ODA, especially through meetings with the beneficiaries, by the organization of Sanitation Committees in the project area, and by informing and educating the beneficiaries, i.e.:

- Awareness raising and health education was introduced into Japanese Technical Cooperation for environmental sanitation. It is accomplished through audio-visual distribution of information material, street theaters, and cooperation with mothers, health workers and doctors at all levels. Special attention is given to sanitary behavior.

- Sustainable operation and maintenance is supported through human resources development, emphasizing that training should not be confined merely to local engineers and managerial staff of the provider. A project for water supply from boreholes is currently being implemented in Uganda in liaison with UNICEF; it includes components for the training of villagers (often women) who will be assigned to operation and maintenance on a full-time basis. Further, spare parts are provided for several years after the project's completion, and liaison is established with O&M systems in the vicinity, with the aim of providing ongoing technical and managerial support to the project.

7.2 Selected Experience of Other Aid Organizations

All organizations agree that, in addition to good engineering, many other factors must be considered to make a project successful.

Some interesting examples demonstrate the intricate web of interactions that must take place.

7.2.1 Many Factors Must Be Considered

In the preparation and appraisal of projects for environmental sanitation, all of the other organizations apply very different yardsticks today than they did only a few years ago. Some may have developed innovative methodologies, but all still struggle with the implications of changing policies and the need to make projects more effective and sustainable. Consequently, the planning of projects involves different studies and activities than were undertaken in the past.

As in Japanese ODA, the other aid organizations emphasize consideration of a mix of the technical, socio-economic and socio-cultural, financial and budgetary, management, and institutional circumstances of the projects. The number of sanitation projects supported is

already large, larger than in Japanese ODA, and the effect of translating changing policies into actual project design is already discernable. Yet, it is also acknowledged that more research is needed to develop methodologies and indicators for the study and analysis of a project's development impact and of the socio-cultural and socio-economic factors involved, especially as regards the willingness of the beneficiaries to pay for environmental sanitation, the funding of on-site sanitation, and the best approach to cost recovery and operation and maintenance.

No guidelines have yet been issued by the other organizations in light of the above. But operational experience is already available. Implications of this experience relate to:

- The content of feasibility studies.
- The consideration of software factors.
- Sustainable management and finance (including cost recovery).
- The choice of technology.

Details are examined in Chapter 8.2.

7.2.2 Some Examples

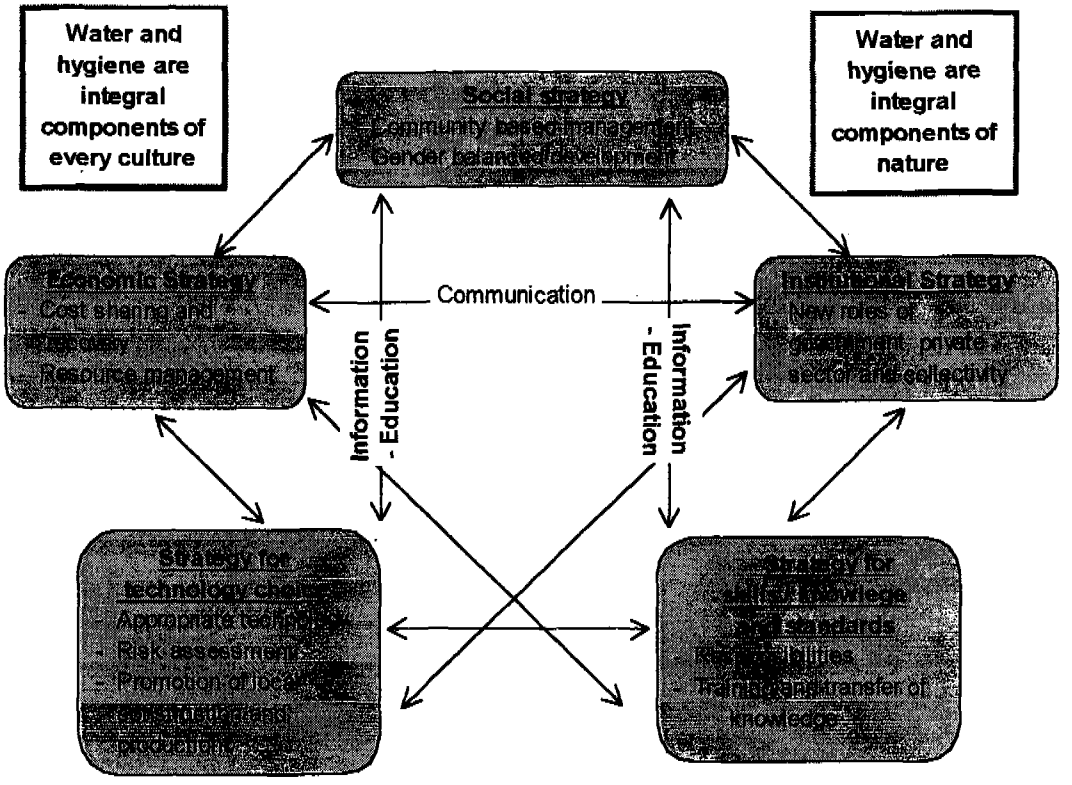
In the following paragraphs, a number of examples are presented describing some of the approaches used to make projects for environmental sanitation successful.

Swiss Development Cooperation (SDC)

In a model developed and used by the Swiss Development Cooperation, a multi-facetted strategy recognizes water supply and environmental sanitation as integral components of every culture, and requires that planning and project design follow five interdependent approaches. This involves a broad flow of information for education and communication between users, providers and planners (see Figure 7.1):

- The use of an appropriate and affordable technology, promotion of local construction, and the avoidance of different types of risks that are not normally encountered in the industrial countries.
- Providing beneficiaries with tangible and visible benefits from projects in an effort to promote cost recovery for long-term, realistic sharing of costs — based on users' full understanding of the interdependence of costs and service levels.
- The motivation and participation of both providers and users in local structures for community-based operation and maintenance.

Figure 7.1 — Strategy of Balanced Development



Source: Swiss Development Cooperation (SDC)

- Institutional development aiming at efficiency and transparency, and the strengthening of institutions, within national, sector and overall development polices.

- Ensuring that sustainability is the ultimate requirement, and acknowledging that its success is dependent on the ability to plan, to solve problems in the socio-cultural environment of the project, and to make knowledge and information available through education and communication among all involved parties.

UNICEF and the United States Agency for International Development (USAID)

Based on a review of 38 evaluation reports covering 54 sanitation projects sponsored by UNICEF and USAID's Environmental Health Project, Draft Guidelines were developed for sustainable environmental sanitation programmes. Guiding principles are, among other things:

- The choice of programmes should be guided by the criterion of sustainability — not merely by technological merit. Programmes should permit the expansion of coverage without risking effectiveness, efficiency and sustainability.

- Long-term self-reliance and cost-effectiveness are essential; investment should seek to deliver the greatest (visible) health and other benefits to the greatest number of consumers at the lowest cost.

- To achieve the above, the following is required:

  - Maximum degree of participation of the beneficiaries so as to (i) estimate demand, (ii) raise funds for project activities, (iii) design programme strategies and plans, (iv) stimulate behavioral change, and (v) develop operation and maintenance.

  - Selection of technology based on (i) local preferences, (ii) differences in the ability and willingness of different community groups to pay, (iii) capital and recurrent cost tradeoffs, and (iv) operation and maintenance requirements.

  - Identification of a strong (often central) agency that would eventually change from being a direct provider to taking responsibility for promotion, regulation, training, advocacy, and facilitation.

  - Support to a cadre of sanitation workers.

  - Promotion of financial sustainability through cost-effective technologies, community management, cost-sharing, standardization, private sector participation, and monitoring and evaluation.

UNICEF has since revised its strategies for water and environmental sanitation. Most of the above have become integral parts of the strategies.

Directorate-General for International Cooperation of the Netherlands (DGIS)

Projects supported by the Directorate-General for International Development of the Netherlands are screened carefully to determine whether they meet the criteria of effectiveness and sustainability. Therefore, in designing projects, attention is focused on:

- Contribution to the country's priority goals for development, i.e. poverty alleviation, women in development, environmental protection, and institutional development (including capacity building, and training); also, the project must fit into an established national or regional plan, and into a thematic and/or sectoral policy or plan.

- Sustainability must be assured in terms of economics and finance, institutions and business-like management.

Swedish International Development Agency (SIDA)

The Swedish International Development Authority (SIDA) gives special attention to Africa and, in its programme for environmental hygiene (sanitation), focuses on rural areas; in the future, it will include the urban fringe. SIDA stresses the basic principles of sustainability, affordability and replicability as criteria for a successful project. It gives additional attention to environmental aspects so as to minimize negative ecological consequences of water projects in fragile areas. In its strategy for environmental hygiene, the following are essential requirements for making a project successful.

- Problem identification and planning based on a comprehensive description and analysis of target groups, and on a firm understanding of local problems and potentials — as they are perceived by the local people themselves.

- Consideration of national as well as local resource potentials and capabilities.

- Technologies must be chosen which will be accepted by the local people, affordable by the target group, and sustainable through local resources.

- Education and information for the beneficiaries, to stimulate their participation and appreciation of the wide range of alternatives and their implications, so as to determine the technologies that will be appropriate.

- Participation of the people to ensure a process of sustained development and for their acceptance of new technologies and methods. This should involve all groups, include both women and men, and should assure a leading role of the community in controlling the facilities, and in the planning, implementation, operation, maintenance, monitoring and evaluation of the programmes.

- Manpower training must be an essential component of all programmes and projects, and must include social and behavioral aspects — not merely technical ones. It must be provided to field workers and craftsmen, who are crucial manpower resources at the local community level, and should focus on construction, operation and maintenance at the village level.

- Health education is required in support of health-related behavioral change. Objectives for health education and practical strategies must be developed carefully in order to ensure real integration into water supply and environmental sanitation activities. Target groups should include both women and men, and the role of local leaders, both formal and informal, should also be investigated.

Research Organizations

Based on their research, the International Water and Sanitation Centre (IRC) in the Netherlands and the International Development Research Centre (IDRC) in Canada have

contributed a wealth of methodological information and guidelines for planning successful projects for environmental sanitation which fall into line with the above experience and with the guidelines of other organizations. This information stresses that, in order to make a project successful, its effectiveness and sustainability must be enhanced through more software-oriented approaches in project planning and design; above all, the choice of technology must be based on consumer demand, on the community's ability and willingness to pay, on its capacity for operation and maintenance, on gender issues, and on participation.

7.3 Discussion

Software can "make or break" a project and should be a genuine part of every project.

There is a large degree of agreement between Japanese and other organizations' experience. Four basic lessons can be learned and should guide the preparation of projects for subsequent funding.

It should be standard practice to develop projects on the basis of studies and investigation of the technical **and** sociocultural and socio-economic, institutional and organizational aspects of the project, operation and maintenance, users' participation and cost recovery.

7.3.1 The Preparation of Projects for Environmental Sanitation Must Change

Unfortunately, in the past many projects for environmental sanitation failed to make the developmental impact expected. Several factors were responsible for the poor performance of the projects, e.g.:

- A large part of the population was not reached.
- There was inadequate or scarcely any operation and maintenance.
- There was a persistent lack of money to pay for operation, repairs and the replacement of parts.
- Systems were improperly used, e.g. sewers filled with garbage, and treatment facilities neglected and out of operation.

Some of the reasons were:

- Technology, managerial approaches, financing schemes and the role of the beneficiaries were transferred from the industrial countries without adaptation to the conditions and needs of the developing-country recipients. Generally, the preference of the planners was for water-borne, off-site disposal, which is the technology used in the industrial countries.

- Project objectives were defined in limited technical terms only (e.g. to build a sewerage system) rather than perceived as development goals (e.g. to clean up the living environment or to reduce infant mortality in the project area), and, therefore, developmental impact and effectiveness were not explicit considerations in the planning and design of the project. The planner aimed at a technical solution, at efficiency in the use of investment funds and at strict adherence to the implementation schedule.

- In light of the above, many projects were "hardware solutions", and did not include supporting measures — without which the hardware cannot perform in developing countries.

- Projects were focused on off-site sanitation in central areas, with their specific infrastructural requirements, management capabilities and ability to pay. This left without sanitation the lower-income people in peri- and semi-urban areas, and also the rural areas — precisely those who are most at risk if environmental sanitation is inadequate.

- Planners did not consult the beneficiaries as to their expectations and potential participation, especially in the funding of schemes. In consequence, the beneficiaries were ill-informed about projects and could not appreciate the interrelations between technology, levels of service, costs and funding, and the requirements of operation and maintenance.

- Accordingly, many project planners ignored the need for financial sustainability; the projects were financially unsound and unable to raise the money required to pay for operation and maintenance, let alone that needed to pay amortization and interest on loans, nor accumulate the reserves needed for renewals and further extensions.

As has been clearly exhibited in Chapters 7.1 and 7.2, the situation described in the preceding paragraphs must be addressed in the preparation of projects for environmental sanitation. The crux of the matter is:

> It should be standard procedure to develop projects on the basis of studies and investigations of not only the technical but also the sociocultural and socio-economic, institutional and organizational aspects of the project, as well as operation and maintenance, users' participation and cost recovery.

What does this imply?

1. The objectives of the projects must be defined in light of the discussion in Chapter 6 rather than "as usual".

2. The approach to the preparation of projects for environmental sanitation must indeed change. This will be the subject of discussion in Chapter 8.

7.3.2 Software Can "Make or Break" a Project

Projects consisting of "hardware" alone will not be successful. Hardware may include sewer pipes, tanks and ponds for the treatment of wastewater, septic tanks and latrines — depending on the technology chosen. As the experience discussed in Chapter 7.1 and 7.2 demonstrates, the hardware component of a project must be supported by additional measures that will make it successful. Since investment projects are mainly hardware, it has become customary to call the supporting measures "software". Hardware is needed to collect, transport and dispose of wastewater, whereas software addresses the "environment" of the project, e.g. policy, regulations and standards, institutional development, operation and maintenance, participation, capacity building, and measures to assure cost recovery. The planning of this software will be discussed in Chapter 8.3.4. Suffice it to say at this stage that every project must include software, and that this software must be planned and implemented together with the hardware, as it exhibited in Figure 8.4.

Planning for software will require special studies, investigations and funding, and the timing and length of the implementation phase are critical factors in the development of a project. If the project is financed through an ODA loan, some of the software might be funded as part of that loan. But as shown in Figure 8.3, some — if not most — of the software requires Grant Aid, and/or may best be implemented through prior Technical Cooperation.

There is no general rule as to how much money must be spent to plan and implement the software of a project. For off-site sanitation projects, this may be on the order of several percent of the total cost — say, between 5 and 10%. For on-site sanitation, it may be much higher, especially for latrine programmes, which may involve a large measure of funding by the beneficiaries themselves.

7.3.3 Four Lessons

The four lessons learned through experience are:

- The success of a project is determined by the ways in which it is prepared. A new approach to project preparation calls for a broad gamut of studies and investigations and the active participation of the beneficiaries.

- The experiences of the industrial countries must not be transferred to the developing countries without major adaptations to the conditions, the needs and the capacity of the recipients and the target group. This is of particular importance with respect to the choice of technology, funding, cost recovery, management, operation and maintenance, roles of recipient and beneficiaries, and the place of the project within the country's development context.

- Projects must include hardware **and** software. Both need careful planning on the basis of in-depth studies and investigation. The allocation of time and money for the software should be considered at the stage of project formation (when the SOW is negotiated), and during the monitoring and evaluation of the project.

- Software, sustainable management and finance (including cost recovery), and the choice of technology should be part of every project Development Study, and also be addressed in the appraisal of every project submitted for funding.

It is very important that the message conveyed by these lessons be translated into practical measures during the planning, design and implementation of the project. Chapter 8 will provide information as to how this may be done.

8

Preparation of a Project for Subsequent Funding

Projects must meet many requirements and expectations. However, in accordance with the overall purpose of the present document, the focus of Chapter 8 will be on the expectation that the project will be able to attract funding from an ODA. Thus, in the preparation of the project attention should be given to:

- Full information about the project's basic characteristics, taking into account the implications arising from the different possible sources of funding.
- The measures needed to support the project and make it successful.
- A funding and implementation proposal.
- An assessment of the project's expected impact and of its risks.

In Chapter 8.3, the project's preparation is discussed in the light this strategy. Japanese and other experience is summarized in Chapters 8.1 and 8.2, respectively.

8.1 Japanese Experience

8.1.1 Master Plans and Feasibility Studies

> The centerpieces in the preparation of a project are the master plans and feasibility studies undertaken by Consultants in the context of a Development Study.

Master plans and feasibility studies are normally carried out in the context of JICA's Development Studies. The objective is to assist the recipient in the adaptation of long-term plans and in making investment decisions for a specific project. The objectives and the types of JICA's Development Studies are referred to in Chapter 3 and fully explained in Annex 3.

Master Plans

As already referred to in Chapter 5.1, master plans comprise a considerable body of information on the sector and on the developmental aspects of projects. They may be country-wide, regional or for a specific area. They are basic studies, often requiring extensive investigation and research, and contain proposals for a step-wise implementation.

The preparation of master plans for environmental sanitation will normally involve:

- The collection and review of existing data and information, i.e.:
  - The physical features of the area, e.g. climate, topography, geology, communications, *etc.*
  - Social and economic conditions and statistics; the social circumstances in the sector of environmental sanitation.
  - Policies and development plans in the sector, present conditions, on-going projects, legislation on sanitation.
  - Institutional and managerial aspects, the financial condition of existing implementation agencies or organizations.
- Field surveys, e.g.:
  - Present conditions and the quantity and quality of waste to be discharged.
  - Geology, topography, water quality and land use in the vicinity of existing or future disposal sites.
  - Public awareness concerning environmental sanitation.
- Forecast of socio-economic change and future demand for sanitation.
- Identification and evaluation of issues.
- Formulation of the actual master plan, e.g.:
  - Confirmation of the planning framework, including time horizon, demand forecast, definition of the programme or project area.
  - Setting goals and strategies, including the analysis of alternatives.
  - Selection of priority projects for step-wise implementation. Consideration of the economics of alternative programmes for phased implementation.

- Analysis of technical features and aspects.
- Cost estimates and financial plan.
- Institutional, organizational and managerial aspects, and needs for capacity building.
- Operation and maintenance.
- Plans for public information.
- Overall evaluation of the technical, environmental, financial and socio-economic features of the plan.
- Implementation plan.

Feasibility Studies

Feasibility studies, as already discussed in Chapter 5.1, are undertaken to prepare specific projects for implementation. The studies also identify needs for additional studies and Technical Cooperation.

Normally, a feasibility study involves:

- Confirmation and/or updating of the master plan in terms of time horizon, project areas, service levels, major project components, and environmental impact.
- Supplementary studies and investigation, as required, including social studies, in accordance with JICA's guidelines.
- Preliminary engineering design of the proposed facilities and equipment.
- Cost estimates and a financial plan in accordance with the criteria of the prospective funding agency or agencies (not necessarily Japanese).
- Operation and maintenance.
- Plans for institutional development.
- Public relations, and plans for public education.
- Evaluation of the project's features in terms of its technical, environmental, financial and socio-economic features.

The results of the feasibility study are normally made the subject of a seminar involving the recipient, Japanese, and eventually other ODAs, Consultants, and the prospective implementation agency or organization.

8.1.2 The Approval Schemes of Japanese ODA

The approval of requests for an ODA loan or Grant Aid involves the appraisal of the project's technical, financial and economic, and supplementary features.

The Approval of Japanese Official Loans

When providing official loans, the ODA takes account of the economic circumstances of the recipient country, e.g. LLDC to NIE. The terms of the loans are based on the economic situation and the capacity of the country to service debts.

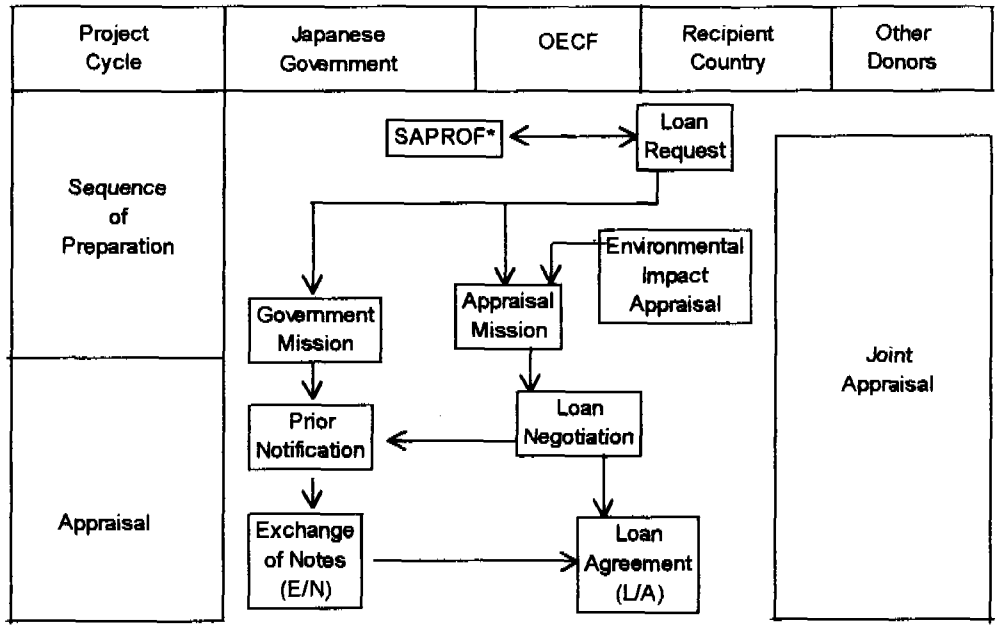
The approval scheme is exhibited on Figure 8.1. Its main steps include:

- Preparation of the project with financial, economic and environmental evaluation, and submission of a loan request by the recipient.
- Appraisal by the Government of Japan and OECF.
- Prior notification, loan negotiation and agreement.

In order to be appraisable in the light of Japanese and, as appropriate, other ODAs' criteria, the feasibility study must exhibit the following (see also Annex 7.1):

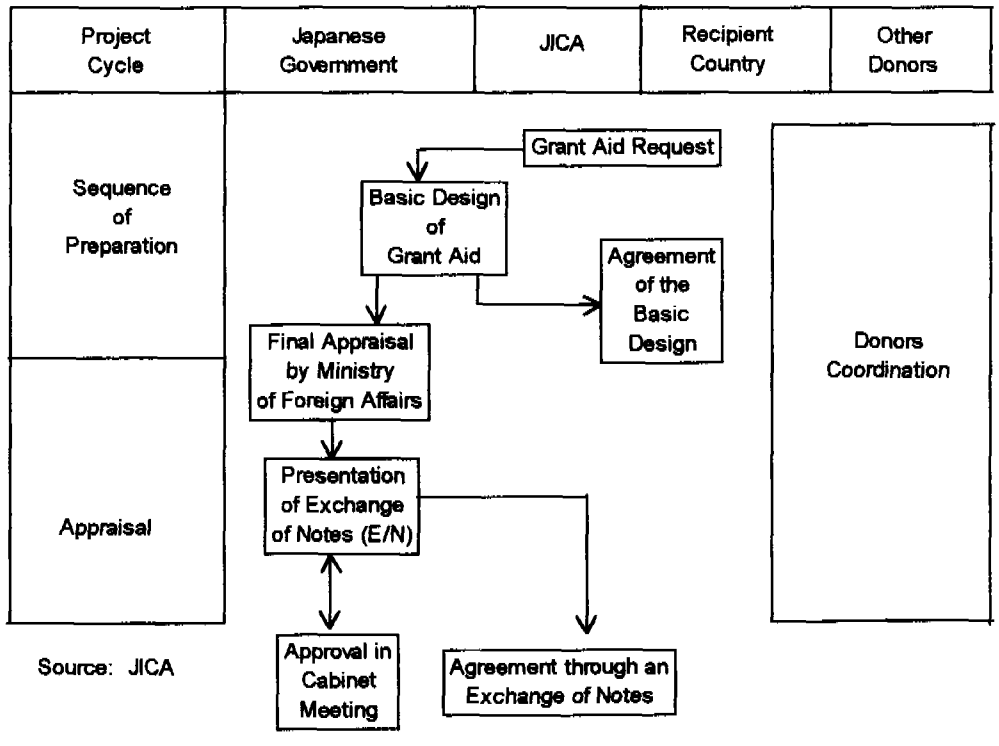
- The technology of engineering works and the supply of materials at shadow and market prices.
- The legal aspects, management (on a self-paying basis), and the capacity of the implementing agency or organization.
- Financial features, e.g. the FIRR, debt service, coverage ratio and the repayment schedule.
- An evaluation of risks and uncertainties.

Figure 8.1 — Appraisal of a Request for a Japanese Official Loan



* SAPROF = Special Assistance for Project Formation
Source: JICA

Figure 8.2 — Appraisal of a Request for Grant Aid



Source: JICA

The Approval of Grant Aid

The scheme for the approval of Grant Aid is shown in Figure 8.2. The main features of the process of approval include:

- A request for Grant Aid from the recipient.
- Studies and the basic design.
- Appraisal and approval.
- Detailed design and implementation.

8.1.3 Linking Development Studies with Project-type Technical Cooperation

Linkage between the Development Studies and project-type Technical Cooperation offers many advantages.

Project-type Technical Cooperation may extend over a long period of time, beginning often before the Development Study and possibly continuing beyond the implementation of the investment project itself. This offers opportunities for research and development as regards local conditions and preferences, socio-cultural factors, the most appropriate technology, institutional development, and general capacity building. In some cases, project-type Technical Cooperation may be a start-up phase of a subsequent Development Study, or it may involve a pilot study between the preparation of a master plan and the subsequent feasibility study, or vice-versa. Combining the two types of Japanese ODA will often be advantageous, especially as regards the consideration of software, as described in Chapter 8.

Linking Development Studies with other types of Technical Cooperation is very effective. Among other things:

- Package contracts combining Project-type Technical Cooperation with a Development Study may be made for Consultants.
- Technical Cooperation may start small with the intention of following up with a full-scale Development Study.
- A pilot project may be undertaken during the preparation of a master plan or feasibility study in cases requiring capacity building or institutional development.

- A mini-Development Study may be undertaken as a startup for project-type Technical Cooperation in projects with relatively small-scale funding cooperation.

8.1.4 Manuals for the Planning of Projects for Environmental Sanitation

Some manuals are available for the planning of projects for environmental sanitation.

A considerable amount of experience has accumulated, and research been undertaken, during the vast build-up of environmental sanitation in Japan since World War II. An important aspect of this experience relates to the transition from traditional systems for the disposal of nightsoil and graywater, through modern on-site facilities (*Jokaso*) and/or small-scale sewerage systems, and, ultimately, to the large-scale sewerage and sewage purification systems serving all the large cities of Japan today.

In the course of this transition, many socio-cultural and socio-economic, and institutional and organizational problems, had to be dealt with — and they are still challenging the implementation agencies as the programme for universal coverage moves into some of the country's semi-urban and rural areas. Many lessons for application in the developing countries have been learned in coping with these problems.

Japanese technical and other literature covering the experience abounds, although often it is in Japanese. Two volumes have recently been published in English by the International Environmental Planning Center of the University of Tokyo, entitled, "Nightsoil and Gray Water Treatment in Japan" (see Notes). Another publication in English is the "Manual for the Introduction of *Jokaso* System in Developing Countries" by the Overseas Survey Committee on Night Soil Treatment Technology Transfer. Other publications are listed in the Notes.

The above-mentioned publications contain basic technical information for the planner and designer. For use in Japan's domestic programmes for environmental sanitation, they are supplemented by a number of manuals issued by the governmental bodies responsible for the programmes, i.e. the Ministry of Construction and the Ministry of Health, and are intended to guide the preparation of projects for subsequent funding from a variety of sources available.

Further, JICA has issued a "Case Study for Development Studies for Water Supply, Sewerage and Drainage, Flood Control, Water Resources and Groundwater" (in Japanese). The latter emphasizes the social background of projects, the selection of treatment methods, costs, construction, and evaluation. The former sums up five cases, i.e. Egypt, South Yemen, Indonesia, Thailand and Peru. Both JICA and OECF have published guidelines for environmental impact assessment of development projects, and, specifically, for projects for water supply and environmental sanitation. The Ministry of Construction, in cooperation

with other ministries and concerned professional organizations, has issued a Manual on Master Planning for Sewerage and Sanitation in Developing Countries. A guideline for operation and maintenance is under preparation. The Ministry has also published a Guideline in 1993 on "The Application of Technologies for the Treatment of Urban Sewage in Developing Countries" (in Japanese), which addresses integrated technologies for sewage and drainage, both on-site and off-site. The Ministry of Health is issuing a manual dealing with *Jokaso*.

8.2 Experience of the Donor Community

8.2.1 Background

> After the International Decade, a wealth of information for planning projects for environmental sanitation is available and is used by the other organizations, both as regards investment projects and Technical Cooperation.

Most of the aid organizations have supported projects for environmental sanitation in the past. All have had experience with water supply projects which are similar in nature and require a similar approach. Considering that 748 million people were newly provided with sanitation during the International Drinking Water Supply and Sanitation Decade — 1981 through 1990 — it is obvious that a wealth of experience is available in all the organizations as regards the preparation of projects for subsequent funding.

The experience of the Decade derives from projects of all types and sizes but, fortunately, it covered both urban and rural areas, water supply and sanitation, and both hardware and software. It involved lending institutions such as the World Bank and the regional development banks, the organizations of the United Nations system, and multi- and bilateral Technical Cooperation and funding organizations. Of the total US$134 billion that was invested during the Decade, 53 billion went for urban sanitation and almost 7 billion for rural sanitation. Of the total amount, 34% came from external sources of funding, the remaining 66% from the national and/or local government and from the people who themselves benefitted from the projects.

During the early days of the Decade, the goal often was — simply — to increase the number or percentage of people having access to water supply and sanitation. In itself this was a good objective, but it disregarded the many factors which were discussed in Chapters 5 to 7. Accordingly, many projects did not perform well, and, gradually, during the Decade, the emphasis shifted away from just pipes and pumps. Among other things, more operational research was undertaken and both the lending institutions and the Technical Cooperation agencies increased their coordination so as to make the best use of new knowledge during the preparation of projects for subsequent funding. Some of the lending institutions added Grant Aid to projects under certain conditions and also began to provide Technical Cooperation if the projects so warranted. By the same token, the Technical Cooperation

agencies added Grant Aid for construction in cases when pilot or demonstration projects were an essential part of their cooperation. The experience of the Decade suggests that many benefits can accrue if close cooperation takes place between Technical Cooperation, Grant Aid and actual lending.

In a nutshell, the Decade provided a huge amount of experience and information — more like what had already become available in many other development sectors. Mechanisms have been established jointly by the Donor community and the developing countries to keep this experience up-to-date and to undertake needed research, and, also, to translate it into actual project design. These tasks have been undertaken, respectively, by bodies such as the Water and Sanitation Collaborative Council and the UNDP/World Bank Water and Sanitation Programme.

8.2.2 Are There Any Guidelines?

No guidelines have been written for using this information for the preparation of projects for subsequent funding. The other organizations rely on the expertise of their technical staff and the experience of the recipients.

However, most of the other organizations have issued guidelines or instructions setting out the scope and depth of the appraisal reports that they require prior to the approval of a loan or of Grant Aid. The best sources of guidance for project development are these instructions for appraisal.

Has all this experience been written up for use in the preparation of projects for subsequent funding? Usually not.

The other aid organizations will insist that the quality of a project prepared for subsequent funding depends, in the first place, on the quality of the prior negotiations between the external support organization and the recipient, on the one hand; and, on the other hand, on the experience of the recipient and the quality of the Consultants. No written document, so the other organizations assert, can be a substitute for this — because no project resembles another with respect to its technical needs and its socio-economic and cultural circumstances. The other organizations prefer to rely on the competence and experience of their own technical staff for the formation — in cooperation with the recipients — of tailor-made projects.

It is not surprising therefore that the other aid organizations have not published guidelines or manuals for project preparation. The notable exception is the Project Preparation Handbook published by the World Bank in 1983 as part of the UNDP/World Bank Water and Sanitation Project. It consists of three volumes published in the World Bank Technical Papers Nos. 12, 13, and 14. Another, though more limited, example is the "Design

Guidelines for Simplified Sewerage", also Published by UNDP and the World Bank, in 1994, as part of their joint programme. The publication mainly covers the technical features of the design, and only a few of the other aspects of project preparation.

The other organizations have published the results of their research on many of the specific subjects encompassed by environmental sanitation, and the most pertinent of these publications are listed in the Notes at the end of each sub-chapter. The other organizations have also published project experience and case studies, although neither these case studies nor the research findings constitute formal guidelines for project preparation. Projects must be tailor-made on the basis of field investigations and studies carried out by the Consultants under contract for the preparation of a project, and the Consultants are selected on the basis of their experience and professional record, and are given detailed TOR rather than manuals to be the basis of their work.

However, most of the other organizations have issued guidelines or instructions setting out the scope and depth of the appraisal reports that they require prior to the approval of a loan or of Grant Aid. Some of these instructions have been summarized in Annex 6. They indicate clearly how the staff of these organizations will appraise the projects prepared by the recipients and the Consultants. Naturally therefore, the best sources of guidance for project development are these instructions for appraisal. Most of the instructions are made widely available and are used as reference points when the TOR for the Consultants are prepared, and when Consultants are briefed prior to the commencement of their work.

8.2.3 Projects Must Be Appraisable

Feasibility studies required by other organizations have expanded in scope and have become more complex and diversified for all investment projects. In the case of Grant Aid, however, the requirements for appraisal are scaled down to save time and money. Software factors, technology, sustainable management and finance remain predominant criteria in any appraisal.

In the requirements for appraisal reports, the other aid organizations use a fairly uniform approach to projects for environmental sanitation (and water supply).

Feasibility Studies for Investment Projects

For projects requiring investment in terms of either a loan or Grant Aid, feasibility studies are required. In the past, the studies mainly served the purposes of estimating the costs, establishing the basis for subsequent implementation and the preparation of tender documents, financial forecasting, and institutional strengthening. This has changed considerably; the studies have become more complex and diversified.

In accordance with the experience described in Chapters 5 through 7, today many additional investigations must be carried out in the course of the feasibility studies, e.g.:

- proof that the scheme fulfills overall development goals;
- proof that sector-specific objectives can be attained;
- establishment of realistic time horizons of — often — not more than five to ten years hence;
- cross-linkages with water resources development and other relevant sectors, i.e. health, housing, infrastructure and regional development;
- assessment of users' benefits;
- measures to ensure sustainability of the project, e.g.:
  - good management;
  - financial sustainability, including cost recovery and users' participation;
  - operation and maintenance; and
  - technological acceptance and appropriateness;
- full financial planning;
- institutional proposals, empowerment and participation;
- potential for private sector participation, and
- protection of the environment.

From the foregoing, it can be seen that there is a need for a whole gamut of special studies to be undertaken in order to address existing gaps. The other organizations do not, therefore, impose planning models or checklists upon the Consultants. They all insist that professional qualifications and experience cannot be replaced by models or manuals.

The Case of Grant Aid

In the case of Grant Aid for investment, the requirements may be relaxed for several reasons, such as (i) the amount of funds involved is comparatively small and may not warrant a very expensive feasibility study, and (ii) the time available for planning is normally much shorter than in the case of a loan and this will call for shortcuts. Nevertheless, the information

required for the appraisal of Grant Aid for investment projects is the same as that shown above, although the depth and detail of the information may be less.

Software Factors

Increasing attention to "software" is apparent in the programmes of all of the other aid organizations. Neglect of human considerations has been shown to have seriously compromised too many projects in the past. First, last and in the middle — every single aspect of water and sanitation has to do with people. Their needs and attitudes and abilities cannot be omitted from any calculation. In many cases, therefore, supplementary studies and proposals now are required before the project can be approved. Participatory planning is emphasized as a good way of "getting it right".

Sustainable Management and Finance

Sustainability has become a concern of all other organizations, although they may use different terminology. An interactive mesh of activities, many of them closely concerned with software once more, are now considered necessary in the planning process. Factors addressed in the process include institutional and managerial measures, the costs and financing, and the choice of technology — all treated as a closely interrelated system — as has been described already in Chapter 7.

There is wide agreement among the other aid organizations with regard to the need for good management, and also on the following specific requirements that must be addressed by the planner during the preparation of the project:

- Devolution, accompanied by support to the local level from higher levels of government, if needed.
- Involvement of the beneficiaries.
- Sound fiscal policies at government level, matched by cost recovery based on an assessment of the willingness and ability of the beneficiaries to pay.
- Sound managerial procedures accompanied by human resources development emphasizing operation and maintenance, and monitoring and surveillance.
- Participation of the private sector, as appropriate.

8.2.4 Choice of Technology and Its Funding Implications

On-site sanitation and low-cost sewerage are accepted as valid alternatives for semi- and peri-urban and rural areas; however, a general strategy for the funding of on-site disposal is not available yet.

Choice of technology has become a major pre-occupation of all of the other organizations. They share the view that when making this choice, consideration of the present level of information and future educational capacity of the user is a must, and that a careful balance of the costs *versus* the willingness and ability of the consumer to pay must be achieved. By the same token, local O&M of systems is greatly favored. There is wide agreement that the capital-intensive high-tech technology applied in the industrial countries for off-site environmental sanitation is not the preferred option for most situations in the developing countries. Increasingly, low-cost and appropriate technologies are used in the programmes of the other organizations — such as:

- Low-cost sewer systems for the collection and treatment of household wastewater,
- On-site technologies for nightsoil and graywater collection and treatment, and
- Recovery and re-cycling.

While these technologies are substantially different from each other, the distinctions between them do not imply that only one or the other would be the "prescribed" solution for a specific situation at all times. As in the industrial world, quantum changes in technology are also expected in the developing world, in tune with the progress of development.

So far, no clear-cut policy has yet emerged with regard to two basic questions posed by these technologies:

(1) **Models**

What is the best model for making low-cost and on-site environmental sanitation fundable, especially in the case of on-site disposal in peri-urban and rural areas and when it involves a large degree of private ownership of the latrines or other on-site equipment? Several models have been researched: e.g. (i) combining sanitation with drinking water supply and taking advantage of the institutional setting normally available or proposed for the water supply component, and (ii) creating a credit bank or union or similar mechanism which can act as the recipient and fund manager, and which lends funds to the private owner, based on an application which may be scrutinized by a local governmental or nongovernmental institution. These models are described in the Case Studies of Annex 8, especially those dealing with projects in India and Lesotho. They require careful analysis, and they may

involve long-term preparatory activities and support measures which need to be undertaken before a funding decision can be taken. By a large measure, at this stage Grant Aid is the most suitable option for funding; funding by ODA loans under suitable conditions is still an open question. The experience available so far points to the following:

- A research or pilot project may be undertaken with a view to investigating technological options promoting the programme and explaining it during informational and educational campaigns.

- During the pilot project, the buildup of a community structure is desirable to advocate, supervise and monitor both the pilot project and the full-scale project or programme.. This may involve local government or nongovernmental structures.

- As part of the foregoing, the project should provide training to local government staff, who will then train and provide technical advice to the community's responsible officials, e.g. sanitary staff of the local health infrastructure, and extension workers.

- Promote, support and license, as appropriate, private sector participation, e.g. local production and construction of the facilities.

- Provide ODA funding during several years of operation.

- Assure the full support of the project by regional and/or central government in terms of policy, legal requirements, financial backup and guaranties, participation in the promotion, supervision and monitoring of the project, technical backup and advice, and financial input during the initial phase.

- Following the pilot operation, it is important to create a critical mass for the full-scale project, i.e. aim at an area-wide district, regional or even national coverage by the project.

(2) Mixes

In choosing the technology, not just one option might be considered for a specific project area, but rather the best "mix" — so as to address the needs and potentials of the different areas and/or population groups within the project area. On the one hand, infrastructural requirements, land use, building codes and public health needs will (or may) vary greatly from section to section of the project area. On the other hand, the population may be mixed, including wealthy people, demanding and paying for a traditional sewerage system, the fringe populations depending on on-site and on-plot systems, and the people living in between who are able to afford a simple system of sewers (these might be connected to the central system or otherwise discharge into an open water or groundwater with or without prior treatment). Further, the situation is very fluid in many of the developing countries, and the "right" and affordable technology may change quickly; this will pose a special challenge to the planner (see also "Time Horizons" in Chapter 8.3.4).

8.3 Discussion

A primary goal in the preparation of a project is its eventual approval by the funding agency or agencies — not easy, because of the many requirements which these agencies do need to have fulfilled. The present chapter describes how a project should be specifically designed to fulfill just such needs.

A comparison of the information summarized in Chapters 8.1 and 8.2 demonstrates that the experience accumulated in Japanese overseas cooperation for environmental sanitation tallies with that of the other aid organizations in many respects. However, there are also differences as regards, on the one hand, details and depth and, on the other hand, principles and emphasis. This is not the place to assess the differences. Still, it may be concluded that lessons can be learned both ways. It is deemed appropriate to capitalize on the experience of all ODAs, and to undertake to keep the following Discussion as broad as possible.

8.3.1 Implications of the Source of Funding

> Not all sources of funding can be tapped for all types of systems for environmental sanitation. A realistic appraisal of the constraints posed by the funding sources is an important step in the preparation of a project. The sources may be ODA loans, Grant Aid or Technical Cooperation Funds, or a combination. The projects discussed here are principally investment projects and those supporting measures needed to make them successful.

Considerable differences will exist with respect to the funding of investment projects, i.e. funding through loans, Grant Aid, or a mix of the two. The potential for cost recovery varies, according to the ability and willingness of the target group(s) to pay for the service, and will be a major factor in designing the most feasible funding scheme. This also has important technological implications, according to the following rules of thumb:

- For central urban areas, a relatively high-tech sewerage system with high-degree sewage treatment prior to the discharge of the effluent into the sea or a river, or its re-use, may be feasible. Thus, projects for such areas are likely to be off-site systems with a strong operating agency and a favorable economy of scale. Therefore, even though they are capital-intensive, they are more easily financed because people are able and willing to pay for the service, and banks are basically ready to make loans.

- In contrast, projects for rural and many peri-urban areas are likely to be low-cost sewerage or on-site facilities and must be designed taking into account (i) the ability of the beneficiaries to pay very little, and (ii) the paramount problem of making a

sustainable arrangement for operation and management at reasonable cost to the owner of an on-site facility. Such projects are not usually attractive to banks because they often involve a very large number of individual latrines or septic or other tanks which can be funded more easily through Grant Aid. If this is not available, their funding will depend on innovative managerial and financial schemes in order to make them sustainable and "bankable".

- An intermediate situation may exist in some semi-urban areas where low-cost sewerage systems may be feasible. In such cases, funding agencies will not need to deal with a large number of individual hardware components but will, nevertheless, need to adapt to beneficiaries who can pay only limited amounts of money. Accordingly, funding by banks or Grant Aid is more feasible than in the case of on-site sanitation.

- In considering the above rules of thumb, ALL costs must be considered, i.e. the cost of capital investment, costs of operation and maintenance, and the replacement and improvement costs. The sum of all costs should be measured up to the ability of the beneficiaries to pay, and also to the policy regarding "who pays" and "who not", especially if there is a policy regarding the distribution of the costs among the different segments of population. Consideration of all these factors may or may not favour a technology which ordinarily would be "ruled out" on the basis of its capital costs alone. A further case in point is the reduction of the costs to low-income people if foreign Grant Aid is available to render the costs of construction nonrepayable. In this case, the costs of off-site sanitation may indeed be lower than would those of an on-site system which the owner would have to install and maintain totally at his own expense.

- In either loans or Grant Aid, the principles of effectiveness and sustainability are the same, and the preparation of projects must involve consideration of all relevant factors. This is particularly important in the case of projects for environmental sanitation, which, more than many other types of projects, are affected by social, economic and cultural factors, by the degree of participation, by the problems associated with operation and maintenance, and by the choice of technology.

Technical Cooperation funds are different, and are intended to finance preparatory and/or supporting measures, or "software". In most cases, they are funded through grant money, and include the dispatch of experts, training, the provision of equipment, investigations, public relations, health education, *etc.* Thus, Technical Cooperation funds may be an important component in the total funding of a project, and their availability and best use should be carefully explored during the negotiation of the SOW and during the Project Study itself. Unlike ODA loans and Grant Aid for investment projects, Technical Cooperation Funds can be approved and allocated within a relatively short time. They are also more flexible in response to changing conditions in the project.

Projects for environmental sanitation always harbor risk of delays and unforeseen events caused primarily by their social dimension. When a Project Study is undertaken and when

the project is implemented, flexibility and contingency allocations are important and should always be agreed upon during the negotiation of the SOW. Consideration should also be given to the following:

- All projects for environmental sanitation will need Technical Cooperation funds for dealing with software matters. For on-site sanitation, Technical Cooperation will differ in both quantity and quality from that in the case of off-site projects. As a rule of thumb, projects for on-site sanitation will in most cases not only require more funds for Technical Cooperation, but also for a longer time and involving a more interdisciplinary approach than off-site projects.

- Many projects for environmental sanitation involve a research and/or pilot component for which Technical Cooperation funds should be the best source of funding.

- Because of their early availability, Technical Cooperation funds should always be used to involve the potential funding agency or agencies, with the view of shaping the project itself and its environment, and for creating conditions which will ensure subsequent funding of the project.

- Technical Cooperation, and the Project Study itself, offers opportunities for joint activities with other Technical Cooperation agencies. Such opportunities should be exploited with a view to capturing the widest possible gamut of experience in the donor community and to promote funding through ODA loans or Grant Aid.

Figure 8.3 outlines an algorithm relating systems technology to the potential sources of funding. If a traditional sewage system is feasible, at least the hardware component of the project has the potential of qualifying for an ODA loan. Some of the software components may involve Technical Cooperation, and some may become part of the loan, depending on the circumstances of the project.

If a traditional sewerage system is not possible, an on-site or low-cost sewerage solution must be sought. Even then, at least some part of the hardware may qualify for a loan, whereas the rest (hardware and software) may require Grant Aid and/or Technical Cooperation. If an ODA loan is not feasible for the project in its entirety, a combination of Grant Aid and Technical Cooperation would be sought for the project — probably focusing hardware on Grant Aid and software on Technical Cooperation.

A special case would be when some of the hardware could qualify for an ODA loan if it were combined with either a traditional sewerage project or with some other type of project, such as for water supply. A case in point might be the hardware component of a low-cost sewerage system and/or an on-site system for a semi-urban area which might be combined with the sewerage system for the central area of the town. Another case could be a system for on-site sanitation for a rural area if combined with a water-supply project that is funded through a loan.

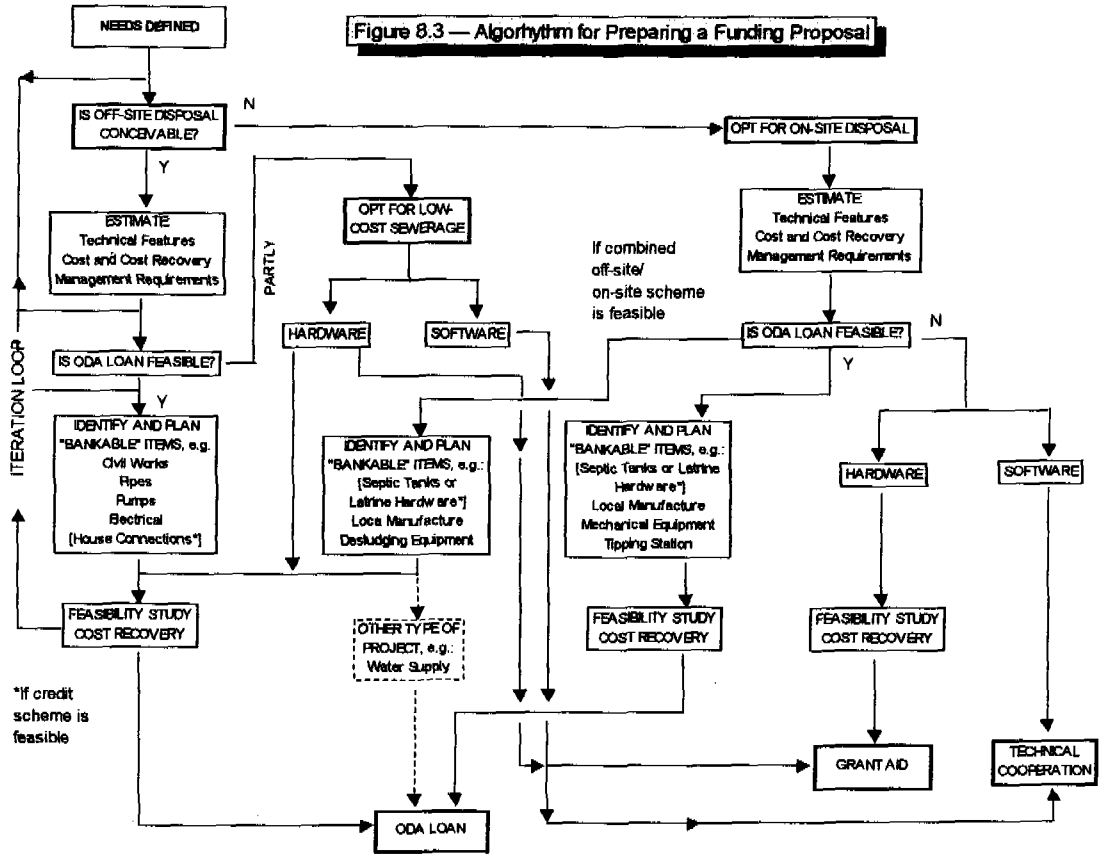


Figure 8.3 — Algorhythm for Preparing a Funding Proposal

8.3.2 General Approach to the Preparation of a Project

Preparation of a project involves studies and investigations, engineering design, the actual project proposal, a logframe analysis, and project-support measures.

The actual project proposal will in most cases be based on preliminary engineering studies and design. When Grant Aid is involved, implementation design may be substituted so as to save time and money. But many other studies and investigations are also needed.

As discussed in Chapters 8.3.4 through 9, the actual project proposal will include information on — at least — basic project features, project-support measures, the costs and financial aspect of the project, implementation, expected impact and risks involved, and the implementation agency or organization. It will also analyze the project in light of the general conditions in the country and the sector.

The Principle

It should now be clear that all projects must be **tailor-made**; i.e., for each project, a different set of conditions must be met. All parties involved must be fully aware of the implications thereof: i.e. the recipient, the beneficiaries, the international or bilateral ODA, the Consultants, and the public whose taxes fuel the whole process.

It goes without saying that the studies and investigations which will be undertaken to prepare the project must also be **tailor-made**. Each study will be different, involve different investigations and arrive at different conclusions. The scheme presented in Figure 8.2 is only a generalized presentation of the preparation of the project, and should not therefore be followed blindly. The figure is intended (i) to exhibit the interrelated and interactive elements which will bring the project to fruition and (ii) to provide guidance for the planning and design of the investigations and supporting measures which are required to make the project appraisable and successful.

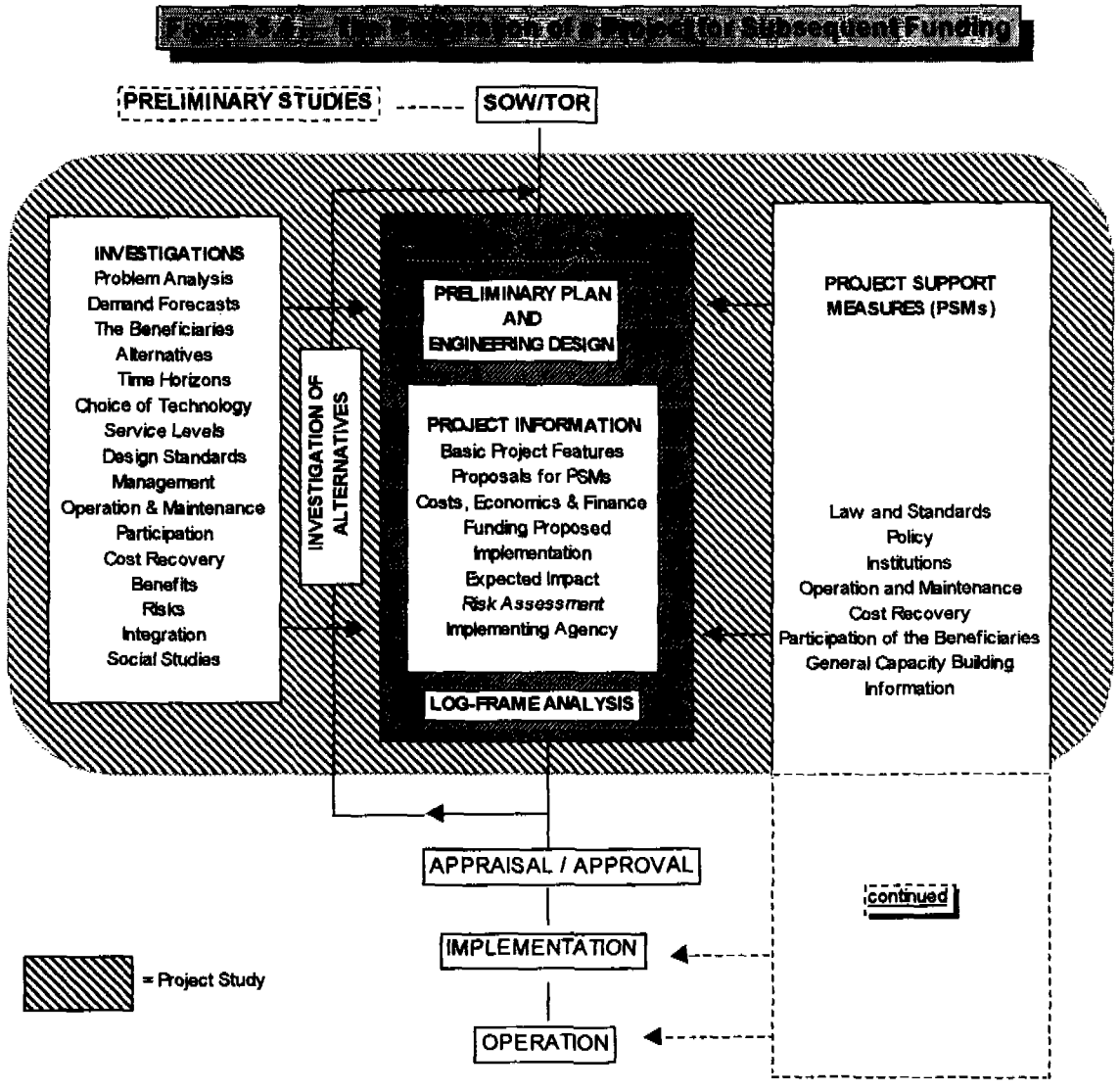


Figure 8.4 exhibits the following:

The project proposed (center)	this will be the actual project proposal.
Investigations (left)	the investigations undertaken during the preparation of the project. They may be technical, socio-economic and socio-cultural, managerial, and institutional. The listing in Figure 8.4 is not a prescription for any specific project, since each Project Study must be tailor-made, as pointed out before. But it indicates the wide range of subjects which the Consultants may need to study.
Project Support Measures (right)	The project-support measures will normally be planned during the preparation of the project. However, implementation may take place prior to or during the appraisal/implementation of the project, as will be discussed in Chapter 8.3.5.

Studies and Investigation

(1) **Engineering**

Engineering studies are the backbone of every project for environmental sanitation. If an ODA loan is involved, preliminary engineering studies and design are undertaken as part of the Project Study. The scope and depth of such studies and design are well known and need not be repeated here in detail. Suffice it to say that they involve a wide gamut of field studies and investigations, as well as office studies and analyses which must be clearly described in the TOR.

In contrast, time and money is often limited when projects receiving Grant Aid are planned and designed. In such cases, the stage of preliminary engineering may be severely compressed, even eliminated, and instead implementation (final) engineering will be undertaken and tender documents prepared. The Consultants responsible for the engineering must nevertheless address and investigate the same variables listed below for preliminary engineering, although in considerably less detail. The TOR must make this clear.

The scope and depth of the engineering studies will vary with the technology applied. For high-tech water-borne sewerage systems and treatment works, fully fledged engineering studies are required. On the other end of the spectrum, the engineering of latrines is rudimentary but, nevertheless, investigations into several aspects should be carried out, e.g. the choice of the type of latrine, soil characteristics, the problem of groundwater protection, the standardization of parts, and construction methods. If septic or other tanks are required, engineering will focus on the same problems and in addition deal with prefabrication of tanks and other parts, operation and maintenance, including desludging and the disposal of sludge.

For low-cost or small-bore sewerage, engineering must deal with many of the aspects covered in the case of off-site systems, but pay particular attention to their special hydraulic characteristics, accessibility in crowded and narrow settlements during construction, maintenance requirements, house connections, and the protection of the sewers against vandalism.

The following presentation intends to summarize the points made above as regards engineering studies. Annex 4 provides further information on the choice of technology.

	Type of Engineering Design
Loan for:	
- Traditional sewerage system	Fully fledged preliminary engineering
- Low-cost sewerage system	Fully fledged preliminary engineering
- On-site systems	Implementation design with standardized technologies, if appropriate
Grant Aid for:	
- Low-cost sewerage system	Reduced preliminary engineering and/or implementation design
- On-site systems	Implementation design with standardized technologies, if appropriate

(2) **Other**

In Chapters 8.3.5 to 8.3.9, many subjects are discussed requiring studies and investigation. Many of these will be non-engineering, i.e. socio-economic, sociocultural, financial and fiscal, managerial, institutional, *etc.* All parties in a project are challenged to identify the specific studies and investigations required, and to plan and implement them — always with the active participation of the recipients and often including the beneficiaries. No general guideline can be established as to the subjects to be dealt with, nor as to the depth or methods of investigation. Each case must be tailor-made, as was pointed out before. Chapters 8.3.5 through 8.3.9 are intended to provide some overall information, and the Notes at the end of each chapter (and Annexes 5 and 6) include the most important publications of the extensive literature covering these matters.

Project Information

In Chapters 8.3.4 through 9, the range of information that the actual project proposal should cover is discussed, i.e. the basic features of the project, project-support measures, costs and

the economic and financial aspects — including a proposal for the project's funding — implementation, the expected impact of the project, and the risks involved. The information should also demonstrate the compatibility of the project with the situation of the country and sector.

8.3.3 Compatibility with Situation of the Country and Sector

During the preparation of projects for environmental sanitation, the compatibility of the project with the overall situation and development trends in the country should be analyzed.

Every project should be based on information regarding the existing sector development policy.

Avoid planning and designing a project on the basis of expatriate criteria and perceptions.

Compatibility with the Situation in the Country

Chapter 4 stipulates that the project must be compatible with the country's economy, problems, policies and priorities. This may relate to financial and economic policy, governance, participation and community management, women and the role of the private sector — all of which bear heavily on projects for environmental sanitation. It must further be compatible with current development plans and their priorities and with the constraints encountered in their achievement, as well as with priorities for ODA cooperation.

The primary purpose in this respect is to set out clear objectives and operational approaches, and to enable an assessment of how and to what degree the proposed project relates to and contributes to the items listed. Thus, not all of the information needs to be in great detail, but it must be assembled early in the planning process. For Grant Aid projects, the information may be brief indeed but is nevertheless important. Whenever quantitative information is not available, this should so be stated, and qualitative statements presented.

Compatibility with the Situation in the Sector

Many countries and most of the donor agencies recognize environmental sanitation as a field for priority action and, accordingly, have undertaken sector studies and established sector policy, both for national action and ODA cooperation. Most of the studies and policy deal with both water supply and sanitation and often also relate to other sectors, e.g. water resources, health, housing, urban and/or rural development.

Sector policy and development, and local conditions and needs, are among the parameters that must guide project planning and design. They must be studied carefully so as to avoid the project being planned and designed on the basis of expatriate criteria and perceptions. The parameters may include but are not limited to:

- Actual conditions and shortfalls in the sector:
  - Coverage by environmental sanitation on a per capita or area-wide basis;
  - Unserved and/or underserved population, its characteristics and distribution;
  - Type and physical conditions of existing systems and their operation and maintenance; and
  - Management and institutions.
- Related conditions and problems:
  - Public health;
  - Environmental conditions or standards to be met;
  - Water resources; and
  - Geology and hydrogeology.
- Existing sector priorities and programmes, and timeframes for action:
  - Projects already identified or under way in the area, and their timeframes;
  - Target groups; and
  - Other ODA activities in the area.
- Potentials and capacity in the sector:
  - The potential ability to pay, to assume functions in operation and maintenance, and for participation;
  - Resources available at the household, community and governmental levels; and
  - Local management capacity and management support from higher levels.
- Common constraints in the sector:

- Funds available for capital investment and for operation and maintenance;
- Institutions and management;
- Cost recovery; and
- Participation, management at the community and/or household levels.

- Sector principles:
  - Use of the most "appropriate" technology;
  - Integration with water supply, hygiene education and environmental protection; and
  - Coordination with other sectors.

- Policies:
  - Government *versus* community funding;
  - Government *versus* community management; and
  - Cost recovery.

8.3.4 The Basic Project Features

The basic project features will cover 11 items, at least; i.e. problems analysis, demand forecast, the beneficiaries, alternatives, time horizon, choice of technology, service levels, design standards, management, operation and maintenance, and participation.

Problem Analysis

The problem analysis will give answers to a wide gamut of questions regarding the technical, socio-economic and socio-cultural conditions which the project will specifically address.

The current status of environmental sanitation in the project area should be analyzed, together with the consequences arising therefrom, e.g. the impact on individual and public health, convenience, the environment, water-resources development, pollution of surface and

groundwater, the potential for social and economic development, infrastructure in the area, and — specifically — the impact on women and children.

The analysis should further cover the factors which may constrain the project, such as lack of awareness on the part of the beneficiaries of the benefits of the project, their ability and willingness to pay for it and to undertake operation and maintenance of facilities, the suitability of different technologies, community institutional aspects and organizational shortcomings, the existing legal framework regarding water resources and the environment, the availability of land, geology and hydrogeology, the capacity of surface, groundwater or ocean for the disposal of effluent or nightsoil, and potentials for the re-use of treated effluent.

Other problems to be analyzed include the availability of resources of all kinds, the role of the private sector in the area, and government and community structures and their interactions in the planning, implementation and maintenance of public works systems.

Demand Forecasts

The demand forecasts should be undertaken in terms of both the number of people in need of services and the amount of wastewater and residues to be expected. Consideration should be given to the actual availability of water supply in the area, the costs of sanitation and other local factors. Estimates should not be made by using standard figures, as is often done by expatriate Consultants. Forecasts for water-supply demand in the area should be taken into account or, if not available, approximated as part of the demand analysis.

The forecasts should also consider the influence on future sanitation demands of potential socio-economic developments in the area, technology, alternative service levels, project costs, the recurrent costs for operation and maintenance, and local traditions and perceptions.

The Beneficiaries

The target group or groups should be described in a historical, current and future perspective. Why was this population selected? How can demography be interpreted? What are the socio-economic and sociocultural characteristics? Are there any commercial, industrial and/or agricultural users who will benefit from the project (and might their needs pose any problems)? Which public utilities exist or may be built in the future? Which particular aspects relating to women and children must be taken into account? What is the income level and distribution? How much can people pay for sanitation within their own budgets? Are they ready to assume ownership? What are their perceptions with regard to environmental sanitation and how would different service levels and their respective costs affect their willingness to pay? What is the best arrangement for ensuring their participation in the planning, implementation, funding and operation and maintenance of services such as environmental sanitation, and what can be predicted in that respect?

Many of these questions cannot be answered without a thorough knowledge and deep understanding of the people in the community. Thus, expatriate Consultants will definitely need the cooperation of local Consultants.

Alternatives

In the investigation of alternative project designs, it is not sufficient to consider physical, topographic and financial parameters alone, as is customary in the planning of projects in many other sectors. Considerable weight must be given to the variables which impact on the performance of the project, its operation and maintenance and, ultimately, sustainability. These variables have been discussed in Chapters 5 through 7.

Technology will be of primary importance in investigating alternatives because of the fundamental differences between a traditional sewerage system (off-site disposal), the on-site disposal of graywater and nightsoil, and low-cost sewerage systems — or, perhaps, a combination. As pointed out in Chapter 4, on-site disposal is a valid alternative for environmental sanitation in many situations and is now considered a valid approach for Japanese ODA, provided that suitable financial and operational arrangements can be made — especially in rural and semi-and peri-urban areas. It is less costly on a per-capita basis than off-site systems. Off-site sanitation will continue to be a valid alternative, but it requires more capital investment per capita and is suitable mainly for central urban areas serving an economically better-off population. A combination of the two may be practical under certain conditions, especially for peri-urban areas, as exemplified in Annex 4. Whenever population density allows, especially in semi-urban low-income areas, the introduction of small-bore sewerage may be feasible, especially if combined with a traditional sewerage system and/or genuine on-site disposal.

In presenting alternative solutions, not only their technical and financial characteristics must be analyzed. Consider also the options regarding their management, with its socio-economic and socio-cultural implications, and the problems to be expected in operation and maintenance, and, ultimately, in sustainability.

Time Horizons

Unless this matter has already been decided in the context of preliminary negotiations between the recipient and the external support agency, the time horizons for projects in environmental sanitation should be analyzed on the basis of water supply development plans, demand forecasts, the likely urban or rural development, infrastructure requirements and other related factors. Important considerations are (i) the rapid changes in urban and town planning, and in the demography of developing countries, and (ii) the likelihood of transitions from one technology to another as these changes occur, i.e. from on-site disposal to low-cost sewerage and from there onwards to a fully fledged sewerage system.

Time horizons are also important considerations in the design of facilities for treatment of sewage prior to its discharge — into a body of water, into the surface, groundwater or sea — or, alternatively, prior to the re-use of treated effluent. In few cases should it be expected that a very high degree of sewage treatment must be attained in one step. Rather, the step-wise achievement of advance treatment will be the rule rather than the exception — in keeping with the step-wise implementation of the sewerage system itself, and in line with the gradual development of the institutional capacity for the operation of the sewage works. In other words, both the capacity and the degree of treatment of the sewage should be carefully phased.

Special study is needed as to how soon the circumstances of the projects might undergo changes such as those referred to above. Accordingly, the timing of investment and/or the economics of deferring investment to a later stage should be studied and assessed on that basis.

The time horizon of sanitation projects may be relatively short, and interim solutions may be fully acceptable. The traditional approach in the industrial countries of planning sewerage systems for 20 and more years is clearly not recommended, especially in semi- and peri-urban situations.

The Choice of Technology

The choice of technology is presented as a perennial challenge throughout most chapters of the present publication, and will not be reviewed in detail in the current Chapter. It suffices to recall that the actual project proposal should contain convincing information that the technology or technologies proposed are suitable after a careful study.

The implications of funding should not be considered the dominating factor in the planning of a project for environmental sanitation. However, when a project is prepared for subsequent funding by an ODA, the information of Chapter 8.3.1 needs to be paid very special attention with regard to the choice of technology, as do the following considerations:

- Loans must be repaid, and the lending institutions insist on dealing with a borrower who can ensure good technical and fiscal management as well as the project's sustainability. Systems using off-site technology can meet these requirements more easily than on-site systems, for which it may be difficult to identify a suitable borrower.

- House connections to off-site systems have been funded by ODA loans although ultimately they are the responsibility of the beneficiaries. Since off-site systems always have an identifiable borrower, the funding of house connections can be arranged through that borrower to the satisfaction of the lending institution. In contrast, in the case of on-site systems, the funding of the individual latrine or septic tank should always be considered the responsibility of the beneficiaries; yet

experience has shown that, often, the beneficiaries are unable to raise the capital, considering that this may equal the family's income of one month or even more; consequently, a number of models have been explored recently for providing capital loans to such families as well (see 8.3.1).

- In the case of Grant Aid, the funding of house connections and on-site systems is less difficult. However, the Consultants must present a technology which is nevertheless financially sound and sustainable.

Service Levels and Design Standards

The differences between the quality of the service of off-site *versus* on-site systems are obvious. Yet, within each of these two alternatives there is latitude for choosing service levels, and the flexibility is still greater in the case of transitional systems. The range of available service levels should be investigated and assessed in each case in terms of their cost, operation and maintenance requirements, the actual and future water supply, environmental protection and social acceptability.

Once the decision on service levels has been taken, design standards should be established and justified in the project proposal. The inflexible adoption of standards such as are published in many texts is not to be recommended. Many local factors need to be considered, e.g. the cost, location, depth and hydraulic characteristics of sewers and their minimum diameter and gradient under the conditions and expected changes in the project area, the type, local availability and/or production of materials and appurtenances, local methods of construction, the likelihood and consequences of inadequate operation and maintenance, the frequency and intensity of storms and floods, the likelihood of garbage and refuse being thrown into sewers, access of people, access of animals, the breeding of disease vectors and the propagation of other agents of disease.

A special case is the standard for the disposal of effluent from both on-site and off-site systems:

- On-site systems can meet only relatively low standards reliably unless high-tech design is applied, and operation and maintenance are of a high standard and monitored regularly (as is the case with some high-tech Japanese *Jokaso*). The potential pollution of underground water and nearby wells for water supply are genuine problems in all developing countries and must be studied carefully.

- Off-site sewage treatment can meet almost any effluent standard, theoretically, but in order to operate reliably and at reasonable costs the standards must be adapted to environmental requirements and the ability of the operator to ensure the proper functioning of the treatment plant. High-tech treatment processes are not normally recommended for developing countries because of their cost in foreign currency, frequent breakdowns, difficulties encountered in replacing malfunctioning equipment and purchasing spare parts. Alternative technologies are available, and should be investigated, e.g. oxidation ponds and lagooning (see Annex 4).

- If the re-use of treated effluent is proposed, strict adherence to the standards recommended by WHO for the safeguarding of public health and/or the environment should be considered obligatory.

Management: the Implementation Agency or Organization

The management of the proposed project is inextricably linked with governmental and community structures and capacity and managerial expertise should be carefully researched and fostered. In few cases will it be possible merely to base the project's management on what exists. Therefore, management will also be among the project-support measures discussed in Chapter 8.3.5. What follows are selected items requiring information and assessment when a project for environmental sanitation is presented for subsequent funding; other items should be added as appropriate:

- The distribution of functions and capacity between the agency or organization, on the one hand, and the different levels of government, the community, nongovernmental organizations, and the beneficiaries, on the other hand; and a strategy for their further development and interaction, including measures to fill existing gaps, with special attention to:
  - the mobilization of financial resources;
  - fiscal management;
  - operation and maintenance; and
  - participation of the beneficiaries.
- The resources available, including human resources, and an assessment of the way they are managed.
- The legislative and/or legal preconditions to make the management structure effective and the project as independent of subsidies as possible.
- The options for linking or merging the management of on-site and off-site sanitation.
- By the same token, the options and the pros and cons for linking or combining management with water supply and/or programmes or projects in other sectors, e.g. health, infrastructure, and/or regional development.
- Potential participation and the roles of NGOs and the private sector.
- The implications of the policies and other requirements of the cooperating ODAs and the best strategy to address them.

Operation and Maintenance (O&M)

O&M is part of management and is implicit in the discussion in the preceding paragraphs. Special matters to address include:

- Procedures for O&M, and the adequacy of managerial capacity and human resources and skills to implement them.
- Capacity building and human resources development for O&M.
- Users' participation, e.g. cost sharing or the maintenance of on-site units and off-site house connections, in keeping with health and environmental requirements.
- The funding of the recurrent costs of O&M, including replacements, spare parts, *etc.*

Participation

Every Project Study should include investigation into the roles to be played by the community and the beneficiaries, and how this participation can be brought about. The investigation itself should involve a multi-disciplinary team and may best be carried out in association with local Consultants, governmental and/or nongovernmental institutions. Based on the investigation, suitable project-support measures may be recommended to promote and ensure participation. Factors to be investigated and/or addressed include:

- Awareness by the community and the beneficiaries of the roles they should play.
- Contribution to the financing of the cost of the project in both money and kind.
- Participation in operation and maintenance.

More details are contained in Annex 5.

Logframe Presentation of the Project Proposal

In Chapter 6, the logframe methodology was reviewed. It analyses the overall goals of the project, its purpose, the activities undertaken and the results achieved. The methodology also calls for an analysis of the assumptions made by the planner, the indicators for measuring achievements, and for an assessment of the risks inherent in the project.

A logframe presentation should be a part of every project proposal. The presentation should cover all components of the project, both hardware and software. The presentation will demonstrate that the Consultants have studied and addressed all local factors that make a

project successful rather than having merely applied rule-of-thumb figures and variables found in textbooks, or solely relied on their experience within their own countries.

8.3.5 Project Support Measures to Ensure Performance and Sustainability

All projects must include software components which will support the projects' performance and sustainability. They should be planned as part of the project Development Study.

The supporting measures will address critical issues such as legal matters, policy, institutional development, operation and maintenance, cost recovery, the promotion of participation, general capacity building and information, as the case may require.

The Planning and Implementation of Project Support Measures (PSMs)

In Chapter 7, the case was presented that a project consisting of "hardware" alone will not be successful. It was pointed out that the hardware normally includes sewer pipes, tanks and ponds for the treatment of wastewater, septic tanks and latrines — depending on the technology chosen. The software — as the project-support measures are often called — addresses matters without which a project will fail to perform, such as the enabling laws and standards, policy, institutional development, operation and maintenance, financial planning and cost recovery, participation and capacity building.

The planning of the PSMs is just as serious a business as the planning of the hardware and must be given adequate time and money! In most cases, Consultants are contracted to elaborate the plans, and, in some cases, assist in their implementation

Only in few cases will the PSMs be funded as part of an ODA loan, although exceptionally this has happened. Most often, however, ODA grant money is made available either as part of a Grant Aid allocation or from Technical Cooperation funds (see Chapter 8.3.1). Each case will be different because the planning and implementation of the software is a project-specific matter, *par excellence*, and always requires special skills and a very country-specific approach.

The timing of the planning and implementation of project-support measures will require special attention as early as possible during the negotiations of the SOW. A choice must be made from among at least three scenarios:

- Some PSMs may be planned and implemented before the actual project-support study if the results are essential for the study itself. For instance, the participation of the beneficiaries in the planning process may need to be promoted quite some time before the study commences, as may other PSMs to provide health education to the beneficiaries, or to prepare them to participate in the choice of technology during the actual project Development Study. In such cases, the planning of the PSM may be the subject of a startup phase of the actual study or a preparatory activity, or even a separate project by itself.

- Many PSMs will be planned right at the beginning of the project Development Study and implemented as the study gets under way, e.g. PSMs for establishing financial accounting or for promoting and deciding on cost recovery. Such PSMs must be completed before the project is appraised, so that the potential funding agency can take their outcome into account when making the appraisal.

- Other PSMs may be planned in conjunction with the actual project Development Study but be implemented only after the project has been approved, e.g. a two-year programme for the strengthening of an existing institution or for the establishment of a new one, or a programme for the training of staff and building general capacity for subsequent O&M.

In this context, each project-support measure may be looked at as a small project itself — with an objective or objectives, activities, methods of implementation and a budget.

As pointed out before, the Consultants may not only be responsible for the planning of PSMs but also for their implementation. This will vary from case to case. The Consultants should always be responsible for identifying the PSMs prior to or during the Project Study unless this was already done during the negotiations of the TOR. The TOR must be very clear about this particular aspect.

The Consultants' role in the implementation of PSMs may be selective. But the Consultants should always be responsible whenever the outcome of a PSM is a precursor for some part or all of their work. It is incumbent on the sponsoring ODA, therefore, to include adequate funds in the budget for the preparation of the project, either as part of a loan or Grant Aid or from Technical Cooperation funds. Ample funds should be allocated to undertake the PSMs professionally. Further on in this publication, more will be said about the need for an association between the Consultants and local Consultants or institutions, with the aim of enhancing their capabilities to deal with the sociocultural aspects involved in many of the PSMs.

Under the following nine headings, different types of support measures are discussed. Overlaps with other sub-Chapters of Chapter 8 cannot be avoided because of the complex nature of the factors involved and the measures by which they may be addressed.

The Content of Project Support Measures

The following is intended to serve as examples rather than specific guidelines.

(1) **Law and standards**

The legal prerequisites for projects for environmental sanitation may include some or all, but are not necessarily limited to, the following; and, where they are lacking, they may be developed through a PSM in order to address:

- The rights and obligations of the owner of the dwelling regarding the on-site or off-site disposal of wastewater and nightsoil.
- The rights and obligations of the municipality and, as appropriate, private contractors for handling waste disposal.
- The establishment of rates and tariffs for environmental sanitation, and of other means for the recovery of costs by the municipality or a nongovernmental organization and/or private contractor.
- The discharge of wastewater and nightsoil into the environment.

Legal requirements may either be embodied in general public law or may be contained in enabling legislation, municipal codes, law or regulations pertaining to public, private or semi-private organizations for environmental sanitation, or they may be added to public health law or regulations — whatever suits the situation best.

Other types of standards may also be needed regarding technology and operation and maintenance, e.g. standards and/or standard designs for on-site facilities and their location, technical standards for sewerage systems and treatment works, and environmental standards for the discharge and re-use of effluent and/or graywater and sludge from on-site systems. Standards may be needed for charges for environmental sanitation and their equitable structuring — taking into account the problems of low-income populations in paying for sanitation. (See Annex 2)

(2) **Policy**

At the policy level, each country will choose a different approach and, depending on its administrative structure, will allocate responsibilities for sanitation to the central, regional or local levels, or to a combination thereof. Policy for environmental sanitation may be part of the country's overall policy, or it may be sector policy related to water supply and sanitation, or to water resources, health, public works, environment, infrastructure, housing or a combination among them. Policy may address a variety of subjects, and if one or several are still open to question, a PSM should develop suitable proposals, e.g. for:

- The funding and funding mechanisms (including subsidization, tax breaks, *etc.*) of environmental sanitation both off-site and on-site, including such fundamental matters as the funding of privately owned on-site units, or of house connections to a public or private sewerage system.

- The distribution of responsibilities for construction and operation and maintenance among the participants, i.e. the beneficiaries, the municipality, and/or various levels of government.

- The empowerment of communities to manage systems, with backup from higher levels of government.

- Cost recovery and, as appropriate, charges and tariffs to be levied on the beneficiaries, taking into account their income levels.

- Private sector roles.

(3) **Institutions, especially the implementing agency or organization**

Institutional development is high on the list of PSMs for projects for environmental sanitation in most developing countries. Existing institutions are often inadequate or responsibilities are not clearly defined, or there may be a multiplicity of overlapping responsibilities. Without effective institutions, projects cannot be promoted, planned, implemented and managed.

Consideration may be given to PSMs for:

- Making proposals for the tasks to be faced, the functions to be carried out, and the resources needed by the institution, in the context of the project proposed, with particular emphasis on the implementation agency or organization. .

- An assessment of existing institutional and managerial capacity for handling the project proposed, and on this basis the elaboration of proposals for establishing new institutions and/or mechanisms at the most suitable level, as appropriate.

- Assisting in the implementation of such proposals, including the drafting of by-laws, designing procedures, and assisting in the buildup of capacity to implement them.

- Making proposals for and undertaking training with respect to the supervision of and/or technical support to the beneficiaries in the discharge of their functions within the project.

- Making proposals and developing procedures for the licensing and supervision of private contractors, e.g. for local production and construction, and for the servicing of on-site systems and the disposal and re-use of effluent and/or treated nightsoil.

- Elaborating procedures and providing training with respect to the planning of extensions.

(4) Operation and maintenance

O&M is one of the most critical aspects of the management of sanitation projects both off-site and on-site. All parties must be involved, i.e. the beneficiaries, the implementing agency or organization, the municipality, and the appropriate government institutions at the local, regional or national levels.

The distribution of tasks between the parties is of particular interest in the design of a PSM. Naturally, off-site systems, with their more sophisticated technology, lend themselves to primary action by the implementing agencies, without precluding any action by the beneficiaries. On-site systems will normally be more suited to action performed by the beneficiaries themselves, since they will be the owners of the systems in many cases. Thus, in the design of PSMs for O&M, the following may be used as general guidelines (see also the discussion of participation under (6)):

- For the beneficiaries and/or owners, overall:
  - Information must be provided related to O&M requirements and to their own functions, with training supplied,
  - Supervisors from local and governmental organizations should supply technical support , including visits, and
  - Eventually, financial incentives need to be arranged;

  In the case of on-site systems:
  - Beneficiaries must be informed and trained in the specific requirements of operation and maintenance of on-site systems; and
  - Technical support must be provided.

  In the case of off-site systems:
  - beneficiaries must be informed, and training provided on the specific characteristics of off-site systems and their implications for O&M;
  - Technical support, supervision and monitoring should be supplied relative to the performance of the tasks the beneficiaries must perform.

  In both cases:

  - Dumping of garbage and other unsuitable materials into the system must be prevented.

- For the operating agency of off-site systems: information and training of agency personnel; building capacity for system inspection, O&M and replacement, laboratory analysis; establishing technical and management procedures and systems for record keeping; and establishing stores and the procedures to use and manage them — all with the aim of:

  - Establishing and keeping up-to-date inventories of all physical facilities.

  - Monitoring the conditions of house connections.

  - Monitoring the physical conditions of sewer pipes and appurtenances, and keeping them in good operating condition.

  - Keeping sewage treatment works in good operating condition.

  - Monitoring the performance of sewage treatment works and the disposal of residues, in keeping with health and environmental standards.

  - Timely replacement and/or renewal of parts and components of the system, and keeping stocks in adequate quantities.

  - Planning of repairs and rehabilitation of defective components.

- The strengthening or creation, as appropriate, of services for operation and maintenance, either as part of governmental or community structures, or as a private-sector service establishment.

- The strengthening or creation, as appropriate, of technical support capacity and structures to assist the community and/or the beneficiaries in the tasks they will assume for operation and maintenance.

(5) Cost recovery

A scheme for cost recovery is needed for all projects if only to recover the costs of operation and maintenance, irrespective of whether they are initially funded or partially funded by ODA loans or Grant Aid.

PSMs are needed in most cases, early during project planning and design, to:

- Study the willingness to pay.

- Elaborate proposals for equitable rates and tariffs covering the costs of operation and maintenance, at least.

- Promote the acceptance of rates and tariffs by the beneficiaries.

- Build capacity in the operating agency to apply and collect the charges in accordance with the rates and tariffs proposed.

- As applicable, develop proposals for funding and recovery of costs of on-site units for graywater and nightsoil disposal, and of house connections to off-site systems which may have been funded from project loans or Grant Aid.

(6) Participation of the beneficiaries

The experience gained during the International Drinking Water Supply and Sanitation Decade has demonstrated sufficiently that (i) all projects for environmental sanitation must involve the participation of the beneficiaries, and (ii) most projects must include a software component to promote, facilitate and bring about that participation. No uniform approach for the planning and implementation of this software component has been evolved, nor is the matter as yet fully researched. Indeed, the promotion and facilitation of participation is one of the thorniest subjects in the planning of all projects of environmental sanitation — for, basically, four reasons:

- The beneficiaries are not aware of the negative impact of environmental sanitation on individual and/or public health, and thus are reluctant to participate.

- They give environmental sanitation a lower priority in their family budgets than other basic services, including drinking water supply.

- The high cost of off-site disposal.

- In the case of on-site systems, the reluctance of the beneficiaries to invest money themselves for the construction and maintenance of the required facility.

There is a general agreement that participation is a "must" in rural areas where on-site systems are the "appropriate technology", because experience abounds that in such cases local or governmental organizations are unable to successfully cope with either construction or with maintenance of the hardware.

This is less clear, however, in the case of urban areas and off-site systems; these, it is generally believed, should be the responsibility of the local or governmental organizations because of their technical complexity and managerial and financial requirements. This view is not correct, however; the successful construction and O&M of off-site systems also depend on the participation of the beneficiaries, although of a different kind. The parameters

of this kind of participation are still to be worked out through study, research and experimentation.

Thus, for the promotion of participation, all projects for environmental sanitation should include PSMs. The content of the PSMs must fit the specific target groups. On the one hand, there are no general suggestions as regards their content, but there are guidelines for undertaking the social studies which will provide the basic information for designing the PSMs (see also Annex 5). On the other hand, there is agreement that the PSMs should help to achieve the following objectives:

- They must raise the level of understanding of environmental health and of the prevention of communicable diseases through health education. In this context, health education should not be looked upon as an end in itself. On the contrary, health education should, ultimately, raise the level of motivation of the beneficiaries, especially of the women, who have the key role within the family in matters of health and of environment generally. Thus, health education should first promote hygienic behaviour at the level of the individual and the family, then in the environmental care of the neighborhood; eventually, it must facilitate participation — along with other members of the community — in the planning and implementation of a programme or project for sanitation.

  It must be borne in mind that it is women who are responsible for the upbringing of children, including their hygienic habits. However, women also do all of the cooking, cleaning and laundry; and, as well, in many countries they do much of the farming and other manual labour — all this in addition to their reproductive role. Their workload is crushing, their health strained or failing, and so finding the time and energy for hygienic training of each of many children is not at all an easy matter. Any provision of amenities that will lighten their workloads rather than increase them, or improve the state of their health, will increase their willingness or even ability to provide improved hygienic training. Motivation by itself only goes so far and no further; time and energy are essential requirements.

- In particular, PSMs must provide information on the health problems associated with inadequate sanitation, and on the benefits that can be derived from improved sanitation.

- Information on technological options available for the programme or project should be made available. The objective would be to assure acceptance of the technological option chosen for the project, thus encouraging participation.

- The PSMs must identify the roles of the beneficiaries. Often, participation in kind is proposed as the best form of participation. For instance, participation in the construction of latrines and small sewer lines qualifies as such, and is often

considered essential in the case of village on-site systems. However, this is not enough for either on-site or off-site systems.

In the case of on-site systems, participation may indeed involve contributions in kind during construction. But to keep the system in good operation condition, the beneficiaries — often the owners — must also accept responsibility for the regular servicing and eventual replacement of the system, at their own expense.

For off-site systems, participation may also involve contributions in kind, e.g. during construction and in keeping house connections in good order. Normally, however, the beneficiaries accept having to pay their share in funding the cost of the system both as regards the initial costs of construction and of O&M.

- The PSMs must provide information on the initial and recurrent cost of the facilities and how they are to be funded. Here, the objective is to raise the level of understanding of the cost of environmental sanitation, with a view to promoting acceptance of the principles of cost recovery and cost sharing by the beneficiaries. This should be done in accordance with one of the methods exhibited in Annex 6.

- Participation must be organized. Most forms of it need support from a community and/or nongovernmental support structure, or perhaps from a governmental structure. The PSMs should indicate and promote the most suitable participation design in accordance with the local conditions.

(7) Local production of equipment and material

The local production of sewer pipes and appurtenances, septic tanks, latrines and soak-away components is highly desirable in the context of projects for environmental sanitation — if feasible — and also pumps, electrical and construction equipment. Possibilities should be explored during the Project Study and, if appropriate, suitable PSMs should be planned and/or carried out to facilitate local production, e.g.:

- Feasibility studies.

- Technical advice, planning of production, and preparation of funding proposals.

- Marketing assistance.

(8) General capacity building

In connection with all of the seven items presented above, the following may be suitable PSMs at both the institutional and the community levels:

- The training of technicians at all levels, focusing on operation and maintenance, general and fiscal management, supervision and technical support from local, regional or national governmental organizations, public information and health education.

- Capacity building at the levels of the community and governmental institutions, with special attention to:

  - Information.

  - The general lack of human resources.

- Proposals and assistance in their implementation, with a view to enhancing empowerment and devolution to the lowest possible level; and for accompanying policy and technical advice from the relevant government organizations.

(9) Information

Information is needed to support the planning and design of the project as well as its operation and maintenance, future extensions and evaluation. Most of the information bases are inadequate or nonexisting. The buildup of information and/or the creation of essential information bases are highly relevant subjects for PSMs, covering, e.g:

- Basic information on the status of environmental sanitation (and of water supply) in the project area.

- Demographic information, including the composition of individual households.

- Health related information, especially on infant morbidity and mortality, housing, hygiene, food hygiene and vectors and vector-borne diseases.

- Behavioral information, especially on personal hygiene, individual environmental care, health and environmental priorities, perceptions regarding ownership, and the willingness to pay.

- Information on locally available materials and on private sector potentials.

8.3.6 Costs, Economic and Financial Aspects, and Proposal for Funding

Good financial planning begins with the estimation of the capital **and** recurrent costs, and the costs of PSMs.

Other factors to be considered are the requirements of the ODAs and the quality of fiscal management by the implementation agency or organization.

The next step will always be a financial analysis and the elaboration of a proposal for cost recovery.

Finally, a proposal for the funding of the project can be prepared.

Capital Costs

There is no need to stress that every project proposal must be accompanied by an estimation of its costs. This is accepted engineering practice in all fields, not just environmental sanitation. To make a reasonably precise estimate, Consultants develop the project to the stage of preliminary engineering design. The estimate will take into account:

- Local unit costs of construction,
- The cost of materials and equipment locally available, and
- The foreign exchange needed to purchase materials and equipment not locally available.

The estimate is always broken down into labor and capital requirements, and the latter into local and foreign currency, and in accordance with the potential sources of funding.

Recurrent Costs

It is also standard engineering practice to estimate recurrent costs for all projects, including:

- Capital charges and amortization, depending on the funding scheme proposed.
- Costs of operation and maintenance broken down into:
  - Labor;

- Energy, chemicals, etc;
- Costs of "normal" replacements; and
- Reserve, for extending services within the time horizon of the project.

Costs of Project Support Measures

Contrary to the practice in many industrialized countries (for valid reasons which do not need to be discussed here), the estimation of costs of the project should include the cost of the PSMs discussed in Chapter 8.3.5.

ODA Requirements

Projects proposed for ODA assistance should be accompanied by information which the potential funding agency or agencies need for their appraisal (see Annex 6). Especially for projects proposed for ODA loans, the Consultants must produce data as discussed below. Grant Aid projects should also meet sound economic and financial requirements, although the depth of the analysis of the projects may be relaxed by the funding agency for the sake of expediency. Whenever Technical Cooperation Funds are sought, the need for analysis will be further relaxed, although the proposal will always be accompanied by the rationale, and by an analysis of the expected outcome and impact of the proposed activities, especially if PSMs are proposed.

The information assembled by the Consultants in the case of ODA loans will normally include:

- Is the project the least cost (total costs) alternative to attain the objectives?
- Income and expenditure; the financial plan and its reliability; sources and application of funds.
- The internal rate of return.
- The cost/benefit and cost/effectiveness ratios in terms of social opportunity costs.
- The discounted present value of benefits.

All of the above should be dealt with on a quantitative basis. This is certainly so with respect to the capital and the recurrent costs of the project itself. If some of the other information cannot be presented in fully quantitative terms for lack of information, qualitative analysis may be accepted as a substitute; however, it must be presented in the depth and detail needed for the appraisal of the project by the funding agency.

The funding of individual on-site units or house connections needs special attention if an ODA loan or Grant Aid may be involved. ODA policy may stipulate that all or most of the cost be borne by the beneficiaries. Yet, some ODAs now accept the financing of such items through short-term credits to the beneficiaries, funded by ODA loans or Grant Aid. In such cases, a governmental or a local nongovernmental institution or some sort of credit union may be established and given the responsibility for the re-lending and recovery of the funds. In the case of Grant Aid, a successful model channeled the recovered funds into a revolving fund. This fund may then be used to finance project extensions by essentially the same method or to put the project or programme on a continuing long-term basis.

Fiscal Management

The fiscal management of a project is always a critical issue, and projects receiving ODA funds will be scrutinized with a view to assessing the capacity of the implementation agency or organization to ensure the handling, application and recovery, and, as appropriate, repayment of the funds. Table 1 of Annex 6 exhibits some of the common errors in fiscal management which may be considered in the assessment, in addition to the following questions:

- Is the legal status of the implementation agency or organization compatible with the task to be fulfilled?
- Is it, especially, authorized to take and manage a loan and/or Grant Aid, make decisions regarding cost recovery, and on-lend money, as appropriate?
- Are the management structure and its capacity (including human resources) and the management procedures adequate?
- How is the implementation agency or organization and its fiscal management supervised?

Fiscal management by the potential implementation agency or organization will not be found satisfactory in many cases. In such instances, a suitable PSM may be identified and proposed (see also item (8) in Chapter 8.3.5).

Financial Analysis and Cost Recovery

All projects funded by an ODA loan and/or Grant Aid will undergo financial analysis. There are many procedures for this analysis, and the method used for a specific project will ultimately depend on the requirements of the potential funding agency or agencies. Some examples are summarized in Annex 7. General information regarding the financial analysis of projects for environmental sanitation (and water supply) is exhibited in Annex 6.

Cost recovery is partly a matter of governmental and/or ODA policy, and partly a financial and social issue. Many governments and most ODAs have opted for full cost recovery as a principle in the long run, but have also stipulated that partial recovery may be acceptable as a temporary approach, in which case the costs of operation and maintenance should always be recovered, even if Grant Aid is involved. If individual households receive credits for on-site sanitation or house connections (see previous item), they obviously must amortize the funds over a rather limited number of years (perhaps five).

Cost recovery can be achieved through a variety of techniques, foremost user charges, rates and tariffs. Social cross-subsidization maybe a matter of policy. In any case, the Consultants should propose the most appropriate scheme, taking into account, e.g.:

- The ability of the beneficiaries to pay, and the appropriateness of the charges.
- Impact and feasibility with respect to low-income groups.
- Compatibility with the financial plan for the project and the forecasts of income and expenditure.
- Compatibility with perceptions.
- Institutional capacity to manage cost recovery.

Funding Proposal

In the financial analysis of the project, the sources and the application of funds must be clearly exhibited (see Annex 7, Table 6). At this stage, a funding proposal should be developed concurrently with the analysis. It is important that this task is not deferred until the end of the Project Study. Consultations about the possible sources of funding should start as early as possible between the recipient and the ODA sponsoring the study. During the course of the study, potential funding agencies should already be approached, so that the Consultants and the recipient can investigate alternative funding proposals. In any case, a funding proposal should be part of every project proposed, and should be presented and rationalized as part of the information in the Consultants' Project Study report.

8.3.7 Implementation

In the implementation of projects for environmental sanitation, delays — originating in site factors, software activities, participation and interagency cooperation — are likely to be encountered and should be anticipated.

Consulting engineers are very familiar with the planning of project implementation, although, in the case of environmental sanitation, several special aspects must be considered. The implementation plan should include a set of organizational and implementation procedures covering the interaction and interrelationships with, and the responsibilities of, respectively, the external Consultants, local Consultants, the governmental and nongovernmental organizations involved, the contractor(s) and suppliers and importers of material and equipment. Some of the specific factors which may impinge on the implementation of projects for environmental sanitation involve:

- The interaction and procedures involving the beneficiaries, especially if they need to consent to access to their premises (when house connections are laid), if they are party to activities concerning them (e.g. information programmes), or if they are party to the implementation of hardware components of the project.

- Along the same lines, interaction and procedures with local leaders, and the local representative(s) of the recipients.

- Interaction and procedures involving other governmental organizations, e.g. environment agencies or those responsible for water supply, water resources, health, housing, infrastructure.

Hardware Components

Quite generally, the implementation plans for the hardware components of a project will cover but are not limited to:

- Construction plans and work schedules for each project component and for the project as a whole.

- The timely manufacture of equipment and materials which can be produced locally, e.g. pipes, septic tanks and other equipment for on-site disposal, pumps, and electrical equipment.

- The timely supply of imported material and equipment.

Consideration of Site Factors

For the implementation of hardware components, a number of site factors come into play, e.g.:

- Allowances for the construction of on-site and off-site systems in densely settled areas (e.g. in semi- and peri-urban areas) where access may be difficult for mechanized construction equipment and for the transport of larger diameter pipes, septic tanks, *etc.*

- Allowance for the timing of local production of new types of larger diameter pipes and on-site disposal units, including the supervision of production and the certification of the products.

- Sewage treatment works and facilities for the deposition of sludge from on-site systems may not be well known to local contractors; they may involve unknown construction technologies.

- In some cases, ocean disposal of effluent may be proposed, and the construction technology may be quite new.

Software

The implementation of software components may be rather complex. Delays may occur in the implementation of each individual component itself, but also the timing *vis-à-vis* other software components, and the hardware components themselves. Special allowances may be made in the TOR, though it would always be incumbent on the Consultants, in consultation with the recipient, to monitor the implementation of the software and to adjust timetables. The delays may be due to:

- Time-consuming procedures whenever policy matters are being touched upon, e.g. in the case of institutional development, law and standards, cost recovery *etc.* There may be long delays during project implementation in obtaining agreement to proceed further.

- Along the same lines, allowance may need to be made whenever implementation depends on the participation of the beneficiaries, e.g. in laying house connections or building on-site facilities; and also whenever the education and motivation of the beneficiaries are involved. The time needed to implement this type of software component, and the impact on the implementation schedule of the project, may be large.

- Along the same lines, the training of operating staff during the construction of the facilities may be more time consuming than expected.

- The implementation of many software components will require the participation of local Consultants, especially when policy matters are involved and when the implementation depends on the participation of local and community organizations. The foreign Consultants may not be able to control the resulting delays.

8.3.8 Expected Impact of Projects for Environmental Sanitation

> The Consultants will be responsible for assessing the expected impact of the projects in terms of, at a minimum, (i) health, (ii) the socio-economic and (iii) sociocultural conditions, (iv) future development in the sector, and (v) the environment.

The Consultants should prepare impact assessments with respect to each of the five items listed in the Box, in quantitative terms. However, under the real-life conditions of many projects, qualitative analysis may be substituted due to a lack of quantitative information. The Consultants should endeavor to make valid judgements of the impact, and also make suggestions as to the kind of data that should be assembled during the project's operation, for subsequent review of the project's performance and for post-evaluation.

Health Impact

- Of primary interest is the reduction in infant mortality and morbidity due to diarrhoeal diseases, as will be seen from Annex 1. Other positive health impacts may also be expected.

- Attention should be given to the synergistic effects resulting from conditions and/or improvements with respect to drinking water supply, general cleanliness, the removal of solid waste, stopping the breeding and propagation of flies and disease vectors, and enhancing food safety and general conditions of housing.

Socio-economic Impact

- A specific estimate should be made of the cost/benefit distribution among the target groups within the project area. Of particular interest are the cost-and-benefit implications for low-income groups and how these groups fare in comparison with other groups.

- A more general assessment should be presented of the impact on poverty, and also on the productive capacity of the target groups served by the project. The logframe analysis proposed in Chapter 6.3.4 should be taken into account.

- What is the impact on the private sector?

Sociocultural Impact

Under this heading, four assessments should be made:

- What changes in perceptions have taken place during the preparation of the project and what can be expected during implementation and subsequent operation?
- How has participation evolved and how may it evolve further during the operation of the project?
- What will be the potential impact on empowerment, good governance, and women in development?
- What impact is expected regarding vulnerable groups, especially women and children?

Expected Impact on Future Developments in the Sector

- A first assessment would address the lessons learned during the planning and design of the project and how they may be used in planning sector programmes in the future, including those for the improvement of water supply, solid wastes management, and other measures to improve general environmental hygiene.
- How is the project expected to promote replicability?
- What is the impact on the financial situation of the sector and the sector organization?
- What has been learned regarding the beneficiaries' willingness to pay for sanitation and how will this influence cost recovery in the sector as a whole?
- What is the impact on participation in the sector, including the planning for water supply and wastes management?
- How will the project contribute to private sector involvement in the sector?

Environmental Impact

Environmental assessment is normally a mechanism for avoiding a negative environmental impact due to development projects. However, all projects for environmental sanitation should make a positive environmental impact as well — be proactive. Thus, the assessment of the environmental impact should cover:

- The positive impacts on the immediate environment in which people live, and also on the general environment — by virtue of retaining pollution which hitherto has been discharged into the environment.

- The avoidance of negative impacts such as the pollution of groundwater, drinking water sources, rivers and costal areas, and the other environmental impacts covered in the ODA guidelines for environmental impact assessment.

8.3.9 Risks

No project is without risk even if careful attention is paid to the possible risk factors during its planning and design. The risks should be identified and assessed and the options to reduce and/or prevent them studied and proposed by the Consultants. Risks may pertain to the objectives of the project, design criteria and standards, financial forecasts, implementation, O&M, and side effects. Besides the assessment of such specific risks, an overall assessment should address the severity and preventability of the risks and suggest means of coping with them.

Projects may fail for many reasons. Most frequently, projects aimed too high, operation and maintenance was insufficient, or the finances and their management were inadequate. Often, the lack of authority of the implementing agency or organization is at the root of the problem. Under the following seven headings, the most essential factors are listed that have frequently contributed to the failure of projects in the past.

Achieving the Objectives of the Project

Objectives of the project may not be achieved for many reasons, e.g.:

- Assumptions have been overly optimistic.
- Planning and design errors.
- Inadequacy of software components.
- Inadequacy of basic data.

Design Criteria and Standards

Many risks may be associated with design criteria and standards. The following can only be indicative:

- The amounts of graywater or sewage forecasted were too high. Water consumption did not grow as fast as expected.

- The number of house connections laid-on increased at a slower rate than expected.
- Technical design criteria may prove less than optimal under the conditions in the project area in terms of cost, operation and maintenance, and/or acceptability.

Financial

Cost recovery is a main concern and will always involve risks, e.g.:

- The willingness of the beneficiaries to pay for sanitation has been overestimated.
- The operating agency lacks capacity to collect charges.
- Some of the cost recovered may be diverted for other purposes.

Implementation

All of the factors reviewed in sub-Chapter 8.3.7 involve risks which must be assessed. Other factors include:

- Overruns in costs in both local and foreign currency.
- Delays in implementation because of technical, organizational and managerial factors.
- Departures from design during implementation.

Operation and Maintenance

All factors considered in sub-Chapters 8.3.3 and 4 involve risks, either technical in nature, or involving aspects of budget, management, organization, staffing for O&M, breakdowns, lack of spare parts and many others. Examples of critical bottlenecks are the irregular desludging of on-site systems, leaking septic tanks, poor maintenance of house connections to off-site systems, inadequate cleansing of sewers and appurtenances, unsanitary tipping stations for nightsoil, the re-use of effluent and ocean disposal.

Side Effects

Side effects may be environmental, sociocultural and/or organizational, e.g.:

- Negative impacts on the environment due to effluent of on-site and off-site disposal.
- Risks associated with the re-use of nightsoil and treated effluent.

- Sociocultural risks, e.g. nuisances in neighborhoods.
- Disease outbreaks whether or not actually caused by the project, e.g. a suspected connection with tipping stations for nightsoil, the re-use or the ocean disposal of effluent.
- Complaints or interference by other sectors or sector projects.

Overall Assessment

Each risk should be appraised as regards:

- Severity, e.g. low, medium or high.
- Preventability, e.g. high, medium or low (or even none).
- Means to cope with the risks, e.g.:
  - during planning and design of the project;
  - during implementation and/or operation.

9

The Management of Project Studies

There are two objectives in the management of project studies in international cooperation — the management of the whole process by the ODA, and the management of the work undertaken in the recipient country by the recipient and the Consultants themselves. The two management functions are interdependent, must compliment each other, and are no less important than the quality of the study itself. In devising effective management, the following aspects must be addressed, i.e.:

- The ODA and the recipient negotiate the SOW and TOR and agree on the objectives of the project and the study, including its cost, funding and budgeting. The ODA selects and supervises the Consultants in consultation with the recipient, as appropriate.
- The recipient links the study to subsequent investment decisions, with the participation of the ODA, as appropriate.
- The Consultants and the recipient ensure that the study will be a participatory process and involve all parties. They further arrange coordination and cooperation with other studies undertaken in the project area and/or in the environmental sanitation sector.

9.1 Japanese Experience

> Flexible and effective Project Study management is promoted by JICA, mainly by enhancing the authority and management ability of the study team.

Many parties participate in a Project Study, and their respective functions and responsibilities, their interactions during the whole of the process, and their management of each step all need careful attention. Japanese Project Study management, especially in the past, tended to focus on the technical aspects and the coordination of the Japanese team, whereas the coordination of the interactions with any other participating party was usually vested in the recipient. The current management process aims to avoid:

- Possible misunderstandings and misperceptions.
- Expectations on the part of both the recipient and the ODA which cannot be fulfilled.
- Lack of cooperation by the executive organization, local government, and/or the people in the target area.
- Social and cultural misjudgments.
- Inconclusive results, leading to a lack of followup investment.
- Delays, and over-runs in the costs of the study.
- Adverse repercussions within the ODA/recipient relationship resulting from any of the above.

JICA adopted the following approaches principally to avoid these problems:

- Clear and convincing procedures must be established for the study and for the evaluation and implementation of the project, and the agreement of every participant is to be obtained regarding the study, and the project, through the SOW.
- The TOR is to stipulate that the Consultants must coordinate their work with all of the concerned parties, not only the Consultants' Project Manager, but also all staff of the other involved parties.
- In the case of complex and difficult studies, the Consultants' Project Manager concentrates on management tasks, whereas Sub-project Managers are assigned the usual technical tasks, e.g. study coordination, report writing, technical advice to the project staff, *etc.*
- Communication among all concerned parties is promoted through tools such as TV and radio programmes, videos, brochures with graphics and text, and newsletters.
- To avoid cost over-runs, the selection of the Consultants is based on the technical proposal they are requested to submit, on their overall ability, and on the composition of their staff. The total fee requested will be considered only whenever the two best proposals are of the same quality, or if the best proposal is substantially more expensive than the second.

Good management of project studies will anticipate and cope with the risks inherent in every Project Study supported by an ODA in a developing country. Past experience is monitored by JICA and used with the view of adapting procedures to changing conditions.

9.2 Experience of Other Aid Organizations

Before agreement is reached to undertake a Project Study, in-depth and detailed discussions take place with the recipient, and the responsibilities of each of the participating parties are carefully delineated.

The selection of the Consultants is based on the technical quality of their proposals.

Monitoring of the Project Study and linking it with followup investment are of particular concern.

9.2.1 The Preparatory Process

In-depth discussions take place with the recipient before a Project Study is agreed upon. This is often a time-consuming process and may involve several missions to the country to review and discuss, *inter alia*, sector policies and needs, the relationship of the proposed project to other projects, the country's development priorities and programmes, and whether or not preliminary studies are still needed before the Project Study. By the time the SOW is approved, all parties involved will have a good understanding of the objectives, and of the depth of the studies and investigations to be undertaken. They will also have agreed upon the distribution of responsibilities among themselves, coordination with other agencies both national and external, and with the potential funding agency or agencies.

9.2.2 The Selection of the Consultants

Only exceptionally are studies contracted without a call for a limited number of competitive technical and financial proposals from a number of short-listed Consultants. The selection of the best proposal is based on its technical content and the qualifications of the Consultants' staff assigned to the study. The price attached to each proposal is considered if two proposals are of equal quality otherwise.

9.2.3 Responsibilities

A clearly defined role for the recipient is considered to be essential in the management of the study, although the other organizations retain controls to ensure that the studies are still compatible with their own development goals and sectoral policies. The recipient's role may relate to drafting the TOR, short-listing and inviting Consultants to submit proposals, and contracting and supervising the Consultants selected.

The organizations approve the TOR and may *de facto* write them; they analyse or approve the estimation of the cost of the study, and approve the invitation to submit proposals, which the recipient then issues.

The organizations also:

- Review, comment upon (as appropriate) and approve the recipient's analysis of the proposals received and their suggestions for the selection of the winning proposal. In so doing, they may not only express views but may ask for clarification and/or additional information from the recipient, if the case so warrants;

- Approve, where the recipient is involved in the drafting, the contract with the selected Consultants, including the plan of work, the conditions of payments, reporting schedules, and the procedure for the acceptance of the Consultants' final report and project proposals; and

- Receive copies of all reports submitted by the Consultants in draft form — they are normally addressed to the recipients — together with the recipients' comments thereon.

9.2.4 Monitoring

Most of the other organizations independently monitor the study on-site. A senior technical staff member of the organization, often an engineer, is designated as Project Officer by many of the organizations, and given a large degree of authority in the discharge of this function. The Project Officer proposes whether/when to intervene and to what degree other specialized staff of the organization (e.g. economists, financial analysts or social scientists) or outside specialists should be involved in the monitoring of the study.

9.2.5 Followup Investment

Linking project studies with subsequent investment decisions is an important concern of all of the other organizations. Special arrangements are made for the participation of the potential funding agency or agencies in the preparation of the TOR and the short-listing of the Consultants, and in the monitoring of the progress and outcome of the study.

9.3 Discussion

Cooperation between all parties involved in the study is essential.

The SOW and TOR require special attention during the preparatory phase of the study.

The costing of the study is based on the TOR. For the selection of the Consultants, a wide gamut of technical and managerial information is required.

The participation of the potential funding agencies is desirable at important stages during the study.

9.3.1 Cooperation Between the Parties Involved

Close cooperation between the beneficiaries, the recipient, the ODA and their Consultants, and the potential funding agency or agencies will:

- Establish the mutual trust required to study and address the needs for environmental sanitation at the levels of the family, the neighborhood, and the community.
- Facilitate decision-making with respect to the choice of technology and the financial and managerial responsibility of each party during implementation and subsequent operation and maintenance.
- Facilitate "learning by doing" — especially as regards the broad implications of environmental sanitation for the family and the community, but also for the local and national government sectors and institutions involved.

Among the major roles which might be played by each participant, the following cannot be more than a general framework, since each ODA will follow its own procedures:

The beneficiaries: They are consulted during the negotiation of the SOW and participate from the early phases of the study, especially as concerns the basic features of the project, the design criteria and, of course, all studies and investigation involving themselves.

The recipients: Their role in the overall management of the study is important from many points of view, e.g. ensuring compatibility with existing policy and procedures, making the best use of their

experience, providing training and learning experience, laying the groundwork for followup after the completion of the study, and for promoting the sustainability of the project. In this spirit, the recipient will contribute to the SOW and TOR, and be involved during the planning of the work of the Consultants and throughout the implementation of the study. This involvement will also indicate whether or not the management capacity of the recipients is adequate or might be enhanced by the addition of suitable measures for capacity building during the course of the Project Study.

The recipients are also responsible for providing input on the part of the government, the community and the individual in terms of baseline data, local studies, counterpart funding, materials and equipment, and human resources. They are further responsible for arranging coordination and cooperation within the sector and with other sectors, and they take part in monitoring the project, together with the ODA.

The ODA: The ODA decides on its input into the SOW and TOR. It has the final responsibility for the short-listing, selection and contracting of the Consultants and for their supervision during consultation with the recipient, as appropriate. The ODA monitors the Project Study and arranges coordination and cooperation with other ODAs and the agency or agencies likely to fund the implementation of the project.

The potential funding agencies: They may be consulted during the process of selecting the Consultants, as appropriate, and may wish to participate in the monitoring of the study.

9.3.2 During the Preparatory Phase

SOW

Each ODA will follow its own policy in formulating the SOW. Since the SOW lays the ground for the Project Study, it should be detailed. A well-formulated SOW will facilitate the drafting of the TOR, help avoid misunderstandings during the course of the study and, accordingly, help avoid subsequent disappointments on the part of either the recipients or the ODA itself. Therefore, special studies and investigations, and subjects requiring research, should be identified in the SOW — as well as, of course, the type of technical, financial and managerial recommendations expected from the Consultants. It is also important that the

SOW lists the contributions to be made by each participant, the distribution of their roles during the study, and the strategies for the study's implementation.

TOR

The TOR will be the basic document for the work of the Consultants. It is advantageous to make it part of their contracts. The TOR are formulated in consultation with the recipient, and in a language which they share. That way there is prior agreement as to the scope and depth of the work of the Consultants, and a well-written TOR will facilitate later implementation. The TOR should include the details needed by the Consultants to prepare proposals, plans of work and staffing charts for study, while leaving them considerable flexibility to exhibit their technical approaches and management procedures. Further, the TOR should set out payment procedures in both local and foreign currency, and list any other requirements on which the ODA will base its selection. Thus, it is a responsibility of the ODA to prepare a tailor-made TOR in accordance with the objectives and scope of each specific Project Study. The use of standard TOR is not recommended, nor is it useful to overload the TOR with administrative matters that might better be placed in the more prosaic sections of the Consultants' contracts. As can be seen, the elaboration of the TOR is a professional task.

9.3.3 Costing, Funding and Budgeting of the Project Study

Each Project Study is costed on its own merits. Basic parameters for the estimation of the costs in both local and foreign currency are:

- The TOR.
- The personnel and time required to complete the study.
- Equipment and supplies.
- Sub-contracts, e.g. for research or supplementary investigations.
- Home office support to field activities.
- General overhead.

Costing may need to be adapted to the method of funding of the study.

On the basis of the estimate, the budget for the study can be established. Normally, it exhibits a balance between the ODA contribution and the contribution of the recipient — covering, as appropriate, cash contributions, equipment and materials, data and information, studies and research, and human-resource inputs.

9.3.4 Information for the Selection of Consultants

With few exceptions, the selection takes place on the basis of proposals from a limited number of short-listed firms. In the short-listing, the following information is taken into account:

- Overseas experience of the Consultants in environmental sanitation.
- Ability of the Consultants to apply the multi-disciplinary approach needed for planning and designing projects for environmental sanitation.
- Ability to deal with the socio-economic and sociocultural aspects of the Project Study.
- Ability to respond to the requirements of the potential funding agency or agencies.
- Ability to cooperate with the beneficiaries in the spirit of participatory planning.
- Ability to associate with local Consultants and institutions.
- Qualifications of the Consultants' senior technical and managerial staff.

Based on the TOR, the short-listed Consultants are invited to submit a technical proposal which would exhibit, e.g.:

- The Consultants' experience with similar studies for similar projects for environmental sanitation.
- A full understanding of the TOR.
- The professional approach required to implement the TOR with thorough attention to all aspects of the project.
- The management plan of the Consultants, including explicit responsibilities of their local and home-office staff and senior officers, arrangements for home-office support, and managerial arrangements *vis-à-vis* local Consultants.
- The plan of work and a timetable, including distribution of work between the field level and the home office.
- Proposals for association with local Consultants or institutions.
- Staffing of each component of the study both at the field level and at the Consultants' home office, with an indication of staff time allocated to each component and the qualifications of each staff member involved.

- The Consultants' internal management of the study, including home office and senior specialist backup to the field.
- Reporting.
- The total fee.

The selection is made on a technical basis rather than on the price of the proposal.

9.3.5 Monitoring, Evaluation and Appraisal

Good management of the project studies and their subsequent appraisal by the potential funding agency call for effective monitoring and evaluation. Plans for this phase should be made when the SOW is negotiated with the recipient.

Monitoring and evaluation of the study will relate to the objectives of the project and will be facilitated by the logframe analysis that has been discussed in Chapter 6.3.4. The logframe matrix should always be the basis for designing the content and process of monitoring and evaluation. By the same token, the criteria for subsequent appraisal of the project by the prospective funding agency or agencies should further guide the design.

A desirable approach might be:

- Monitoring and evaluation should always be undertaken with professional participation as regards the technical aspects of the study and its management.
- A useful model is the appointment of a panel of specialists who will regularly visit the study both in the field and at the consultant's home office, as appropriate, together with staff from the sponsoring aid organization. They will report to both the recipient and the sponsor, especially for larger projects. The participation of international specialists is appropriate whenever the subsequent funding of the project involves international funding institutions.
- Clear TOR for the panel are required for each case, and members must be fully conversant with ODA policy and the criteria used by the potential funding agency or agencies.

9.3.6 Linking the Study with Technical Cooperation and Subsequent Investment Decisions

Possible linkages of the study with Technical Cooperation is important, as discussed in Chapter 8.3.1.

The Project Study should lead to followup investment. As exhibited in Chapters 4 through 8, this calls for innovative approaches. To reduce the risks for misjudgements, it is advantageous to "touch base" with the potential funding agency or agencies at certain critical points, such as during the preparation of the TOR, in the short-listing of Consultants, and in the periodic monitoring and review of the Project Study and the Consultants' final reports.

The ODA and the recipient therefore explore — as early as possible — which agency or agencies are likely to fund the project, and ascertain their willingness to participate during the Project Study in the manner indicated above — without commitment at that time, of course.

Annexes

Annex 1[1]

Environmental Sanitation and Health

1.1 Water-related Disease(s)

It is said that the biggest threat to public health is poor environmental sanitation. This is supported by the fact that the incidence of infectious and parasitic diseases is lower in the industrial countries compared to the developing countries because of the generally improved conditions of sanitation and hygiene.

Of the estimated 51 million deaths in 1993 (WHO, 1995):

- Communicable diseases accounted for about 20 million, or 40% of global deaths, and 99% of these occurred in the developing world.

- Non-communicable diseases accounted for 19 million, or 36% of the total, with both the developing and developed world sharing the burden more or less equally.

The difference between infectious and non-communicable diseases is very marked. One in two deaths in the developing world is due to communicable diseases, but in the developed world three out of every four deaths are due to non-communicable diseases.

Children are usually more vulnerable to poor sanitation than are adults. As a result, 11,475 million children under the age of five die every year in developing nations as a result of tainted drinking water, poor sanitation, environmental pollution and malnutrition (WHO, 1995). Out of these, three million children under five die of diarrhoea. Every small child in the developing countries suffers an average of three diarrhoeal attacks a year — and such repeated attacks, even if they do not cause death, lead to malnutrition which stunts physical and mental growth. Across the globe, there are an estimated 1.8 billion episodes of childhood diarrhoea annually, mostly in developing countries (WHO, 1995).

Most of these diseases arise from the contamination of drinking water by human wastes, as a result of poor sanitation. Most people in the developing countries do not have clean drinking water or proper sanitation facilities. The provision of safe water and the management of wastewater has a central role to play in reducing the incidence of many water-related communicable diseases.

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[1] Source: International Environmental Planning Center, Tokyo, Japan

There are three crucial concerns in the relationship between water and health. The first is the shortage of water availability, the second is the maintenance of water quality, and the third is the direct link between water and health. Rapidly increasing populations with increasing *per capita* water demands will create strong pressure on water availability. Assurance of the safety of available water is a prime concern, especially in the face of growing demand. Insufficient supplies and poor-quality drinking water, in combination with inadequate wastewater disposal, lead to outbreaks of many diseases.

1.1.1 Scarcity of Water

Despite the fact that the volume of fresh water available worldwide is only a small fraction of the total global water (97% of which is saline), it still exceeds present and projected future needs. However, its geographical and seasonal distribution is uneven. For instance, most of the flood waters that pass rapidly through India and Bangladesh during the monsoon are not available for use the rest of the year, so that scarcity of water is a problem in the two countries during the dry seasons. But other factors causing shortages in the supply of water are man-made, e.g. inadequate management of water-supply systems, especially water losses. Water losses from water-distribution systems may be very high, mainly in the developing countries. Unaccounted-for water ranges from 51% to as high as 62% in five of the largest Asian cities, while it is only 8% in Singapore.

1.1.2 Water Quality

Basically, the four most important sources of water pollution are caused by the discharge of sewage, industrial effluents, urban run-off, and agricultural run-off. In some countries, mines and the production of oil and energy are major contributors.

In the developed world, sewage and industrial effluents are usually treated before disposal into the environment. In the developing world, in addition to pollution carried by urban and agricultural run-off, insufficient sanitation and solid wastes are largely responsible for inadequate drinking-water quality, as well as the lack of enforcement of pollution standards concerning industrial effluents.

Agriculture contributes to the pollution of water due to use of fertilizers and pesticides. Ten percent of the rivers monitored under the Global Environment Monitoring System (GEMS) have nitrate concentrations higher than the WHO guidelines for drinking water. High levels of nitrates in drinking water can lead to serious, even fatal, consequences in infants below six months of age. In some instances, dieldrin and DDT were also found in drinking water.

The sight, smell and taste of water is affected by the chemicals it contains. The chemical quality of drinking water can lead to disease if concentrations of essential constituents are too low (iodine, *etc.*) or, more commonly, if they are too high (metallic ions, nitrate, *etc.*). Standards for the quality of drinking water have been issued by many governments, and international guidelines have been issued by the World Health Organization (see Annex 2).

1.1.3 Communicable Diseases Associated with Water

An infectious disease is one which can be transmitted from one person to another or, sometimes, to or from an animal. All infectious diseases are caused by micro-organisms, i.e. bacteria and viruses, or parasites, and transmitted by the passing of these organisms, directly or indirectly, from one person to another.

Most of the diseases associated with water are communicable. In most cases, the pathogens are discharged in animal or human excreta, usually faeces and occasionally urine. The most common route of infection is fecal-oral contact, either by ingestion with food or water, or by contaminated fingers or utensils. Once ingested, most pathogens multiply in the alimentary tract and subsequently cause disease in the host person. Without proper sanitation, the pathogens then excreted find their way into water, and without safe water supplies, can infect many people. Some pathogens can even survive outside the host body for a long period of time, e.g. in sewage and occasionally in the soil, from where they may be retransmitted to water and food. Some other diseases may be transmitted by vectors. Therefore, the collection, transport, treatment and disposal of excreta are the essential technology in the protection of health in any community.

Bradley suggested that diseases associated with water can be classified into four categories based on the role of water in the transmission (White, 1972):

Water-borne diseases: These diseases are transmitted when the water drunk or used for the preparation of food is contaminated by human or animal faeces or urine containing pathogenic micro-organisms. Sometimes, direct fecal-oral contact, food contamination or contact of abraded skin with infected water may cause transmission also. Water-borne diseases include the classical infections, notably cholera and typhoid, but also include a wide range of other diseases, e.g. infectious hepatitis, diarrhoeas, and the dysenteries.

Water-washed diseases: People can be infected due to the use of infected water for domestic purposes other than drinking — due to the unhygienic handling of water which, before mishandling, was safe. Scarcity and the inaccessibility of water make washing and personal cleanliness difficult and infrequent. A water-washed disease may be defined as one whose transmission will be reduced following an increase in the volume of water used for personal hygiene. All water-borne disease can also be water-washed, but this category also includes some vector-borne diseases.

Water-washed diseases are of three main types. Firstly, some are infections of the intestinal tract, and are fecal-oral in their transmission. The second type affects the skin or eyes. Bacterial skin

sepsis, scabies, and fungal infections of the skin are extremely prevalent in many hot climates, while eye infections such as trachoma are also common and may lead to blindness. They are related to poor hygiene and cannot be water-borne. Thus, they relate primarily to water quantity rather than to water quality. The third type of water-washed infection is also not fecal-oral and therefore can never be water-borne. These are infections carried by lice which may be reduced by improving personal hygiene. Louse-borne epidemic typhus is transmitted by body lice, which cannot persist on people who regularly launder their clothes. Louse-borne relapsing fever may also respond to changes in personal hygiene, especially the increased use of water for washing.

Water-based diseases: Water provides the habitat for intermediate hosts (water snails or other aquatic animals), in which some parasites pass part of their life cycle. The infective larval forms of these parasites are released in the fresh water and find their way into humans by boring through skin, ingestion of water flora or of fish eaten raw or inadequately cooked. All of these diseases are caused by parasitic worms (helminths) which depend on aquatic intermediate hosts to complete their life cycles. Examples are schistosomiasis and guinea worm infections.

Water-related vector-borne diseases: Water may provide a habitat for vectors such as mosquitos and flies. Some of the vectors prefer relatively clean water, while many others thrive in polluted water such as the pools around flooded pit-latrines or muddy swamps. Malaria, yellow fever, dengue, and onchocerciasis (river blindness) are transmitted by insects breeding in water, while West African sleeping sickness is transmitted by the riverain tsetse fly, which bites near water.

The environmental strategies for disease control appropriate to water-related diseases are shown in Table A1.1.

Table A1.1 Preventive Strategies for Water-related Diseases

Preventive Strategies for Water-related Diseases	
Category	Preventive Strategies
Water-borne	Improve quality of drinking water Prevent casual use of unprotected sources
Water-washed	Increase water quantity used Improve accessibility and reliability of domestic water supply Improve domestic and personal hygiene
Water-based	Reduce contact with infected water Control snail populations Reduce contamination of surface waters
Water-related vector	Improve surface water management Destroy breeding sites of insects Reduce need to visit breeding sites Use mosquito netting

Source: Cairncross & Feachem, 1993, "Environmental Health Engineering in the Tropics". 2nd edition, John Wiley & Sons, UK

1.2 The Control of Infectious Diseases

The basic objective of proper sanitation is to keep the infectious diseases away from the people. For the environmental engineer, it is convenient to group the diseases into classes related to engineering methods of control. Four broad general classes can be identified, namely water-related, excreta-related, refuse-related and housing-related infections. The water-related infections are described in Section 1.1 of Annex 1. Poor refuse disposal will encourage the breeding of flies and other vectors of disease, and may thus promote the transmission of fecal-oral infections. Some species of mosquitoes breed on uncollected refuse or on wastewater near garbage, and may transmit filariasis, dengue and yellow fever. All housing-related infectious disease can be prevented by appropriate housing design and construction. However, excreta-related diseases are more directly related to sanitation.

All the diseases in the fecal-oral category mentioned earlier, as well as most of the water-based diseases and several others not related to water, are caused by pathogens transmitted in human excreta, normally in the faeces. The excreta-related diseases can be controlled by improvements in water supply and hygiene, and by a whole gamut of measures for excreta disposal, ranging from the construction or improvement of toilets and latrines, on the one hand, to water-borne methods for transport and the treatment and final disposal or re-use of the excreta, on the other hand. Table 1.2 summarizes control measures available to "build out" infections by improved environmental health.

Table A1.2 Excreta-related Infections: Classification, Transmission and Control

Excreta-related Infections: Classification, Transmission and Control			
Class	**Infection**	**Transmission**	**Control**
Fecal-oral, non-bacterial	Poliomyelitis Hepatitis A Rotavirus diarrhoea Amoebic dysentery	Person-to-person contact Domestic contamination	Domestic water supply Improved housing Toilets and latrines Health education Personal hygiene
Fecal-oral, bacterial	Diarrhoeas and dysenteries Enteric fevers	Person-to-person contact Domestic contamination Water contamination Food contamination	Domestic water supply Improved housing Toilets and latrines Excreta treatment Health education Food hygiene
Soil-transmitted helminths	Round worm Whip worm Hook worm	Soil contamination Yard contamination	Toilets and latrines Excreta treatment Health education
Helminths, Animal intermediate hosts	Tape worm	Soil contamination Yard contamination Food contamination	Toilets and latrines Excreta treatment Health education Food hygiene
Water-based helminths	Schistosomiasis Liver fluke Fish tapeworm Intestinal fluke Lung fluke	Water contamination Food contamination	Toilets and latrines Excreta treatment Health education Food hygiene Control of host animal
Excreta-related vector-borne	Filariasis	Insects breed in faecally contaminated site	Elimination of breeding site Use of net

Adapted from: Cairncross & Feachem, 1993 (see Table 1.1)

It must be remembered that the improvement of drinking water supply will not achieve the anticipated benefit without the proper disposal of excreta. Moreover, without the proper disposal of excreta, there will always be a risk of contamination of drinking-water sources. The protection of drinking-water sources is always of particular importance.

1.3 Health Risks Requiring Special Attention

1.3.1 Soil and Groundwater Pollution

Ground water is one of the most precious water resources and must be protected, especially in the arid and sparsely populated areas. The study of the pollution of soil and ground water by excreta also provides useful information for the design of excreta disposal, especially its location with respect to sources of drinking water supplies. After excreta are deposited on the ground or in pits, the bacteria, unable to move much by themselves, may be transported horizontally and downward into the ground by leaching liquids such as urine or rain water. The distance of travel of bacteria in the soil varies with several factors, the most important of which is the porosity of the soil itself. It is reported that, unless "flushed" by a considerable amount of water, bacterial contamination does not travel more than 7.5 m through fine sand.

Depending upon conditions of humidity and temperature, pathogenic bacteria and the ova of parasitic worms will survive varying lengths of time in the ground. Pathogenic bacteria do not usually multiply in the soil, and will die within a few days. On the other hand, hookworm eggs will survive as many as five months in wet, sandy soil, and three months in sewage.

1.3.2 Location of Latrines

In the developing countries, private and small-scale public wells provide drinking water to a large part of the rural population. Many of these wells are contaminated by liquid leaching or leaking from wrongly built and/or located latrines. Regarding the location of latrines, the following points should be taken into consideration:

- There can be no arbitrary rule governing the distance that is necessary for safety between a pit latrine and a well for drawing drinking water. Many factors, such as slope and level of ground water, and soil permeability, affect the removal of micro-organisms from groundwater. However, the typical distance between a pit and a ground-water source should be between 7.5 m to 15 m.

- In homogeneous soils, the chance of groundwater pollution is virtually nil if the bottom of the pit latrine is more than 1.5 m above the groundwater table.

- A careful investigation should be made before building pit latrines in areas containing fissured rocks and limestone formations.

- Pour-flush latrines involve larger amounts of liquid than pit latrines, and this must be taken into account with respect to both the design and the location of the latrines.

1.3.3 River and Coastal Pollution

River and coastal pollution harbor many risks. River water is often used as a source of drinking water without prior purification in the developing countries, both by individuals and small communities, and it serves widely for bathing and laundering. Coastal water is used for recreation and the production of sea food, and presents special risks of pollution. Many people are exposed to polluted surface and coastal water in the developing countries, especially women and children. The following must be taken into account:

- The discharge of sewage and nightsoil without prior treatment is basically undesirable, although it may be practiced temporarily. It must be carefully appraised in light of public health requirements.

- The treatment of sewage prior to disposal should be standard practice, although the degree of treatment should be adapted to the local health and environmental requirements (see Section 8.3.4).

- The disposal of sludge from on-site sanitation (latrines or septic or other tanks) requires special attention. The sludge may be highly infective in terms of both individual and community health, and also harbours occupational risks for those involved in desludging operations. The following must be considered:

  - The safety of the equipment and procedures used in desludging.

  - The type and location of the disposal, taking into account public health and environmental requirements.

  - The special risks and criteria for tipping stations, where applicable.

- Whenever rivers of coastal waters are used for the disposal of sewage and nightsoil, water quality should be monitored.

1.3.4 Re-use of Effluent and Nightsoil

The re-use of nightsoil is basically undesirable. Whenever effluent is re-used, strict public health criteria should be observed both in the planning and operation of the facility.

1.3.5 Open Drains

Open drains for the collection and transportation of sewage are basically undesirable but are in use in many of the developing countries. They harbour many risks, e.g. they are accessible and are a source of personal contact (especially by children), they may provide breeding grounds for insects, rodents and vectors of disease, and they are used for the disposal of

garbage are thus often clogged and flooded. The design, and the operation and maintenance of open drains, must take these risks into account.

1.3.6 Criteria and Standards

Annex 2 lists some selected criteria and standards which should be used and/or adapted with a view to protecting health and the environment against the special risks discussed in the preceding paragraphs.

Annex 2[2]

Environment- and Health-related Standards and Criteria

2.1 Introduction

As guidelines to assist Japanese ODA participants in the field of sanitation projects, the following tables and references introduce examples of standards and criteria. Among them, some Japanese standards and criteria are introduced, and these may be helpful for non-Japanese participants or specialist who are not familiar with Japanese conditions. As not all Japanese health- and environment-related standards can always be used in ODA projects, however, most of the tables and references are selected from international standards and criteria. They come from the areas of microbiological standards and characteristics, water consumption, effluent standards, wastewater-treatment options, community participation, and gender issues.

Two tables of nightsoil purification tanks and *Jokaso* are shown as examples of Japanese standards and criteria for appropriate technoligies for rural areas in Japan.

2.2 Japanese Standards and Criteria

2.2.1 Simple *Jokaso*

Table A.2.2.1 Installing Conditions and Performance of *Jokaso*

(footnotes, source, next page)

Installing conditions and performance of *Jokaso*				
Particular sanitary obstacle[a]	<100 100 - 500 >500	>65 >70 >85	<90 <60 <30	flush toilet waste water only
Water pollution control law[b]		>90	<20	
No particular obstacle[c]			<120	
Others	<500 500 - 2,000 >2,000	>65 >70 >85	<90 <60 <30	flush toilet waste water only

[2] Source: International Environmental Planning Center, Tokyo, Japan

a) Area permitted in regulations provided by district government agency because of particular sanitary obstacle
b) Area where Biochemical Oxygen Demand (BOD) of discharged water is determined as less than 20 mg/l by water pollution control law
c) Area permitted in regulations provided by district government agency because of no particular obstacle
d) Capacity measured as equivalent of number of people, according to method established by Ministry of Construction
e) Removal ratio of BOD to be obtained by dividing the given numerical value of BOD by the numerical value of BOD in the water flowing into individual sewage disposal

Source: T. Noike (1995) Night Soil Treatment and Disposal in Japan. In: JICA/Japan Society on Water Environment, Environment. Eng. Course — Water Quality Management, No. 13.

2.2.2 Structural Standards for On-site Systems

Table A2.2.2 Outline of Structural Standards for *Jokaso* Systems

<Table on next two pages>

Source: Ministry of Health and Welfare, Ministerial Notification No. 1292

Table A2.2.2 Outline of Structural Standards for *Jokaso* On-site Systems

(Page 1 of 2 pages in table)

Outline of Structural Standards for *Jokaso* On-site Systems

Classification		Type of treatment	Treatment method	Capacity (persons)						Treatment	Performance	Remarks
				5-50	51-200	201-500	501-2,000	2,000-5,000	5,0001 -	BOD removal, %	BOD in effluent	
#1	1	Flush toilet wastewater treatment	Separation - contact aeration process							>=65	<=90 mg/l	(1)
	2		Separation - aeration process									
	3		Trickling filter process									
	4	Combined domestic wastewater treatment	Separation - contact aeration process							>=90	<=20 mg/l	
	5		Anaerobic filter -contact aeration process									
#2	1	Combined domestic wastewater treatment	Rotating Biological contact process							>=70	<=60 mg/l	
	2		Contact aeration process									
	3		Trickling filter process									
	4		Extended aeration process									
#3	1		Rotating Biological contact process							>=85	<=30 mg/l	
	2		Contact aeration process									
	3		Trickling filter process									
	4		Extended aeration process									
	5		Conventional activated sludge process									
#4		Flush toilet wastewater treatment	Septic tank process							>=55	<=120 mg/l	
#5		Flush toilet wastewater treatment	Land filtration process							>=55	<=250 mg/l	Concerning SS concentration
#6	1	Combined domestic wastewater treatment	Rotating Biological contact process								<=20 mg/l	
	2		Contact aeration process									
	3		Trickling filter process									
	4		Extended aeration process									
	5		Conventional activated sludge process									

Table A2.2.2 Outline of Structural Standards for *Jokaso* On-site Systems (continued)

#7	COD (mg/l)	SS (MG/l)	N-hex. (MG/l)	pH	Total Coliforms (N/ml)	Structure
Emission standard under the Water Pollution Control Law	60	70	20	5.8 - 8.6	<=3,000	#2, #3, #5
	45	60	20	5.8 - 8.6	<=3,000	#3, #6
	30	50	20	5.8 - 8.6	<=3,000	#6
#8	Specially approved process	Qualified to be equivalent or better than processes with structures specified by Notification Nos. 1 through 7 by the Ministry of Construction				
Note: The shadowed parts (on page 1 of table) indicate the range of people and processes applicable to "the districts recognized to have hygienic problems by the competent authorities and specified as such by applicable regulations".						

(1) (see page 1 of table, upper right) Multichamber type and modified multi-chamber type

Source: Ministry of Health and Welfare, Ministerial Notification No. 1292

2.3 International Standards and Criteria

2.3.1 Water Supply

1) Microbiological aspects of drinking water

Table A2.3.1.1 Bacteriological quality of drinking water

Bacteriological quality of drinking water	
Organisms	Guideline value
All water intended for drinking	
E. coli or thermotolerant coliform bacteria	Must not be detected in any 100-ml sample
Treated water entering the distribution system	
E. coli or thermotolerant coliform bacteria	Must not be detected in any 100-ml sample
Total coliform bacteria	Must not be detected in any 100-ml sample
Treated water in the distribution system	
E. coli or thermotolerant coliform bacteria	Must not be detected in any 100-ml sample
Total coliform bacteria	Must not be detected in any 100-ml sample

Source: WHO, Guidelines for drinking-water quality, 2nd ed., Vol.1: Recommendations, Geneva,1993

2) Water consumption

Table A2.3.1.2 Water consumption in some rural areas in four developing countries

Water consumption in some rural areas in four developing countries					
Water use (liters per person per day)	Lesotho[a]	Uganda[b] Lango	Kenya[c]	Pakistan[c] Punjab	Mozambique[d]
Drinking and Cooking	8.0	5.8	6.4	5.7	2.3
Other domestic use	10.0	11.9	1.6	24.0	10.0
Total	18	18	8	30	12

a: Feachem *et al.*, 1978; b: White *et al.*, 1972; c: Ahmed *et al.*, 1975; d: Cairncross, S., personal communication

Source: WHO, A guide to the development of on-site sanitation, Geneva, 1992

2.3.2 Sanitation

1) Bacteriological aspects of wastewater and nightsoil

Table A2.3.2.1 Occurrence of some pathogens in urine[a], faeces and sullage[b]

Occurrence of some pathogens in urine, faeces and sullage				
Pathogen	Common name for infection caused	Present in: urine	faeces	sullage
Bacteria				
Escherichia coli	diarrhoea	yes	yes	yes
Leptospire interrogans	leptospirosis	yes		
Salmonella typhi	typhoid	yes	yes	yes
Shigella spp	shigellosis		yes	
Vibrio cholerae	cholera		yes	
Viruses				
Poliovirus	poliomyelitis		yes	yes
Rotaviruses	enteritis		yes	
Protozoa - amoeba or cysts				
Ascaris lumbricoides	roundworm		yes	yes
Fasciola hepatica	liver fluke		yes	
Ancylostoma duodenale	hookworm		yes	yes
Necator americanus	hookworm		yes	yes
Schistosoma spp	schistosomiasis	yes	yes	yes
Taenia spp	tapeworm		yes	yes
Trichuris trichiura	whipworm		yes	yes

a: Urine is usually sterile; the presence of pthogens indicates either faecal pollution or host infection, principally with *Salmonella typhi, Shistosoma haematobium* or Leptospira

b: From: Cheesebrough (1984), Sridhar *et al.* (1961) and Feachem *et al.* (1983)

Source: WHO, A guide to the development of on-site sanitation, Geneva, 1992

2) Effluent standards

Table A2.3.2.2 Effluent standards in five developing countries[5]

Effluent standards in five developing countries					
Country	BOD (mg/l)	NH_4^+ + NH_3	TSS (mg/l)	pH	Temp (°C)
India[1]	30	-	100	5.5 - 9.0	-
Tanzania[2]	30	10	no sludge formation	6.5 - 8.5	-
Brazil[3]	60, or 80% removal	-	settle. sol. <=1 mL/L	5.9	40
Thailand[4]	20[6]	Nkj<=40	30	5 - 9	40
Philippines[5]					
Class AA	30	-	50	6 - 8.5	40
Class D	50	-	75	6 - 8.5	40
Indicated are maximum allowable values					

1 For domestic and most industrial waste water
2 Ministry of Health, April 1977
3 State of São Paulo, May 31, 1976
4 Drafted standards by National Environmental Board; Nkj stands for Kjedahl-nitrogen, covering also ammoniacal N.
5 1982; Class AA: receiving water intended for water supply with minimal treatment; Class D: receiving water suitable for irrigation and industrial purposes
6 Depends on size of polluting unit

Source: International Institute for Hydraulic and Environmental Engineering, Feasibility of anaerobic sewage treatment in sanitation strategies in developing countries, Delft 1990

3) *Choice of sanitation system*

Table A2.3.2.3 Choice of sanitation system

Choice of sanitation system								
Sanitation system	Suitable for rural areas?	Pop. density where suitable	Con-struction cost	Operation cost	Ease of con-struction	Water require-ments	Perme-able soil required?	On-site facilities required
Pit latrine	Yes	L	VL	L	Very easy	None	Yes	None
VIP latrine	Yes	L	L	L	Easy	None	Yes	None
Twin pit latrine	Yes	L / M	M	L	Needs builder	None	Yes	None
Pour-flush toilet	Yes	L / M	L	L	Needs builder	Water nearby	Yes	None
Septic tank and soakaway	Yes	L	H	H	Needs builder	Multiple tap	Yes	Sludge disposal
Small bore sewerage (sewered pour-flush)	No	H	H	M / H	Needs engineer	Yard tap	No	Sludge disposal, sewers, treatment
Sewerage	Yes	H	H	M	Nees engineer	Multiple tap	No	Sewers, treatment
H = high, M = medium, L = low								

Source: London School of Hygiene and Tropical Medicine/Ross Institute, Small Scale Sanitation, London, 1988

4) *Comparative analysis of sanitation programmes*

Table A2.3.2.4 Comparative analysis of sanitation programmes (on-site, intermediate-scale, off-site) by major selection determinants[5]

Comparative analysis of sanitation programmes (on-site, intermediate-scale, off-site) by major selection determinants					
Wastewater / Determinant (strategy)	On-site: black	On-site: gray	Intermediate-scale: brown	Intermediate-scale: gray	Off-site: gray
Technical					
BOD removal (Environmental pollution control)	-	0	0	++	++
Pathogen removal (Public health improvement)	0/ (++)[1]	0/ (++)[1]	0/+	0/+	0/+
Process stability	+	0	+	+	++
Economic and financial	++	0	++	+/++	-
Institutional	0/++	0/+	0	0	-
Community involvement	++	++	++	++	-
The marks indicate suitability (in terms of performance, applicability or cost) of the programme; they have only a relative meaning to allow comparison within one row					
[1] Provided percolation of supernatant into soil functions well, and removed sludge is disinfected					
Legend: ++ high efficiency, easy, very low cost; + good efficiency, relatively easy, reasonable cost; 0 fair efficiency, not very easy, higher cost; - poor efficiency, relatively difficult, higher cost					

Source: International Institute for Hydraulic and Environmental Engineering, Feasibility of anaerobic sewage treatment in sanitation strategies in developing countries, Delft, 1990

5) *Landscape and selection of wet on-site and off-site low-cost sanitation and treatment technologies*

Table A2.4.2.5 Landscape and selection of wet on-site and off-site low-cost sanitation and treatment technologies in tropical developing countries with special reference to the position of anaerobic treatment

<Table on next two pages>

Source: International Institute for Hydraulic and Environmental Engineering, Feasibility of anaerobic sewage treatment in sanitation strategies in developing countries, Delft, 1990

Table A2.3.2.5 Landscape and selection of wet on-site and off-site low-cost sanitation and treatment technologies in tropical developing countries with special reference to the position of anaerobic treatment

(Page one of two pages in table)

Landscape and selection of wet on-site and off-site low-cost sanitation and treatment technologies in tropical developing countries with special reference to the position of anaerobic treatment							
Site Condition		Planned or unplanned uncongested area (medium to high income)			Unplanned congested area (low to medium income)[1]		
		Sewerage feasible	Low-cost sewerage / drainage feasible		Sewerage not feasible		
		Land price in town			Household income/month		
		<=US$5	>US$5		<=US$35	>US$35	
		Estimated size of target population in world (% of total population)				Local institutional framework	
		5-10	15-20	25	25	strong	weak
Strategy							
A.	Environmental protection						
1	BOD eff: 50 mg/l	pond	UASB	communal[3] or township UASB (for preferably grey wastewater)	on-site: black wastewater: black wastewater, percolated; and sullage properly drained away in existing drain and treated off-site		
2	BPD eff: <20 mg/l	series of ponds	UASB + post-treatment[2]	communal or township UASB + off-site post-treatment	ditto		
3	BOD eff: <20 mg/l, 75% nitrification	series of ponds	UASB + post-treatment[2] or full anaerobic treatment	communal or township UASB + off-site post-treatment	prohibitively expensive unless subsidized		
4	BOD eff: <20 mg/l, 75% nitrification, eutrophic control	as 3 but with appropriate tertiary treatment		prohibitively expensive	prohibitively expensive unless subsidized		
B.	Public health	series of ponds; or dilution in river		effluent of communal or township UASB conveyed in closed sewer + off-site post-treatment	(double) leaching pit; public[3] toilet	(double) leaching pit or septic tank and trench; cartage	(double) leaching pit

Landscape and selection of wet on-site and off-site low-cost sanitation and treatment technologies in tropical developing countries with special reference to the position of anaerobic treatment

Site Condition	Planned/unplanned medium-density (medium to high income)			Unplanned congested area (low to medium income)[1]	
	Sewerage not feasible		Sewerage feasible	Sewerage not feasible	
	Household income/month			Household income/month	
	<=US$5	>US$5		<=US$35	>US$35
	Estimated size of target population in world (% of total population)			Local institutional framework	
	5-10	15-20	25	25	strong / weak
Strategy					
C. Ground water protection	*go to A*	*go to A*	*go to A*	cartage; public toilet near township + sewer, shared[3] UASB with effluent conveyed via open drain	
D. Re-use					
1 In irrigation	ponds	UASB	communal or township UASB (+ off-site only sludge can be re-used; toilet near drain pond)		
2 aqua- and pisciculture	series of ponds (HRT = 25d)	UASB + series of ponds	communal or township UASB + off-site series of ponds	ditto	
X. Sludge fate	off-site dewatered, possibly after digestion; sludge sold as fertilizer or dumped		tank desludged and sludge locally or centrally dewatered; as fertilizer or dumped	pits emptied and tanks desludged by carts (private or government or city); stabilized and disinfected; dewatered; sold as fertilizer or dumped; shared[3] tanks more easily desludged	

1. Congested area means typical population density of >500 cap/ha, without multi-storeyed buildings. Monthly income is here considered to be typically US$35-70
2. Post-treatment may include pond, physical pre-anaerobic treatment depending on land cost
3. "Communal" means for 10-11 households.
   "Shared" means for 2-5 households.
   "Public" toilet facilities aim typically at 5-50 households, and do not provide for individual house connections.

(Page two of two pages in table)

Table A2.3.2.6 Descriptive comparison of sanitation technologies

Descriptive comparison of sanitation technologies

Sanitation technology	Rural application	Urban application	Construction cost	Operation cost	Ease of construction	Safe-to-use potential	Water requirement	Required soil conditions	Complimentary off-site investments[a]	Reuse potential	Health benefits	Institutional requirements
VIP latrines and ROECs[c]	Suitable	Suitable in low/medium-density areas	L	L	Very easy except in wet or rocky ground	H	None	Stable permeable soil; groundwater at least 1 meter below surface[b]	None	L	Good	L
PF toilets[c]	Suitable	Suitable in low/medium-density areas	L	L	Easy	H	Water near toilet	Stable permeable soil; groundwater at least 1 meter below surface[b]	None	L	Very good	L
DVC composting toilets[c]	Suitable	Suitable in very low-density areas	M	L	Requires some skilled labor	H	None	None (can be built above ground)	None	H	Good	L
Self-topping aquaprivy	Suitable	Suitable in low/medium-density areas	M	L	Requires some skilled labor	H	Water near toilet	Permeable soil; groundwater at least 1 meter below surface[b]	Treatment facilities for sludge	M	Very good	L
Septic tanks	Suitable for rural institutions	Suitable in low/medium-density areas	H	H	Requires some skilled labor	L	Water piped to house & toilet	Permeable soil; groundwater at least 1 meter below surface[b]	Off-site treatment facilities for sludge	M	Very good	L
Three stage septic tank	Suitable	Suitable in low/medium-density areas	M	L	Requires some skilled labor	L	Water near toilet	Permeable soil; groundwater at least 1 meter below surface[b]	Treatment facilities for sludge	M	Very good	L
Vault toilets and cartage	Not suitable	Suitable	M	H	Requires some skilled labor	H[d]	Water near toilet	None (can be built above ground)	Treatment facilities for nightsoil	H	Very good	VH
Sewered PF toilets, septic tanks, & aquaprivies[c]	Not suitable	Suitable	H	M	Requires skilled engineer/builder	L	Water piped to house	None	Sewers & treatment facilities	H	Very good	H
Sewerage	Not suitable	Suitable	VH	M	Requires skilled engineer/builder	L	Water piped to house & toilet	None	Sewers & treatment facilities	H	Very good	H

a. On- or off-site sullage disposal facilities are required for non-sewered technologies
b. If goundwater is less than 1 meter below ground, a plinth can be built
c. VIP means Ventilated Improved Pit; ROECs means Reed Odorless Earth Closets; PF means Pour-flush; DVC means Double-vault composting
d. for vault construction
L = low, M = medium, H = high, VH = very high

6) Descriptive comparison of sanitation technologies

Table A2.3.2.6 Descriptive comparison of sanitation technologies

<Table on preceding page>

Source: World Bank, Appropriate technology for water supply and sanitation: A planner's guide, 1980

7) Expected removal of excreted bacteria and helminths

Table A2.3.2.7 Expected removal of excreted bacteria and helminths in various wastewater treatment processes

Expected removal of excreted bacteria and helminths in various wastewater treatment processes

Treatment process	Removal ($\log_{10}$ units)			
	Bacteria	Helminths	Viruses	Cysts
Primary sedimentation				
Plain	0 - 1	0 - 2	0 - 1	0 - 1
Chemically assisted[a]	1 - 2	1 - 3 (E)	0 - 1	0 - 1
Activated sludge[b]	0 - 2	0 - 2	0 - 1	0 - 1
Biofiltration[b]	0 - 2	0 - 2	0 - 1	0 - 1
Aerated lagoon[c]	1 - 2	1 - 3 (E)	1 - 2	0 - 1
Oxidation ditch[b]	1 - 2	0 - 2	1 - 2	0 - 1
Disinfection[d]	2 - 6 (E)	0 - 1	0 - 4	0 - 3
Waste stabilization ponds[e]	1 - 6 (E)	1 - 3 (E)	1 - 4	1 - 4
Effluent storage reservoirs[f]	1 - 6 (E)	1 - 3 (E)	1 - 4	1 - 4

(E) With good design and proper operation the Engelberg guidelines are achievable
a. Further research is needed to confirm performance
b. Including secondary sedimentation
c. Including settling pond
d. Chlorination, ozonation
e. Performance depends on number of ponds in series
f. Performance depends on retention time, which varies with demand

Source: Feachem *et al.* (1983)

Source: WHO/UNEP, Guidelines for the safe use of wastewater and excreta in agriculture and aquaculture, Geneva, 1989

2.3.3 Wastewater reuse — Recommended microbiological quality guidelines

Table A2.3.3 Recommended microbiological quality guidelines for wastewater use in agriculture

Recommended microbiological quality guidelines for wastewater use in agriculture[a]					
Category	Reuse conditions	Exposed group	Intestinal nematodes[b] (arithmetic mean no. of eggs per litre[c])	Faecal coliforms (geometric mean no. per 100 ml)	Wastewater treatment expected to achieve the required microbiological quality
A	Irrigation of crops likely to be eaten uncooked, sports fields, public parks[d]	Workers, consumers, public	<=1	<=1000[d]	A series of stabilzation ponds designed to achieve the microbiological quality indicated, or equivalent treatment
B	Irrigation of cereal crops, industrial crops, fodder crops, pasture and trees[e]	Workers	<=1	No standard recom-mended	Retention in stabilization ponds for 8-10 days or equivalent helminth and faecal coliform removal
C	Localized irrigation of crops in category B if exposure of workers and the public does not occur	None	Not applicable	Not applicable	Pretreatment as required by the irrigation technology, but not less than primary sedimentation

a In specific cases, local epidemiological, sociocultural and environmental factors should be taken into account, and the guidelines modified accordingly.

b Ascaris and Trichuris species and hookworms.

c During the irrigation period

d A more stringent guideline (<=200 faecal coliforms per 100 ml) is applicable for public lawns, such as hotel lawns, with which the public may come into direct contact.

e In the case of fruit trees, irrigation should cease two weeks before fruit is picked, and no fruit should be picked off the ground. Sprinkler irrigation should not be used.

Source: WHO, Health guideline for the use of wastewater in agriculture and aquaculture, Geneva, 1989

2.4 Others

2.4.1 Community participation

Table A2.4.1 Level of participation related to project stage

Level of participation related to project stage			
		Level of community participation	
		Water supply	Sanitation
1. Pre-planning		low	low
2. Planning			
1)	Data collection, needs assessment	low	low
2)	Identify technical options	low	low
3)	Community organization	medium	low
4)	Select goals, systems, technology	low	low
5)	Decide on timetable	low	low
6)	Determine manposer needs and resources	medium	low
7)	Identify local hygiene education needs and strategies	low	low
3. Implementation			
1)	Designs	medium	low
2)	Construction	high	medium
3)	Information, education, commuication	low	low
4)	Maintenance	medium	medium
50	Evaluation	low	low

Source: IRC, Community participation and women's involvement in water supply and sanitation projects, The Hague, 1988

2.4.2 Gender issues

Table A2.4.2 Actions to make sanitation programmes more gender specific

Actions to make sanitation programmes more gender specific		
Level	Action	Reason(s)
Programme	Selection of geographic areas	Gender relevance; efficiency: effectiveness
Programme	Setting of gender-specific behavioural objectives	Go beyond physical outputs to adequate maintenance and use by men, women, boys, girls
Programme	Greater and informed user choice to men and women in focus of improvements, type(s) of technology, design and contributions, including division within households	Sustainability of programmes
Programme	Formulate gender-specific strategies to plan and implement sanitation projects. Revise hygiene education and training strategies to include new gender insights	Effectiveness, socio-economic benefits, redressing of gender imbalance
Policy	Make capacity building of men and women a programme aim besides physical outputs and sustained behaviour change	Sustainability of programme
Policy	More gender-specific research and documentation of sanitation programme with emphasis on whether conditions and practices continue to be improved	Insight development
Policy	Support to capacity building of agencies involved in sanitation for gender-specific and sustained programmes which improve community conditions and practices in cooperation with local men and women	Shift from short term "building" to long term "enabling"
Policy	Aim at better gender balances, increased professionalization and inter-disciplinary staff in sanitation	Current sanitation has low status and specialization; staff is mainly male

Source: van Wijk C (Undated) Gender aspects of sanitation, the missing slipper of Cinderella? The Hague, IRC International Water and Sanitation Centre (paper prepared on request of SIDA, Stockholm)

Annex 3[3]

JICA's Development Study

3.1 Development Study

A Development Study is part of the technical cooperation of JICA (See Figure A3.1), defined as "the undertaking of basic surveys for development projects in developing regions of the world". It is one of the main pillars of government-level technical cooperation provided by Japan.

Figure A3.2 shows the implementation structure in a schematic form, centering around official development assistance.

3.2 Significance of the Development Study

The significance of a Development Study is to contribute to concrete plans for national development through formulation of plans for socio-economic development (See Figure A3.3), e.g.:

- Data for judging policy-making decisions;
- Formulation for the extension of financial assistance (loan or grant), to be used by the development organizations, *etc.*; and
- Technology transfer to technical staff (counterparts).

3.3 Areas to be Covered by a Development Study

A Development Study covers all areas relating to national development, e.g.:

- Agriculture, forestry and fisheries;
- Mining, industry and energy;

[3] Adapted from unpublished JICA document

- Socio-economic infrastructure; and
- Regional development.

3.4 Types of Development Study

JICA's Development Studies are divided as follows (See Figure A3.4):

- Regional development plan;
- Sectoral master plan (M/P);
- Feasibility Study (F/S);
- Resource exploration study;
- Preparation of basic national topographical maps; and
- Detailed design (D/D).

3.5 Process of a Development Study

In the cycle of a Japanese assistance project, the Development Study undertakes the stage of preparation (See Figure A3.5). The implementation process of a Development Study has several stages, as described in Figure A3.6. Necessary actions to be taken in each stage are described in Figure 3.7.

Figure A3.1 — Services and Operations of the JICA

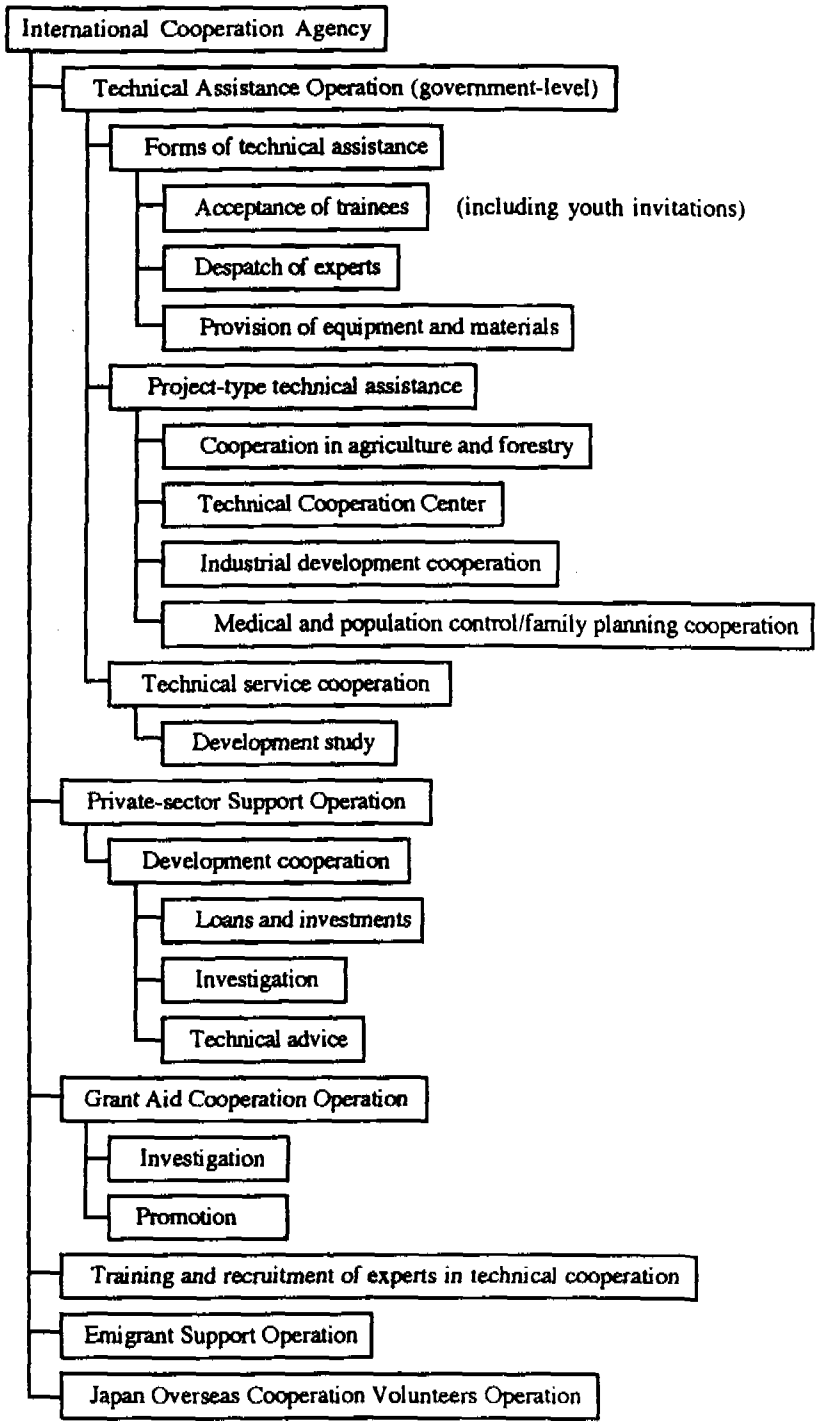


Figure A3.2 — Implementation Structure of Economic Cooperation

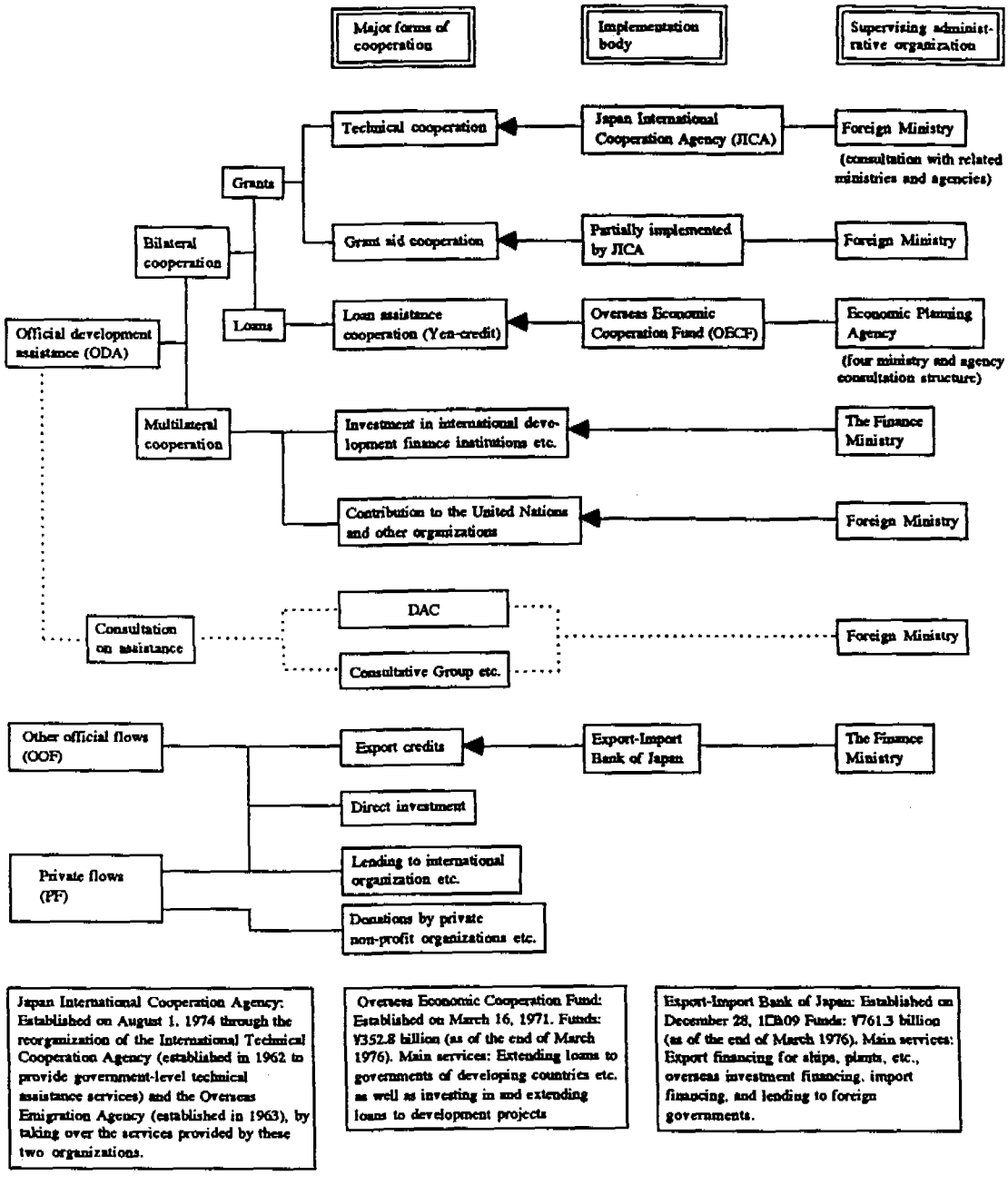


Figure A3.3 — Function and Role of the Development Study

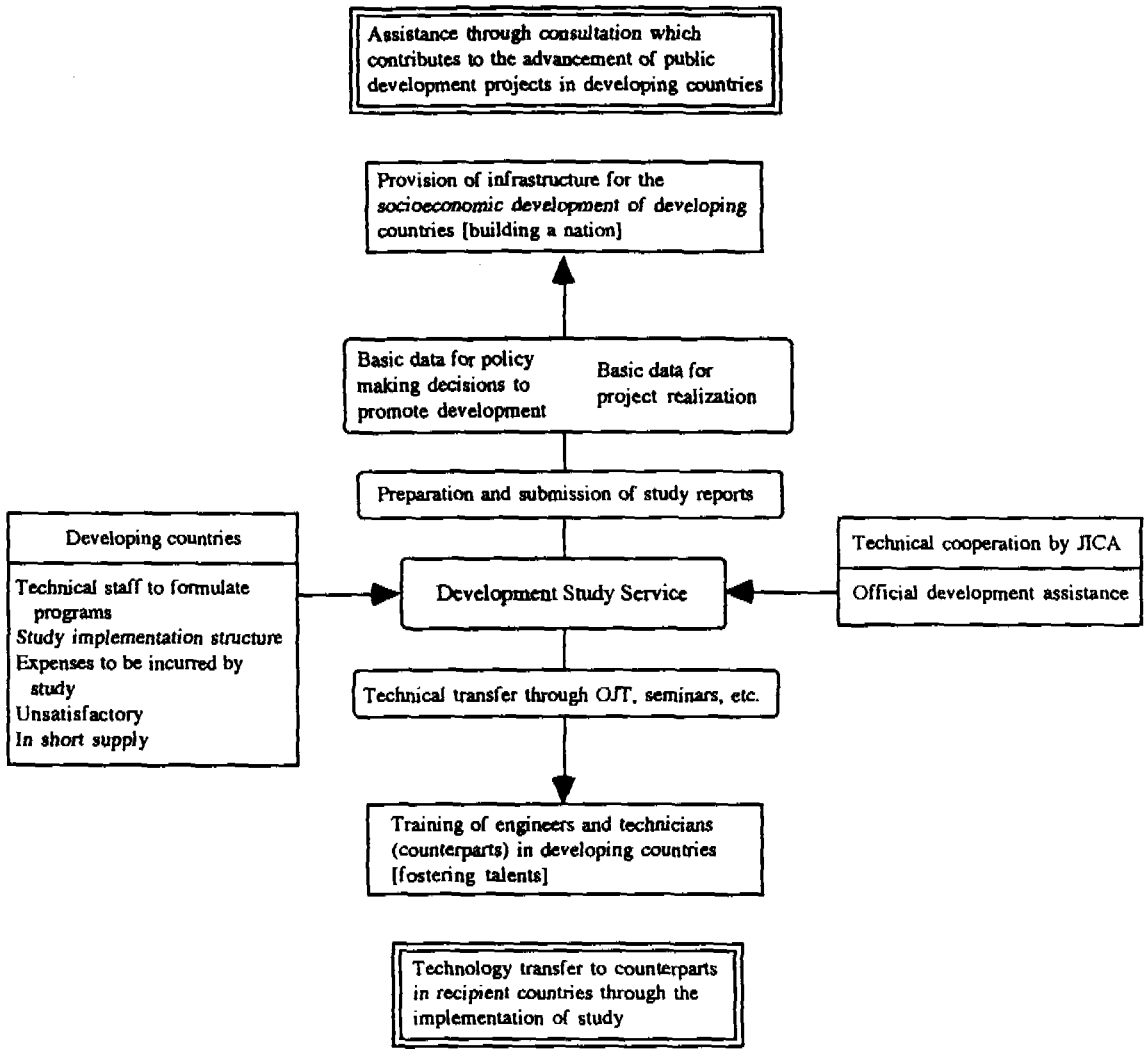


Figure A3.4 — Types of Development Study

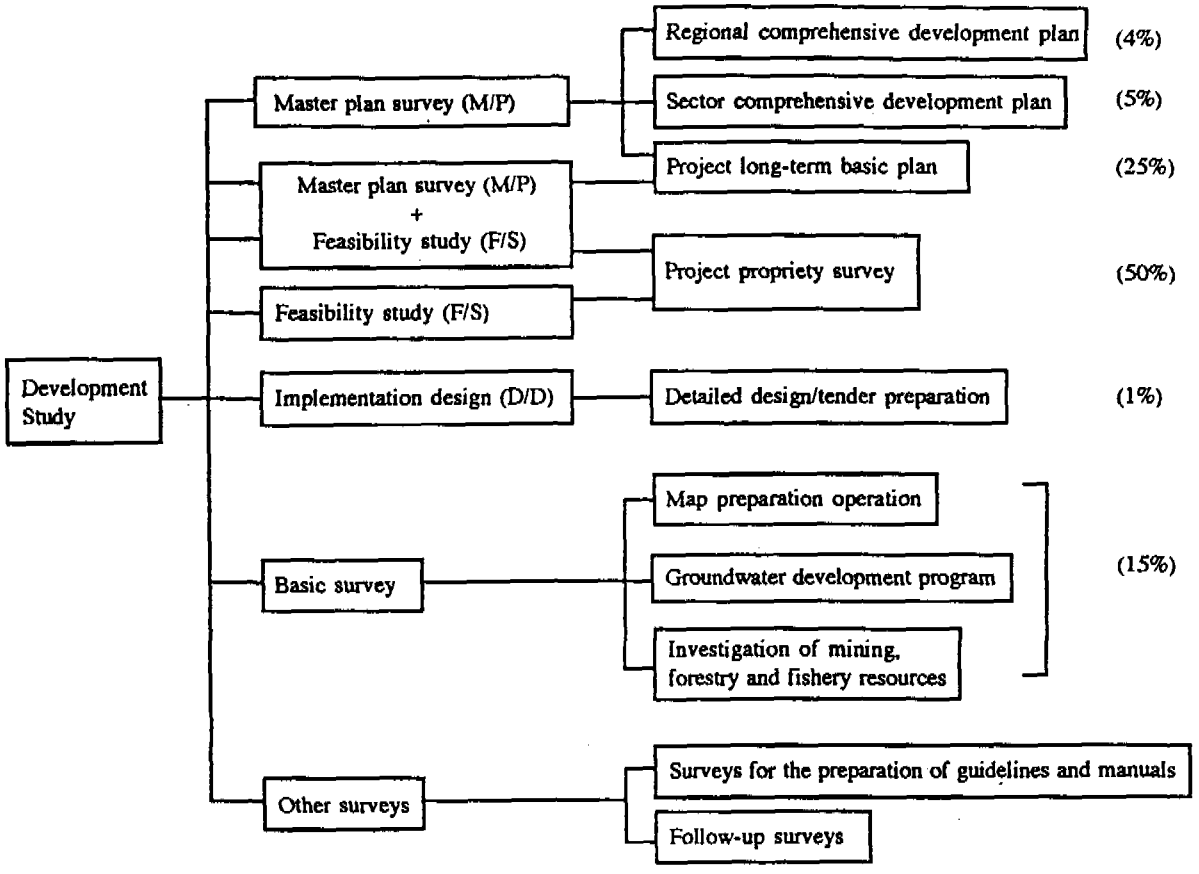


Figure A3.5 — Cycle of Japanese Assistance Project

Stages		Implementation step		Related organizations
Finding	1st Stage (finding)	· Collection of information relating to economic and social infrastructure	.....	Government of prospective recipient country ⇄ Local embassy
	↓	· Understanding of development needs		
		· Formation of project idea		
	2nd Stage (formation period)	· Preparation of T/R for project		
	↓	· Request for assistance	.....	Government of prospective recipient country → Local embassy
Selection	3rd Stage (selection stage)	· Evaluation of practicability and propriety of assistance and adoption of scheme	.....	Foreign Ministry/JICA
	↓			
	4th stage (confirmation stage)	· Implementation of preliminary study and agreement on S/W for full-scale study	.....	JICA
	↓			
Preparation (study)	5th Stage	· Implementation of full-scale study	.....	JICA (consultants)
		· Preparation of a study report		
	↓	· Decision making on whether to recommend project implementation	.....	Recipient country
	6th Stage	**(Grant aid)**		
		· Request for grant	.....	Prospective recipient country government → Local embassy
	↓	· Evaluation of practicability and propriety of assistance and adoption of scheme	.....	Foreign Ministry/JICA
			.....	JICA (consultants)
		· Implementation of basic design survey	.....	Cabinet meeting
			.....	Cabinet meeting
		· Evaluation on whether to provide grant aid	.....	Both governments
		· Decision to provide grant aid		
		· Signing of exchange of notes	.....	Recipient country → Local embassy
		(Loan assistance)	.....	Foreign Ministry, Finance Ministry, Economic Planning Agency and Ministry of International Trade and Industry
		· Request for loan		
		· Evaluation of request	.....	Cabinet meeting
			.....	Both governments
		· Decision to provide loan		
		· Signing of exchange of notes		
Evaluation	7th Stage	· Negotiation of loan contract with	.....	OECF/Recipient country
	↓	· Investigation by lending organization	.....	OECF
			.....	OECF/Recipient country
		· Conclusion of loan contract		
Design	8th Stage	· Selection of consultant	.....	Recipient country (OECF)
		· Implementation design	.....	Consultant
	↓			
Survey and construction	9th Stage	· Procurement of equipment and services (erection work)	.....	Recipient country government
	↓	· Execution of erection work	.....	Contractor
		· Implementation of loan	.....	OECF
		· Construction management	.....	Consultant
Commissioning	10th Stage	· Commissioning of facilities	.....	Recipient country government
	↓			
Assessment	11th Stage	· Confirmation of the effectiveness of assistance (follow-up assessment)	.....	JICA, OECF, etc.

Figure A3.6 — Implementation Process of Development Study

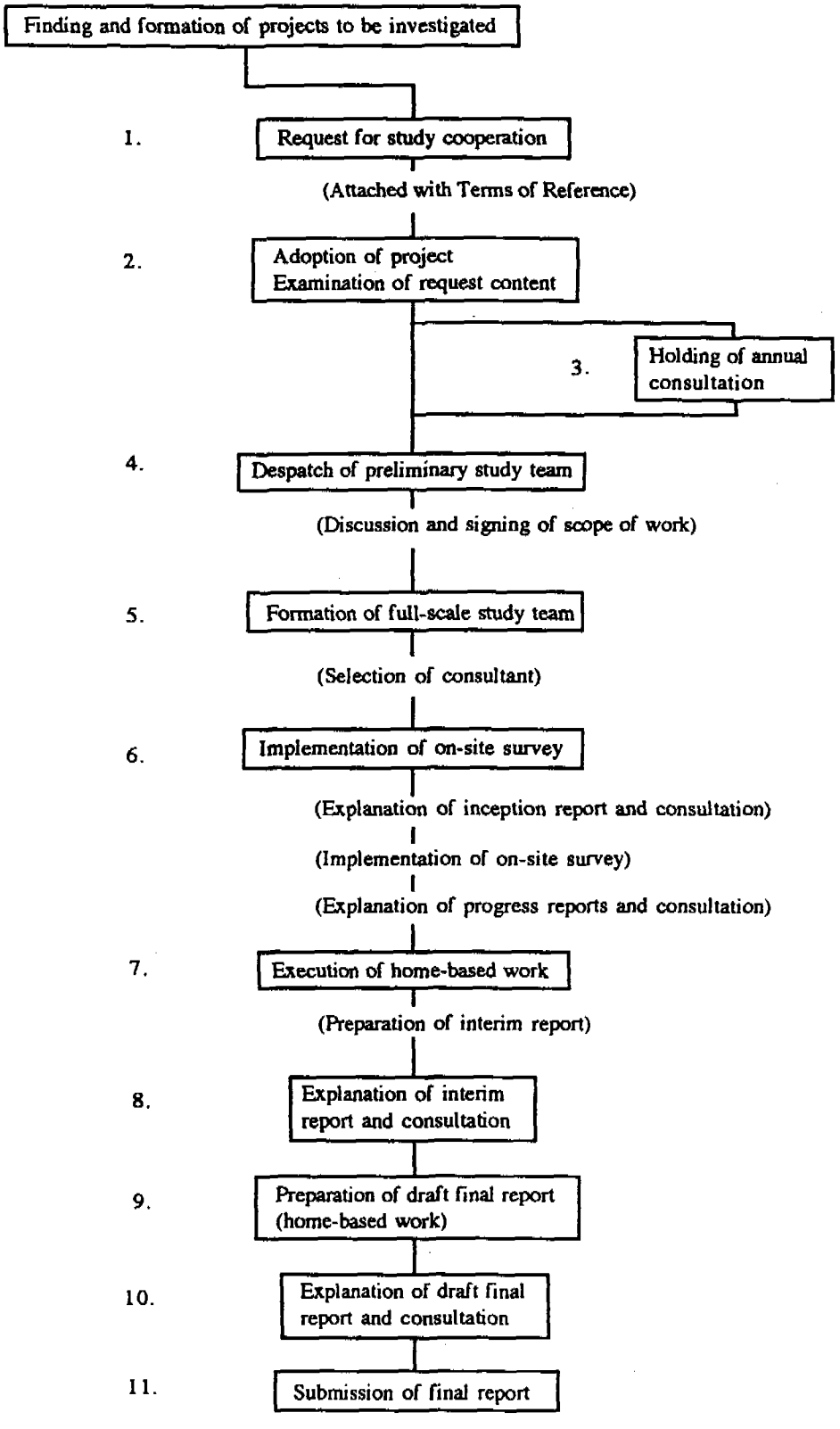


Figure A3.7 — Necessary Action in Each Stage of Development Study

No.	Item	Implementation body	Explanation	Remarks
1	Request for study cooperation	Requesting country → Local Japanese embassy	(1) Request is to be made with a verbal note (Note Verbal) (a document containing a statement to the effect that a request is being made for the implementation of a study) attached with a survey request (Terms of Reference)	(1) The issuer of the verbal note should be the representative of the organization which coordinates economic cooperation projects in the recipient country. (2) Content of TOR 1) The project name and objectives, study area, stage (M/P, F/S etc.) and content, prospective project implementation body, facilities to be provided by the requesting country, the study implementation schedule, etc. for the project being proposed should be described and included. 2) As the background to the requested study, its position in the overall national development plan, priority, and the necessity of the study (e.g. the state of damage) should also be included. It is also desirable that the prospective source of funds for the implementation of the project after the completion of the study, as well as maps, data, the existence of reference materials, etc. related to the study be described and included for reference.
2	Examination of the content of the request and the adoption of the proposed scheme	Foreign Ministry, JICA	(1) Evaluation is to be made of all proposed schemes from various countries as to the necessity and propriety of conducting a study as well as Japan□s capability of accommodating them, with consultation taking place on successful schemes for which a study will be conducted. (2) Views are sought on technical matters from ministries and agencies supervising the area involved in the proposed scheme as necessary.	(1) Criteria for evaluation of proposed schemes: 1) Present state, problems, the propriety of the development method in the proposed scheme and its urgency 2) Prospect of developmental effectiveness (economy, society and politics) 3) Compatibility with programs of higher precedence 4) Present state of the prospective project implementation body (e.g. financial state, technical capabilities and staff structure) as well as the prospective source of funds for project implementation 5) Its position with regard to Japan□s past cooperation (technical and financial cooperation) 6) Trends in other aid organizations' operations to provide assistance (e.g. collaboration and emphasis) 7) Availability of basic data (data on natural conditions as well as hydrological and statistical data)

				8) Existence of environmental problems (natural as well as social environments) 9) Conditions of public peace and order
3	Despatch of a study team for annual consultation (project confirmation)	Foreign Ministry, JICA	Based on the evaluation results in "2" above, a decision is made on whether to adopt the proposed project after consultation with the requesting country. Depending on the consultation results, an order may be issued to JICA to implement a study.	Countries under an annual consultation arrangement with Japan are informed of the results in "2" above through the local Japanese embassy.
4	Despatch of a preliminary study team	JICA	Prior to the implementation of a full-scale study, a preliminary study is conducted to undertake the following tasks: (1) Prior investigation of the content of the request and the setting of a basic work direction (2) Site surveillance (3) Preparation of a work direction outline (Scope of Work) and consultation (including the requesting country's share of burden and provision of facilities) (4) Preparation and submission of a report incorporating suggestions and recommendations regarding the implementation of a full-scale study.	The preliminary study team is despatched after the embassy obtains confirmation of its acceptance from the requesting country.
5	Composition of the full-scale study team	JICA	(1) For the implementation of a full-scale study, a private-sector consultant is chosen and appointed to undertake the study work under contract. (2) An advisory committee is established as necessary in order to give technical advice to private-sector consultants.	
6	Implementation of full-scale study/on-site survey	JICA (consultant)	(1) The study team (consultant) prepares an inception report through home-based work, incorporating concrete study items, methods and schedule as major components, based on the agreed S/W, etc. (2) On-site investigations are basically conducted on the following items: 1) Explanation of the inception report and consultation 2) Collection of study-related data and information 3) Detailed survey of the area to be covered by the study 4) Examination of natural conditions necessary for technical investigations such as surveying and boring 5) Preparation and explanation of a progress report and consultation.	Prior to the implementation of a full-scale study, the local Japanese embassy issues a verbal note to the representative of the requesting body informing him/her of the commencement of the survey, and receives a verbal note from the other party in reply. With this, an international obligation for the implementation of the survey is considered to be established. Implemented through joint work with counterparts appointed by the requesting country

7	Home-based work	Same as above	A report is prepared on the on-site investigation results, and submitted and explained to the competent authority of the requesting country. For some schemes, such as large-scale projects or those covering a large area, an interim report is usually prepared incorporating the work results up to the establishment of the basic direction of project formulation (e.g. establishment of alternative plans and the selection of an optimum one)	Depending on the project, an interim report is sometimes prepared during the on-site survey.
8	Submission and explanation of an interim report and consultation	Same as above	(1) An interim report is submitted to the competent authorities of the requesting country with consideration made to avoid impediments to the implementation of future work by holding consultation and explaining the results of home-based work . (2) Additional on-site investigations are undertaken as necessary.	
9	Preparation of a draft final report	Same as above	The survey results from each of the above stages are compiled as a draft final report. This report should have accuracy and content suitable to become a final report, without change, if no comment has been made by the requesting country.	
10	Submission and explanation of a draft final report and consultation	Same as above	A draft final report is submitted and explained, while consultation is held asking for any comments from the requesting country.	
11	Submission of a final report	Same as above	A final report is prepared and submitted to the requesting country after any modifications have been made based on the above comments.	

Annex 4[4]

Choice of Technology

- The number of technology options available for selection is very large
- The status of drinking water supply has always been and will continue to be the primary criterion in the choice of technology for environmental sanitation.
- Today, it is accepted practice, however, that many other technical and non-technical factors are considered in choosing technology for environmental sanitation in developing countries.
- The step-wise upgrading of technology is the most realistic approach in the preparation of long-term development plans for sanitation in the developing countries.

4.1 Technology Options

The technology options for environmental sanitation cover a very wide range — from rudimentary open pit latrines, on the one hand, to, on the other hand, water-borne sewerage systems with high-tech technology for the treatment of waste water, followed by the safe disposal or re-use of effluent. Their unit, or *per capita*, initial and recurrent costs, and their managerial, operational and financial requirements, also cover a wide range; a full-scale and high-tech sewerage system may cost as much as 2000 US Dollars *per capita* and more, and will call for a sophisticated organization to operate and maintain it. In contrast, a rudimentary open latrine may cost very little but certainly does not meet most criteria of public health and convenience.

Much research has been undertaken and many books and reports have been published on the technology options for environmental sanitation in the developing countries. One of the first publications of international relevance was the WHO Monograph No. 39, on "Excreta Disposal in Rural Areas and Small Communities", 1958. Many others followed, based on

[4] Source: International Environmental Planning Center, Tokyo, Japan

research by such organizations as the IRC–Water and Sanitation Centre, the London School of Hygiene and Tropical Medicine, the Water Engineering and Development Centre, the World Bank, various bilateral aid organizations, e.g. IDRC, SIDA and the SDC, and a number of research establishments. The WHO updated its early Monograph No. 39 in 1992 and issued additional information recently.

Today, off-site and on-site sanitation stand side by side as the two principle options ready for application. This has not always been the case. Off-site sanitation, of course, is commonly used in the developed part of the world but its cost and other requirements have proven prohibitive in very many cases in the developing countries — even though lending for such system by the international and bilateral funding organizations can be relatively easy. In such cases, the challenge for the planner is to choose from among the options of on-site sanitation with due consideration of the imperatives posed by implementation, operation and maintenance, and funding.

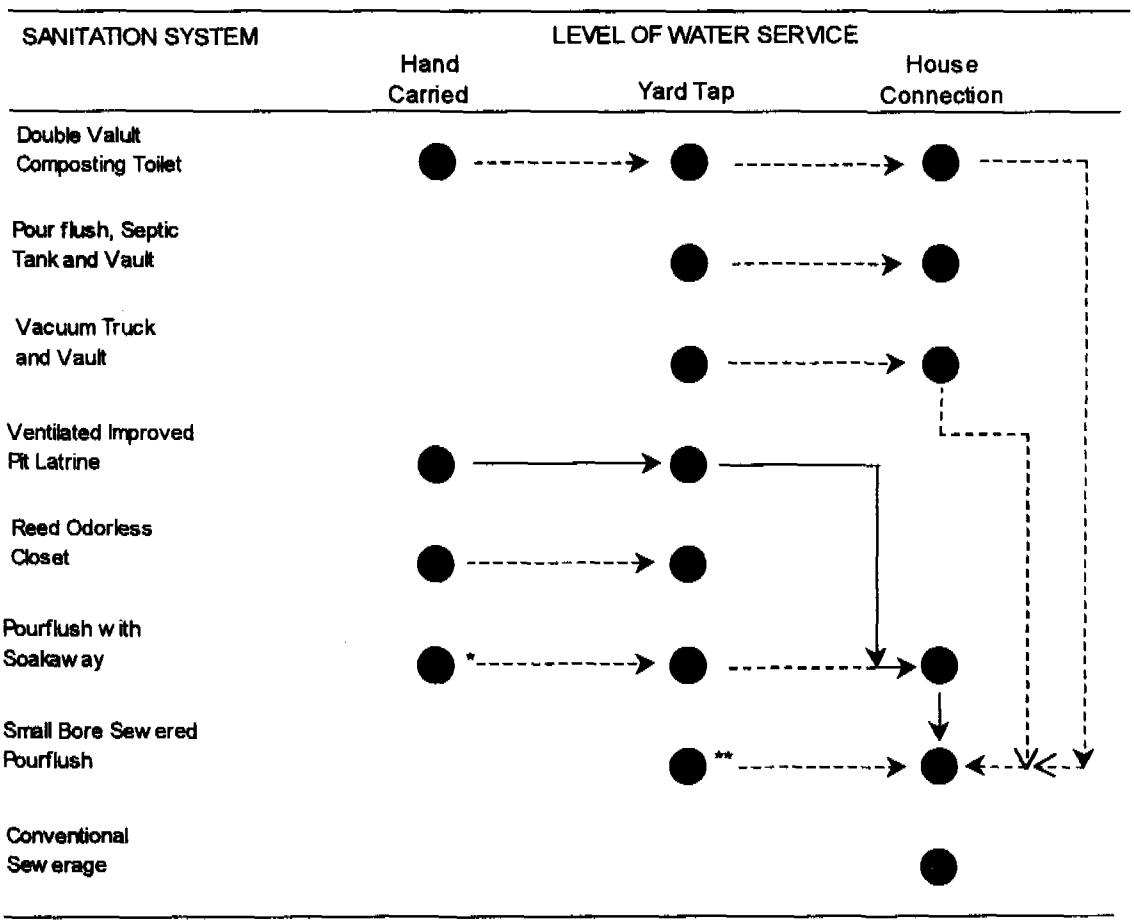
This is not the place to review the literature regarding the technology options for environmental sanitation. Selected references are shown in the "Notes", and additional information is contained in Annex 2.

4.2 Conventional Approach

It is compelling logic that the capacity and the technology of environmental sanitation must be commensurate with the amount of waste water to be handled. Yet, this logic is too simplistic for two reasons, i.e. (i) the system must not only handle waste water (gray water) but, in the first place, human excreta, and (ii) the system must always meet public health criteria in addition to merely handling a certain quantity of water. Thus, it has already pointed out that even if only very small amounts of drinking and household water are available, rudimentary open latrines are undesirable and should be replaced by more sanitary technologies, such as double vaulted composting toilets, Ventilated Improved Pit Latrines, or pour flush latrines with soakaway.

On the other hand, it goes without question that the planning of environmental sanitation should be based on the level of water service, as has been the conventional approach for many decades. It is important to anticipate the future levels of water service rather than accept an existing situation as a design criteria. It should always be assumed that the water services will be improved, even if only gradually. For instance, if the distance for hand-carrying water is reduced by the introduction of a piped supply with public outlets spaced, say, at 200 m, the amount of hand-carried water will thereafter be substantially greater than that in situations where water must be fetched from natural sources over long distances — perhaps miles. Similarly, if taps are installed at or in the yard of dwellings, the amount of water drawn will increase again. Ultimately, if house connections are available, more and more waste water will be produced.

Some criteria for the choice of technology options have been exhibited in Annex 2. More details are discussed in Figure A4.1, which relates sanitation technology to the level of water service to be anticipated in a project area. The Figure demonstrates that several technology options are available whenever water is supplied through yard taps, according to the circumstances. The number of options decreases when house connections are introduced and ultimately, only two broad categories of options remain, i.e. small-bore sewered pour-flush latrines and, finally, a conventional sewerage system.



* Feasible if sufficient pourflush water will be hand carried
** Feasible if toilet wastewater flow exceeds 50 liters per capita daily
Source: Economic Development Institute, The World Bank, Low Cost Sanitation

4.3 Factors Considered Today

In Table A4.1, some of the most common factors are listed that should be considered nowadays when the technology for environmental sanitation is chosen. Obviously, the Table

is a general guideline only, since for each project the planner must decide which of the factors are relevant in the specific case.

Table A.4.1 Factors Commonly Considered

Factors Commonly Considered	
Type	**Factors**
Physical	Aridity Frequency of floods Availability or lack of land Type and design of housing Squatter areas and slums Population density
Environmental	Environmental absorptive capacity Water quality protection
Public health	Contamination of drinking water Endemic diseases Vectors of disease Re-use of waste water Occupational risks associated with nightsoil
Engineering	Status of water supply and its likely future development Water resources Availability of construction material Constraints imposed on construction methods Availability of equipment, pipes and other supplies Availability of labor for construction
Management and finance	Availability, or lack of it, and source of funding Willingness of the beneficiaries to pay Capacity of the management organization Participation of the beneficiaries O&M requirements Degree of sustainability Private sector participation
Sociocultural	Perception and response of the beneficiaries Insufficient appreciation by government and foreign Consultants of cultural factors Participation and community action for O&M

4.4 Step-wise Upgrading of Technology

4.4.1 Need for Step-wise Improvement

Appropriate sanitation systems shown in conventional guidelines do not normally reflect the time required to develop water supply and sanitation in a developing country to the "desirable" level — which often is more than 10 years, or even a couple of decades, because of tight financial situations and other constraints. It is important, therefore, to pay attention not only to the final goal but also to the intervening process and necessary steps to arrive at that goal.

In the development of appropriate sanitation, there are always two major alternatives, i.e. off-site sanitation and on-site sanitation. (Each offers several options within itself.) The selection among these two basic categories is always controversial because, on the one hand, the people and the recipient usually prefer the installation of an off-site system; whereas, on the other hand, the lack of money, the operational and maintenance implications of technology, and the lack of cost-sharing render such systems infeasible in many situations prevailing in developing countries. Even if the users can afford to pay for off-site sanitation, it may be many years before tertiary sewers reach the beneficiaries. Thus, a "second best" solution may be required for the intervening period of time..

Three terms are used in the following paragraphs:

- Should-be picture — This would be the "desired" solution. For example, in densely populated area, the should-be picture would be a conventional system of off-site sanitation or, perhaps, low-cost sewerage. In rural areas, it would be VIP-latrines or other on-site systems. But in both cases, the should-be picture is the "ideal" solution chosen without due consideration of the time it may take to achieve this goal.
- On-the-way picture — This would be the practical and appropriate intermediate solution. For example, wherever the should-be picture is an off-site system, the on-the-way picture may involve some temporary use of on-site technologies, during a period of time, while the off-site system is gradually introduced.

- Step-wise improvement

This concept, introduced by the International Environmental Planning Center of the University of Tokyo, implies that the development plan (i) responds to the most pressing needs and (ii) makes the best use of available resources by defining the most feasible on-the-way technologies or improvements which will finally lead to the should-be picture. This implies:

1) Step-wise improvement must address the health implications of intermediate solutions in the light of current health states, especially the degree to which they are determined by the current state of environmental sanitation. Health indicies must be used to evaluate these implications in the first instance rather than environmental ones, i.e. the fecal coliform contamination should be considered rather than the biochemical oxygen demand (BOD).

2) Step-wise improvement is different from part-by-part improvement, since its steps imply the gradual upgrading of technology — as is implied in the example used in the explanations for "Should-be picture" above, i.e. the gradual change-over from one technology to another in keeping with resources available, rather than the introduction of the "final" technology according to a phased construction schedule. Obviously, therefore, step-wise improvement requires careful attention to avoiding "double or repeated investment" and also to the economics of deferred investment.

4.4.2 Identification of the Should-be Picture in Japanese Experience

An important step in the definition of the should-be picture is the "demarcation" of, respectively, the off-site part and the on-site part of the project area. After the demarcation, specific technologies would be reviewed for both parts and the most appropriate chosen.

In Japan's domestic programme for environmental sanitation, off-site technologies are usually applied in urban areas. However, in peri-and suburban areas, the difference in cost-effectiveness between off-site and on-site sanitation must be studied. Planning methodology for the demarcation has been established by the Ministry of Construction.

Each prefectural government, together with the municipalities, makes area maps on which on-site and off-site areas are demarcated for each inhabited sector, including small communities. On-site sanitation is usually by combined *Jokasos* (in-site treatment of nightsoil and gray water) whereas off-site sanitation normally implies the use of a conventional sewerage system. The methodology rests on cost comparison over 30 year of the initial investment cost and the cost of operation and maintenance of the two technologies. In this context, it is assumed that the lifespan of on-site sanitation is 15 years and of off-site sanitation 30 years. In the case of off-site sanitation, construction costs include both the sewer network and the sewage treatment plant. After the cost comparison, the most economical alternative overall is chosen as the should-be picture.

4.4.3 On-the-way Picture

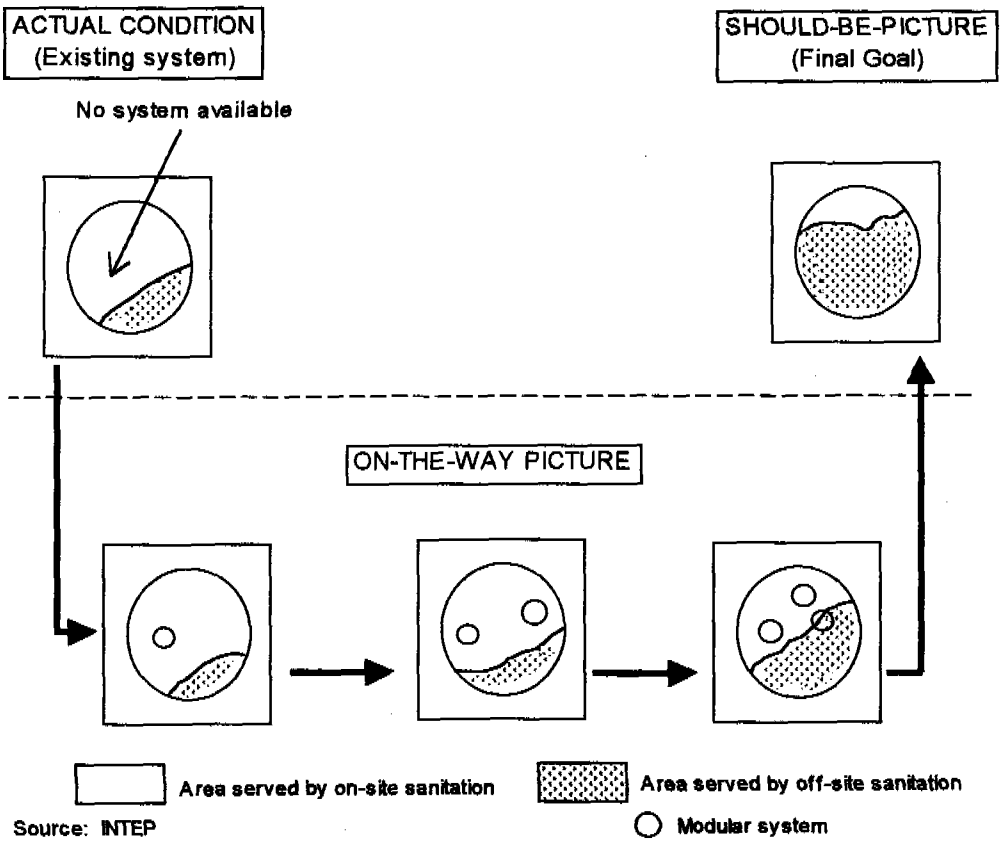
According to the concept of "Some for All rather than More for Some", the should-be picture may need to be scaled down and temporary systems introduced for the time being. This is the essential concept of "step-wise improvement". Figure A4.2 exhibits this approach, which may imply the following steps:

- Prevention of the discharge of human excreta into the environment by prohibiting open defecation or the use of "over-hung latrines".
- Installation of public toilets or individual on-site sanitation (e.g. pour-flush toilets with septic tank or leaching pit if no appropriate system for the treatment of sludge is available).
- Investment in desludging equipment and facilities for servicing individual on-site sanitation.
- Gradual development of the total area, and construction of temporary small-scale treatment facilities.
- Connecting temporary treatment facilities to the final off-site system.

In Figure A4.2, the temporary small-scale treatment facilities are shown as small circles and identified as "Modular systems" in the legend. The purpose of step-wise improvement is to maximize the benefits by the best spatial and time-wise allocation of available resources, and with due regard to the specific circumstances of the project, especially the health implications. This approach is not without risks, however, and requires careful planning of investment and the avoidance of "double or repeated investment". Planning will be facilitated by a choice of technology based on the following considerations:

- The choice of technology must also include respectful consideration of locally existing technologies, and should not be a total "transfer" by the external aid organization.
- Maximum use of locally available materials and labour is desirable.

- Technology and methods should encourage participation and self-help.
- Past performance should be looked at, of similar projects under similar conditions in that country.
- Capacity for O&M could be a limiting factor.
- Willingness and ability of the beneficiaries to pay and participate in cost-sharing affects the pace of transition.



Annex 5

Social Studies

In Sections 4 to 8, a case was made for the study of the societal aspects of every project for environmental sanitation. The purpose of such studies is:

- to obtain basic information for the preparation of the project;
- to identify questions requiring answers during the preparation of the project;
- to identify, plan and implement project support measures;
- to enable post-evaluation; and
- to identify research and information activities to be carried out in conjunction with the project.

> Social studies cannot be planned and carried out in the consultants' home office. They involve local investigation and consultation with the people in accordance with local traditions.
>
> The subjects investigated will normally encompass the beneficiaries, the best form of their participation, the choice of technology, cost recovery, empowerment, integration with other measures, and the social factors contributing to the risks of the project.

Basically, social studies deal with people — population groups and the way they are organized, act and interact. Thus, social studies are only one aspect of project planning and design. The others are the technical, economic and financial, and managerial studies undertaken in the course of the development of a project for environmental sanitation.

5.1 The Planning and Implementation of Social Studies

No single model is available for the planning and implementation of social studies. But there are universal requirements, e.g.:

- The studies cannot be planned and implemented in a vacuum. Planning must involve the target population itself and the implementation must be on-site.

- The method of the study must be culture-specific, especially as concerns the process of interaction with the target group, and not forgetting the women. Gender bias can doom sustainability. Consultation with all concerned should therefore be the key operational approach.

- The degree of government participation must be determined by country-specific factors.

- Social studies cannot be successful unless they are conducted with the full and active participation of local, and — in many cases — non-governmental and female investigators; you need the informal leaders on your side, not in opposition.

- Every social study, in addition to yielding information, should be designed to be a means to motivate participation.

5.2 Subjects for Study

What follows is a listing of subjects that often require social studies, although others may be added to the list in accordance with the needs of each specific project. Eight subjects have been derived from the points made in relation to social matters in Sections 7 and 8. For each subject, a few items are listed to which the studies might give particular attention. The lists are "by way of examples" and cannot be more than general suggestions for the planning of the studies. In any case, it should be borne in mind that each study must be planned in light of the local conditions it will address, so that its outcome will allow the design of tailor-made project-support measures and/or serve as genuine guidelines for the planning and design of the project as a whole. Many of the items relate to several of the subjects listed.

Many, if not most of the subjects listed below, relate to the beneficiaries and how they can be motivated to take an active part in the preparation, implementation and subsequent O&M of the project that is being elaborated. As has been pointed out in Chapter 8.3.5, their sufficient level of awareness of the problems, benefits, and solutions regarding environmental sanitation is an important prerequisite in motivating them. Health education is considered the essential instrument for motivation. Therefore, health education may in itself be a subject for study — in which case, items listed below under numbers 5.2.1 through 5.2.7 would be studied in addition to health statistics and population data related to the communicable diseases originating from the environment.

5.2.1 Beneficiaries (Target Group)

Projects cannot be planned without a wide gamut of information on the beneficiaries, both as individuals and as part the community. The items for study include:

- Demography.
- The distribution of health states.
- Literacy.
- The awareness, understanding and perceptions of the beneficiaries with respect to hygiene and health, their preferences and felt needs, and the priorities they give to environmental sanitation *vis-à-vis* other needs, and why.
- Misconceptions.
- If there is a lack of understanding, the reasons for it.
- The sanitary behaviour at the level of the individual and the family.
- The attitudes towards ownership and participation.
- Gender roles.
- Income levels and other socio-economic factors, and their distribution.

5.2.2 Form of Participation

Participation may "make or break the project". A great deal of specific, localized information is needed for promoting and achieving it, e.g. what is:

- The understanding of participation on the part of the individual and the community and of what may be involved, e.g.: decision-making, cost sharing, contractual obligations, labor.
- The degree of social readiness to accept responsibility for communal affairs.
- The underlying social structures, and the implications of the country's legal and political system.
- The tradition with respect to ownership.
- Other facilitating factors and constraints.

5.2.3 Choice of Technology

The planner must choose technology against the background of people's perceptions. To make a judgement, information must be available on, e.g.:

- The people's perceptions and expectations with respect to the range of possible technologies *per se*, their optional service levels and of their costs and methods of funding.
- Past experience with sanitation technology.
- The implications of alternative technologies with respect to the readiness for cost sharing.
- The variations between high-income *versus* low-income groups.
- The implications of O&M requirements.

5.2.4 Cost Recovery

Cost recovery is the acid test for the quality of the project and its preparation. It takes into account, *inter alia*:

- The beneficiaries' awareness of the risks of bad environmental sanitation, and of the benefits that can be accrued with good environmental sanitation.
- The value of privacy.
- Understanding of the technical options, their respective costs, and available funding.
- Acceptance of the need for cost sharing and financial participation.
- The history of cost sharing in other fields.
- The beneficiaries' income and income distribution.
- Affordability and the people's willingness to pay, and cost distribution within the community.
- Incentives required, e.g. credits for latrine components or house connections.

5.2.5 Empowerment

The factors facilitating or constraining community management of environmental sanitation must be very well understood by the planner, e.g.:

- The existing social organization, its strength and weaknesses.
- The influence of the country's legal and political structure.
- The degree of readiness and the capacity of the community and local organizations.
- Government structures in the sector and related sectors.
- Miscellaneous facilitating factors and constraints.
- Synergistic effects of linkages with other developmental measures planned or under way.
- The presence of the private sector.

5.2.6 Integration

Integration with other developmental measures to improve health and hygiene, especially water supply, food, solid waste, environmental pollution, and water resources protection.

Benefits may be offered by linking environmental sanitation with other development measures, although, without a full understanding of the situation by the beneficiaries, no effective linkages can be proposed. Points to be explored include:

- General hygiene practices at the levels of the family and the community and their respective impact on health.
- Health implications of prevailing conditions.
- Perceptions and preferences of the beneficiaries as to the priorities among the above.
- Opportunities offered by other development measures in the project area.
- The role of schools.
- Synergistic effects.

5.2.7 Risks

Prior risk assessment is an imperative for the sustainability of sanitation projects but cannot be undertaken without information regarding the beneficiaries and the community. This may involve:

- Their general literacy and especially health literacy.
- Their sanitary behavior and perception of cleanliness.
- The existing conditions regarding the up-keep of present sanitary facilities by the beneficiaries.
- The degree of motivation of the beneficiaries.
- The effectiveness of community structures.

5.2.8 Research and Information Activities

For monitoring and follow-up, research and information programmes may be needed if so indicated. The following social factors may be included:

- Health states and their stage of evolution.
- Sanitary behavior and changes occurring in it.

Annex 6[5]

Financial Analysis and Cost Recovery

Financial analysis is undertaken to determine the financial features of projects, including how revenues are created to meet the annual cost.

Financial analysis is essential to projects whether funded through loans or Grant Aid. It will provide the information for establishing the total financial and economic costs of the project. It should also be used in selecting the best project alternatives.

Financial analysis includes selection of the best method of raising revenues to cover all or part of the costs of the project.

The funding agencies require that effective financial management be developed during the preparation of projects for subsequent funding.

The method described hereafter represents good management but must be scaled down in the case of on-site sanitation.

6.1 General

The overall objective in financial management is to maintain cash liquidity. However, in real life, this objective is often not achieved when dealing with environmental sanitation, and it is for that reason that international and bilateral funding institutions hesitate to make loans. They fear that the projects, once built, may fail to perform because revenues are below expected levels. Some of the common errors found in the financial management of environmental sanitation and their effects on the performance of projects are exhibited in Tables A6.1,A6.4 and A6.5.

[5] The permission of WHO to make extensive use of "Financial Management of Water Supply and Sanitation" (Geneva, World Health Organization, 1995) is kindly acknowledged.

The International Drinking Water Supply and Sanitation Decade provided ample proof that sharing costs between government and beneficiaries is not only essential but also feasible. Financial analysis, both of project alternatives and of the proposed project, is the tool necessary for arriving at a practical arrangement under which the beneficiaries will be able to financially participate. The operating organization or the involved government agency, for their part, must focus on cost containment on the investment side and on consultation with the beneficiaries to determine their willingness to pay. A rate or tariff structure should assure that expenses are covered.

6.2 Financial Analysis

Financial analysis should start when the alternatives for achieving the project's objectives are investigated. The analysis should cover construction, O&M, and calculation of the total annual cost. Of course, at this stage, only rough and preliminary estimates are available since implementation design has not yet started. Construction costs would be divided into foreign and local cost, and the local cost should be divided into cost covered both by cash and in kind, i.e. divided into capital, material, and labor cost, including labor provided by the beneficiaries. The latter must also be considered when the beneficiaries assume part of the cost of operation and maintenance.

On the basis of the above information, the total annual financial cost can be estimated. The cash expenditure must include interest payments on foreign and local loans. The estimate of the total annual cost, in local currency, will then allow calculation of the amount to be recovered from the community. Should this show that full recovery will not be possible, changes in the scheme must be made, including a reduction in cost and/or shifting capital cost from loans to Grant Aid.

After the best technical solution for achieving the project's objective has been selected, full and precise financial analysis can begin, using the format presented in Table A6.2. The analysis will be based on (i) financial data derived from preliminary engineering designs rather than being preliminary estimates only, and (ii) revenues which can be realistically expected. In this context, the total financial costs are made up of three components, i.e.:

- Capital cost, which is the sum of interest, repayment and depreciation;
- Costs of running the system and producing its output, including the cost of materials, consumables, spare parts and miscellaneous services and contracts; and
- Personnel expenditure and general overhead.

As part of a full analysis, the economic costs of the project are also of interest, especially if the project competes for national and/or external resources, either with other projects for environmental sanitation or with projects in other sectors. The economic cost is different from the financial cost because it measures the cost to the country of making available

environmental sanitation. In other words, the financial cost of the project is made up of the three components listed above, whereas the economic costs contain only those elements that could have been otherwise utilized if the project had not taken place, such as:

- Cost of capital — at the rate of return at which the money could be invested in other projects for environmental sanitation or in other sectors;
- Cost of construction, O&M, equipment, personnel, goods and services, evaluated in economic terms and reflecting the actual use of resources; and
- Value of time if expenditure had been postponed.

The average incremental cost (AIC) is a useful indicator for tariff setting, in the case of off-site environmental sanitation. Similarly, the internal rate of return (IRR) of the project is an indicator for comparing the proposed programme with a number alternatives. The IRR is the discount rate which the sum of discounted cost increases and discounted service increases so that the present cash flow is zero. A format for the calculation of the AIC is contained in Table 3.

6. 3 The Creation of Revenues

The raising of revenues is a matter requiring consultation with the beneficiaries so as to determine the best method or mix of methods, e.g.:

- Community fund raising: beneficiaries finance or partly finance the project by contributions to various community funds or payment of taxes, especially for projects where all households are provided more or less identical environmental sanitation (where a mix of on-site and off-site sanitation and/or a variety of service levels are proposed, user charges to reflect these differences in service will be usually more appropriate).

  For community fund raising, a number of options exist, e.g.:

  - ad-hoc contributions
  - revolving funds;
  - communal revenue levies; and/or
  - cooperative unions.

- Indirect taxes: this method is not advisable for communities without an adequate taxation base and effective tax collection. Where indirect taxes are used, it must be assured that the funds collected for the project will unfailingly be transferred from the taxation agency to the operating agency (this is often not the case).

- User charges: they are made after the system has been built and put in operation. They can be:
  - connection charges in the case of off-site environmental sanitation, and for on-site systems which receive a loan or grant and/or which are serviced regularly by the operating agency;
  - fixed charges levied on households depending on the number of people in the household and/or the drinking water consumed. They may be applied in the case of both off-site and on-site systems.
- Contributions in kind, e.g. latrine construction and/or maintenance.

Consultation with beneficiaries must include a study of their willingness to pay. The study of the willingness to pay for environmental sanitation is inextricably linked with the beneficiaries' perception the benefits which can be accrued from improvements in individual and public health and the quality of life. In most cases, therefore, research for the study of willingness to pay will involve a number of project-support measures of the kind discussed in Chapter 8.3.4.

6.4 Ensuring Effective Financial Management

The project proposal submitted for appraisal by the prospective funding agency or agencies will exhibit institutional and managerial arrangements made for the financial management of the system. This will include:

- Arrangements for the mobilization of the financial, physical and human resources required during construction and operation.
- Systems for recording, accounting and monitoring of the project's financial management, and for assessing its efficiency in the use of resources.

This implies that:

- Appropriate institutional development has taken place during the preparation and/or implementation of the project, including human-resources development;
- Accounting systems are in place to:
  - enable financial decisions;
  - indicate the level of efficiency in use of resources;

- determine to which extent the needs of the community have been met; and
- to keep account of cost recovery.

The choice of accounting system must be made dependent on the circumstances and the capacity of the institution. A minimum system may simply be a cash book in which all financial transactions related to the running of the system are recorded, together with a simple log of payments and receipts. A full system may be much more detailed and record investments and show how they have been financed, i.e. allowing the preparation of standard financial statements as they may be required. Ultimately, electronic data processing may be chosen. In each case, however, a procedures handbook must be established before the project is submitted for appraisal, containing instruction on standard practices and being suitable for training the staff of the operating agency.

All this will culminate in the preparation of annual financial statements made in accordance with legal and audit requirements, and will provide information for the planning and operation of the facility and its future expansion. The accounting system should comprise:

- balance sheets;
- income and expenditure statements;
- statements of sources and application of funds;
- cash flow analysis;
- details on debtors and creditors; and
- other management information reports as required.

It should be borne in mind that the information contained in the above reports will also be needed to inform the community and the beneficiaries on a regular basis. Typical formats for a balance sheet, a statement of income and expenditure and on the sources and the application of funds are each contained in Tables A6.4, A6.5, and A6.6.

6.5 Scaling Down the Analysis in the Case of On-site Environmental Sanitation

The difficulties associated with the funding, operation and maintenance, and timely replacement of on-site sanitation must not be considered sufficient reason for foregoing a financial analysis of such projects. Financial analysis should always be obligatory. But the analysis can be scaled down in the case of on-site sanitation by taking into account:

- the small investment usually needed for on-site sanitation as compared with off-site projects;

- the high ratio of funds needed for, respectively, software components *versus* hardware components;

- the high proportion of funding by the beneficiaries themselves in many cases, both with respect to initial investment and to operation and maintenance;

- the need for simple and community-based management which often must "learn by doing" in a cultural environment where people may look at government as being the sole provider of sanitation and which, thus, is not conducive to the application of strict financial and lending practices.

In light of the above, scaling down the financial analysis is necessary. This implies that the analysis is carried out in considerably less detail and on the basis of rather rudimentary data only — without, however, sacrificing the principles of financial analysis. Primary consideration should be given in that context to the following, at least:

- Repayment of financing that the beneficiaries obtained for construction of the on-site facilities, even if Grant Aid is involved;

- Payment for any services provided by the local or other organization, or from the private sector, e.g. during construction, and for operation and maintenance, including the relocation of latrines after they are full, the desludging of septic tanks, or the regular servicing of the on-site facilities; and

- Creation of programme/project reserves for extensions, replacements and technological up-grading.

Consequently, the minimal analysis would focus on:

- the annual income, expenditure and cash flow of the organization (Table A6.2);

- a statement on the sources and application of funds of the organization (Table A6.6); and

- the preparation of balance sheets.

Accordingly, the analysis will not include calculation of the AIC and the IRR, nor the economic costs of the project.

Table A6.1 Common Errors in Financial Management and their Effects

Common Errors in Financial Management and their Effects	
Error	Effects
A. Financial & management accounting	
No clear accounting policies in place Backlog of accounts and regular reports allowed to build up Poor budgeting and budgetary control Lack of qualified staff Poor communication within the organization	Consolidation of information from different regions/offices is impossible Information available to managers is too little, inaccurate or late, so that they are unable to make soundly based decisions The effectiveness of the use of resources cannot be assessed.
B. Cash management	
Inadequate management information or financial planning leading to inadequate information on short- and long-term cash needs Inadequate links between cash-flow systems and budgeting systems means that cash requirements cannot be anticipated and provided for	*Either* Shortage of funds to make scheduled payments, e.g. to suppliers or repayments of debt Need to recover short-term deficits through expensive short-term borrowing *Or* Excessive surplus cash holdings, suggesting inadequate investment procedures and absence of financial planning
C. Tariff and charging policies	
Failure to understand the cost structure of the service provided Failure to understand the different types of consumers and their service requirements Failure to understand the behaviour of consumers in response to changes in prices Failure to undertake financial planning	Revenues do not cover costs, leading to liquidity problems — operating costs, debt service payments or working capital requirement cannot be covered The social objectives of the service may not be achieved
D. Billing and collection	
Inflexible and inappropriate payment arrangements for customers Inadequate management information does not identify debtor accounts Failure to take account of customer complaints Failure to take action on overdue accounts Late billing because of ineffective arrangements for revenue collection Inadequate accounting for bad debts	Poor and ineffective billing and collection leads to high levels of accounts receivable, and the expenditure of too much money on the procedures themselves, thus using up scarce resources and threatening the liquidity of the service

(continued on next page)

Common Errors in Financial Management and their Effects

Errors	Effects
(continued)	
E. Asset management	
Inadequate or inappropriate records of assets Failure to ensure efficient use of assets Failure to optimize life of assets through consideration of costs of maintenance and replacement Failure to adequately maintain assets	Financial statement may not reflect the true value of the assets to the service Wrong decisions may be made concerning the need to replace assets The depreciation allowance may be wrong, leading to longer-term problems of adequacy of revenues to cover costs and provide for service extension
F. Information technology (IT)	
Failure to address the proper role of IT Failure to include it in IT budgets, and inadequate allocation for support and training	Overinvestment or underinvestment in an IT system, its support and training requirement Selection of an IT system that does not improve customer service in a cost-effective manner
G. Procurement and inventory management	
Lack of clear strategy for procurement Inadequate storage capacity Opportunities for economies of scale in procurement are not used Purchase lead times not taken into account Inappropriate stores-valuation procedures followed	Inappropriate levels of stock: levels that are too high lead to wastage of money, in particular scarce foreign exchange, and perhaps to pilferage and wastage of stock; those that are too low hamper other parts of the operation of the service, e.g. maintenance
H. Capital structure	
Failure to determine all sources of finance and their terms Failure to take a long-term view of the implications of different types of financing Failure to address the appropriate mix of debt and equity	Failure to meet debt service payments, or to be able to sustain working capital requirements Failure to ensure sufficient return on capital
I. Organization of the finance function	
Failure to ensure that the organizational structure of the finance section is compatible with the aims of the finance function, e.g. with regard to reporting arrangements, information flow, manpower and skill levels	All other areas of financial management are hindered by inappropriate organization, as a result of inadequate information, reporting, manpower and skills, or possibly excessive costs incurred by the finance section

Source: WHO (1995). Financial Management of Water Supply and Sanitation. Geneva, World Health Organization. 101 pp.

Table A6.2 Calculation of Project Cash Flow

Calculation of Project Cash Flow				
	Year 1	Year 2	Year 3	Year 4
Construction cost:				
Foreign exchange				
Local component				
Financing:				
Foreign loan				
Local loan (from government)				
Government grant				
In-kind contribution = community fund				
Foreign loan:				
interest				
repayments				
Local loan:				
interest				
repayments				
Debt service and replacement				
Wages:				
skilled labour				
unskilled labour				
Wastewater treatment				
Other				
Operation and maintenance				

Source: ibid.

Table A6.3 Calculation of Average Incremental Cost

Calculation of Average Incremental Cost				
Item	Year 1	Year 2	Year 3	Year 4
Construction costs (financial)				
Foreign currency				
Foreign cost (adjusted)				
Local cost				
Total construction cost (economic)				
Replacement costs (financial)				
Foreign currency				
Foreign cost (adjusted)				
Local cost				
Total replacement costs (economic)				
O&M cost (financial)				
Skilled labour at market cost				
Unskilled labour at market cost				
Skilled labour at economic cost				
Unskilled labour at economic cost				
Water treatment				
Other				
Total O&M costs (economic)				
Total undiscounted costs				
Discount factor				
Discounted capital costs				
Discounted replacement costs				
Discounted O&M costs				
Total discounted costs				
Production				
Discounted production				
Sales				
Discounted sales				
Sum of discounted costs				
Sum of discounted production				
Sum of discounted sales				
AIC				

Source: ibid.

Table A6.4 Balance Sheet

Balance Sheet				
	Year 1	Year 2	Year 3	Year 4
Assets				
Gross book value				
Less cumulative depreciation				
Net fixed assets				
Work in progress				
Cash and bank deposits				
Accounts receivable				
Inventories				
Other (prepayments)				
Total current assets				
Liabilities+ equity				
Retained earnings				
Government equity				
Community funds				
Total equity				
Foreign loans				
Local loans				
Total long-term liabilities				
Accounts payable				
Deferred taxes				
Overdraft				
Debt-service arrears				
Total current liabilities				

Source: ibid.

Table A6.5 Income and Expenditure Statement

Income and Expenditure Statement				
Item	Year 1	Year 2	Year 3	Year 4
Income				
From desludging				
From flat rates				
From connections				
Total sales				
Interest received				
Total income				
Expenditure				
Wastewater treatment				
Labour				
Other				
Total				
Operating surplus				
Depreciation allowance				
Profit before interest and tax				
Interest				
Net profit before tax				
Tax				
Net profit				

Source: ibid.

Table A6.6 Statement on the Sources and Application of Funds

Statement on the Sources and Application of Funds				
Sources				
Profit before interest and tax				
Depreciation allowance				
Internally generated funds				
Foreign loans				
Local loans				
Overdraft increases				
Government grants				
Community funds				
Total external funds				
Applications				
Construction or replacement				
Interest				
Repayments				
Arrears				
Tax				
Increase in cash				
Increase in noncash working capital				

Source: ibid.

Annex 7

Selected Parameters for the Appraisal and Evaluation of Projects for Environmental Sanitation

The appraisal and evaluation of a proposal to undertake and finance a Project is the acid test in the life of that Project. It clears the way for approval by the funding agency, and for subsequent negotiations with the recipient. Many different sets of parameters have been included in the guidance issued by some of the aid organizations for the preparation of the appraisal reports, which most of the organizations require before they decide to support a Project.

The appraisal report is normally prepared by the technical staff and economists of the organizations to whom the Project is submitted for funding. Sometimes, representatives of other disciplines may also be involved, e..g. sociologists, social anthropologists, and/or political scientists. The important point to note is that the appraisal and evaluation are in-house matters and are never passed on to others.

Some of the organizations have chosen to issue guidance for project appraisal and evaluation in a generic form, others opt to cover very specific parts of the appraisal, e.g. financial, economic, institutional and gender-specific appraisal, or with respect to sustainability or operation and maintenance, e.g. the World Bank. In a number of other cases, checklists or screening formats exist for pre-appraisal and appraisal, e.g. in GTZ and DGIS. The OECD has issued DAC Principles for Effective Aid which include the essential points of project appraisal, e.g. technical, financial, economic and institutional, and the identification of the target groups, social and distributional analysis, and environmental impact.

Of greatest interest are the few guidelines which have been established specifically for the appraisal of projects for environmental sanitation, e.g. those published by the KfW and the European Union, and, to some degree, by the BID.

The guidance issued for project evaluation is also of interest. WHO issued Minimum Evaluation Procedures during the International Decade, giving emphasis to assuring the

appropriate use and social impact of systems for water supply and environmental sanitation. A general evaluation handbook and a guide to performance measurement have been published by US/AID, and a handbook on social development by ODA. SIDA has made available an evaluation manual, and in the Swiss Policy Paper for Water Supply and Sanitation (SDC) some checklists and indicators are listed.

By implication, all of the above are also guidelines for the preparation of projects for environmental sanitation in the developing countries. Though they have been issued as guidance for use during subsequent stages of the project cycle, i.e. appraisal and evaluation, they also indicate the information already considered essential at the stage of project formation, especially for the preparation of master plans or feasibility studies.

In the following pages, the parameters for appraisal and evaluation are exhibited in some detail, serving as a demonstration of the types of methods used by six rather different organizations. They vary greatly in scope and detail. For full detail, the individual references should be consulted.

Table A7.1 Japan Overseas Economic Cooperation Fund (OECF)[6]

OECF	
1. National economy and national development plan	
Geographic natural environment	Historical social environment
Present situation of the national economy and problems	Development policy and plan
2. Background and necessity of the Project	
Background	Necessity
Present situation of demand and supply	Demand and supply forecast
3. The Project	
3.1 Basic plan	
Location requirements of the Project	Scale and timing of implementation
Style of Project	Plan of main facilities
Basic design	
3.2 Project cost and financial plan	
Coverage of Project cost	Standard of cost estimation
Domestic and foreign money	Points of evaluation of Project costs
Finance method	Financial plan
3.3 Implementation and management plan of the Project	
Operational institution and staff	Contractor and Consultant
Supply of machinery and materials	Construction plan and work schedule
Operation and management plan	Institution of operation and management
4. Evaluation	
4.1 Financial evaluation	
Profit analysis	Scope and calculation of cost and profit
Evaluation of the internal rate of return	Payment plan
4.2 Socioeconomic evaluation	
Evaluation of national economy	Quantitative and qualitative analysis
Economic evaluation	Social evaluation
4.3 Environmental evaluation	
4.4 WID	
5. Management of the proposed Project	

[6] Extracted from: Operational Guidance on OECF Loans, OECF, Tokyo

Table A7.2 Directorate-General for International Cooperation (DGIS), The Netherlands[7]

DGIS	
1. Overall Policy Check	
Project contributes to priority goals of recipient country	Project fits into the Netherlands' Country Policy Plan
Project complies with the Netherlands' Sector Policy (see 4., below)	Target groups and beneficiaries identified
Data available on poverty, WID, environment and indicators established	Target group has participated in preparing the Project
Project complies with DAC-WID principles	
2.. Assessment of effects on poverty, WID and environment	
3. Assessment of feasibility and sustainability, e.g.:	
Technical feasibility	Financial cost-benefit analysis
Economic cost-benefit analysis	Institutional feasibility
Socio-cultural feasibility	Sustainability analysis
4. Principles of the Netherlands' sector policy	
Coordination with other sectors and water users	Strong institutions
Cost recovery for autonomous operations	Community participation and management
Integration of water supply with sanitation, hygiene education and environmental protection	Use of an appropriate technology
Coordination between donors and multilateral organizations	

[7] Extracted from: Development Screening, Three Parts, DGIS

Table A7.3 ODA[8]

ODA	
1. Overall: all submissions for approval must address:	
Benefits for the poor Population component, whenever practical	The role of women
2. For investment projects:	
Conditions essential for the Project's success (must be monitorable and enforceable)	The main components of the Project and the allocation of aid between them
Background of the Project, e.g.: Compatibility with aid policy Pre-investment work to date	Compatibility with country's development policies/programmes
Technical appraisal Proposed design and standards Cost effectiveness of proposed solution Difficulties encountered in the design Reliability of cost estimates Risks associated with implementation	Economic justification, e.g.: Cost benefit and cost-effectiveness in social-opportunity-cost terms Least-cost means to achieving stated objectives? Net present value
Environmental appraisal	Labor inputs and services required
Financial appraisal, e.g.: Financial flows arising from the Project, including O&M Reasonableness of financial policy Operating enterprise's financial sustainability Financial viability of the Project Financial management of operating enterprise	Social and institutional appraisal, e.g.: Impact on poverty Impact on participation Will Project disadvantage any section of population? Impact on gender roles and needs of the beneficiaries Formal and non/formal institutions with the Project, with justification of the chosen approach Institutional effectiveness and efficiency
Arrangements for the operation of the completed Project, e.g.: Obligations of recipient and responsible agency Arrangements of management and training Arrangements for maintenance and sustainability Supporting technical cooperation	Finance for capital and technical cooperation costs Arrangements for implementation
Arrangements for the operation of the completed Project, e.g.: Obligations of recipient and responsible agency Arrangements of management and training Arrangements for maintenance and sustainability Supporting Technical Cooperation	
3. Performance criteria for evaluation	
Vis-à-vis ODA's priority objectives Economic liberalization Enhancing productive capacity Good governance Poverty impact Human resources: education Human resources: health Human resources: children by choice Environmental impact Impact on women	Project effectiveness Social impact Institutional Impact Technical success Time management within schedule Cost management within budget Adherence to Project conditions Financial rate of return Economic rate of return Financial sustainability Institutional sustainability Overall sustainability

[8] Extracted from: Guide to Aid Procedures, Section G, and Guide to ODA Evaluation Studies, ODA, London, respectively June and August 1994

Table A7.4 Kreditanstalt für Wiederaufbau (KfW)[9]

KFW	
1. Problem analysis	
General framework and developments in the sector	Regional and local background of the Project
Justification	
2. Problems to be addressed through the Project	
Technical scope	Planned developmental impact
Expected demand and proposed levels of service	Compatibility with sector policy
3. Objectives, target groups and developmental framework	
Achievement of overall goals	Demand and feasible objectives, and indicators for measurement
Target group	Compatibility with sector and general policy
4. The planned intervention	
Previous KfW supported measures	Relation to measures supported by other organizations
Intervention and result Targets and time horizons Possible alternatives Rationale of the selected alternative Software components Choice of the technology Risks	Implementation, e.g.: Capacity for subsequent O&M Participation in O&M Risks
7. Borrower and executing agency	
The borrower	The executing agency Legal status, functions and programmes Relations to target groups Economic and financial capacity Capacity to sustain the system
6. Costs and financing	
Total costs, e.g.: Investment costs, per-capita costs and costs of software components Basis for estimation	Financing, e.g.: Appropriateness, distribution and budgeting Participation of target group
7. Effectiveness and overall risks	
Impact on the local economy, e.g.: The effective costs of the Project Cost recovery Economic and financial feasibility	Impact on the national economy The Project in the national resources context National water resources context Urban and regional development context
Socio-economic impact, e.g.: For target groups Low-income groups Replicability WID	Socio-cultural impact, e.g.: Changes in perceptions Participation
Ecological impact, e.g.: Environmental impact assessment Risks	

[9] Extracted from: Appraisal Guidelines for Waste Water Projects, KfW, Frankfurt, 1995

5. The World Bank[10]

The World Bank	
1. General	
Basis for decision	Consistency of components
Facilitates evaluation	
2. Economic aspects	
Appropriate use of countries' resources	Fits sectoral plans, not just for "viability" and "optimality"
When inappreciable, anticipated Project revenues may serve as proxy	Reduction of income disparity and poverty alleviation
3. Technical aspects	
Sound engineering	Estimates of investment and operating costs
Minimum needs: good feasibility study and preliminary design	If necessary, additional studies
4. Institutional aspects	
Management methods	Organizational arrangements
Staffing and training	Financial management system and performance
Operation and maintenance system	Inter-agency coordination
Sectoral policies	Institutional aspects must be part of Project design
5. Financial aspects	
Reliability of Project's financing plan	Financial performance
Accounting and auditing arrangements	Reasonableness of financial forecasts
Appropriateness of pricing	Possibilities for reducing costs
For non-revenue-earning projects, focus on recurrent financial cost of O&M	Impact on financial beneficiaries and incentives for their participation
Financial Analysis in light of financial forecasts	
6. Social aspects	
Sociocultural characteristics	Acceptability
Social strategy for Project implementation and operation	Willingness to contribute
People linked to Project	Special case of women

(continued on next page)

[10] Extracted from: Operational Manual Statement No. 2.20, and OP 10.40, The World Bank, Washington, D.C., respectively January and September 1994

The World Bank	
(continued from last page)	
New Operational Policies, NO. OP4.40	
1. Criteria for acceptability	
Discounted expected present value of Project's benefits, net of costs: Must not be negative Must be higher than or equal to expected net present value of mutually exclusive project alternatives	Alternative Project designs Throughout Project cycle Mutually exclusive designs
2. Nonmonetary benefits	
Must ensure broader sectoral or economy-wide programmes	Project must represent least-cost way of attaining the stated objectives
3. Sustainability	
Project will be sustained during its life	Therefore: assess robustness with respect to economic, financial, institutional and environmental risks
Legal and institutional framework must be in place or will be developed	Critical private and institutional stakeholders have or will have incentives to implement the Project
Financial impact on implementing/sponsoring institution	Must estimate the direct effect on public finances of the Project's capital outlays and recurrent cost
4. Risk	
Source, magnitude and effects of risks	Consider possible range in the values of the Project's variables and assess robustness of Project's outcome with respect to changes in these values
5. Poverty	
Meets Bank's poverty-reduction strategy	
6. Externalities	

Table A7.6 European Union[11]

European Union	
1. Background information	
1.1 Main features of the sector	
The broader policy context	Health and sanitation
Water resources	Development policy for the region
Institutional resources	Role of the private sector
Existing credit system	National financial resources available
1.2 Problems	
Poor water quality	Wastage
Inadequate sanitation	Estimating the effective demand for water
Promoting the level of sanitation	The location
Appropriate technology	The weakness of institutions
Problems of O&M	Inadequate education
Limited access to facilities	
1.3 Beneficiaries and parties involved	
2. Intervention	
Overall objectives	Project purpose
Results	Activities
3. Assumptions	
Assumptions at different levels	Risks and flexibility
4. Implementation	
Physical and nonphysical means	Organization and implementation procedures
Timetable	Cost estimate and financing plan
Special conditions	
5. Factors ensuring sustainability	
Policy-support measures	Appropriate technology
Environment-protection measures	Institutional and management-capacity building
Sociocultural and legal aspects	Economic and financial analysis
Community participation	Cost/benefit analysis
Proper maintenance	Cost effectiveness analysis
Women	Special issues
Legal issues	
6. Monitoring and evaluation (annexes)	
Evaluation & Bibliography	Environmental Checklist
Assumptions in the Logical Framework (plus an example)	Logframe Matrix: Sewerage in Jamaica
WID Questionnaire	

[11] Extracted from: Guidelines for the Preparation, Management and Evaluation of Projects/Programme in the Rural Water supply and Sanitation Sub-sectors, CEC, Brussels, 1993

Table A7.7 Organization for European Cooperation and Development (OECD)[12]

OECD	
1. The central notion of sustainability	
Policy or policy changes to create a conducive environment Project design corresponding to the capacity of the recipient Affordability of initial costs and O&M Choice of technology according to economic and social conditions Adequate maintenance and support systems once external assistance is terminated Environmental sustainability	Clear and realistic goals Economic soundness Involvement of local authorities and target groups Realistic time frames Compatibility with sociocultural conditions
2. Technical appraisal	
Technology and standards	Technical implications of factors listed under item 1
3. Financial appraisal	
Financial analysis, e.g: Expected income and expenditure on capital and recurrent outlays Repercussion of the Project on public finances Financial viability of Project & operating entity Financial sustainability Cost recovery Repercussions for vulnerable groups Ability of recipient to provide adequate financing	Appropriate terms, e.g.: Concessional terms of financial assistance Concessionality in terms for end-users
3. Economic appraisal	
Cost-benefit analysis	Shadow prices or the effects method
Economic returns analysis whenever possible, or else alternative methods of demonstrating the standard and quality of service and benefits rendered to as many beneficiaries as possible	
4. Institutional assessment	
Capacity of implementing agency to execute Project Financial management by the implementing agency	Management framework of the agency Extent and duration of technical assistance required by the agency
5. Provision for effective maintenance	
Human resources available	Delineation of responsibilities
6. Target groups and social and distributional analysis	
Distribution of costs and benefits Role of women in development Involvement of local institutions and target groups	Socio-cultural analysis Demographic analysis
7. Environmental assessment	
8. Provision for monitoring and evaluation	

[12] Extracted from: DAC Principles for Project Appraisal, In: DAC Principles for Effective Aid, in Development Assistance Manual, OECD, Paris, 1992

Annex 8

Case Studies

Annex 8 summarized eight projects as case studies for highlighting some of the experience reviewed in Sections 5 through 8. One of the projects was carried out with the cooperation of Japanese ODA, one with UNICEF, one with KfW, and five with the participation of the UNDP/World Bank Water Supply and Sanitation Programme. The information provided by these organizations is very much appreciated and acknowledged.

All eight cases deal with low-cost on-site sanitation. It was not deemed necessary to review projects with off-site sanitation; all parties involved are very familiar with such projects. For lack of additional space, only brief summaries are included. For each, additional information is available from the organizations indicated throughout the Annex.

8.1 Bangladesh — Changing Sanitary Behaviour
8.2 Brazil — Sanitation Programme in Brazil for Poor People (PROSANEAR)
8.3 Ethiopia — Study of Water Supply and Sanitation in Eleven Centres
8.4 Ghana — The Kumasi Strategic Sanitation Project
8.5 India — Urban Low-cost Sanitation Component
8.6 Lesotho — Rural Sanitation — from Pilot Project to National Programme
8.7 Lesotho — Low-cost Urban Sanitation — Overview and Funding
8.8 Pakistan — The North-East Upgrading Project

8.1 Bangladesh[13]: Changing Sanitary Behaviour

8.1.1 An Evolving Programme

The UNICEF-assisted School Sanitation Programme was initiated in 1992. At the start, emphasis was placed on the construction of water and sanitation facilities, with the assumption that such facilities would meet the basic requirements of the schools. Today, construction is supplemented by a deliberate focus on behavioural development among school children, so that personal hygiene, sanitation, and safe water use become integral to their life style. Experiential learning is promoted by encouraging active participation in extra-curricular activities, in partnership with teachers, parents and members of the School Management Committee (SMC).

[13] UNICEF. For the full study, see: School Sanitation Program in Bangladesh. Waterfront, Issue 9, UNICEF, New York, December 1996.

This evolution mirrors the changing emphasis in the UNICEF-assisted programme on Water and Environmental Sanitation. Bangladesh is already renowned worldwide for having achieved 97% national coverage for access to a safe water supply within 150 m of the household. The last few years have also seen a healthy trend in sanitary latrine coverage (e.g., 48% in 1995 *vs.* 16% in 1990). However, the challenge remains insofar as the daily deposit of about 20,000 metric tons of fresh human excreta still contributes to a heavy pathogen load on public land and water sources through open defecation or hanging latrines.

Mortality and morbidity due to diarrhoea and parasitic worm infection remains very high in the country and no significant decline in the occurrence of diarrhoeal episodes has been observed in spite of the success in supplying safe water and increasing sanitation coverage. Environmental sanitation and personal hygiene practices (e.g. handwashing before eating and after defecation, cutting nails, use of safe water for drinking and domestic purposes, disposal of children's faeces in sanitary latrines, *etc.*), together with a clean environment, as well as related measures in health and nutrition, are therefore essential for reducing the risks of diarrhoea and parasitic infestations.

The current emphasis in the WES programme is hence on creating a "mindframe" which leads to a clean environment and healthy behaviours, and on bringing about greater convergence with such efforts as oral rehydration therapy, diarrhoeal case management, breastfeeding, immunizations and nutritional supplements. In this respect, a major focus is being placed on the potential of primary school students inculcating behavioural development within themselves and through them to motivate parents and other community members towards desirable behavioural change.

Table A.1.1 School Sanitation Programme, Bangladesh (1992-1995)

School Sanitation Programme, Bangladesh (1992-1995)				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1992	1,089	16	16	16,420
1993	369	11	28	5,840
1994	678	19	43	7,458
1995	438	05	34	2,512
				(Ongoing)
Total	2,575	51	121	32,230

8.1.2 Lessons Learned

Several lessons have been learned along the way that have helped in modifying and improving the programme.

1. An assessment done in 1994 shows that the attendance of girls in Classes III through V in the sample schools rose on average by 11%. This was in part due to the social mobilization campaign for compulsory primary education for All. The girl respondents indicated that the privacy provided by separate latrines for girls was an important contributory factor.

2. A comparison of survey results from 1994 and 1995 shows that the quality of construction and the maintenance of water and sanitation facilities improved remarkably during the year. For example, the percentage of running tubewells in the sample schools increased from 68% to 89% and satisfactory discharge of water increased from 55% to 95%. Similarly, the status of clean and flushed pans increased from 36% to 80%. These are attributable to a monitoring system that combined inspection and corrective measures, thus indicating its importance as part of the implementation process.

3. The 1995 survey shows that 95% of the teachers from the sample schools received training and 96% replied that they are now teaching hygiene and sanitation in their classes, following the training. It is encouraging that funds for maintaining WATSAN facilities are available in 44% of the schools in 1995 as compared to 7% in 1994, a sign of increasing initiatives taken by the teachers. Also, soap or ash was kept next to the water supply facilities in 52% of the schools, which helped to encourage handwashing after defecation, another sign of initiatives triggered by teachers' training.

4. In 1995, an action-research study in Moulavibazar was carried out in five schools to engage the School Management Committees (SMCs) in the implementation of the Programme. Performance by SMCs was far superior to that by contractors hired by the Department of Public Health Engineering (DPHE). For example, the time taken by SMCs for completion of construction was 28 days as opposed to 7-10 months by contractors. The quality of materials used and the overall construction by SMCs were cost-effective and met specifications and plan design. Contractors hired by DPHE generally quoted costs that were 80% higher. Most importantly, the initiative by the SMC promoted and ensured participation, empowerment and a sense of ownership among the community while encouraging, at the same time, local capacity building and better management of the WATSAN facilities.

5. An experiment in Social Mobilization in Barisal demonstrated that school children were very effective in prompting their parents to build and use sanitary latrines and keep them clean. The process was helped greatly by the personal interest and political will demonstrated by the Divisional Commissioner and District officials to promote sanitation and hygiene.

8.1.3 The Way Forward

In 1996, several measures have been taken to improve the School Sanitation Programme.

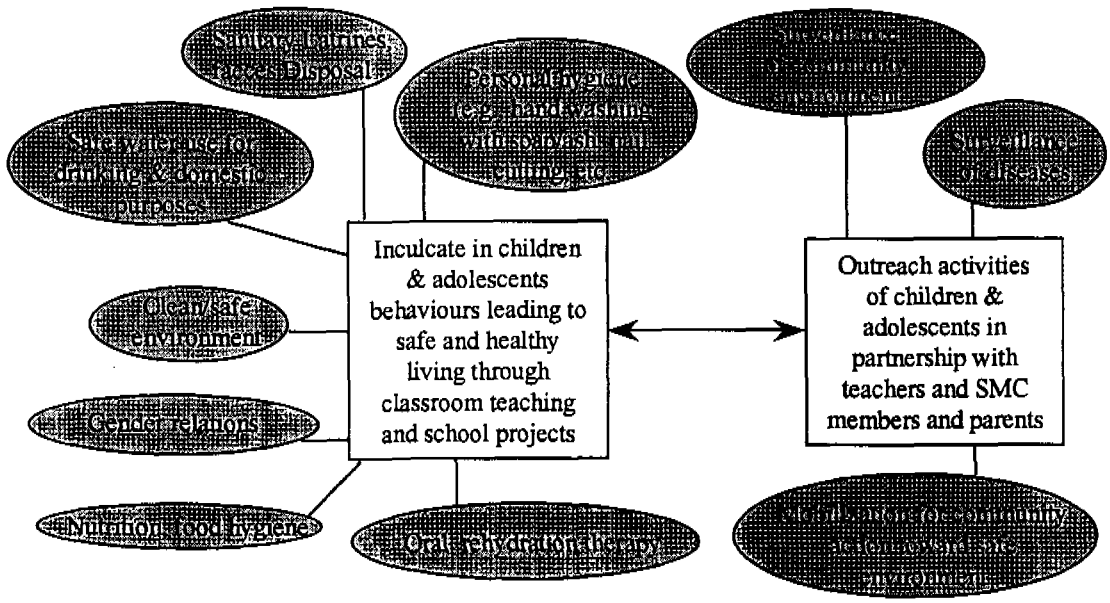
Plans for Environmental Sanitation

1. Based on the encouraging results from the experiment in Moulavibazar, the Secretary, Local Government from the Ministry of Local Government, Rural Development & Cooperatives (MLGRD&C) has issued the directive that all activities under the School Sanitation Programme will henceforth be implemented through the SMCs. Multisectoral district and thana committees of concerned government officials have been formed to oversee the programme and provide guidance and technical support. Accordingly, this approach is being applied in 800 schools in six districts.

2. Distribution of deworming tablets and nail clippers is also being introduced in all of the 800 schools. These subprogrammes will act as entry points and educational tools to promote improved sanitation and hygiene among the students as well as their siblings and parents.

3. A module for Safe Learning Environment in Primary Schools is being developed and introduced on an experimental basis in the Noakhali district. Figure A8.1.1 gives a framework for the experiment. As already discussed above, the time has now come to supplement the current School Sanitation Programme and create an enabling environment for the active participation of students in partnership with teachers and members of the School Management Committees. There are two parts to the concept: (i) to inculcate in children those behaviours that would lead to safe and healthy living, through classroom teaching and experiential learning, by engaging in school projects linked to various themes as shown in Figure 8.1.1; and (ii) to reach out to the community by enabling children to function as motivators for change. Both of these would be pursued in the form of extracurricular school projects with the help of teachers, SMC members and parents.

FigureA8.1.1 — A Framework for School Sanitation and Safe Learning Environment



A preliminary action-research study has been initiated in the Noakhali district to examine the effects on the behavioural development of school children due to the construction of WATSAN facilities (four schools) and by adding the SLE components (four schools) as opposed to those where no facilities or SLE have been introduced (four schools). Lessons learned from this study will help design an extension of the approach to other primary schools operated by the Government and NGOs.

The new innovations mentioned above are important developments in the continuing effort to orient the School Sanitation Programme towards more effective behavioural development among children. The initiative has already taken root in 2,575 Government primary schools. Estimates show that there are altogether about 57,600 such schools, of which about 45% still lack any WATSAN facilities. The goal ahead is to cover all of these schools and also non-formal primary schools run by NGOs with active School Sanitation and Safe Learning Environment Programmes by the year 2000.

8.2 Brazil: Sanitation Programme in Brazil for Poor People (PROSANEAR)[14]

8.2.1 Background

During 1981-1988, the Ministry of Interior in Brazil financed studies aimed at developing and testing methods for increasing coverage for the poor with improved water supply and sanitation services. The results showed that although access of the poor to improved water supply had greatly improved over the years, sanitation services had been mostly neglected. As a result, there was growing pollution of the slum and squatter areas where most of the poor and migrant populations stayed. Part of the reason was found to be the lack of technologies suitable for low-income communities. Moreover, projects for low-income communities were invariably based on standards developed for middle- and upper-income families, and they were implemented without consultations with the community. The beneficiaries were not involved in the maintenance or financing of the services. These findings led to a followup pilot project known as PROSANEAR, which was financed by the World Bank and the Government of Brazil.

8.2.2 The PROSANEAR Programme

PROSANEAR is the Brazilian acronym for "Sanitation Program in Brazil for Poor People". It is a large-scale project implemented in 126 low-income areas in eight states of Brazil. More than US$100 million was invested in it, with 50% provided by the World Bank, 25%

[14] Source: Proceedings of the Urban and Peri-Urban Strategic Sanitation Conference (unpublished), UNDP/World Bank Water Supply Sanitation Programme, March 1996, The World Bank, Washington, 1996.

by the Government of Brazil through the Employee Indemnity Fund, and 25% by the participating states and/or municipal local governments. The programme was designed to provide water supply to a population of 200,000, and improved sanitation to a population of 700,000. Implementation started in 1992 and ended in June 1996. It is being managed by the *Caixa Economica Federal* (CEF), which is the Brazilian Federal Bank for Urban Development. Key features of the programme were community participation and the use of low-cost engineering techniques to build basic sanitation systems for the poor.

The main characteristics of the programme were:

- Priority was given to outlying urban areas and/or to slums in cities with populations above 50,000;
- Provision of service to urban groups that have traditionally not been served by formal systems; thus, beneficiaries were families whose household incomes were less than three times the minimum wage of US$100.00 and who lived in areas where about 40% of the population earned less than the minimum salary;
- Involvement of communities in the design and construction of water and sanitation infrastructures; community participation and hygiene education were used to define the rights and responsibilities of local residents as well as those of water companies;
- Emphasis on low-cost technologies;
- Maximum investment cost for water supply was limited to US$98 per capita;
- Maximum investment cost for sanitation, including treatment, was limited to US$140 per capita;
- Sewerage projects addressed waste treatment (possible treatment options were discussed with the community, which made investment decisions on the basis of the technical feasibility and available funding available); and
- To upgrade environmental conditions, all water projects had to include community-generated solutions for sanitary sewer systems and, where possible, solid waste collection.

The programme was inherently demand-oriented; it entailed unbundling of service areas and the adoption of institutional arrangements conducive to sustainability, while enhancing the prospects of scaling up. Community members were involved in the planning, construction and management of tertiary sewers through the "condominial" approach. In this, the community decides between three basic options for the route of the system serving their block — the options being back of lot, front of lot and in the street. In all three cases, it is assumed that government should continue to be responsible for facilities serving wider areas. Initiatives have recently been taken to assign responsibilities for operating feeder and disposal facilities to the private sector in some areas.

8.2.3 Demand Orientation

PROSANEAR follows a participatory approach involving a dynamic process of interaction with the community. This approach is based on the premise that sustainability of infrastructure in peri-urban areas depends in part on the degree of interaction between the beneficiaries and all the production agents of the project (private companies, public officials, utilities, consultants and construction contractors). For such interaction to be effective, there must be a clear definition of the rights and responsibilities of all the parties and stakeholders involved. Partnerships in the projects have been formed from the bottom up, starting with partnerships between individual communities and public/private water companies and/or with local governments, and progressing to partnerships between state and federal governments, and then, between the federal governments and the World Bank.

The following steps have been followed —

- *Information Dissemination* — This is the first step in the participation process, although elements are present in all stages of the project as well. There is a continuous dissemination of information through which the community learns about the various options that are available, such as service levels and organizational arrangements for operating and maintaining constructed systems. During this period, the project staff also learns about the community characteristics and dynamics. The goal of this step is to deepen community understanding of project details, and further develop participation. In the local context, it often means integrating "popular wisdom" with technical know-how. The project staff and the community engage in an on-going discussion of the local situation (i.e. the realities of the community) and the technically feasible interventions.

- Proposal and Decision — At this stage, the project staff and the community discuss and take decisions on those actions possible that are at once technically viable and organizationally best suited to the local conditions.

- Responsibility — This is the final stage of the participation process. It is at this point that project staff, and the community commit themselves to specific actions and define their mutual responsibilities. For instance, PROSANEAR requires that 80% of all the groups served by a secondary-level sewer must have signaled their commitment to work at the tertiary level before the secondary-level sewer is built. The PROSANEAR approach involves cost recovery through user charges after facilities have been installed.

The final step (responsibility) is designed to ensure that any future privatization of cities would include the poor areas. The following are typical roles for project staff and communities —

- Role of the project staff or their agents: to provide sanitation systems that are suited to the community's characteristics and dynamics, to guarantee the operation of the system, and charge fair rates for services.

- Role of the community: to pay agreed rates for the services, operate the systems correctly, and maintain the facilities.

8.2.4 Unbundling of Technologies — Diversifying Technology

Based on the results of the *Proposal and Decision* process, the technological choices are designed and implemented. Normally, the feasible sanitation technologies are diversified down to three levels: (i) household; (ii) neighborhood; and (iii) trunk and treatment.

- Household Level. At the household level, sanitation investments are treated as pure private goods.

- Neighborhood Level. At the neighborhood level (blocks), sanitation investments begin having the characteristics of both private and public goods. Alternative methods have been developed to keep down costs. Under the condominial system, a network of secondary sewerage is built to the entrance of a block of houses, and the community assumes responsibility for the design, construction, operation and maintenance of the infrastructure within their blocks. The procedure can cut costs by an average of 50%. Three types of routing for the internal systems are most common:

- Location of sewers in backyards;

- Location in front of lots; and

- Location in the street.

Each option carries a different cost to the community, with backyard location being the least-cost option.

- Trunk and Treatment Level. At the trunk and treatment level, the "public good" aspect dominates. The most widely used treatment was a decentralized system of small treatment plants.

8.2.5 Institutional Arrangements

PROSANEAR is based on the tenet that water and sanitation management should be participatory, with decisions taken at levels as close as possible to the beneficiaries. It advocates that:

- Decisions on water and sanitation projects should reflect user demands;

- Particulars of projects are defined by a negotiating body which ensures that public/private decisions are participatory in nature and reflect broad agreement by all the social agents involved;

- Decisions and actions that can be effectively taken at levels closer to the users of the system should never be taken at a higher level; and

- Technical solutions must be efficient (which might require the establishment of an appropriate cost-benefit ratio, good allocation of funds, and well-defined partnerships).

8.2.6 Sustainability

The basic approach is to move the boundary between private- and public-sector provision from the plot boundary to a point further downstream, generally to the point at which locally managed tertiary sewers meet government-constructed secondary sewers. Further, PROSANEAR has tackled one of the important institutional issues surrounding facilities that have been built wholly or partly with community resources but which are connected to higher level facilities operated by public- or private-sector organizations. What tariff should the users of such facilities pay? The answer is to give discounts on standard tariffs to reflect the private and community resources devoted to the provision of local-level facilities.

The 1978 Brazilian legislation on tariff structure for water and sanitation introduced the concepts concerning the social aspects concerned in public-service provision. The law envisaged that all segments of society, including low-income communities, should benefit from water supply and sanitation service improvements. It allowed state administrations to incorporate specific regional and socioeconomic features into the design of tariff structures.

PROSANEAR operates on the premise that community members will be responsible for the operation and maintenance of the local feeder facilities which directly affect them. The incentive is provided by the fact that people have committed their own resources to the provision of facilities and will be adversely affected if the facilities cease to operate. There is a need for systematic study of the sustainability of the informal local-management systems for the sewers built with the assistance of the OPP. The indications are that such sewers are rather better managed than those which are the direct responsibility of government departments.

A system of cross subsidies was introduced under which tariffs were determined according to category and levels of consumption. The users with low levels of consumption (assumed to be poorest) were cross subsidized by those with higher levels of consumption (assumed to be richest). So far, this law has not been changed. With this law, the sustainability of each area of the project depends on the sustainability of all the city (cities) included in the cross subsidization process. In the next PROSANEAR it will be necessary to propose a change in this law.

8.2.7 Expanding the Programme

PROSANEAR has been a resounding success. Water-supply coverage has been four times the original target of 200,000 people, and coverage for sanitation has been almost 30% higher than the initial target of 700,000 people. With the success of the programme, a decision has been taken to prepare a follow-up PROSANEAR, similar to the first, but incorporating lessons learned in the pilot project. It is envisaged to cost about US$400 million.

8.3 Ethiopia: Study of Water Supply and Sanitation in Eleven Centres[15]

8.3.1 Overview

In 1994, only 26% of the total population and 18% of the rural population in Ethiopia were estimated to have access to potable water. Consequently, the majority of the population was amd is exposed to contaminated drinking water and, thus, to waterborne diseases. It is also estimated that less than 12% of the total population use latrines. An estimated 1% only of the rural population have access to adequate refuse disposal.

In light of this situation, the Government has given priority to water supply and sanitation in 11 centres from among 230 rural centers listed in the National Development Plan, and commissioned a study carried out by JICA. According to the Scope of Work agreed upon by the Ethiopian Government and the Government of Japan, the average 1995 population of the 11 centers is 15,664, and the average annual population growth rate between 1984 and 1993/1994 is calculated to be 5.9%.

The major objectives of the study are: (i) to conduct a feasibility study of the water supply system in order to improve the living conditions of the population in the study area by enhancing the water-supply services in terms of quantity and accessibility, (ii) to formulate a plan for sanitary education and the diffusion of sanitary facilities in order to raise people's awareness of hygiene and improve the safety of the water supply, and (iii) to transfer technologies to the Ethiopian counterpart personnel with the view of strengthening management.

The study has been conducted during the two fiscal years 1994/95 through 1995/96, and divided into two phases. Phase I was conducted between December 1994 and March 1995, while Phase II started the following May and was completed in February 1996. During Phase I, a detailed survey was carried out for four centers, and for the remaining centers in Phase II. The Study's mandate included surveys of meteo-hydrology, geo-electric prospects, water quality, water use, sanitary and health conditions, initial environmental examination

[15] Compiled from information made available by JICA.

(IEE) and an environmental impact assessment (EIA), and consideration of the people's sanitary education and practice, their awareness, social background and relevant socio-economic factors. The mandate also included construction of experimental toilets and pumping tests and related investigations.

Costs of introducing sanitation to all 11 centers (by target year 2010) have been estimated to be 23,246 thousand Birr (about 348.7 million Japanese Yen in 1996)(1 US dollar = 6.3 birr in November 1995). Implementation through Japanese Grant Aid cooperation is under preparation.

8.3.2 Some Salient Project Features

Based on previous experience and lessons learned, the following are of particular interest:

Health and Sanitary Awareness

Sanitary Behaviour. Sanitary behaviour has been scored by a household survey. The scores have a strong negative relationship with reported incidence of diarrhoea (correlation coefficient (CC):0.7) and a less strong positive relationship (0.4) with the awareness of diarrhoeal disease control. This implies: (i) the better the sanitary behaviour the lower the risk that a household will encounter diarrhoea; and (ii) knowledge about diarrhoeal disease control is not a major determining factor affecting sanitary behaviour at the level of the household.

Children's Awareness. Boys and girls (under the age of 15 years) are much less likely to be aware of ORS, suggesting gaps in health education which need to filled during the implementation phase.

Role of Women. Gender segregated data shows that men and women have similar levels of knowledge about diarrhoeal disease control but women are more aware of ORS. Although women generally have the role of teachers and caretakers of sanitary behaviour, men and women share control over the resources that are needed to pay for sanitary facilities. Sanitary education needs to be targeted at both men and women.

Construction of Experimental Toilets

Among the various types of toilets, community toilets were selected for testing in two communities out of the whole study area. Communities using the toilets have been organized through promoters of community participation. Responsibility for administration, operation, maintenance and safeguarding of the toilets has been vested in the communities with, among other things, video promoting their effective use.

The community was readily organized for using the toilets and little help was needed from the promoter. The community elected several representatives, i.e. one coordinator, one accountant and an assistant (female).

Operation and maintenance were to cover the payment of water consumed. In one community, the toilet required a guard because it was located near a market. The guard was appointed from among the members of the community, and also assigned to cleaning the toilet. The community re-allocated the costs of operation and maintenance to household members, with fifty cents to three birr each, according to their income. The costs of emptying the toilet every two years could be met from the surplus of the monthly payments and interest.

In one center, people wanted separate community toilets for women and men. In the other center, toilets for each household were preferred. Each group operates and maintains one toilet, the work being done by a person chosen from the group and supervised by a committee set up by the group.

Experimental Emptying of Toilets

The salient lessons learned by experimental emptying highlight the need for prior preparation of dumping sites and accessibility to the latrines. The study team planned 100 disposal trips for the two experimental centres. However, only 60 trips were made, for the following reasons:

- Accessibility to the latrines was difficult after rainfall because of poor drainage;
- Difficulty of access and narrow openings of some latrines; and
- Improper dumping area in the case of one centre (due to disputes between the people and the municipality).

Experimental Sanitary Education

Film Show. The showing of a film was readily planned and carried out. Advertisements were made by megaphone around the centre with the help of the municipality. Police presence for crowd control was organized. Production of films during the experimental stage of the project is highly effective and will stimulate people's interest. 16 mm Film was used for large audiences, and video for smaller groups with a maximum of 40 to 50 people.

Street Theater. A street theater took five days to organize. Its effect is probably greater than that of showing a film; this medium is justified if it is part of a more intensive programme. 28 Students were chosen by the Headmaster of a High School to perform in the dramas. A four-hour training session on street theater was organized. Students were divided into four groups, each dealing with one subject, i.e. personal hygiene, domestic hygiene,

environmental hygiene, and safe excreta disposal. For the next three consecutive days, two-hour practices were held, including one dress rehearsal the day before the performance in the street. During the practice sessions, the students were advised by those in their own group and other groups, and by the Study Team. In this manner, the students researched the topics for the dramas, wrote the sketches and performed them — all by themselves. Four dramas were performed in the street outside a house near to the experimental toilet site. They were effective in popularizing sanitary education.

8.4 Ghana: The Kumasi Strategic Sanitation Project[16]

8.4.1 Background

Kumasi is the capital city of the Ashanti Region of Ghana. With a current population of one million and an area of 150 km^2, it is the second largest city in Ghana. Its location in the centers of both Ashanti and Ghana has made it a nexus from which road, rail and air transportation systems radiate to other parts of the country and to the region. Kumasi is a major center for a wide range of services and activities: cultural, political, and educational affairs, administrative and banking services, and a wide range of industrial, manufacturing, and commercial activities. Its central market is the second largest in West Africa. These features probably account for the current level of permanent and transient populations, resulting in congestion and overstrained physical infrastructure.

Over the years, the local authority currently known as the Kumasi Metropolitan Assembly (KMA) has introduced measures to respond to the shortage of urban infrastructure in the city. In the case of sanitation, the KMA opted for a master sewerage plan. So in 1954, Kumasi became the first city in Ghana to prepare such a plan. The plan has been updated at intervals of about ten years — in the 1960s and in the 1970s — but its high cost has proved prohibitive and has discouraged the city authorities from implementing it. Meanwhile, most of the poor have had no access to satisfactory sanitation services, and the city was choking under the weight of its own sewage — only about 10% of the excreta produced in the city was being properly collected for safe disposal; the rest was being dumped within the city environment — in streams and on open land.

In the end, the city became convinced of the futility of relying on the master plan approach. Accordingly, on the initiative of the UNDP, it decided to try an alternative approach, the strategic sanitation approach, which was in its early stages of development at the World Bank.

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[16] Source: Proceedings of the Urban and Peri-Urban Strategic Sanitation Conference (unpublished), UNDP/World Bank Water Supply Sanitation Programme, March 1996, The World Bank, Washington, 1996.

8.4.2 The Kumasi Sanitation Project

The Kumasi Sanitation Project (KSP) was a pilot project designed to test the efficacy of the strategic sanitation approach in satisfying the immediate wants of the people of Kumasi for improved sanitation services. It was funded by the UNDP and executed by the UNDP/World Bank Program. It was under this project, which started in 1989, that the Kumasi Strategic Sanitation Plan (KSSP) was prepared and implemented. The population of Kumasi at that time was 600,000.

The key elements of the plan were demand orientation, widening and unbundling of technological options, and institutional reform. These features of the plan enhanced the prospects of sustainability of investments made under it, and paved the way for scaling up the plan.

8.4.3 Diversifying Technology

Based on the results of demand studies, the range of technically feasible sanitation technologies was identified and unbundled into three levels:

- In-house sanitation infrastructure;
- Feeder sanitation infrastructure; and
- Trunk sanitation infrastructure.

In-house Sanitation Infrastructure

In-house sanitation infrastructure is defined as facilities located at the household level or at sources of waste generation. They are systems that are decentralized to the household or waste source level. Two types were used, the conventional water closet and the Kumasi Ventilated Improved Pit Latrine (KVIP). The first could be connected to a septic tank system or to a public sewer system. The second is a VIP latrine in which there is access to two possible adjacent pits from one toilet room. Only one of the two pits is put into use initially. When full, it is blocked off from service to allow its contents to undergo decomposition. Meanwhile, the second pit is put into use. By the time it also becomes full, the decomposition process in the first pit would be complete, and its contents would have been converted into an innocuous humus which could be safely removed for use as a soil conditioner.

Feeder Sanitation Infrastructure

Feeder sanitation infrastructure is defined as sanitation infrastructure installed for collective use by a part of the city population. This user population may be a neighborhood community, a group of neighborhoods, or an identifiable transient population that passes through such public places as markets, recreational areas, and transportation yards. They are systems that are decentralized to neighborhoods or to larger specific parts of city populations. In the KSSP, two types of feeder sanitation infrastructure were considered: public latrines and simplified sewerage.

Kumasi already had 290 public latrines. Prior to the KSSP, they were operated and maintained by the Metropolitan Assembly (KMA), but conditions in many became so deplorable that responsibility for their operation and maintenance was assumed by members of local political organizations known as "Committees for the Defense of the Revolution" (CDRs). The performance of the latrines improved under the CDRs, who introduced charges for their use. The cost to the KMA for the operation and maintenance of these latrines still exceeded the revenues reported to the Assembly by 800,000 cedis a month. However, the survey of demand for public sanitation facilities conducted under the KSSP showed that private operation of the public latrines would be profitable. Accordingly, the management of 12 of the most frequently used public latrines was given on a trial basis to five private contractors who signed three-year management contracts. Ownership of the public latrines still remained with the KMA. As part of their contracts, the private operators were to pay monthly fees to the Assembly for renting the public latrines for their businesses. The privatization was a resounding success.

The KMA was making 750,000 cedis a month from the private operators, compared with the former 800,000 cedis a month net cost to the Assembly for the same public latrines; the private operators were happy with the profitability of the new business — so much so that some rehabilitated their latrines at their own cost — and the users were happier with the cleaner, more convenient public latrines, as evidenced by their willingness to pay more for them.

The second type of feeder sanitation infrastructure used in the KSSP was a system of simplified sewerage, 8 km in length, serving 320 housing units over an area of 4 ha. The sewers were laid in alleys between rows of houses; and the sewage is being treated in waste stabilization ponds installed under the project. In line with experience with privatization of public latrines, the operation and maintenance of the simplified sewerage systems and the treatment plant have been privatized.

8.4.3 Demand Orientation

The starting point for the plan preparation was two surveys aimed at estimating, respectively, demand for improved in-house sanitation facilities, and demand for public sanitation facilities. The demand for improved household sanitation facilities was assessed through a large husehold survey. During the household survey, information was collected on:

- Demographic characteristics of respondents;
- Existing water and sanitation situation, including the types of facilities used, monthly expenditures, degree of satisfaction with existing sanitation facilities, and perceptions of privacy, convenience and cleanliness;
- Household willingness to pay for improved sanitation facilities; and
- Socio-economic characteristics of the household, including such items as education, income, ownership of assets, weekly expenditures, occupation, religion, and housing characteristics.

A two-stage, stratified sampling procedure was used to select a random sample of 1663 households for this survey. The results formed the basis for technology choice and the formulation of cost-recovery policy for the in-house sanitation facilities.

The demand for public latrines was determined by posting observers at selected public latrines for one week, starting each day from about 4:00 A.M. and ending at about 10:00 P.M. The observers recorded the number of people who used the public toilets, and based on that estimated the daily revenues for use of each such facility. This study led to the conclusion that privatization of such public latrines was financially feasible.

8.4.4 Institutional Requirements

A key institutional feature of the Kumasi Strategi Sanitation Plan is its emphasis on privatization of service delivery. Under the Plan, a Waste Management Department has been created within the Kumasi Metropolitan Assembly for the management of both sanitation and solid waste. However, the focus of this department is on policy formulation, overall strategic planning, contract management, formulation and enforcement of standards and regulations, *etc.* The actual supply of services and the operation and maintenance of installed facilities is left to the private sector. Under the KSSP, the following are all undertaken by the private sector:

- Operation and maintenance of public latrines;
- Installation of in-house sanitation infrastructure;
- Installation of simplified sewerage and waste stabilization ponds;
- Operation and maintenance of all feeder sanitation infrastructure; and
- Septic tank emptying services.

So far, the involvement of the private sector has been limited to feeder sanitation infrastructure; the Waste Management Department handles trunk infrastructure, which is

limited to the operation of the facilities for the disposal of septage. The Department charges private contractors for the use of the septage disposal facilities.

8.4.5 Sustainability

For investments to be sustainable, it is not enough for the choice of investments to be driven by demand. It is equally important that the subsequent operation and maintenance and the overall supply of services should be responsive to the wants of users. The Kumasi experience has shown that involvement of the private sector in a competitive way in operation and maintenance of installed facilities can provide powerful incentives conducive to the sustainability of investments.

The KSSP has produced out of Kumasi a number of skilled contractors that no one knew existed. Thus, the right incentive brings out desired skills. Private entrepreneurs will hire people with requisite skills if the incentives are right. The use of such incentives can reduce reliance on capacity building at start-up of projects. The Project has also demonstrated that appropriate involvement of the private sector can enhance the quality of service. For example, the privatization of the managment of public latrines has resulted in highly improved services. In addition, the licensing of private contractors for septic tank emptying has increased availability of septic-tank-emptying trucks in the city and has reduced the response time for septic-tank emptying.

8.4.6 Expanding the Programme

The Kumasi experience shows that the role of private operators can be integrated into the overall management structure for sanitation facilities. It suggests that the presence of an incentive system with clear performance-related rewards and sanctions is a prerequisite for the success of such an approach. This is easiest to achieve for franchised operations in which the contractor has to make only a limited financial commitment but holds the contract for a limited period, so that failure to perform can be dealt with by termination of the contract and awarding it to another contractor.

Kumasi further provides an example of the involvement of the private sector in the provision of feeder infrastructure. The first step was to implement a pilot project, involving the franchising of the operation and maintenance of 12 public latrines. This initiative has been successful and is being used as a model for the extension of the approach to other public latrines in the city, and to the operation and maintenance of a simplified sewerage system and treatment plant serving a total of 320 houses.

In light of the above, the success of the KSSP has led to the decision to expand the plan to cover the rest of the city. Thus, more KVIPs are to be constructed at household level, and private management is to be extended to cover all 290 public latrines. It also planned to provide simplified sewerage for other parts of the city in response to demand. Potential

demand for this type of service is estimated to be 3700 connections, necessitating 150 km of sewers, compared to 320 connections and 8 km installed under the KSSP. The approach has formed the basis for the preparation of a World Bank-funded project covering the ten Regional capital cities in Ghana.

8.5 India: Urban Low-cost Sanitation Component[17]

8.5.1 Overview

This project is part of a nation-wide effort to replace traditional dry (bucket) latrines by sanitary and low-cost pour-flush latrines. The bucket latrines are emptied manually by scavengers. An estimated number of more than 300 000 scavengers, both men and women, are employed either municipally or privately; they are economically weak, educationally backward and socially marginalized. A programme has been launched with multiple objectives, i.e. (i) to liberate the scavengers and retrain them for other work, (ii) to replace existing bucket latrines by pour-flush latrines, and (iii) to construct the same type of facilities for houses without latrine.

This physical improvement programme is coordinated by the Ministry of Urban Development and implemented by the Housing Urban Development Cooperation (HUDCO). HUDCO has been handling governmental programmes since the mid-1980s. It channels credits to municipalities, depending on the levels of income of the beneficiaries. The urban low-cost sanitation project described thereafter is a component of a project in Maharastra State (other States may be added) with three components, i.e. (i) new housing, (ii) slum rehabilitation, and (iii) sanitation. It is now in its fifth stage, involving a "loan" from KfW to HUDCO in the amount of 700 million IRs (including 67.5 for cost increases during implementation) of which 100 million (3.5 million DM) are earmarked for sanitation. The latter amount of 100 million will fund 50% of the cost of the latrine programme, for which the remainder will be contributed, mainly by HUDCO from governmental sources (45%) and the rest by a contribution from the beneficiaries (5%). The "loan" is made from Grant Aid sources. HUDCO is the "borrower" and operates it as a revolving fund. It relends money to local municipalities. The individual beneficiaries take credits for the construction of the latrines; credits are recovered over a seven-year period. The management scheme is exhibited in Table A8.5.1.

The average cost of a unit is IRs 3,000. Assuming an average number of ten users for each unit, the project will serve 700,000 people and is expected to liberate perhaps 5,000 scavengers. According to a survey carried out, it may be assumed that 90% of the scavengers will find new employment, especially as municipal workers.

[17] Compiled from information made available by KfW

8.5.2 The Salient Project Features

Based on previous experience and lessons learned, the following are of particular interest:

- Site selection and needs assessment: The nodal State agency identifies the towns most urgently in need in consultation with the local bodies. Factors taken into account include the percentages of dry latrines, households without latrine and the numbers of scavengers. HUDOC's Regional Office "sanctions" the selected towns. Among other things, the Sanction Note spells out details regarding loans and subsidies.

- Area-wide coverage: No isolated latrines are supported. The emphasis is on area-wide coverage. In other words, the project aims at a critical mass and at completely eliminating all scavenging in an area.

- Education and information of the beneficiaries and municipal personnel: This is an essential pre-condition and must be assured by HUDOC though the local bodies and the involved NGOs. If required, relevant activities are supported in the context of the project. Subjects to be covered include the construction, use and maintenance of latrines, and the sensibilitation regarding loan repayment and the actual level of the costs to the beneficiaries.

- Information and retraining of scavengers.

- Technology: The double-pit pour-flush latrine with open-jointed brick-work lining has been adopted.

- Implementation through NGOs: The implementation of the project is vested in qualified NGOs, which are selected and supervised by the regional office of HUDOC. With general concurrence, Sulabh International, an NGO with many years of successful professional experience and with international recognition in this field, has been chosen. The local bodies guaranty for the work of the NGO over a period of five years. In general, all construction is carried out by contractors. The participation of the beneficiaries is basically financial.

- Maintenance: Maintenance requirements are an essential part of the education and information of both the beneficiaries and the municipal personnel, and is the responsibility of the implementing NGO. The local bodies are responsible for organizing a service for desludging and for the safe deposition of the sludge, but for larger schemes or communities, private-sector desludging is encouraged. Desludging must be paid for by the beneficiaries.

- Cost recovery: Full recovery of the loan within seven years is mandatory, but in real life it may fall below 50%. On a monthly basis, this will amount to 30 to 35 IRs, as compared with the 15 to 40 IRs per month paid today to scavengers for the cleaning of dry latrines. The loan and subsidy division for the low-cost programme is

summarized in Table A8.5.2, based on maximum construction costs per unit of IRs 2,500 in 1993 (Source: HUDOC, 1993).

- HUDOC, as the borrower, selects the implementing organization and certifies that the above features of the project are fulfilled, especially that:
  - site supervision personnel are adequately trained to adjust the standard design to local conditions and to ensure that on-site water resources are not endangered;
  - income groups have been correctly determined for the purpose of fixing grant percentages;
  - municipalities are capable of covering maintenance;
  - scavengers have been given other jobs or are participants in training programmes.

HUDOC also monitors payments made and confirms that funds were deployed correctly.

Table A8.5.1 Involved Agencies and their Responsibilities

Involved Agencies and their Responsibilities			
	Planning	*Implementation*	*Operation & Maintenance*
Ministry of Urban Development	- Determination of number of towns to be reached by sanitation programmes - Allocation of funds to different states for sanitation programmes - Determination of funds covered by grants and funds available for loans	- Loans channeled through the Town and Country Planning organization and/or HUDCO - Subsidy channeled through State Government agency	

Involved Agencies and their Responsibilities			
	Planning	***Implementation***	***Operation & Maintenance***

(continued from Table A8.5.1)
 	
Ministry of Welfare
	- Determination of policy for:
	  ○ conversion of dry latrines
	  ○ construction of new latrines
	  ○ liberation of scavengers
	  ○ financing at State level
	- Determination of overall and town targets for sanitation programme
	- Preparation of guidelines for implementation
		- Loans channeled through HUDCO and/or State Government agency
		- Implementation through State or selected NGO
		- Subsidy channeled through State Government agency	

HUDCO	- Preparation of guidelines for financing of :
	  ○ conversion of dry latrines
	  ○ construction of new latrines
	  ○ construction of public latrines
	- Assess loan applications from authorized institutions
	- Formulate loan agreements
		- Release of funds for implementation
		- Monitoring of progress, and release of loan instalments if progress is according to agreement
			- Ensure repayment of loan by Directorate of Municipal Administration or Municipalities

Directorate of Municipal Administration	- Identification of towns for sanitation programmes - Determination of allocation of funds (loans & grants) - Directives for loan recovery - Planning for implementation at municipal level	- Supervision of implementation through municipal authority or private organization - Monitoring of proper utilization of funds	- Release of funds for maintenance - Ensure repayment of loan by municipality

Involved Agencies and their Responsibilities			
	Planning	*Implementation*	*Operation & Maintenance*
(continued from Table A8.5.1) **State Water & Sewage Board**	- Project planning - Preparation of engineering details - Preparation of budget	- Responsibility for project implementation - Selection and supervision of contractors - Technical guidance	- After implementation, handing of responsibility for operation and maintenance to municipal authorities - Ensure repayment of loan by municipality
Municipal Authority	- Planning of projects at local level - Training of staff - Selection of beneficiaries - Planning for motivation and education of beneficiaries - Preparation of loan agreement with beneficiaries	- Implementation of work - Selection of contractors - Supervision of contractors - Motivation and education of beneficiaries - Site selection of public latrines - Monitoring of Implementation	- Provision of services for operation and maintenance of public latrines - Provision of services for private latrines if requested - Provision of pit emptying services - Recovery and repayment of loans
Nongovernmental Organizations	- Assist municipal authorities or state level organizations in project planning - Planning for motivation and education - Planning for training of local municipal staff and contractors	- Construction of latrines - Technical guidance - Selection of contractors - Motivation and education of beneficiaries - Training of local municipal staff and contractors	- Provision of services for operation and maintenance - (Usually) handing over of responsibilities to municipal authority

Table A8.5.2 Financial Information

Financial Information								
	UP TO PLINTH				SUPERSTRUCTURE			
Beneficiary category	EWS	LIG	MIG	HIG	EWS	LIG	MIG	HIG
Loan	50%	60%	75%	75%	90%	85%	75%	60%
Central subsidy	45%	25%	nil	nil	nil	nil	nil	nil
contribution beneficiary	5%	15%	25%	25%	10%	15%	25%	40%
interest rate per annum (%)	10.5	10.5	10.5	10.5	9.5	12.5	15.0	17.0
loan period (year)	7	7	7	7	15	15	15	15

Legend: EWS — Economically Weaker Section
LIG — Low Income Group
MIG — Middle Income Group
HIG — High Income Group

8.6 Lesotho: Rural Sanitation — from Pilot Project to National Programme[18]

8.6.1 Overview

The rural sanitation programme in Lesotho exhibits a process of sector development, from the implementation of a small-scale pilot project to the establishment of a nation-wide improvement programme. It began in 1983 with financial assistance from UNDP and UNICEF, and laid the groundwork for a large-scale, integrated national programme. It places a high level of responsibility on users to pay for improved on-site sanitation as a decisive factor in making rural sanitation feasible and sustainable. The programme uses the VIP latrine at a total cost of US$ 75 to $150 per unit. Sustainability has been enhanced through the successful transfer of construction and maintenance skills to members of the rural communities.

In Lesotho, very little Government or donor money is spent for rural sanitation.. A privately supplied and privately financed market for latrines has been created, and latrines would

[18] Compiled from: UNDP/World Bank/PROWWESS Water and Sanitation Discussion Paper Series No. 3, World Bank, Washington D.C. 1990.

continue to be built even if all government support were to come to a halt. The purchase of a latrine under an unsubsidized programme shows that a high priority has been given to sanitation, which suggests that improvements have been made in hygiene attitudes and behaviors.

The emphasis on cost recovery from users has also been welcomed by donors. With a reasonably well-defined and tested strategy, and a cost-recovery policy in place, the programme was more attractive to donors when support was sought for national expansion.

The programme's requirement for relatively high levels of cost recovery also raised the issue of affordability. Some percentage of the population in rural Lesotho will not be able to afford improved sanitation at current costs. However, subsidies have been avoided for two reasons: first, current costs of construction are already high without subsidies being provided, and second, introduction of a subsidy might undermine the self-help philosophy of the programme and misallocate resources to those who can afford to pay the full cost of their own latrine. Several strategies to increase affordability without subsidy were tried, including a credit union scheme for financing latrine construction. Success has been mixed and further efforts are needed to enable the programme to reach more of the very poorest population.

Relatively high levels of cost recovery can only be achieved when sanitation demand is high. Demand is largely a function of an appreciation of the advantages of improved sanitation, particularly the potential health benefits. Therefore, in the programme, extensive interaction with community members was required to convey the advantages of improved sanitation, and to instruct users on the hygiene behavior needed to maximize associated health benefits. Increased demands for latrines and a reduced incidence rate of diarrhoea among young children were seen where participatory methods were used systematically.

8.6.2 Some Salient Features of the Programme

- Due to severe budgetary constraints, the Government stipulated that beneficiaries would be required to make a significant contribution to overall costs through direct payment of construction expenses. Construction was to be handled by the private sector with Government playing a largely facilitative role through organizing and training, the promotion of community involvement and health and hygiene education. Latrine builders were to be recruited from the local population and would receive training from project assistants. On-site production of concrete components by the local builders was found to be the most cost-effective method. Householders were given responsibility for procuring materials and employing the local builder.

- As latrine construction proceeded, studies were conducted of prevailing attitudes and levels of knowledge among the district's rural population, with an emphasis on sanitation-related diseases.

- After three years of pilot operation, with 400 latrines built, the decision was made to expand the project and to replicate it on a national scale. As the Government of

Lesotho endorsed a National Rural Sanitation Programme, the focus on district-level activities was retained and donor funding proceeded on a district-by-district basis. At the national level, coordination is the responsibility of a national team made up of a national coordinator, a chief technical officer, a health-education and training officer, an officer for monitoring, and two national teams for training, one made up of four technical assistants and the other of two health assistants. Actual field implementation is the responsibility of district sanitation teams, with a district coordinator and four health assistants provided by the Ministry of Health, and four technical assistants provided by the Ministry of Interior. The rural health-care system of the Ministry of Health was already reasonably well developed and focused on village-level concerns, making use of over 4,000 volunteer village-based health workers.

- Overall community approval and commitment to sanitation has been found to be extremely important. Over the years, a five-stage pattern of promoting community commitment has emerged, to be used when the district programme expands into a new community:

  - An orientation and participatory training workshop for district extension workers is organized.

  - This is followed by entry into villages with information provided and opinions solicited. Extension workers form learning groups and conduct house-to-house visits.

  - Local latrines builders are trained.

  - The technical and health assistants stay on for a couple of months, if possible, to supervise construction and to consolidate changes in health and hygiene behavior.

  - Monitoring and evaluation of activities. Monitoring covers, inter alia, rates and standards of construction, prices, credit flows, and the degree of activity of the local latrine builders.

- Latrine-building loans are provided entirely in kind, in the form of materials or payment notes which the latrine builders cash at the credit union office when work is completed. The borrower signs a legal bond that states the cash value of the loan and the repayment schedule. Credit union management at the local level is variable, of course, and may need strengthening. Cost recovery is managed by the Ministries of Health and Interior. Funds are deposited at rural clinics where they are collected by the district's sanitation coordinator and finally placed in a Ministry of the Interior account, to be used for centralized purchase of material for additional latrines.

- Affordability of the latrines was investigated in 1985 by USAID's Water and Sanitation for Health Project. An estimated 45% of the rural population could afford VIP latrines without any external financial assistance, 30% were estimated to be in

need of some extension credit, and 25% could not afford to participate without partial or full subsidy.

- Hundreds of latrine builders have been trained at the village level by the technical assistants from the Ministry of Interior. Courses are normally of two weeks duration and involve 20 to 30 participants. Of those trained, 15% take up latrine building as a full-time career, 45% part-time and 40% drop out. Builders come from a wide variety of backgrounds and are between 17 and 70 years old; a significant number are women.

- As the national programme expanded, efforts were made to increase the effectiveness of educational activities through the use of more effective methods, with an emphasis on female audiences. At the national level, training focused on the district sanitation coordinators in participatory approaches. District sanitation coordinators, in turn, taught these methods to extension workers, who could then use the teaching techniques to raise awareness and promote changes in sanitation and hygiene behavior among villagers.

- The final link between the programme's health education activities and the village is the village health worker. These are volunteers, generally women, who are selected by their communities to act as liaisons with the formal health system. Their responsibilities include first aid, baby weighing, immunization, health counseling and referrals. The sanitation programme has gradually increased their role in health and hygiene education, and included latrine construction training courses. The village health workers also assist in teaching sanitation in schools.

8.7 Lesotho: Low-cost Urban Sanitation — Overview and Funding[19]

8.7.1 Summary

The low-cost sanitation programme in Lesotho is a remarkable learning experience. It started with pilot projects for both urban and rural sanitation in 1980 and 1983 respectively, and has since evolved into a national programme with few expatriate personnel and modest reliance on governmental or external funding (see also Annex 8.6).

Initially, in the 1930s, bucket latrine systems were introduced, with the aim of preventing pollution of ground water from the pit latrines. At that time, water was still drawn from shallow wells which were subject to contamination. During the 1970s, water supply shifted to piped systems and boreholes, and the introduction of the VIP latrine in the context of a

[19] Compiled from: Isabel Blackett, UNDP/World Bank Water and Sanitation Discussion Paper No. 10, World Bank, Washington, 1994.

site-and-services scheme as part of a housing development in Maseru provided a new type of experience. During the 1980s, urban sanitation was becoming a new priority as the government responded to the challenge of the International Water Supply and Sanitation Decade. It was then that the pilot operation was initiated as part of an urban development project funded by the International Development Association (IDA) and an urban Sanitation and Health Improvement Team was established to plan and manage the project. The Team was renamed Urban Sanitation Improvement Team (USIT) in 1991.

While the Team implemented the pilot project, the Ministry of Water, Energy and Mining (MoWEM) negotiated a loan for sanitation projects in 13 district towns with the Kreditanstalt für Wiederaufbau (KfW). Originally foreseen as a sewerage project, the feasibility report revealed that a significant component of on-site sanitation was required to achieve the objective of improving overall sanitation in these 13 towns, which are now an example for an integrated approach to sanitation in towns. It combines both off-site and on-site technologies and involves two ministries. Since 1984, responsibility for the on-site component has been vested in the USIT as the most appropriate body to handle this particular aspect of the overall programme for the district towns.

Thus, three ministries share responsibility for water supply and sanitation in Lesotho, i.e. the Ministry of Interior through the USIT and its Village Water Supply Section, the Ministry of Health through the National Sanitation Programme (see Annex 8.6), and the Water and Sewerage Authority of the MoWEM. When USIT started, it was a small government department. Ultimately, there were three sections: the community section, the technical section and a small administration. For some years, expatriate experts assisted the team. When the 13 towns project started, new team members came from within and not outside of existing government structures, and most of the best arrived directly from schools, college or university, or from another department which had a similar teamwork philosophy. Many of the best were women. In 1990, the government provided US$72,000 for salaries as counterpart to an ODA budget of US$75,000. Since 1990, more staff has been added by the government. The budget covers wages, office and transport; the ODA funding covers promotion, training, new vehicles, capital equipment, and evaluation and monitoring for the work in Maseru and the headquarters team. The total running costs for the 13 towns project (KfW-funded) is about US$80,000.

As regards technology, the VIP latrine is the mainstay of the low-cost urban sanitation approach. The programme relied on local builders who were trained by the team. Great care was taken to consult with the users as to their needs and preferences. Initially, four types of VIP designs were being promoted by different agencies. The resulting confusion led to the agreement that a national design standard was needed, which was established after considerable debate. The standard stipulates that the latrines can be built as a ringbeam VIP, a fully-lined VIP, a VIDP (Ventilated Improved Double Pit latrine) or VIP bucket conversion.

For a family of six, the VIP will require emptying or relocation after a period of about six to eight years. An emptying service is operated in most urban areas and the most popular model is the fully-lined VIP. In rural areas, pits are abandoned and the superstructure is

relocated; this has favoured the wide use of ringbeam VIPs, or double-pit latrines. In Maseru, emptying is operated by the USIT. As different types of equipment were used and tested, concern focused on the safe and economic disposal of the sludge. Initially, the sludge was disposed of at nightsoil farms. Clearly, this imperfect method required change. In Maseru, lagooning was adopted on land near the city's sewage treatment plant. More trials will be needed for other areas.

8.7.2 Lessons Learned

Four widely applicable lessons emerged from Lesotho's urban (and rural — see Annex 8.6) sanitation experience:

- The right design: The technology must be adequate, affordable for most people and acceptable to the users. It should be standardized for economy and simplicity. In Lesotho, the VIP was the most appropriate solution. In other situations, different types of latrines may be required.

- No subsidies: Whenever possible, the users should finance their latrines themselves, or through a credit mechanism. The users should directly employ private sector local builders who are trained in latrine construction. If subsidies are required, the real costs should be determined first, and the implications and likely problems be foreseen cautiously.

- Promotion: To attract the users, the issues of health and status should be addressed through various media. Promotional materials need not be professionally produced, but must be thoroughly tested.

- Institutional arrangements: Programmes should work through governmental structures, if possible. Collaboration with related programmes should be encouraged. Running costs of programmes should be kept appropriate to government budgets so that the local government can afford to take over costs once donor funding is phased out. Staff must be carefully selected and team spirit is essential. Few expatriates should be engaged, and only those who can demonstrate a long-term commitment to the programme, but staff should be localized over time.

8.7.3 Funding

The Water and Sanitation Discussion Paper No. 10 states:

> Experience indicates that once subsidies are offered, it is often very difficult to discontinue them and persuade people to finance the entire cost of the latrine by themselves. Sufficient funds to subsidize latrines for an entire nation are unlikely to become available. But even if they were, would subsidies be the best policy? USIT evaluated this subject closely and

concluded that subsidies, grants or free latrines were generally inappropriate for domestic sanitation in Lesotho because:

- A significant percentage of urban people were buying fairly large household consumer items that they desired, with the assistance of credit;
- In several countries, while creating short-term benefits, subsidies have also created serious problems that affect the long-term sustainability of what might otherwise have been an effective program;
- They intrinsically contradict the policy of sustainability;
- Users have less than full responsibility for their sanitation, and, therefore, proper cleaning, upkeep and maintenance is less likely;
- They place a permanent drain on government or donor resources;
- They are very difficult to target and rarely assist those who have genuine need of help; and
- If USIT offered subsidies, it would contradict the policy of the Rural Sanitation Program (serving people with generally lower incomes).

On the other hand, if a low-cost sanitation program is to be feasible, extended payment arrangements are needed. USIT was aware that to achieve substantial sanitation improvements, some people would have to spread their costs over a year or two. A revolving fund in the form of a loan scheme was designed which had the following advantages:

- Financing was available for sanitation improvements on a long-term basis;
- There is no limit to the number of people who could be assisted, and testing for eligibility would be unnecessary;
- Repayment with interest means that full responsibility for sanitation remains with the householder, thereby increasing the probability of proper cleaning, upkeep and use;
- Donor or government seed money is given a long-term value; and
- Sustainability of the system is more likely.

Many large household items that people owned were comparable in cost to a VIP latrine. Some of the large consumer items were purchased through commercial credit schemes. Many people also built houses through credit schemes. Although the cost of a latrine appears to be an additional burden to the cost of building a house, it actually constitutes a very small amount in comparison to the total cost.

After two years of discussions, a loan scheme was set up in conjunction with the parastatal Lesotho Bank. It was a key point that the government should not be seen as the lender. In other credit schemes, poor repayment rates have been partly attributed to the borrowers' awareness of the government's inefficiency at collecting debts and prosecuting defaulters. Therefore, promotion of the scheme advertises USIT as giving the technical advice and assistance, but the actual loan comes from Lesotho Bank.

Lesotho Bank bought the idea of managing the scheme, as it helped them to increase their range of services and further utilize their newly acquired computer system. They have since started similar credit schemes in conjunction with low-cost housing projects and for extension of urban infrastructure services. For the scheme to be successful, it had to be as simple as possible to manage, acceptable to the accountant general and legally sound so that defaulters could be prosecuted. Satisfactory levels of loan repayment are attributed to several factors:

- The loan application is submitted to a Loan Approval Committee of two USIT officers and three or four local people such as the town clerk, chief, hospital matron or military officer. The Committee must interview the client before the loan can be approved. The Committee is also responsible, along with USIT, for following up on late repayments.

- A substantial deposit (30-40% of total cost) is required. This involves not only money but organization, time and effort, and helps to ensure the client is serious about wanting the latrine.

- Lesotho Bank is regarded as an efficient institution that would certainly try to reclaim debts if they were owed.

- Reminders are given or sent out automatically after 30, 60 and 90 days when a repayment has been missed. The 90-day reminder is copied and circulated to the local chief (or town clerk) who will also follow up the debt.

- USIT strongly encourages people to visit the office to discuss repayment problems. Community staff follow up on clients who are defaulting on their loans.

- No repayments are expected during December and January when everyone has the costs of Christmas as well as the school fees to pay. The loan is actually to be repaid in 20 installments over 24 months.

Figure 8.7.1 is an example of a flyer used to provide information to potential borrowers as to how to apply for a sanitation loan.

Figure 8.7.1 — Information Flyer

HOW TO GET CREDIT FOR YOUR VIP

If you do not have the funds to build a VIP now, then you can apply to USIT for a loan from Lesotho Bank. This is what you have to do:

1. Go to your nearest USIT office and ask for a full explanation of the Loan Scheme and the various options available.

2. With USIT assistance, complete the Loan Application Form. You can choose to repay your loan over any period of up to 20 months. Interest will be charged at the normal Lesotho Bank rates on the loan. In exceptional circumstances, repayment of the loan could be negotiated for a longer period.

3. You will then be called for an interview by the Loan Approval Committee (LAC). They need to check that you are over 18, that you can produce a site ownership certificate and that you are likely to meet your monthly repayments. Before you can receive the loan, you will have to collect 120 blocks and sand for the substructure. You must also dig your own pit.

4. When you have collected the materials, you will have to sign an "Acknowledgment of Debt" agreement and commit your collateral against the loan amount. You should then pay the M 10.00 registration fee. This fee covers the cost of paperwork, flyscreen, roofscrews and a few small items. You will then be given a "loan number".

5. USIT will help you find a trained builder and give you a purchase order for the remaining materials and the builder's fee.

6. After you collect the materials yourself from the suppliers, the builder can start building. A USIT Technical Officer will check that it is built correctly. When it is finished, you will have to sign a completion certificate — stating that you are satisfied with the VIP — before the builder is paid.

7. When the invoices have all been paid, USIT will set up the loan with Lesotho Bank. You will be given a Loan Repayment Card to take with you to the Bank. The repayment should be made on or before the first day of every month.

8. If you have any financial problems and cannot make a repayment, talk to USIT community staff about it and USIT will try to help you. Remember, if you repay in less than 20 months, you will pay less money in interest.

Invariably, the bad debtors have been the wealthier people who think no one will follow up on the debt. Most poorer people are concerned about falling into debt and thus repay regularly. Many people have repaid more quickly than their chosen loan period, to reduce their interest payments. No one has been prosecuted yet, but legal proceedings have started against a few clients. The default rate has risen slowly since the scheme started. This is mainly due to understaffing in the USIT Community Section, which makes it difficult to follow up on everyone who is behind on payments.

8.8 Pakistan: The North-East Upgrading Project[20]

8.8.1 Background

Lahore is the second city of Pakistan and has a population of around four million. A planning study of the city was carried out with World Bank funding in 1979/80, and this was followed in 1983/84 by a more detailed study of the northern part of the city, which contains a high proportion of informal development, including many industries. In the course of this study, an area in the north-east of the city was identified as a potential upgrading area. This area later became the location of the North-East Lahore Upgrading Project, which like the original planning study was funded by the World Bank. The total area covered by the project was about 400 hectares, of which about 270 hectares was already built up in 1986 when project preparation work began. Most of the area had developed informally over the previous 20 years, although there were some older settlements. It was mostly residential in nature, although there was also a considerable amount of industry and commerce.

Prior to the start of the project, there were virtually no sewers in the area, and those WCs that existed discharged their effluent into open drains via household septic tanks. Falls were very limited, but with a slight overall fall from east to west. At the time of the project, most of the undeveloped land lay along the western fringe of the area and the relatively low level of this land tended to hold back development.

8.8.2 The North-East Lahore Upgrading Project

The project was designed and implemented in stages, starting with trial schemes in two lanes, which were carried out in early 1987. A pilot scheme for a seven-hectare area followed in 1988, and implementation of the main project began in 1989. The challenge was to develop proposals for sewerage and drainage which would:

- Form part of an integrated approach to upgrading;

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[20] Source: Proceedings of the Urban and Peri-Urban Strategic Sanitation Conference (unpublished), UNDP/World Bank Water Supply Sanitation Programme, March 1996, The World Bank, Washington, 1996.

- Use design standards and details which were both affordable and appropriate to the conditions found in the area; and

- Deal with the technical problems created by the limited falls.

Given the fact that all sewage would have to be pumped, it was decided at an early stage that efforts would be made to keep stormwater out of foul sewers as far as was reasonably possible. In practice, a fully separate scheme is impossible in such an area, but minor streets were designed with levels which allowed stormwater to run off on the surface into covered rectangular storm drains in the main streets.

The design of collector sewers and storm drains was carried out in a conventional way, although it is worth noting that the storm drains were designed for a return period of less than one year. The procedures for planning and designing tertiary sewers are of more interest. Basic design guidelines were developed, relating the allowable minimum slope to the number of houses served by a sewer. The aim was that these slopes would provide a minimum velocity of about 0.75 m/sec. for peak dry-weather flows. However, some relaxation of this criterion was inevitable near the head of the sewer. The minimum-slope guidelines were then used to design local sewer networks which were plotted on 1:500 plans of the area. At each manhole or chamber, the existing ground level and the proposed invert and cover levels were indicated, and the drawings also showed the distance between manholes to the nearest 0.5 m and the sewer slope. Cover levels were used to determine street levels and thus ensure that a slope was always available for stormwater run-off.

Sewer pipes were spun concrete, locally manufactured with spigot and socket joints. The minimum depth to invert allowed in lanes too narrow to allow vehicular access was 500 mm, with rather greater depths required in wider streets and lanes. Standard details were developed for a range of standard chambers and manholes and each standard design was designated by a letter (Type A, Type B, *etc.*). The required type could then be indicated on the sewer plans at each manhole or chamber location. Chambers on tertiary sewers were spaced at intervals varying from about 17 m to a maximum of 35 m, but generally falling in the range 20-25 m.

8.8.3 Diversifying Services and Technology

The project unit within the Metropolitan Planning Wing of Lahore Development Authority (LDA) was responsible for the provision of tertiary and some secondary sewers within the project area, leaving the remaining secondary sewers and trunk facilities to be provided by the Water and Sanitation Agency (WASA). No explicit effort was made within the project to deal with household-level facilities. In retrospect, it is arguable that more could have been done to diversity technologies, with World Bank funding and LDA efforts being concentrated on secondary facilities, leaving local government and community-led initiatives to provide sewers at the local level. This might provide a response to the shortage of technical resources — already identified as a problem. The role of government engineers and

private consultants should be to develop the overall framework and provide the primary and secondary infrastructure, leaving local professionals and tradesmen to design and implement the tertiary-level facilities, which, individually, require a lower level of technical input.

8.8.3 Demand Orientation

The North-East Lahore project was essentially top-down, with little community involvement in planning , design and implementation. Despite this, it is fair to say that there was a clear demand for improved sanitation. Surveys showed a significant increase in the number of households with flush sanitation, from around 36% in 1986 to around 84% in 1990. The latter figure was found both in areas that had already been upgraded and in those awaiting action.

Subsequent experience suggests that demand from householders is not, in itself, enough to guarantee the success of a scheme. There has also to be a willingness to take on the responsibilities associated with improved sanitation. In the case of North-East Lahore, this meant that WASA was required to take responsibility for operating and maintaining services while residents were expected to make regular payments for the services provided. Difficulties and delays were experienced in achieving these conditions because, for various reasons, there had been insufficient dialogue with the two groups at the planning stage of the project. The experience suggests that demand from households is a necessary but not sufficient condition for long-term improvements in sanitation. It is also important to ensure that all concerned have been involved in the planning process and have considered their likely responsibilities.

8.8.4 Institutional Requirements

Following on from the last point, it is clear that the institutional arrangements for North-East Lahore left something to be desired. The main problems arose from the separation of responsibilities for planning and design from those for operation and maintenance. This is a common structural feature of integrated projects implemented through some form of project management unit and will often lead to problems unless specific efforts are made to ensure that all concerned understand and can undertake their responsibilities. There were also problems in providing the required technical and managerial knowledge and skills from within government, and these problems are discussed below in the section on replicability.

8.8.5 Sustainability

The institutional problems raise doubts about the sustainability of the project. It was clear from the time that facilities were ready for handing over that WASA had not budgeted for the operation and maintenance of the system. Another important determinant of sustainability is the financial viability of a system. The project proposals assumed that cost recovery for

upgrading would be achieved partly through the imposition of user tariffs and partly by raising property taxes. It is doubtful whether either was achieved to the level envisaged by project planners, and this points to the need to consider such matters as integral to the project design, and to obtain the agreement and commitment of all concerned parties at the beginning of a project.

8.8.6 Expanding the Project — Replicability

The project was relatively large, serving a total population of over 100,000. However, it could have only a limited impact on conditions in the city as a whole. In 1991, it was estimated that all the World Bank funded upgrading projects in the Punjab Province of Pakistan would only deal with about 17% of the annual growth in unserviced areas in the Province. One measure of a project's success must therefore be the extent to which it has been replicated. In this respect, an important feature of the approach was that it required a high attention to detail and a fair degree of skill on the part of the designer. This was particularly true in relation to the decision to separate storm flows and to allow them to run off by gravity. Attention had to be paid to various details, for instance to the arrangements needed to carry foul connections under main storm drains. More importantly, the whole system of foul sewers had to be carefully engineered, with attention paid to relative levels, the depth and type of each manhole and the slope of each sewer leg. The approach was therefore dependent on:

- The availability of good survey drawings, providing accurate information on levels;
- Careful, at times painstaking design, by a skilled designer; and
- The availability on site of trained engineers and technicians and conventional surveying equipment.

In North-East Lahore, the first requirement was met, since the whole area had been surveyed by a survey contractor, and plans had been prepared at a scale of 1:500. The survey was based on a triangulated grid fixed by a theodolite traverse, and details were filled in using plane table methods. Levels were tied into the national datum. The cost of producing these drawings was around Rs 2,300 (US$80) per hectare in 1987. The standard of the surveys was good, but experience elsewhere in Pakistan suggests that it is difficult to ensure this quality of survey as a matter of course. There must be some doubt about overall capacity to produce surveys and drawings at the rate required to make a significant impact on conditions in informal areas.

A more important constraint on the replicability of the approach is the shortage of engineers with the skills and attitudes required to produce detailed designs to the required standard. Most of the design for the seven-hectare pilot project and the first two full-size contracts (covering areas of about 30 hectares and 25 hectares, respectively) was carried out by expatriate consultant engineers. Although there were some problems with these designs, they worked well on the whole. Later designs were carried out by local consultants working

under an expatriate project manager. The indications are that some aspects of these designs, particularly those which dealt with stormwater, were not considered in as much detail as had been the case for the early contracts. Observation of the standard procedures adopted for many locally funded schemes in Pakistan suggests that it is perhaps unrealistic to assume that the resources are available to ensure the requisite attention to detail required for this approach.

The availability of the skills and equipment required to set out sewers in accordance with the levels shown on drawings is also in doubt. For the project itself, a reasonably good team of site engineers was assembled, although there was a lack of management skills. However, it is doubtful whether the attitudes and skills necessary to replicate the project widely are generally available within the government sector.

The conclusion must be that considerable investment would be required — for introducing new skills into both the government and private consulting sectors — before the North-East Lahore approach could be adopted as standard throughout Pakistan.

Another point relating to replicability is the form of the project in relation to typical government initiatives in the field of sewerage provision. The key point here is the difference between the relatively large, carefully engineered contracts let in North-East Lahore project, and the small-scale and relatively *ad hoc* approach taken to the provision of local sewers by municipal authorities and local residents. It is difficult to see how the former could influence the latter, and equally hard to see how the North-East Lahore approach could be generally adopted by local government.

Notes

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