WATER SUPPLY AND SANITATION IN DEVELOPING COUNTRIES

SECTORAL POLICY DOCUMENT OF DEVELOPMENT COOPERATION ⑫

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FOREWORD

The present document is the twelfth in a series of sectoral and thematic policy documents on development cooperation, and elaborates on the general principles formulated by the Minister for Development Cooperation in the policy documents 'A World of Difference' (1990)[1] and 'A World of Dispute' (1993)[2]. It replaces an earlier, 1989 memorandum.

This document follows on from the sectoral policy document on water management and development cooperation[3], the sectoral policy document 'Sustainable Irrigated Agriculture'[4] and the sector paper 'Women, Water and Sanitation'[5]. Together, these four documents describe the of Netherlands Development Assistance (NEDA) policy in the field of water and water management in developing countries.

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1. INTRODUCTION

1.1 Scarce water

Over 70% of the earth's surface is covered with water. Only 2.5% of this is fresh water, however, and therefore in theory capable of maintaining terrestrial life. The great majority of this water is in a frozen state, or is situated very deep in the earth's crust, making it impossible in economic, if not in technical, terms to exploit. In the final analysis only 0.26% of the total fresh water reserves - 93,000 km^3 - is actually suitable for use[6].

Unlike natural resources such as petroleum, gas and minerals, water is a renewable resource. This renewability - resources are suppleted by precipitation as part of the hydrological cycle - is limited, however. If exploitation is to be sustainable, no more water can be used than falls as precipitation on the earth's surface (on average 119,000 km^3 per year) less evaporative losses (on average 72,000 km^3 per year). The difference is 47,000 km^3. If this amount were divided equally amongst the world's inhabitants, everyone could use 8000 m^3 per year[7]. A country or region will experience (periods of) shortage when the quantity of renewable water available is less than 1,700 m^3 per person per year[8].

Water resources are being depleted and contaminated due to increasing, wasteful usage and pollution. As a result, water of good quality is becoming increasingly scarce and therefore more costly. Furthermore the available fresh water is distributed unequally over the world. Many countries, particularly in the Middle East and Africa, face water shortages. This uneven geographical distribution of water is a potential source of conflicts. Water therefore figures high on the international political agenda.

1.2 The importance of water and water management

If water resources are not managed sustainably, water can in the near future become a constraint impeding sustainable development in many developing countries. The availability of adequate water of good quality is important not only for health (drinking water supply and sanitation) but also for productive activities such as agriculture, fishing, industry, shipping and energy (hydro power). Water is also needed for recreation and for the preservation of ecosystems and biological diversity.

The consumption of water varies by type of use; seventy to eighty percent is consumed by agriculture for irrigation purposes, while rather less than twenty percent is consumed by the industrial sector; households account for only six percent of total water consumption for domestic and sanitation purposes (worldwide averages)[9].

Integrated water management seeks to exploit water resources sustainably so as to satisfy the demand of all user groups, while preventing flooding. In allocating the water, the interests of the different water users and of the environment must be carefully balanced.

Integrated water management must ensure priority for the *minimum water needs for drinking and sanitation*, since this is a *basic social need*. These minimum needs include use for drinking and cooking in the home, flushing away waste, washing and cleaning, and water usage in public facilities such as schools and hospitals.

1.3 The place of drinking water and sanitation within Dutch policy on development cooperation

The policy document *A world of difference* (1990)[1] clearly defined the main objective for Dutch policy on development cooperation as the alleviation of poverty, with attention for the themes of environmental management and the role of women in sustainable development. It stresses the importance of meeting the need for clean drinking water and sanitation as a weapon in the fight against poverty. The objective of Dutch policy on water and sanitation is to provide access to drinking water and sanitation for as many of the poor as possible on a sustainable basis.

A world of dispute (1993)[2] developed these ideas further, and urges a more coordinated approach to political and development issues. It describes succinctly the present situation in regard to water in the world (p 57):

> *"Water is needed to increase food production, provide energy, develop industry and hence employment, promote health (drinking water supplies) and maintain biological diversity and ecosystems. Much can go wrong with water. Water projects have a low yield, water is not inexhaustible, water pollution is an increasing problem, and large scale abstraction of water threatens the balance of nature. Water is a scarce commodity, has an economic value and should therefore be regarded as an economic good, in development cooperation policy also".*

In 'The Foreign Policy of the Netherlands: A Review' (1995)[10] the government emphasised the continuing pressing need to combat poverty, with special attention being required for the basic needs of the poorest groups, such as safe drinking water, food, sanitary facilities, primary education and health care including birth control. This is echoed in the '20/20 initiative' launched at the Copenhagen World Summit for Social Development in 1995, in which the importance of investing in these social sectors was again emphasised.

1.4 Structure and purpose of this document

The water supply and sanitation sector is described briefly in chapter 2, its importance for poverty alleviation, women and development, the environment and health is indicated, and international developments for the sector from the Water Supply and Sanitation Decade through to the Summit for Social Development in Copenhagen are described. Chapter 3 then summarises the problems and experiences of Netherlands Development Assistance (NEDA) and other donors in the sector. NEDA policy for the sector is set out in chapter 4, and chapter 5 describes the systematic approach taken to policy implementation.

This memorandum is designed to be used within NEDA and in embassies in developing countries for project preparation and implementation. It sets out principles applying to consultations with the authorities and organisations in partner countries, with other donor agencies and with organisations active in the sector.

The document provides also a framework for monitoring and evaluating projects and programmes in this field.

2. THE WATER SUPPLY AND SANITATION SECTOR

2.1 Introduction

Water supply and sanitation facilities refer to the facilities which provide for the supply of domestic water, sanitation, the drainage of rainwater and the processing of solid waste. Water supply and sanitation are of fundamental importance for alleviating poverty, for women, for the environment and for public health. In this chapter, the different components of the water and sanitation sector are considered in turn - water supply, sanitation and drainage and waste processing - and the importance of the sector for the aspects mentioned is examined further. International developments in the field of water supply and sanitation are then summarised.

2.2 Water supply

The term water supply refers to activities designed to provide water of good quality for domestic and industrial use. Health considerations mean that a minimum of 20 litres per user per day is necessary. This quantity must be available within a maximum walking distance of about 400 metres. Households in high-income groups connected to the water supply may consume more than 300 litres of water per person per day. The mean water consumption in the Netherlands in 1995 was 134 litres per person per day.

2.2.1 Water supply systems

There are a great variety of water supply systems in developing countries. Use is made of open wells, springs, pools, streams, rivers and lakes. These systems provide no protection against pathogens and other contaminants. In addition there are the following enhanced facilities:

- covered wells with or without handpumps or, simpler still, a winch with rope and bucket;
- public distribution networks supplied from ground or purified surface water by engine-driven pumps or by gravity.

These systems can supply water at various levels of service as follows (in order of increasing level):

- facilities for communal use (well equipped with handpump or public standpipe supplied from a distribution network);
- yard connection (a standpipe in the yard);
- house connection.

In sparsely populated rural areas the lowest of these levels is common, because a public distribution network is not viable in these circumstances. In urban areas all three levels are found.

The choice of system and service level depends on a large number of factors, of which the most important are: the availability of water, the population density, the local capability to manage the facilities sustainably, the willingness and ability to pay for the facilities and the users' preferences.

2.2.2 Costs

Both consumption levels and construction costs rise with the service level. This effect in relation to construction costs can be seen in table 1. The regional differences in costs are noteworthy.

Table 1: Water supply: construction costs by region and by technology level

Costs per region

	Construction costs urban (US$ per capita)		Construction costs rural; (US$ per capita)
Region	**house connections**	**public standpipe**	**public supply (all levels)**
Africa	91	55	44,5
Latin America and Caribbean	152,5	68,5	80
South-East-Asia	111,7	47,7	27,7
Eastern Mediterranean	225	135	90
Western Pacific	225	107	75,5

Costs by technology level

	Technology level	US$ per capita
High-cost technology:	Urban water supply (house connections)	200
Intermediate-cost technology.	Marginal urban water supply (network with public standpipes)	100
Low-cost technology:	Rural water supply (wells with handpumps, gravity schemes)	30

SOURCES: *WHO (1990) The Water Supply and Sanitation Decade, End of Decade Review (as at December 1990). Geneva: WHO. WHO/UNICEF (1990) Water Supply and Sanitation Sector Monitoring Report 1990. New York/Geneva: WHO. WHO/UNICEF.*

The operating costs for a water supply consist of the running costs (including salaries, energy, chemicals) and maintenance costs (spares, repairs). There are not many reliable data on the operating costs of domestic water supply. The following figures serve as a guide: one to two USD per user per year for a well with handpump, one to two USD for a standpipe connected to a distribution network where the water is transported by gravity and four to ten USD per year for house connections in urban and peri-urban areas.

The charges for piped water supply can be determined in various ways. In some countries charges are based on the quantity of water used, in others, for example, on floor space. The former method has the advantage of deterring waste, while the latter is administratively and technically more straightforward (since it does not require water meters to be installed or read).

2.2.3 Organisations

The following organisational structures for managing water supply facilities - or a combination of them - can be distinguished:

- water departments under a national ministry which manage drinking water and sanitation facilities in rural areas and small urban centres;
- governmental and semi-governmental enterprises (public utilities) and municipal services, mainly in cities;
- user cooperatives (particularly suited to managing small-scale drinking water and sanitation infrastructure in rural and peri-urban areas), in some cases through NGOs, in cooperation with government agencies;
- private sector.

Until the early 1980s, the management of water and sanitation was dominated by the first two types of institution. In recent years there has been increasing interest in the two latter types, as a consequence of weaknesses in the way many public institutions work.

2.3 Sanitation

Sanitation refers to the means of hygienic removal and treatment of excrement and waste water[11].

2.3.1 Sanitation systems

The range of sanitation facilities in developing countries is also wide. Defecation often occurs on open ground or into public waters. In sparsely populated, arid and semi-arid areas this causes little environmental impact, so that demand for better sanitation has a lower priority. As the population density increases, however, so does the need for improved facilities which limit the risk of pollution and faecal contamination.

The following systems can be distinguished:

- systems in which excreta are deposited directly in a pit (pit latrines, with or without water flush) or septic tank and the waste water drains into the soil;
- systems (bucket latrines) whereby the excreta are collected in containers and are deposited at a central disposal site or treatment plant, or are used for agricultural purposes;
- a central sewerage system with or without sewage treatment. Waste water acts as a vehicle whereby faecal waste is transported along a network of conduits to a central discharge point or treatment plant. Sewage systems require a minimum water consumption in order to enable the waste to be transported.

Systems in which the waste is disposed of *in situ* are relatively simple and cheap, since there is no central collection and transport system. The responsibility for managing these kinds of sanitary facility devolves entirely on the households themselves. This applies particularly in rural areas, where the availability of space permits the contents of a latrine or septic tank to be disposed of on the owner's land or a new facility to be constructed. This space is often lacking in towns. It is then necessary to resort to a costly and complicated centralised system for the collection, transport and processing of the contents of latrines and tanks. The bucket latrine is one of the oldest forms of organised sanitation, and is still used in many cities in developing countries, particularly in Asia. The collection and emptying of the containers is often carried out by stigmatised groups (e.g. the 'scavengers' in India) who work in demeaning conditions. These conditions are the main driving factor behind the Indian government's moves to replace this system. The system is equally objectionable on environmental health grounds.

In densely-populated areas such as cities with a relatively high water table, on-site sanitation (latrines, septic tanks) can create the risk of serious groundwater contamination due to the disposal of excrement and the drainage of waste water into the soil. When the permeability of the soil is poor, drainage problems occur. In such cases, connecting houses to a sewer system is usually the only, albeit costly, solution available. These high costs have led in recent years to the development of cheaper alternatives, such as small bore sewers, condominium systems[12] and public toilets. These facilities are often managed by users' organisations in cooperation with the authorities and/or NGOs.

2.3.2 Costs

The investment costs for sanitation facilities are shown in table 2. It can be seen that, as in the case of drinking water facilities, significant regional differences occur.

Table 2: Sanitation facilities: constructioncosts by region and by technology level

	Construction costs urban (US$ per capita)		Construction costs rural (US$/capita)
Region	**sewer connections**	**other**	**latrines**
Africa	120	100	22
Latin America and Caribbean	120	70	25
South-East-Asia	151,5	36	10,7
Eastern Mediterranean	360	65	72,9
Western Pacific	600	155	38,7

Costs by technology level

	Technology level	US$ per capita
High-cost technology:	Urban sanitation (sewers and sewage treatment)	350
Intermediate-cost technology:	Marginal urban sanitation (on-site sanitation)	25
Low-cost technology:	Rural sanitation (on-site sanitation)	20

SOURCES: *WHO (1990) The Water Supply and Sanitation Decade, End of Decade Review (as at December 1990). Geneva: WHO. WHO/UNICEF (1990) Water Supply and Sanitation Sector Monitoring Report 1990. New York/Geneva: WHO. WHO/UNICEF.*

The operating costs for sanitary facilities are dependent on the technology and the service level. The costs of a sewage system with full waste water treatment can exceed USD 50 per person per year. The costs can be recovered from the users of the system through water charges or local taxes.

2.3.3 Organisations

The institutional structure is often the same as for the water supply. The responsibility for sanitation can lie with the same organisations as manage the water supply or equally with other organisations. Although subsidies are paid in some developing countries for the construction of latrines, the authorities often only have an enabling and supervisory role for facilities of this kind, unless a cen-

trally organised removal system for the waste from the latrines is necessary. Local health services organise information campaigns and ensure that regulations relating to the design, equipment and hygienic use are observed.

2.4 Drainage and solid waste disposal

The drainage of stormwater and the removal of solid waste (domestic, street and market waste, construction waste and industrial waste) is necessary for the quality of the living environment in cities (water and soil).

2.4.1 Systems

Solid waste disposal comprises collection, discharge and, where appropriate, processing/recycling of the waste. Public refuse disposal involves the collection of waste by refuse lorries on a house-to-house basis or from street corners, and its transport to a central landfill or other disposal site.

Waste is not only landfilled/dumped but is also increasingly recycled. The informal sector plays an important role in this by separating, gathering and selling materials suitable for recycling such as metal, textile, plastic, glass, wood and paper. Jakarta, for example, produced an average of 21,000 m^3 of waste per day in 1988, of which 25% was collected for recycling by the informal sector, thus saving the refuse collection services between US$ 270,000 and 300,000 per month[13].

Domestic refuse can be incinerated and used to generate energy. Incineration is often not possible in developing countries because of the high moisture content of the waste (between 45 and 85%) and its low calorific value. Even if the calorific value is adequate, the costs of an incinerator are often higher than those for establishing a landfill, due to the relatively low price of land in developing countries.

Solid waste can often be composted because of the high content of organic, biodegradable substances (vegetable and fruit waste). The compost can, providing it meets certain environmental requirements, be used for agricultural purposes. The methane gas released during anaerobic composting can be used for energy purposes as in the case of anaerobic treatment of waste water.

In developing countries stormwater is usually conducted away by a system of open drains into which, if there are no closed underground sewers, waste water is also released. Because of the deficiencies in the solid waste disposal system, solid waste is also sometimes dumped in these drains. This leads to clogging and flooding, with adverse consequences for the environment and for public health.

Table 3: Costen of solid waste processing

	low income country	middle income country	industrialised country
waste produced (tonnes/cap/year)	0,2	0,3	0,6
income (US$/cap/year)	350	1950	17500
waste collection costs (US$/cap/year)	3 - 6	9 - 21	42 - 72
waste disposal costs (transport and dumping) (US$/cap/year)	0,82 - 1,6	2,4 - 7,8	18 - 42
total costs (US$/cap/year)	3,82 - 7,6	11,4 - 28,8	60 - 114

SOURCE: *S. COINTREAU-LEVINE (1994) Private sector participation in municipal solid waste services in developing countries. Washington DC: UNDP/UNCHS/ World Bank Urban Management Programme.*

2.4.2 Costs

As living standards in a country rise, its inhabitants consume more and as a result produce more waste. This is why the production of waste in developing countries is less than in industrialised countries (see table 3). Despite this, however, waste disposal absorbs a higher proportion of incomes in developing countries. Although labour costs are lower, the purchase costs of the equipment, often imported (such as refuse lorries) are high. Collection is often more difficult, since in many developing countries the manner in which waste is tendered leaves much to be desired.

Drainage costs are almost never presented separately, but form part of the overall costs of the sewage system if the drainage is by means of closed conduits, or of the costs of roads and streets, if drainage takes place in open gutters.

2.4.3 Organisations

It is usually the local authority which is responsible for solid waste processing. A municipal service is charged with carrying out this task. A clear tendency can be discerned to contract these functions out to the private sector in the interests of efficiency.

In developing countries the informal sector has an important role in relation to waste collection because:

- the public services often fail to deliver;
- waste collection and recycling is an important source of income for many active in the informal sector.

The responsibility for drainage also lies with municipal agencies: either the sewage service or the department which manages roads.

2.5 The importance of the sector

2.5.1 Poverty alleviation and economic development

Non-existent or poor access to clean drinking water and good sanitation leads to poor living conditions, and is one aspect of poverty.

Improvements in the drinking water supply and in sanitation reduce the costs of curative health care (treatment of water-borne diseases) and the costs of reduced labour productivity resulting from these diseases. They can also produce direct economic benefits and therefore improve living standards[14]. Many women in developing countries transport water by foot over long distances; hard and time-consuming (up to 15% of their time) work[14]. A better water supply closer to the home (well or public standpipe) can reduce this time considerably, and the time spent on carrying water can be reduced to almost zero by a connection in the yard or house.

When water is contaminated by pathogens the health risks associated with consumption can be reduced by boiling the water. The energy costs involved can vary between 11 and 29% of household income for the lowest income groups[15]. Furthermore in many places there is an inadequate supply of cheap fuel (mainly firewood, again mainly collected by women). Safe drinking water and sanitation make it unnecessary to boil water before consuming it, thus helping to save money and energy, and therefore also reducing air pollution.

An adequate supply of good quality water is needed not only for human consumption but also for industrial use. A good water supply is therefore indispensable for industrial development.

Sanitary facilities also enable waste and waste water to be recycled. This can also bring substantial economic benefits.

2.5.2 Women and development

Women's participation in the decision-making relating to the planning, design, implementation, upkeep, operation and financial management of drinking water and sanitation facilities is vitally important, because:

- women bear the brunt of the consequences of deficient drinking water supply and sanitation: the care of their children, affected by water-borne diseases; the transport of water long distances on foot;
- in almost all developing countries the responsibility for using drinking water and for hygiene in the home lie with women, who in consequence possess a wealth of knowledge and experience accumulated over generations related to water supply and the effective and efficient use of water in and around the home;
- children are brought up primarily by women, who are therefore the traditional passers-on of knowledge, and thus the target group *par excellence* for hygiene education.

Furthermore the poorest groups in developing countries consist predominantly of women, which makes it vital in terms of poverty alleviation that they are involved.

2.5.3 Environment

There is a close relationship between water quality and the waste problem. Solid waste and waste water contain not only biodegradable organic substances but also, particularly in industrialised countries, nutrients (nitrates, phosphates) and persistent toxic substances such as heavy metals and pesticides which are harmful to human health and pollute the environment.

When the discharge of organic waste into surface water exceeds the self-purification capacity of this water, its oxygen content falls below the minimum level needed to sustain aquatic life. Furthermore many of the organic pollutants are of faecal origin and therefore carry disease which can survive for a long time in the oxygen-free (anaerobic), polluted conditions described.

Nutrients originate mainly from fertilisers and detergents, and can cause the excessive growth of algae. High levels of nitrate in drinking water are also toxic. Persistent toxic substances are dispersed through the environment and accumulate in the soil and in organisms, killing fish and birds, contaminating food, etc.

The volume of solid waste and waste water is increasing, particularly in rapidly growing cities in developing countries. Many of these cities cannot cope with these increasing volumes, and water and soil are becoming polluted due to the uncontrolled dumping of solid waste and the discharge of waste water. Ground and surface water are being made unsuitable for many uses, including the supply of drinking water.

Sanitary facilities are essential to deal with waste and waste water in an environmentally acceptable manner.

2.5.4 *Public health*

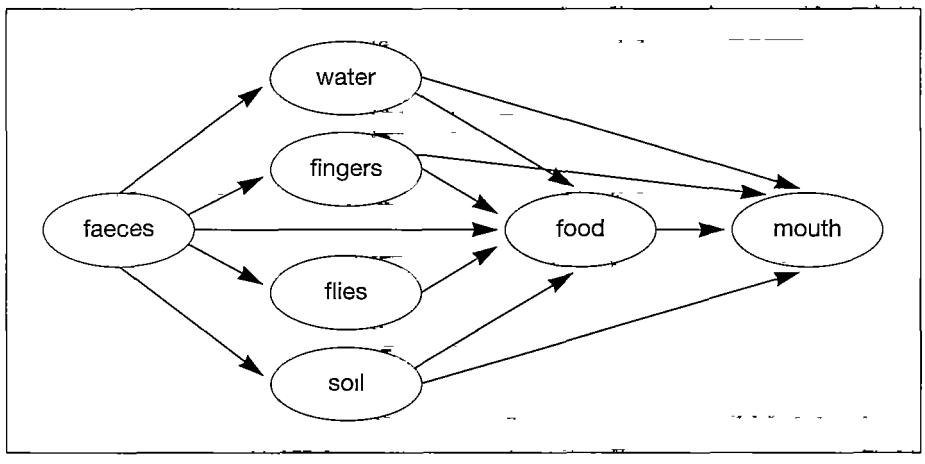
Insufficient and/or contaminated drinking water and the absence of or unhygienic sanitation are largely responsible for the high morbidity and mortality in developing countries. An estimated 80% of all diseases and one-third of all deaths in developing countries are caused by the consumption of contaminated water and at least 10% of productive man-hours are lost due to water- and sanitation-related diseases[9] such as diarrhoea, cholera, Guinea worm, etc.

The following preventive measures are important in suppressing the primarily faecal-oral transmission of diseases related to water and sanitation:

- the safe removal and treatment of faecal waste either separately or combined with waste water (sanitation);
- safe supply and use of drinking water;
- environmentally sound drainage and treatment of stormwater and solid waste;
- personal hygiene;
- hygiene in the home and workplace including the hygienic preparation and consumption of food, and pest control.

Primary health care in particular complements water supply and sanitation activities in fighting infectious diseases and promoting public health.

Figure 1: Faecal-oral transmission routes



SOURCE: *BOOT, M.T. AND S CAIRNCROSS (1993) Actions speak; the Study of Hygiene Behaviour in Water and Sanitation Projects. The Hague: IRC.*

2.6 *International developments*

2.6.1 *The Water Supply and Sanitation Decade (1980-1990)*

Recognising the need for reliable drinking water and sanitation, in 1977 the United Nations declared 1980-1990 to be the 'Water Supply and Sanitation Decade'. The object was to achieve an acceptable level of drinking water and sanitation for all ('Water for all'). The costs were estimated at roughly US$ 300-600 billion. In practice, some US$ 134 billion was invested[15]. Of this total, 66% was found by the developing countries themselves and 34% by donors.

The numbers of people in developing countries provided with drinking water and sanitation during the Decade are shown in table 4. It can be seen that by the end of the decade, 1.2 billion more people had access to an adequate supply of clean drinking water than in 1980, and 770 million more had sanitary facilities.

Another important achievement of the Decade was the development, promotion and acceptance of modifications in the technology. Simple, low-cost drinking water and sanitation technologies were developed during the Decade. Some of these are now applied widely in developing countries, with the necessary equipment being manufactured locally. This has reduced investment and operating costs to levels, which can be afforded by many poorer users.

Sturdy hand and foot pumps were developed for water supply purposes. Many such types of pumps, including direct action handpumps based on the so-called 'Village Level Operation and Maintenance' (VLOM) concept, were put into production, and many hundreds of thousands of hand and foot pumps are installed each year. The rope pump, used for many centuries in Europe and China before falling into disuse, has been resurrected, and has proved its reliability particularly in Central America, in easy to maintain at user level[16].

The techniques available for digging wells have also been extended with the help of tools which allow wells to be dug by hand. Simple purification techniques for preparing drinking water from polluted surface water (for example by slow sand filtration, if necessary preceded by filters with coarse filter material) are being developed. Results to date have been encouraging[17].

In the area of sanitary facilities, different latrines have been developed: VIP (ventilated improved pit) latrines, Sanplat latrines and compost latrines, such as double vault pour-flush latrines.

Simple techniques have also been developed for the transport and treatment of waste water and organic waste, for example so-called small-bore sewers, and anaerobic treatment plants producing biogas.

The Decade also saw increasing acceptance of the role of users (not only voluntary contributions but also participation in decision-making) at all stages of the project cycle: planning, design, construction and operation (operation, maintenance and financial management).

Hygiene education has also become an integral part of water and sanitation programmes. The construction of improved water supply and sanitation provisions is not in itself sufficient to diminish disease linked to water and sanitation. It is equally important that good hygiene is practised around the facilities.

A successful example is the worldwide campaign, supported by UNDP and UNICEF, to eradicate dracunculosis (Guinea worm). Some 10 million people caught this disease each year, with a resultant annual loss of agricultural production of US$ 1 billion. Improvements in rural water supplies, treatment and hygiene education have resulted in a notable reduction of dracunculosis in Ghana, Nigeria, Cameroon, Senegal and Pakistan.

The resources needed to meet the objective set for the Decade made it clear that it was intended to act more as challenge and stimulus than as a feasible objective. Despite great efforts made, at the end of the decade there were still over 1.7 billion people in developing countries without safe drinking water and 1.9 billion without decent sanitary facilities (see table 4). The motto for the Water Decade, "Water for all" did provide a stimulus, but what was actual achieved by 1990 fell far short of this ideal. Many new facilities also rapidly fell into disuse as a result of poor maintenance and management.

Table 4: Results of the Water and Sanitation Decade

	year	population (millions)			% with access
		total	access	no access	
water supply	1980	3.239,47	1.492,83	1.746,64	46
	1990	3.990,61	2.697,95	1.292,66	68
sanitation	1980	3.239,47	1.273,59	1.965,88	31
	1990	3.990,61	2.043,42	1.947,19	51

SOURCE: *WHO (1990) The International Drinking Water Supply and Sanitation Decade, End of Decade Review (as at December 1990). Geneva: WHO.*

2.6.2 *Global Consultation on Safe Water and Sanitation for the 1990s (1990) and International Conference on Water and the Environment (1992)*

The economic and political turmoil since the end of the 1980s has not left the water and sanitation sector untouched. Rapid economic progress, particularly in East Asia, has been accompanied by tremendous investment in the development of infrastructure (including drinking water and sanitation infrastructure). This has happened less in Eastern Europe and the former Soviet republics because political instability and the difficult transition from a centrally planned economy to a decentralised administration and a market-based economy are hindering much urgently needed investment. Furthermore, a great deal of water and sanitation infrastructure has been destroyed or severely damaged by hostilities resulting from conflicts in Africa, the former Yugoslavia, the former Soviet republics and elsewhere, and by natural disasters. Reconstruction requires enormous investment. These catastrophes have also produced millions of refugees and displaced persons, for whom emergency facilities must be set up. Finally there is the increasing scarcity of water, which threatens to lead to a water crisis in a number of countries, particularly in the Middle East and Southern Africa.

At the end of the Decade, the Collaborative Council of External Support Agencies (ESA) was formed to continue the development of the sector into the next century.

During the Global Consultation on Safer Water and Sanitation for the 1990s, held in New Delhi in September 1990, the ESA Collaborative Council decided to extend membership of the Council also to sectoral experts from donor countries and to representatives and sectoral experts from developing countries[18]. The name of the Council was therefore changed in New Delhi to the Water Supply and Sanitation Collaborative Council (WSSCC). The purpose of the WSSCC is to promote cooperation between developing countries and donors in order to foster the sustainable development of drinking water and sanitation facilities in developing countries, with a particular focus on the poor.

During this conference and the major water conference held in January 1992 in Dublin - the International Conference on Water and the Environment[19] - generally accepted principles for the sustainable development of the sector were formulated on the basis of experience from the field during the Decade, such as:

- decentralisation to the lowest possible level (autonomy for the managing agencies and participation of the users, particularly women);
- recovery of the costs from the users;
- recognition of the important economic value of water, and the resulting need to regard it as an economic good;

- application of appropriate technology;
- integration of the water and sanitation sector into sustainable environmental management and health.

2.6.3 *United Nations Conference on Environment and Development (1992)*

These principles were largely incorporated in chapter 18 (on fresh water resources) of the United Nations Conference on Environment and Development (UNCED) Agenda 21 report. This chapter discusses the relationship between the management of fresh water resources (including drinking water and sanitation) and other issues related to the environment and development (including the protection of water resources through the abatement of pollution and the role of water in sustainable urban development). This resulted in a series of recommendations for the sustainable development of the water and sanitation sector. No hard agreements were made about implementing these recommendations, however.

2.6.4 *Ministerial Conference on Drinking Water and Environmental Sanitation (1994)*

As a contribution to the actual implementation of chapter 18 of Agenda 21, the Dutch Minister of Housing, Spatial Planning and the Environment organised an international conference at ministerial level on the environment and the international drinking water and sanitation problem[20].

An action programme was drawn up which was approved by the Commission for Sustainable Development.

In conclusion, it can be stated that the main focus of international sectoral policy, having regard, amongst other factors, to the environmental and financial constraints which apply, is on using natural resources and existing water and sanitation facilities more effectively and efficiently, in order to benefit as many users as possible ("some for all rather than more for some").

2.6.5 *The World Summit for Social Development (1995)*

The World Summit for Social Development, held in Copenhagen in 1995, urged donors and partner countries to increase their expenditure in the social sector on the basis of the 20/20 initiative, whereby donors reserve 20% of their development cooperation budget for basic social services, and the recipient countries do the same with 20% of their national budget[21]. The importance for poverty alleviation of investing in basic water and sanitation facilities was stressed.

3. EXPERIENCES

3.1 Introduction

The Netherlands is supporting a wide variety of drinking water and sanitation activities in developing countries. Firstly, projects with a specific objective are supported, for example to perform groundwater research in a given area, to provide goods or to arrange temporary placements of specialists in water supply or sanitation organisations. A second category of projects is geared towards preparing and implementing multidisciplinary activities in which drinking water supply, sanitation facilities, the drainage of surface water and waste disposal are integral components alongside hygiene education, training people to make the best use of the facilities, and institutional strengthening of national water and sanitation organisations. Over half of Dutch bilateral expenditure in the water and sanitation sector in recent years has been in Africa, about one-third in Asia and approximately 10% in Latin America.

Most of the activities are taking place in rural areas, but as a result of the high urbanisation rate in developing countries, NEDA is paying increasing attention to basic provisions for the urban poor. This urbanisation confronts utilities with millions of additional potential customers each year. The great majority of these are slum-dwellers, and are generally regarded by the service providers as particularly unattractive customers. This means that services, when they exist at all, are often not adapted to the needs of these users. Furthermore the provision of services in shanty towns is often hampered by other infrastructural deficiencies such as poor or no roads, energy supply, etc. and the lack of rights of ownership or use (the residents often do not have legal tenure). The urban poor therefore often have no access to basic facilities such as clean water, sanitation, drainage and refuse collection.

The Policy and Operations Evaluation Department ('IOB') carried out an evaluation of the drinking water activities supported by NEDA during the period 1975-1980[22]. In evaluating Dutch bilateral aid to India, Mali and Tanzania the IOV paid considerable attention to the extensive assistance to rural water and sanitation programmes in India and Tanzania[23]. Many other drinking water and sanitation activities financed by NEDA were also evaluated.

On the basis of this experience in the field, and the experience acquired during the Decade, a number of specific problem areas which are hampering sustainable development in the sector were identified:

- insufficient involvement of the users;
- insufficient emphasis on a gender-specific approach;
- weak institutional structures and management;

- lack of integration of the water and sanitation sector into sustainable water resource and environmental management and health care;
- inappropriate technology;
- lack of donor coordination.

These problem areas are explored further in the sections below.

3.2 User involvement

Many water supply and sanitation facilities prove to be unsustainable because they are not matched to the aspirations and possibilities of the poorest users in particular. Public utilities and national agencies responsible for drinking water and sanitation in developing countries, but also donors, often focus too much on the construction - rather than the management - of supply-driven high-value facilities. The level of service provided is therefore often out of reach of the poor. The users are often not able to contribute sufficient to the maintenance of the facilities, so that the latter cease to work properly within a short time of their construction.

A number of developing countries pursue the policy that central government provides the population with minimum water facilities free-of-charge. No active involvement on the part of the users is required. In such a situation giving the users joint responsibility requires a change in national policy.

In the mid-1980s the main form of participation envisaged was the provision by the users of labour and materials free-of-charge during the realisation and thereafter during the maintenance and operational phases. Experience has shown that if water and sanitation facilities are to be sustainable, a system of 'community management' is necessary whereby the users are able to take autonomous decisions about the measures needed during the entire project cycle. The users then become 'co-owners' of the project, have influence over the facilities and a shared responsibility for the financial management.

In rural areas a lot of progress has been made in financing the construction, use and maintenance at the user level. In constructing latrines and water supply facilities, users contribute money and/or local materials, tools and voluntary labour. In a number of countries the water supply and sanitation organisations at district level carry out major repairs and deliver components, while preventive maintenance and the replacement of small components is arranged by users at the community level. In other countries repairs are carried out by appropriately trained, independent specialists who are paid either per repair or per month or season. The approach to charging for use and repairs also varies. Charges are sometimes made per repair while in

other cases users pay a monthly or yearly contribution to a water fund which finances the maintenance and repair costs and possibly also new investments.

These contributions however are often not even enough to cover the running costs. In some countries the users still make no contribution to costs at all, and the role of the user groups is largely confined to notifying the responsible water and sanitation organisations of faults.

In the water supply and sanitation programmes supported by NEDA, user involvement is strongly encouraged, for example by establishing 'water committees'. Socio-economic units are also established within the technical departments so as to give form to these community based activities (such as the integration of sanitation and hygiene education with water supply activities). These special units only extend to water and sanitation projects supported by donors. This limits their ability to serve as a model. Since they are also usually totally dependent on donor financing, they cannot be regarded as being sustainable. It is not clear whether these units can be institutionalised in local structures, and which organisation could take on their function. It would probably be sensible to see whether there are capable local NGOs which could take over the catalyst function of the present support units in the future.

Following the success of community-managed water supply and sanitation projects, these have in recent years sometimes been linked to projects in other sectors, such as small-scale irrigation, afforestation to combat erosion, health care and literacy programmes. Although this is in principle laudable, some caution is desirable. The inclusion of other activities can arouse expectations and create responsibilities which the water supply and sanitation project cannot fulfil. Extending projects into other sectors also necessitates close cooperation between government organisations in various sectors. Often the possibilities for this are lacking, which could lead to the collapse of the entire programme.

3.3 Gender

Men and women participate unequally in decision-making, implementation and management and the transfer of know-how. This is often not adequately recognised.

Women often have, for socio-cultural and economic reasons, limited access to resources for the construction and maintenance of water supply and sanitation facilities.

Women participate in water committees (although their number is usually small) but this participation is often passive.

3.4 Institutional and financial structure

The construction and operation of public water supply and sanitation facilities requires institutions with good technical and organisational capabilities. These are lacking in many developing countries. Furthermore, existing institutions are often dependent on government, and therefore not autonomous.

This dependence leads to less efficient service delivery, particularly in rural areas. It is often difficult to cater for the local needs and requirements of remote and scattered communities from a district centre or capital city. Although much has already been achieved in terms of delegating exploitation and maintenance to the village level, there are still certain tasks which have to be performed at a higher level. This calls for good communications between villages and the government agency providing the service. These are often lacking, so that villagers may have, for example, to wait months for an essential component for a pump, in the meantime having to resort to polluted surface water.

The costs of centralised services are also very high because of the large distances and difficult access to many rural communities. In such cases, subsidies are often necessary.

Because the service providers are dependent on central government, they are not free to set tariffs and/or charges themselves. Prices are frequently kept far too low for electoral reasons because water is traditionally regarded as a basic facility which should be provided virtually free-of-charge by the government. There is therefore little or no costs recovery from users.

This means firstly that there is no incentive to exploit and maintain the facilities effectively and efficiently and no accountability to users. And secondly, due to the absence of a price mechanism, consumers lack an important means of demanding improvements and indicating preferences. Furthermore, a clear relationship has been demonstrated between the degree to which users contribute to the costs of water supply and sanitation and the durability of these facilities[24]. It is also desirable in terms of environmental sustainability that users should pay for services, as this reduces wastage of water and pollution, since the greater the water usage and the more waste water and solid waste produced, the greater the costs to the user.

There is often no relationship between prices and costs. A review of urban drinking water supply projects financed by the World Bank indicated that on average the price of water amounts to only 35% of the costs[25].

In many cities more than half of total drinking water produced cannot be billed because of losses and illegal connections. The collection of charges from customers is unsatisfactory. As a result the proceeds are inadequate to meet even the operating costs, let alone the capital costs. The already meagre pro-

ceeds must be paid over to central government. The resulting deficit is more or less made good each year by the same government. These subsidies are however in many cases barely enough to pay the - frequently due to political pressure unnecessarily large - staff.

The consequences of these institutional shortcomings are inefficient operation, wastefulness and pollution, financial losses and a completely substandard level of service. Under these circumstances users are even less willing to pay charges which reflect the full costs.

This problem is not unique to the water supply and sanitation sector. Users of other infrastructural services in developing countries, particularly public transport, energy, etc., also pay nothing or too little. This is an important issue in structural adjustment programmes. These programmes are putting central government subsidies to utilities and public service providers under pressure. The need to transform these enterprises and organisations to make them efficient, autonomous, customer-oriented and capable of generating sufficient income to provide an adequate level of service is therefore obvious.

Many countries are busy, with assistance from bilateral and multilateral donors, preparing and implementing such policy adjustments, reformulating targets and making the necessary changes in organisations. One problem being encountered is the limited capacity of local governmental and semi-governmental organisations. They are often abruptly faced with responsibilities for the performance of tasks (e.g. to generate income locally) for which they are completely unready. One solution may then be to get the private sector involved.

Particularly in the large cities in developing countries there is an increasing tendency to contract out to the private sector (often foreign companies), through management contracts or concessions, the management of water supply and sanitation facilities. This is done in order to make the service more efficient. The government retains ownership of the infrastructure in these circumstances. An additional advantage of such arrangements is that no great demand is imposed on the scarce skills and financial resources within government.

Large projects financed by one or more donors often make use of a temporary project organisation which is dissolved after the termination of the project: the project is then transferred to the local water supply and sanitation organisation. The latter becomes responsible for running and maintaining the facility, but is often not at all prepared for this. This method of working generally contributes little to developing the local capability to implement and manage the facility. Experience shows that completely new organisations which are set up alongside existing ones do not survive long. It is better to use existing structures as far as possible.

A major obstacle to a balanced sectoral development is that in general different organisations, for example at central government level the ministries for water and for health, and at the local level municipal services or public utilities, are responsible for the water supply, sanitation, drainage and solid waste disposal. There is often no single organisation with a clear mandate for an integrated approach to drinking water supply and sanitation. Balanced development therefore depends on good coordination between different organisations.

3.5 Integration with sustainable environmental management and health care

Rapid growth of the population and urbanisation have led to an increasing demand for water and to increasing volumes of waste in many developing countries. Water resources have to be well managed to protect them from over-exploitation, pollution and other forms of environmental degradation. Such management is lacking in many developing countries. A disproportionate amount of attention is given to installing facilities to meet the growing demand for water, particularly on the part of the productive sectors, at the expense of examining the harmful effects of excessive water consumption and the burden of waste imposed on the environment. In many developing countries this has led to environmental impoverishment, degradation and pollution, and forms a threat to public health.

Depletion of water resources

Depletion of ground and surface water resources is caused by over-exploitation, in particular by productive sectors such as agriculture and industry. This occurs when water abstraction exceeds replenishment.

Some countries invest heavily in irrigation, partly to safeguard their own food supplies and partly to promote the export of cash crops and derived products. Often the capacity of water resources is not even sufficient to meet the demand for irrigation water sustainably, let alone to satisfy basic human needs such as drinking water and sanitation.

Apart from the increasing demand, further factors which contribute to the depletion of water resources are:

- non-optimal use of water, with large losses resulting from dilapidated, antiquated and inefficient production and distribution systems;
- subsidised energy prices which encourage unnecessarily large quantities of water to be used;
- insufficient awareness of water as a scarce natural resource of limited renewability;

- insufficient capacity for the hydrological and geohydrological research needed to determine the sustainable yield of water resources. Where such research has been done, the data have often not been processed to provide usable information, and not disseminated amongst those concerned in the water supply and sanitation sector.

Falling water tables lead in cities mainly to subsidence and consequential damage to structures, and in rural areas to dry wells and reduced biodiversity in ecologically sensitive areas. In coastal areas, falling water tables also lead to the salination of groundwater due to the intrusion of seawater.

Other environmentally harmful activities can also lead to depletion of water resources, such as deforestation for energy supply and for agricultural purposes. There is often a failure to consider the interaction between land and water management. Lack of soil protection leads to erosion with excessive surface water run off rather than infiltration into the soil. As a result groundwater is replenished more slowly, leading to depletion of stocks.

Harm to the environment due to improved water supply

The construction of reservoirs and transport pipelines or canals can harm the environment. The volumes of water stored for the drinking water supply in rural areas are often small compared with the volumes used for irrigation and/or energy supply, but careless planning of reservoirs and pipelines for supplying drinking water to large cities can cause substantial damage to the environment.

Improved water supply in rural areas can increase the capacity for cattle watering, allowing herd sizes to be increased in semi-arid areas to levels above the carrying capacity of the land. Overgrazing and erosion result.

The construction of a communal water facility (e.g. a public standpipe) without attention for drainage can lead to flooding around the facility, forming a breeding ground for the mosquitos which carry malaria and filariasis.

Pollution

Because an awareness of the importance of good sanitation was lacking for so long, the authorities and users tended to favour improvements in water supply over sanitation, drainage and disposal of solid waste.

As a result of these distorted priorities, few resources have been made available for sanitation facilities. The result is that the services needed to halt environmental degradation in the rapidly growing cities in developing countries are completely inadequate.

Refuse collection services are poor. It is estimated that 45 to 75% of the waste in cities in developing countries goes uncollected. A large proportion of this disappears into rivers, drains and canals. This leads to flooding and the accumulation of waste in residential areas. The resulting inundations and accumulated waste pollute groundwater and soil and form breeding grounds for disease-carrying insects and rodents.

It is not only the solid waste collection services which do not work properly. The proper removal and treatment of waste water is also neglected. The pollution of surface and groundwater is assuming alarming proportions, and causes water-borne diseases such as cholera, diarrhoea and worm infections.

The increasing water pollution as outlined above leads to a progressive deterioration in water quality, pushing up the treatment costs for the preparation of drinking water. A lack of good sanitation therefore has an adverse impact on the drinking water sector, which further underscores the need for the integration of these sectors.

The impact of pollution on poor city dwellers is greater than on their more well-to-do counterparts, for the following reasons:

- they often live on marginal plots of land which are prone to flooding;
- they come more frequently into contact with contaminated water and/or waste, both at home and in the workplace, as a result of overcrowding and the lack of basic facilities such as clean water, sanitation and refuse collection, and as a result of wretched living and working conditions, leading to higher likelihood of infection[26].

Although poorer city-dwellers are exposed to the highest health risks, they are often virtually unaware of this.

Hygiene education

The unhygienic transportation, storage and use of water often result in the contamination of the clean drinking water obtained from a standpipe. The unhygienic use of sanitary facilities and incorrect procedures for dealing with solid waste can also lead to contamination and environmental pollution. Inadequate awareness of the importance of using water sustainably leads to waste. The hygienic and sustainable use of water and the environmentally sound treatment of solid waste and waste water are fostered through increasing user motivation and providing them with information about the environment; these are still often lacking. It often proves impossible to change behaviour in the short term.

The reasons for this are a lack of schooling, particularly for women and girls, the fact that methods of bringing about changes in behaviour still have to be worked out further, and the fact that the responsibilities for water supply and for sanitation/health often lie with different government agencies.

Conclusion

It can be concluded that generally insufficient attention is being paid to the diminishing quantity and quality of water resources in developing countries. Unless water resources are properly managed, water could become a factor constraining sustainable development in many developing countries. Amongst the weaknesses in the approach to dealing with water pollution in developing countries are: insufficiently developed policy, a weak institutional and legal framework, insufficient knowledge and awareness of the problem (public support for a system of charges based on the 'polluter pays' principle is still lacking), and insufficient technical and financial resources.

While the main focus used to be on water supply, an integrated approach to water supply, sanitation facilities and hygiene education is now taken in most of the sectoral activities supported by NEDA and other donors. Furthermore there is a growing interest on the part of many partner countries for the transfer of, in particular, Dutch expertise on pollution abatement, both in the area of policy development and management and in the technological field. This has led to a number of successful cooperative ventures (for example in the area of anaerobic waste water treatment).

3.6 Technology and research

Technology

Organisations responsible for managing water supply and sanitation facilities in developing countries are often only interested in expensive, high-grade technologies which are too complicated and costly to be maintained at the local level in cooperation with the users. The community is in that case not involved in the choice of system. An example of this is the unnecessary use of motorised pumps when a cheaper and more durable alternative is possible, for example handpumps or a distribution network which relies on gravity. It is difficult for motorised pumps to be maintained by the users and the energy supply is often unreliable.

This technology, usually imported from industrialised countries, does not promote self-sufficiency because the developing countries remain dependent on donors for the supply of spares and technical assistance. Many donors are often not inclined to foster local technology because of their export interests.

In cities the costly technology can work well for high-income groups, but the corresponding service level (piped water supply, with house connections, waste water removed by sewer systems and solid waste collected by trucks) is not available to the poor because of the high costs. Furthermore, water usage in this target group is often too low to allow a sewer system to oper-

ate. At least 60 litres of water per person per day must be discharged into the sewers[27]. The water consumption of users of public standpipes is frequently considerably less than this. Furthermore many people do not have a flush toilet; kitchen waste water and washing water is often poured into the street or open stormwater drains, so that the sewers remain unused.

Simple, low-cost techniques are increasingly being applied in rural areas. Maintenance and repairs are only possible at the village level if the technology permits it. Among the technologies inspired by the 'village level operation and maintenance' (VLOM) concept, a number of handpumps have been developed which are being deployed on a large scale. These pumps are designed primarily for use in rural areas, but are also employed in poorer urban districts.

Research

Promising concepts and products in the field of water supply and sanitation have emerged from applied research in developing countries. A great deal of progress has therefore been made in developing applied technology, but the exchange of results of this research between developing countries and feedback to the field are often still poor. Too little use is also made of local research institutes, and these institutes also do not have enough say in determining research priorities. There is also still a need for new developments, in particular in the field of user-oriented management and of sanitation in peri-urban areas.

3.7 Donor coordination and cooperation

There has been a considerable improvement in coordination and cooperation between donors, partly due to regular international consultations, for example within the framework of the Development Assistance Committee (DAC) of the OECD. As a result there has been considerable convergence in the sector policies of the various donors, but there are still major differences in the strategies for achieving policy objectives.

The executing agencies in partner countries are having to satisfy a multiplicity of donor requirements, with more or less success. This is often at the expense of their own work, distracting them from their own visions and ideas. Donors are insufficiently aware of this, each sticking to its own methods, networks and procedures. An example is the lack of standardisation of pumps supplied by donors, which causes operational problems.

There is a need for standardisation in the equipment and harmonised regulations for the acquisition of goods by the various donors. The lack of these impose a significant administrative burden on many recipient countries[28].

4. POLICY

4.1 Introduction

The Operations Review Unit (since 1997 the Policy and Operations Evaluation Department) made the following recommendations for the sustainable development of the sector in response to the problems which have been signalled in the past and mentioned in chapter 3[22]:

- user-involvement at the earliest possible time;
- careful identification and assessment of new activities with regard to the institutional, staff and financial capacity of partner organisations;
- institutional development / strengthening of partner organisations at all levels; more attention to pricing;
- integration of water supply with sanitation and hygiene education;
- choice of appropriate technology before commitment is made;
- better utilisation of research results and involvement of local research institutes.

These recommendations, although made in 1983, still measure up well against the principles for sustainable sector development developed during the Water Supply and Sanitation Decade.

Towards the end of the Decade however, when gender and management issues and environmental problems such as water scarcity and environmental pollution came more to the fore, a number of additional recommendations were formulated to improve the access of the poor to sustainable water supply and sanitation. These recommendations were incorporated into the 'fresh water' chapter (chapter 18) of the United Nations Conference on Environment and Development (UNCED) Agenda 21 report, and into the action programme of the Ministerial Conference on Drinking Water and Environmental Sanitation (Noordwijk, 1994):

- protection of the environment and the promotion of good health through the integrated management of water resources and the treatment of liquid and solid waste;
- responsibilities to be devolved to the lowest level possible (autonomy of local executing agencies and participation of stakeholders, particularly women);
- water must be regarded as an economic good.

In this chapter the general principles underpinning Dutch policy for the sector are presented, and a description follows of the way in which the above recommendations, together with the need for better coordination between donors, have led to the formulation of a new policy for the sector.

4.2 General objectives

Investment in water supply and sanitation contributes to the realisation of the principal objective for Dutch policy on development cooperation, i.e. reducing poverty. The Netherlands will therefore continue to support the drinking water and sanitation sector within the framework of the '20/20 initiative' referred to in section 2.6.5. The goal is to enable the recipient country to use the available resources in an as effective and efficient manner as possible to maximise the access of the poor to sustainable drinking water and sanitation.

The central principle is to ensure the sustainability of water supplies and sanitary facilities by designing, implementing and operating facilities which are desired by and can be managed (or co-managed) by the users themselves, which meet reasonable environmental and health standards and which work satisfactorily during a reasonable depreciation period without external contributions to operational costs[29].

The prime focus here will be on improving the operation of existing facilities and the refurbishment of installations which are working badly rather than on the realisation of completely new facilities.

Aid will be diverted away from capital-intensive infrastructure with a high service level. Such investments must in principle be viable, and the users must be able to afford to service the capital costs. Investment financing of such infrastructure will therefore be a job more for commercial and development banks than bilateral donors, who are primarily concerned with grant aid.

There will therefore be less emphasis on implementing infrastructure than on creating the conditions for the sustainable management of water supply and sanitation facilities, with a special focus on matters such as integrated water management, institutional development, user participation, financial management and appropriate technology.

Although the main focus will be on rural areas, increasing attention will be paid to the rapidly growing cities in developing countries.

Where the policy environment and local capacities permit, there will be a shift in the coming years from project-based aid to support for sector programmes initiated by partner countries. In the first instance technical assistance will be needed, but the intention is that this should be discontinued when the capacity-building has been successfully completed and the partners have acquired a sense of ownership. Eventually, aid can take the form of sectoral budget support providing that certain macro-economic and sectoral policy conditions are met[30]. The recipient government should also recognise the programme's priority; its commitment should be evident from a reasonable and preferably increasing contribution[31].

More attention will also be paid to a process approach to aid activities[32]. Experience has shown that donor-centred, centrally planned development activities, lacking in flexibility, have not resulted in a structural strengthening of the local capacity to bring about sustainable change. Flexibility is a key concept in the process approach, with local input always being an important component of development processes.

As well as flexibility, participation is also important in the the process approach. The idea is to get all the stakeholders actually involved in the identification, planning, implementation and management of activities. If the target groups are to participate effectively, it is desirable that they be organised. For this, knowledge of existing organisational forms and a better organisational structure of the target group are important. Capacity-building is therefore the third key characteristic of the process approach, alongside flexibility and participation. Programmes supported by the Netherlands will therefore lay more emphasis on capacity-building, so that the sector can develop on its own in the partner countries.

4.3 User participation and gender issues

User participation should take place during the entire project cycle of planning, implementation, financial management, operation and maintenance through to evaluation.

During preparation, the needs in relation to enhanced drinking water supply and sanitation will be defined in collaboration with future users by means of a preliminary study. At the same time, agreement will be reached with the users about the technical alternatives and their costs, the extent and form of participation and the locations of the facilities. In this context, users will have to be trained in and become well versed in the concepts of ecological and financial sustainability.

The management of and responsibility for small-scale and simple water supply and sanitation facilities should be shared between the water supply/sanitation agency and the community. Technically complex centralised urban water supply systems with distribution networks are generally less suited to a major management role for users (although some components, e.g. district distribution networks and public standpipes may lend themselves to community management).

Wherever possible use should be made of existing residents' associations and community development committees, from which water and sanitation committees can be formed. Community management is no panacea for the failure of government agencies, however. The users cannot manage without supporting services whether provided by the public or private sector. User

participation is only possible if permitted and stimulated by national policy. In some countries, national policy therefore needs to be modified in order to promote or optimise user participation.

The Netherlands stimulates user participation in water supply and sanitation projects not only in rural areas but also in regional centres and peri-urban areas through:

- the setting up of socio-economic units in existing government services or public utilities for the introduction of user participation;
- research into guidelines for the introduction of user participation;
- the involvement of NGOs in mobilising users.

Involvement of women

The Netherlands attaches importance to a gender-specific approach. This is based on the premise that women and men have differing needs, responsibilities and possibilities in relation to water usage. The participation of women at all levels and in sectoral organisations is desirable and important.

An analysis of gender issues will form part of the preliminary socio-economic study (including a study of the existing institutional agreements). Where women have poor access to resources for the construction and management of drinking water and sanitation facilities, measures should be taken to improve this situation, in view of the important role and interest which women have in the sustainable use of water. It is important that water and sanitation committees should include several women amongst their members, and that women should also be actively involved in running (including financial management) and maintaining the facilities. In addition they comprise, together with children (through schools) the main target group for hygiene education.

4.4 Institutional and financial autonomy

Dutch aid programmes will be carefully designed to encourage the development of local capacity in the sector. The transfer of know-how and demonstration projects are important instruments in this process.

The Netherlands recognises that if water and sanitation services are to be sustainable and provide an optimum service they should be run on business lines by the relevant organisation. This means that:

- there must be clear targets set;
- the organisation must be autonomous and responsible for the quality of the service supplied;
- the organisation must be financially independent and sustainable.

Institutional development: decentralisation and self-sufficiency

Water supply and sanitation problems are mostly local. Central government is not well placed to properly respond to them. It is therefore desirable to devolve responsibilities to as low a level as possible.

Public facilities are usually operated and maintained by governmental or semi-governmental organisations or utilities which are still often subsidised by central government. The Netherlands supports the trend to encourage the autonomy of drinking water supply and sanitation organisations in partner countries, with the objective of creating institutions which generate sufficient income, are accountable to their users, which operate in an efficient and sustainable manner and which will in future have access to capital markets and will no longer need to rely on aid or subsidies to finance future investment[28].

There are many ways of increasing autonomy, ranging from the formation of an autonomous public enterprise to full privatisation. In between these extremes there are cooperative arrangements whereby the government remains owner of the infrastructure but management is contracted out partially or fully to the private sector through management contracts/concessions[28]. The Netherlands recognises that involvement by the private sector in the management of water supply and sanitation facilities can improve the standard of service delivery. However the government does need to ensure that correct procedures are followed for selecting contractors and that improved service levels also benefit the poor.

Efforts will be made to fit in with existing structures as far as possible. The setting up of completely new organisations will be avoided if at all possible.

Water supply and sanitation facilities must be attuned to the present and future institutional capacity in order that the enhanced facilities are properly operated and maintained. The institutional capacity of local water and sanitation agencies will therefore need to be determined in the preparatory stage, for example by an analysis of strengths and weaknesses. Realistic plans for institutional development in the longer term can then be made. These plans will have to set out, in as concrete and detailed a form as possible, the tasks of the water and sanitation organisations at all levels.

Not only does executive capacity need to be improved and autonomy promoted at the local level. The capacity of government at the national level also needs to be strengthened, so that the sectoral policy and legislation needed for decentralisation can be developed and implemented. The responsibility for implementing and managing water supply and sanitation facilities will then be transferred to autonomous organisations at the lowest possible level. In this model, the government acts purely as enabler and mediator between the parties involved (users, public utilities, sectoral organisations, local and regional government, NGOs, private sector and donors) who work together to

provide the required services at the local level as efficiently as possible. In order to gain access as effectively as possible to the poorest users, central government encourages community management in rural and peri-urban areas. Central government retains responsibility, however, for sectoral policy and planning, the development of legislation dealing with the quantitative and qualitative water management and policing the laws.

As far as planning, organisational advice and training/transfer of knowledge are concerned, foreign experts can be used temporarily, although care must be taken to firmly anchor the activities of the latter in local structures. Preference should be given wherever possible, however, to using local expertise. It must be appreciated that knowledge provided by the Netherlands was developed in Europe, and does not necessarily square well with circumstances in developing countries. This applies to technology, but even more to areas such as social organisation and management structures.

This notwithstanding, Dutch know-how and experience are already being used in many activities in the government and semi-governmental sector. These include the provision of advice on operations in the form, for example, of twinning arrangements between Dutch and foreign urban water supply companies. The good experiences with such activities provide a stimulus to continue with arrangements of this kind, in the field not only of water supply but also water quality management, sanitation and the processing of solid waste.

Because of the increasing demand from developing and transition countries for advice on the management of drinking water supply and sanitation facilities, KIWA NV (Water Supply Products Testing Certification and Research Institute of the Netherlands) has joined with several Dutch water supply companies and water boards to set up a consultancy 'Aquanet'. Aquanet has set itself the objective of making the know-how and experience which resides in its participating agencies available to partners in developing and transition countries.

The Netherlands will promote the strengthening of organisations in developing countries which represent the interests of the water supply and sanitation sector. These professional organisations can play an important role in promoting the transfer of knowledge.

Financial autonomy

The Netherlands adheres to the principle that at least the operating and maintenance costs should be met by the users. In many cities in developing countries the poor, who do not have access to the public water supply, pay much higher charges to private water vendors than the higher income groups with a connection to mains water. One of the lessons learned has been that the

users of improved facilities are able and willing to contribute to the costs of laying, operating and maintaining facilities which work well providing the charges do not exceed their willingness and ability to pay.

This can be achieved by relating both the service level and the level of tariff and/or charges to the incomes of users. As a rule of thumb it is assumed that for the lowest income groups the total annual costs of drinking water and sanitation should not exceed 5-6% of the annual family income[33].

The Netherlands will foster financial autonomy on the part of the water supply and sanitation sector. This means that the payment of interest and depreciation by the users and the water supply and sanitation organisations will be encouraged. Where this is not possible in the first instance, aid will be granted. Ultimately, new infrastructure will have to be financed by loans raised on the capital markets. This will only be possible if the relevant water supply/sanitation organisation is then financially independent and creditworthy.

Feasibility studies will determine what users can afford and are willing to pay for and also the financial viability of the system.

It will also be necessary to determine at an early stage how and by whom the costs of operation and maintenance will be met. This should lead to firm advance agreements with the users about the charges and collection of payments covering at least the operating and maintenance costs.

If the feasibility should indicate that the users cannot reasonably be expected to meet the operating and maintenance costs, alternatives will have to be sought, such as a lower service level or the introduction of cross-subsidies through progressive tariffs.

Progressive tariffs make it possible for the poor to pay for the amount of water to satisfy basic human needs. If charges are based on the volume of water consumed, a minimum tariff, below cost price, is charged for 'lifeline' supplies. Any water in excess of this is charged at a higher tariff, set above the break-even tariff. The higher revenue from sales to the large-scale users better able to bear the costs make up for the relatively low revenue from sales to poorer users, allowing the company concerned to balance its accounts. It is not necessary to seek subsidies from central government. Charging based on the volume of water consumed acts to reduce wastefulness. If charging is based, for example, on the floor space in the home, a cross-subsidy is achieved, but this system does not foster sustainable water consumption.

A charging system based on the volume of water consumed is therefore to be preferred, even though it is more demanding in technical and administrative terms.

It is advocated that the costs for the transport and treatment of waste water also be based on the quantity of water used since these costs increase not

only with the amount of waste substances in the waste water but also with the volume of waste water itself. This system therefore accords better with the 'polluter pays' principle.

The payment systems discussed above apply to piped water supply and sanitation with house or yard connections. If there is no piped supply or sewerage, as is often the case in urban shanty-towns or sparsely populated rural areas, different financing systems are used.

The costs of constructing and maintaining, for example, wells with handpumps can be financed in any manner acceptable to the users, although preferably one managed by the community. In these systems, users can make payments in kind, for example through unpaid labour or the supply of local materials. They can also carry out simple repairs and perform preventive maintenance.

In any case users should start contributing at least something right from the outset, so that they do not get accustomed to free water. It must be demonstrated, on the basis of reasonable forecasts, that the costs can be financed over a reasonable term by the users. If the costs cannot yet be recovered then the water/sanitation project or programme should form part of an income-generating, integrated rural development and urban poverty programme in which credit facilities (for example through a revolving fund) and land reform play an important role, so that subsidies for water supply and sanitation will be unnecessary in the future.

4.5 Integration with sustainable environmental management and preventive health care

Environmental management

The planning for the water supply and sanitation sector must form part of an integrated national programme for the management of water resources and the environment. Within this integrated programme, priority must be given to satisfying the demand for drinking water over the other functions of water because this is a basic social need.

The sustainable use of water will be advanced by, for example, the recycling of waste water, the introduction of measures to conserve water and to combat water pollution. As far as the latter is concerned, the Netherlands will provide help with the development of instruments when water pollution abatement plans are being drawn up. Measures will have to be subject to the 'polluter pays' principle, and priority will be given to the regulation of the severely polluting industries which discharge toxic substances. Preference will be given to combating water pollution at source by, for example, tackling polluting production processes rather than to 'end-of-pipe' treatment.

The introduction of environmentally friendly methods of processing solid waste oriented towards recycling will be supported. This will include where possible encouraging small-scale waste processing activities in the informal sector.

Proposals relating to environmentally friendly investment by Dutch businesses in developing countries, also in the area of water supply and sanitation, qualify for a subsidy under the 'MILIEV' (Environment and Economic Self-Sufficiency) programme.

Preventive health care

Supplying drinking water without providing sanitation and hygiene education is often counter-productive, as it can lead to an adverse health impact, particularly in densely populated urban areas. For this reason the Netherlands will continue to support not only the integration of sanitation and hygiene education into water supply activities, but also the integration of water supply and sanitation activities with primary health care and food programmes.

Education about the relationships between improved water supply and sanitation, sustainable water use, hygiene and health will form an integral component of the preparation and implementation of water supply and sanitation programmes, so as to bring about changes in behaviour in the use of drinking water and sanitation facilities. Such education has proven effective in combination with the provision of water and sanitation facilities, particularly in schools and clinics, and it will therefore be promoted.

NGOs have been successful in carrying out this educational component of water projects, and where possible and desirable they will be involved in these activities.

The Netherlands will provide assistance in enhancing the quality and scope of health education programmes.

4.6 Technology

Technology in developing countries must be simple to implement, maintain and operate, and must be fabricated as efficiently as possible from local materials, products and labour.

The following are the main criteria which apply to the selection of technologies:
- the local capacity to maintain the equipment properly;
- provision of adequate service at the level required by the users, at a price acceptable to users.

Local, commercial manufacture will be stimulated, and support will be given to the transfer of technology relevant for developing countries related to water supply, sanitation and the processing of solid waste, as well as the related environmental technology.

Schemes for financing the provision of goods and services include the 'ORET' (Development-related Export Transactions) and MILIEV (Environment and Economic Self-Sufficiency) programmes.

Water supply technology

Maintenance and repairs can only be effected at the user level if sufficient tools and spares are available locally and simple, low-cost technologies are used. Handpumps and simple gravity schemes, which have often been used successfully in relatively densely populated mountainous rural areas, are therefore recommended for rural and peri-urban areas.

If there is a risk that surface water is bacteriologically contaminated, protected groundwater wells are to be preferred. If it is necessary to use polluted surface water, the possibilities should be studied, in rural areas, of using slow sand filtration and riverbank filtration, plus pre-treatment if necessary, because these methods are simpler than rapid filtration, and because no chemicals are required.

The development of techniques for harvesting rainwater for drinking purposes will be fostered, and encouragement will also be given to the use of renewable energy sources such as sun and wind power for the transport of water.

Sanitation and environmental technology

It is desirable that excreta and waste water are removed safely and efficiently to reduce health and environmental risks. Sewage systems are usually not a viable option for the poor, however. The Netherlands will therefore promote low-cost (on-site) sanitation. Relatively cheap solutions such as latrines are often more sustainable, partly because users are better able to contribute themselves to the realisation and maintenance of simple facilities of this kind than to capital-intensive and complex sewage projects.

Systems based on centralised removal and treatment can only be considered in areas with a high population density (large cities) and/or inappropriate soil properties. Even then, cheaper and more sustainable alternatives to sewage collection and treatment systems must be examined. An example would be latrines incorporating a system allowing users to hygienically dispose of the contents. If a sewage system proves to be the only possibility, small-bore sewers can be considered. In tropical or sub-tropical climates, anaerobic water treatment and/or oxidation ponds are often the best solution.

4.7 Research and education

The Netherlands will encourage and provide financial support for research programmes for the development of simple, environmentally friendly and affordable water supply and sanitation technologies for the poorer groups in developing countries. This will where possible be done in collaboration with universities, research institutes and water and sanitation agencies in partner countries. Guarantees are needed that research results will be fed back to the field.

Research will also be sponsored into:

- the influence of the choice of technology on the effectiveness of water and sanitation facilities;
- the effects of water supply and sanitation projects on health and the economy;
- the influence of users on the effectiveness of water supply and sanitation facilities;
- the development of sanitation and waste treatment systems which can be managed sustainably by the community in peri-urban areas;
- the financing of water supply and sanitation in rural and peri-urban areas.

The Netherlands will promote the exchange of knowledge between developing countries. International networks must be expanded for this purpose. In order to promote the exchange of knowledge and experience in the regions, research institutes and universities which can act as a regional focal point, for example the regional centres of the International Training Network for Drinking Water and Sanitation of the UNDP/World Bank Water and Sanitation Programme, will be considered for support.

Assistance will also be provided to increasing capabilities in hydrological and geohydrological research and to transforming research results into information useable by the water and sanitation sector. This information is needed to determine the water which can be sustainably abstracted from water resources and to prevent over-exploitation.

Research priorities will be determined by the partner countries.

International educational exchanges are also of importance. Each year many experts from developing countries receive in-service training in public health technology at the International Institute for Hydraulic and Environmental Engineering (IHE) in Delft and the Agricultural University in Wageningen. The IRC Water and Sanitation Centre in The Hague also provides courses in the Netherlands and in developing countries. The IRC, which is supported by NEDA and by the Dutch Ministry of Housing, Spatial Planning and the Environment, seeks to assist in the development of sustainable water and sanitation systems for low-income groups in rural and peri-urban areas in developing countries. In order to achieve this the IRC not only provides the courses

referred to but also establishes demonstration projects, issues publications, maintains and disseminates information, advises, evaluates and disseminates internationally accepted sectoral policy.
IRC also supports similar resource centres at national and regional level in developing countries.

4.8 Donor coordination and cooperation

The Netherlands will continue to support and actively participate in international consultations on the development of the sector, in order to maintain the policy dialogue and bring about a convergence of policy. This will improve the effectiveness of cooperation between donors and partner countries.

The need was stressed in the Treaty of Maastricht (1992) for the European Union and member states to coordinate their development initiatives, both in the formulation and implementation of policy[34]. This policy is of course also supported by the Netherlands.

Donor coordination by partner countries and donor cooperation will be actively encouraged, if appropriate by targeted assistance to the coordinating government agency. A possibility would be for one donor to act as 'lead' donor.

Close cooperation and consultation with international organisations such as the WHO, UNDP, World Bank and UNICEF will be sought. Active participation in international consultations, for example in the Collaborative Council for Water Supply and Sanitation on sectoral policy and strategies, will be continued. The UNDP/World Bank Water and Sanitation Programme and UNICEF can provide a channel for country-specific sectoral initiatives, project implementation and user-oriented research.

5. GUIDELINES FOR IMPLEMENTATION OF DUTCH POLICY

5.1 Introduction

Water and sanitation activities in any country with which the Netherlands has a regular or special relationship related to sustainable development can qualify for support. Dutch support in this area will of course only be forthcoming on the express request of the partner country. In providing this choices will have to be made, based, among other factors, on existing cooperative structures and the activities of other donors.

The 'Logical Framework' approach is recommended for the identification, formulation, assessment, implementation and evaluation of these sectoral activities. This can be an important tool in carefully formulating the project objectives and resources needed, identifying the criteria for success and evaluating the short-term and long-term risks. An important component of the approach is the setting up of a 'logical framework matrix'. This involves specifying, for long-term and short-term objectives, results, activities and inputs (resources): indicators, the verification method, assumptions and risks. This exercise is preceded by an analysis of the problems and needs. The identification of these problems/needs leads to a 'problem tree' and the associated hierarchy of project objectives and desired results[33].

Table 5 shows an example of a logical framework matrix for a water and sanitation project.

5.2 Identification, assessment

The responsibility for drawing up a proposal lies expressly with the recipient country or the proposing organisation.

The purpose of identification is to determine who the involved parties are and define the problem. A decision is then made to tackle the problem together over a period of several years with a coherent package of activities (e.g. capacity-building, policy support, budgetary assistance and more project-related activities). A tentative action plan is drawn up with the parties involved, with an indicative budget. The monitoring and financial control mechanisms are indicated in the action plan.

The embassy must examine the extent to which the proposal complies with the criteria of poverty alleviation, participation by the target groups, the position and role of women (DAC/Women in Development (WID) criteria), environmental conservation and financial and institutional sustainability. The proposal is then submitted to the department for marginal testing against overall cri-

teria such as consistency with international policy and the availability of funding. The remaining processing and approval is dealt with entirely by the missions.

If the technical, financial, institutional and socio-cultural viability and the ecological sustainability of the proposed initiatives have not been clearly demonstrated, one or more of the following 'studies' have to be carried out:

- sectoral and intersectoral analyses related to (integrated) water management (for example by means of a country water sector assessment), other basic infrastructure or health care;
- institutional analysis;
- technical assessment;
- financial and economic analysis (cost-benefit analysis, cost-effectiveness analysis or a multi-criteria analysis);
- gender analysis;
- strategic environmental study and/or environmental impact assessment.

5.2.1 Conditions related to national policy

If the proposed water and sanitation activities are to be sustainable, the policy of the partner country at the national level must be consistent with Dutch sectoral policy, and be directed towards:

- giving priority to the basic drinking water supply over the provision of water to other users;
- providing basic facilities such as drinking water and sanitation to the lowest income groups in the population;
- promoting the autonomy of agencies charged with managing water supply and sanitation;
- devolving implementation and management to organisations at the lowest possible level;
- institutional strengthening of these organisations;
- institutionalising the management of water supply and sanitation facilities by users, with particular emphasis on the interests of women;
- integrating drinking water supply with sanitation and hygiene education;
- adopting technology adapted to the desires and possibilities of the users;
- protecting the environment, and water resources in particular, by enacting and applying legislation. Sustainable water use should be promoted.

If there is sufficient convergence with the policy set forth above, if there is the requisite institutional capacity, and if the country also meets the requirements for sectoral programme aid, sectoral budgetary support can be provided. In other cases, project aid may be appropriate.

Table 5: Example of a logical framework matrix for a water supply and sanitation activity

	description	indicator	means of verification	assumption
long-term objective	improve living conditions (health)	increase in water consumption, reduction in disease, reduction in sources of infection	health reports	partcipatory policy, sustainable water management
short-term objective	improved water supply and sanitation	50 l/person/day for 100.000 people 1 latrine per family	operating reports	sufficient water available
results	500 public standpipes	water quality, distance to standpipe, satisfaction of users, equitable distribution, wastage	wateranalyses evaluations	policy aimed at cost recovery
	10.000 latrines	use of latrine	survey	
	500 water committees	democratic decision-making,numbers of women, contributions of users, numbers of meetings	(minutes of water committee meetings, bank accounts, unpaid labour, materials, cash (tariffs)	
	creditfacilities	water fund		
	social unit in water epartement	staff in social unit		
	maintenance system operational	maintenance contract, numbers of maintenance engineers, stocks of spares, down-time, level of service, duration of repairs	operational costs	
activities	mobilisation of users, feasibility studies, design, formation of committees, credit facilities, digging of wells, installation of handpumps, latrines, hygiene education, operation and maintenance training	wells pumps latrines water fund social unit technical assistance	resources *f* *f* *f* *f* *f* *f*	continued availability of trained personnel

If there are obstacles at the national level which threaten the sustainability of the planned water and sanitation activities, the following supporting activities are possible:

- promotion of national coordination. Good cooperation between the various ministries charged with water management (e.g. agriculture, health, environment, public works) and between regional and local authorities is a pre-condition for the sustainable development of the sector;
- institutional strengthening, human resources development, training and research;
- support in developing and implementing sectoral policy (legislation);
- studies of national sectoral issues. This can be necessary to provide insight into problems. In some countries this can be water pollution (e.g. the Central Asian republics), in others water scarcity (e.g. the Middle East) while in yet others the problems may be related to weak institutions, the lack of grass roots participation and the lack of financial resources.

5.2.2 Conditions related to participation

Consultation with and participation of the target groups is one of the main areas requiring examination in preparing aid activities.

In principle the following issues have to be examined when this preparation is being carried out:

- have traditional methods of water supply and sanitation been studied, and did the results of this study play a role in the choice of the project?
- do the parties involved attach high priority to improving drinking water and sanitation?
- has special consideration been given to the needs of the poorest users? do the planned interventions significantly improve their position?
- will the users have a say in the choice of technology and the choice of the level of service?
- is enough information being provided to the users on the implications of alternative facilities to enable them to make a reasoned choice?
- is sufficient account being taken of the ability of the users to pay for the operating and maintenance costs and also possibly the capital costs? (households cannot generally be expected to pay more than 5-6% of their income for water and sanitation[35]); if the users cannot make the requisite contribution in cash, are they able to contribute in kind to the realisation of the project, for example by working without pay or providing local materials?
- has the willingness of the users to pay for the services to be delivered been studied?
- are the users organised into user groups with water committees?

- have clear agreements been made between the government agencies responsible for water and sanitation and the users about the distribution of responsibilities in the implementation and, later, the operation, maintenance and financial management of the project?
- are methods of instruction and communication adapted to the users (i.e. traditional methods) planned for hygiene and environmental education and training in user maintenance?
- are the interests of women being considered right from the design phase through direct consultation?
- will women in the target group participate actively in the implementation?
- have any constraints related to the participation of women in the project been recognised and have conditions (including financial possibilities) been created such that these constraints are removed?
- does the incorporation of knowledge and experience related to women and development form part of the project planning (also financial) and will it continue to do so throughout the entire project cycle?

The last four conditions are the DAC-WID criteria[5]. By 1998, at least 50% of bilateral expenditure in all sectors must meet at least three of the four DAC-WID criteria.

5.2.3 Conditions related to the environment

Projects involving the creation of water supply and sanitation facilities should in principle be assessed as to their possible environmental impact. The first step is to determine whether the activities will take place in an environmentally sensitive area.

Environmentally sensitive areas are:
- areas subject to desertification, and arid and semi-arid areas;
- biologically valuable tropical forests;
- wetlands;
- areas with high biodiversity;
- areas inhabited by indigenous peoples and areas of special cultural-historical value;
- areas subject to erosion.

If the activities are to be carried out in an environmentally sensitive area, research is needed into whether the planned activities will lead to:
- the inundation of land, due for example to the construction of reservoirs;
- modifications in natural watercourses (canalisation) such as to harm the environment;
- pollution of water resources and soil through, for example, discharges of waste water into surface water or the soil;
- depletion of existing water resources (ground or surface water);

- space requirements for infrastructure (e.g. pipelines, tanks, buildings, pumping stations) such as to harm the environment;
- the increased likelihood of the spread of disease, for example through providing a water supply without sanitation;
- the use of non-renewable resources on an unnecessarily large scale;
- the use of environmentally harmful materials such as asbestos cement.

If the questions listed above cannot be answered clearly in the negative after looking at existing environmental studies, water quality studies, and hydrological and geohydrological investigations, an environmental impact assessment should in principle be carried out[37], one of the outcomes of which might be alternatives which cause less environmental impact and which nevertheless achieve the objectives set at an acceptable cost. A cost-benefit analysis incorporating environmental values may also be useful.

5.3 Implementation

Promoting local 'ownership' of a project means placing the responsibility for both design and implementation activities as much as possible with the partner country concerned - if there is sufficient confidence in the effectiveness of the structures in the host country. This can be achieved by choosing ways of implementation in which much of the responsibility lies with the partner country.

Greater flexibility (process approach) makes phasing desirable. Future activities are planned on the basis of activities occurring in the early stages of the process. Evaluation points with verifiable indicators are fixed for each activity during implementation (see example in table 5, p. 43).

5.3.1 Organisations

Cooperation can be undertaken not only with the responsible counterpart organisations but also with bilateral and multilateral organisations and specialist NGOs.

Counterpart organisations
The counterpart organisation for project implementation is usually one of the technical ministries specialised in water and sanitation. Implementation is often delegated to a local government agency or utility falling under the jurisdiction of the ministry. For non-technical aspects such as community management and hygiene education, options include socio-economic units set up temporarily or permanently within a technical ministry or sectoral organisation or a specialist local NGO. The implementation of non-technical aspects can also be assigned to the ministries which specialise in these areas, for example the ministry for community development and/or for health.

Possible counterpart organisations for water supply and sanitation activities will be assessed primarily on the basis of:

- their proven capacities;
- their client-orientedness: how open they are for a participative approach?
- their status or support base within the stakeholders' circles.

Bilateral aid organisations

It can sometimes be desirable for bilateral donors to join forces in providing sectoral support. This will have to be looked at on a case-by case basis.

Multilateral aid organisations

The UNDP/World Bank Water and Sanitation Programme and the UNICEF drinking water and sanitation programmes are well equipped to implement water supply and sanitation activities because they participate in a broad sectoral programme in many partner countries.

Participation in a broad sectoral programme of this kind at all levels (multi-, bi- or co-financing) offers better prospects for sustainable sectoral development than support for often rather isolated bilateral activities at the project level. Furthermore, participation in this broad sectoral programme permits more effective participation in the policy dialogue on sectoral development in the recipient country. In the case of co-financing, clear agreements will have to be made regarding the use of experts, progress reports, the participation of NEDA in monitoring and evaluation, etc.

NGOs

An option which is gaining in popularity is to get NGOs involved, particularly for participative, non-technical aspects. Dutch financial support to NGOs and communities in developing countries will often be channelled via the Dutch co-financing organisations: NOVIB (the Netherlands Organisation for International Development Cooperation), HIVOS (Humanist Institute for Cooperation with Developing Countries), ICCO (Inter-Church Coordination Committee for Development Projects), SIMAVI (Association for Direct Medical Aid in the Tropics), CEBEMO (Central Agency for Joint Financing Development Programmes). The Netherlands Development Organisation SNV can also be used as a private channel for Dutch aid to water and sanitation projects.

5.3.2 Monitoring

Monitoring involves continuously tracking progress during implementation, and detecting and analyzing promptly factors which may impact on implementation. Activities should be monitored by means of an internal management information system which analyzes progress relative to the objectives set. This is needed to generate the information required for sound and effective decision-making on the project.

There will be greater emphasis on monitoring than in the past. This monitoring should be carried out wherever possible by, but otherwise together with, the local organisations and target groups. A distinction needs to be made here between the monitoring by the executing agency (internal monitoring) and the supervision exercised by the Dutch embassy together with the partner in the relevant developing country (external monitoring).

External monitoring may include a 'project review'. This is a special interim evaluation which takes stock of the operational aspects of the implementation. A project review is incidental in nature, and is carried out under the responsibility of the embassy if the need arises.

5.4 Evaluation

In addition to this monitoring, an activity is also evaluated after completion.

The purpose of the final evaluation of activities related to water supply and sanitation is to ascertain, with the help of measurable indicators, whether these activities have been effective, (achieved the objectives within the timetable set), efficient (is there a reasonable relationship between resources input and results?) and sustainable (is there a beneficial long-term effect on the target group?) (see table 5, p. 43).

A special kind of final evaluation is the ex post evaluation which takes place some time (e.g. five years) after the completion of the activity. This form of evaluation is particularly important in the water supply and sanitation sector because experience shows that it is only after a period of this kind that it can be determined whether an intervention has had lasting benefits.

It is vital that the results of evaluations are fed back to the field. Lessons need to be drawn from evaluations for the benefit of other similar activities and of the development of sectoral policy.

Evaluation is therefore more than monitoring. There is greater attention for any impact the activities may have at various levels: national, project and user levels.

5.4.1 National level

- Has the activity contributed towards the government's sectoral policy objectives?
- Was the activity modified under influence of the government's sectoral policy?
- How was coordination/cooperation with the national government and any other donors involved, and how did this affect the course of the project?

- Where institutional support was provided to a sector ministry, did this activity result in improved sectoral planning and policy development?

5.4.2 Project level

- Were the long-term objectives (improvements in living standards and public health) met?
- Were the specific project objectives met (see table 5)?
- Was the project completed, and were the facilities made operational on budget and on time[38] (see table 5, p. 43)?
- Have institutional reforms been made which guarantee the continued long-term operation of the facilities and the managing agencies after the departure of the donor? Were training programmes in operations, maintenance and financial management held, and what was the impact of these on the managing organisation and the facilities to be managed?
- How well matched is the level of service provided and the chosen technology to the local capacity to operate the facilities sustainably? To what extent was use made of local materials?
- Does it seem likely that the facilities will continue to function in the long term without external contributions to the operating costs?
- Have the activities damaged the environment (erosion, subsidence, water and soil pollution, depletion of water resources)?
- Is the project/programme replicable in other locations?

5.4.3 User level

- Has the project improved living standards, particularly of the poor?
- Were the users involved during the whole project cycle?
- How did users contribute to the implementation of the activity?
- How did the informational activities regarding environmental hygiene go, and have they resulted in the hygienic and sustainable use of the facilities? Has behaviour been changed?
- Have user committees been formed and does the membership include women?
- Have agreements made between the sectoral organisation(s) and users regarding the distribution of responsibilities in relation to operations, maintenance and financial management been adhered to?
- Does the income generated cover the costs and can users afford their contributions?
- Have credit facilities been extended to user groups, and how?
- What training activities were there in community based maintenance, and did these result in the more sustainable use of the facilities?
- Are users satisfied with the facilities created, in terms of their level, location and technology?

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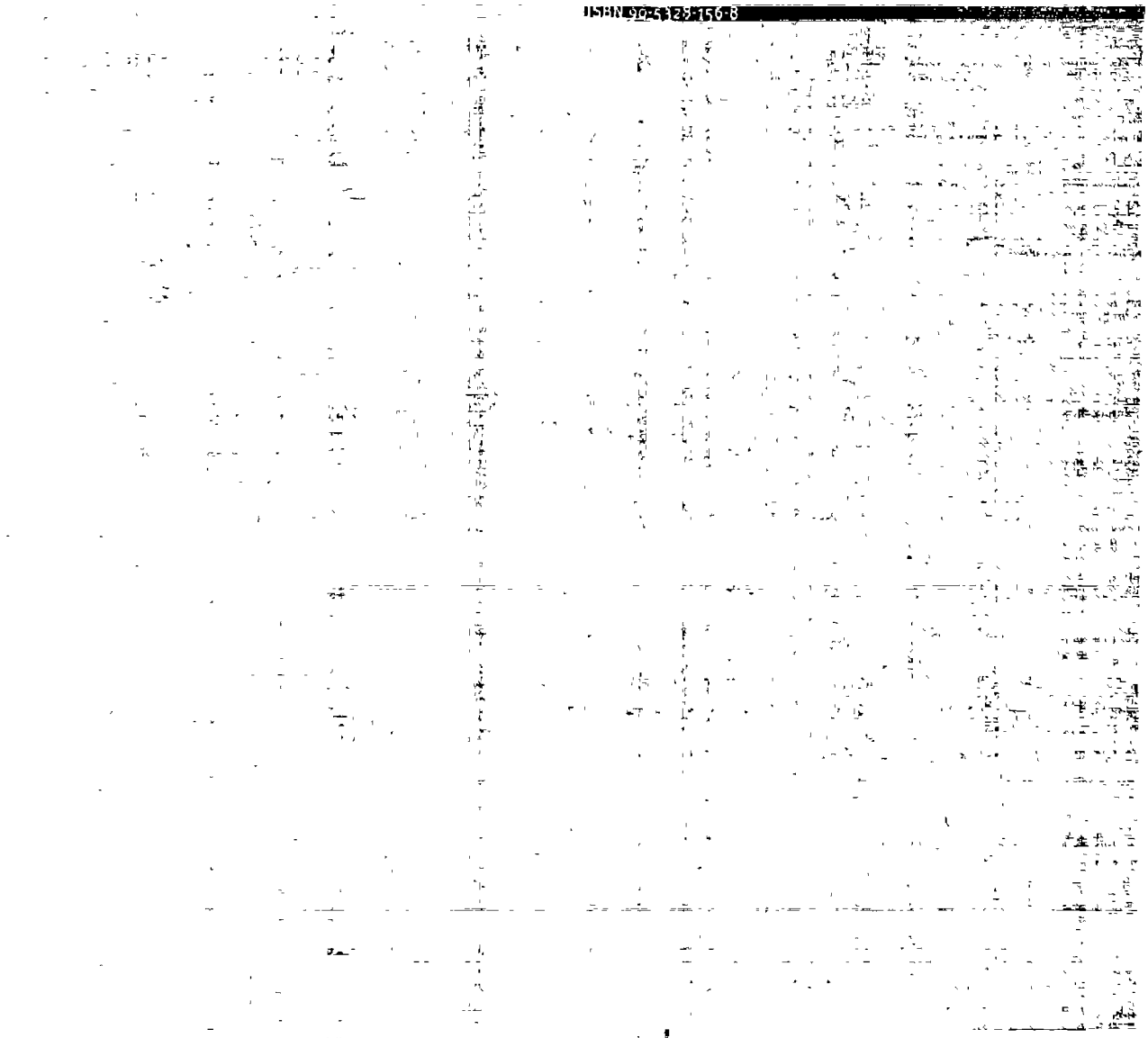

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