asset management of water-related infrastructure

best practices and experiences from the netherlands

henry j. opdam
september 2002

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asset management

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henry j. opdam
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1 Introduction

Over the past fifty years considerable investments have been made in building water-related infrastructure required for rendering a variety of water-related services, such as: flood control, drainage, irrigation, navigation, drinking water supply, industrial water supply, hydropower, sanitation, etc. These investments have yielded a vast set of water-related natural and capital infrastructure assets, such as: canals, weirs, dams, reservoirs, irrigation systems, water off-take structures, dikes, river training and coastal defence works, regulators, sewerage systems, treatment plants, hydropower plants, locks, harbours and port facilities, etc.

The condition of these infrastructure assets, however, is generally unsatisfactory or even obsolete in many developing countries and in countries with economies in transition. Therefore, operation and maintenance are inadequate to the extent that the level and quality of the water-related service are under pressure, or the service is even failing. While improving these services, so far, the attention has been focusing on policy analysis, integrated planning, rehabilitation of the existing infrastructure, or even on building new capital assets, with little or no attention at all for proper operation and maintenance of the (existing) infrastructure.

For this reason, investments in infrastructure assets prove often not to be cost-effective and international donor agencies are becoming more and more reluctant to approve loan agreements for infrastructure investments or rehabilitation projects. Population growth and economic development, however, increase the demand for such investments.

While considering improving the existing water-related infrastructure or new investments, therefore, adequate arrangements should be made for management of the existing assets.

Asset management can be defined as:

Management of infrastructure natural and capital assets in order to minimise the total life-cycle cost of construction, operation and maintenance for a sustainable deliverance of the services to the customers at the required quality level.

This definition includes life-cycle engineering and financing, rationalisation and prioritisation of operation and maintenance in line with policies developed, operational targets set and quality standards agreed (service level and performance contracts) between supplier and consumer of the services provided through the infrastructure. Starting point for the management of the water-related infrastructure is the delivery of water-related services.

Due to the specific location and particular conditions of the Netherlands, the Dutch have developed thorough knowledge and experience in building and managing water-related infrastructure. The present system of the water-related infrastructure and its associated services in the Netherlands is the result of a gradual development over many centuries. The result of this development is a subtle and balanced distribution of tasks and responsibilities between local and central government institutions, between government institutions and private sector, between stakeholders and providers of the water-related services, based on a unique system of legal, institutional and financial rules and regulations.

The Dutch experience and expertise related to the management of the water-related infrastructure assets, especially those developed over the past decades, provide best practices and experiences for governments and international donor agencies while improving the operation and maintenance of existing infrastructure and/or considering new investments.
This report identifies the need of the developing world for introducing asset management plans as a key condition for financing infrastructure investments. It highlights the lessons learned of the management of the Dutch water-related infrastructure and provides recommendations on the application of the Dutch experience and expertise in projects aiming at improving the efficiency of existing water-related infrastructure or preparing new investments in the developing world.

2 Asset management in the developing world

2.1 Need for asset management
In the developing world, until recently, attention was mainly focused on investments. Operation and maintenance were usually left to the (local) governments and stakeholders without annual budgets being made available. The traditional legal, financial and institutional framework needs reform to accommodate for a performance-oriented operation and a proper cost-recovery mechanism. Gradually, however, budgets for operation and maintenance are increasing compared to the investment budgets and asset management has become an issue for international donor agencies such as the World Bank.
Providing loans for operation and maintenance is not an option. Loans therefore now focus on the combination of investments and institutional reform. The provision of Adaptive Programme Loans of the World Bank is an indication of a changing policy.

**Budget-driven organisations (governments) are more and more challenged to specifically justify the budgets for operation and maintenance.** This provokes rationalisation of operation and maintenance by planning, setting targets and service levels, prioritising and applying integrated costing principles. Although it is becoming a condition for financing investment projects, many investment projects still receive loans while operation and maintenance are only commitments on paper, and rehabilitation projects are often nothing else but investments for replacement or reconstruction due to delayed maintenance.

Population growth and economic development increase the need for investments in water-related infrastructure to the extent that public funding is no longer available to a sufficient level. Private sector involvement in the construction and operation of water-related infrastructure and provision of water-related services immediately requires the development of a business plan addressing issues such as:

- delivery targets, quality standards and performance indicators between the supplier and the customer on the one hand, and
- a life-cycle approach for the costs of construction, operation and maintenance and an appropriate cost-recovery mechanism on the other hand.

The need for the introduction of sound asset management principles in the developing world is evident: a long list of examples of lost or non-productive investments can be identified. Reference can be made to various developing countries where the national interest burden on international loans exceeds the economic capacity of the country, reflecting the fact that the projects have not produced the (economic) outcome envisaged in the preparation phase.

**Jakarta floods**

At the request of the Royal Netherlands Embassy in Jakarta a team of Dutch experts carried out an evaluation of the Jakarta floods of February 2002. Their draft report reads:

… A more proper economic analysis puts the damage to the economy at 1 billion US$. The floods were locally induced (not by rains in the catchment). The rains were heavy but not excessive (a 5-year event). The causes of the flood were (i) obstruction of pipes and bridges in the river blocking the flow; (ii) serious sedimentation of silt and garbage that was not removed over the past 10 years; (iii) half of the flood pumps didn't work; (iv) no adaptation of the flood gates over the past 30 years despite fundamental changes in the local catchment characteristics. In short: total absence of O&M and asset management ....

**World Bank Water Resources Strategy**

The draft Water Resources Sector Strategy of the World Bank concludes the following based on its operations evaluation of water resources investment projects:

“From this experience, there are two principal conclusions, which together form the basis for this Strategy. First, it is clear that the “management or infrastructure” dichotomy is false. Both are needed. In most developing countries, there is simultaneously an urgent need for more environmentally and socially sustainable management of water resources, and for developing and maintaining the stock of water infrastructure needed for growth and poverty reduction. Second, it is equally clear that development and management of water resources is a slow and highly political process. All countries, including all industrialised countries, have a long way to go before they manage their water resources in accordance with the globally-accepted principles. The challenge of reform, accordingly, is to determine what is feasible, in any particular natural, cultural, economic and political environment, and to develop alliances around a sequenced, prioritised, realistic programme for improvement”.

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*Road maintenance in Suriname*

Extensive research on road projects and road infrastructure was carried out under WB auspices. Studies from early 90’s demonstrate the reconstruction cost of roads and related infrastructure to be three times higher then regular maintenance cost. The average IRR of Bank financed maintenance projects is about 35-40%, so three times higher then the average IRR of standard investment project in infrastructure (between 5 and 10%).
Semarang experiences subsidence (1-20 cm per year) due to groundwater extraction for the domestic water supply and drainage problems. During a Seminar/Workshop Polder Systems in Waterfront Cities, on September 26-27 2001 it was concluded that the water management problems could be solved by establishing a polder system with a regional polder authority. It was decided to establish a pilot polder of about 500 ha with a water management system that would ensure sufficient rainfall retention capacity, a balanced drainage system and pumping capacity without shifting the problems to the adjacent areas.

Asset management (rationalised operations and maintenance) was selected to be the key issue for improvement. The new polder authority will tune the operation and maintenance of the water-related infrastructure to the operation and maintenance of existing services such as the waste collection that itself is essential for the management of the drainage system. Budgets for operation and maintenance will have to be generated from the services rendered. Only when the polder management organisation is in place and operating satisfactorily, investments will be considered and external finance recruited.

For the legal, financial and institutional reform process a twinning agreement has been set-up between the Government of the Netherlands and the City of Semarang. From Dutch side two Water Boards, the Ministry of Public Works, the Association of Dutch Cities (VNG) and a private consultant participate in the agreement, from Indonesian side the City of Semarang and Bandung University are involved.

Partners for Water is requested to finance the Dutch input in this agreement. This is an interdepartmental organisation of five Dutch ministries:

- Foreign Affairs,
- Economic Affairs,
- Public Works, Transport and Water Management
- Housing, Spatial Planning and Environment,
- Agriculture, Nature Management and Fisheries,

co-operating with the
- Inter-provincial Consultation Board
- Association of Water Boards,
- Association of Dutch Cities,
- Association of Water Supply Companies, and
- Representatives of the private sector

River Basin Management in Indonesia
In the specific setting of Indonesia, the institutional arrangements for managing the 90 river basins is critical. Many of these relative short rivers have steep slopes, are densely populated and heavily utilised. A number of river basins have big urban centres in the coastal planes. Previous investments in water infrastructure resulted in a large number of capital assets, ranging from river training and flood protection works, dams and erosion control measures, to irrigation systems, water supply, urban drainage, hydro-power, etc. The condition of the assets generally is very unsatisfactory and operation and maintenance inadequate. The result is disaster and damage to the local and national economy. The damage due to asset management neglect is far outweighing the costs of proper operation and maintenance. Moreover, asset management neglect also is becoming an obstacle for financing investment in new development. Just to illustrate, the floods in Jakarta last year were the result of a 1:5 year rain event and created $1 billion damage, mainly through management failure and maintenance neglect of the storm drainage system and flood management infrastructure. Improving asset management (including accountable decentralised organisation, financing mechanisms, technical and managerial skills) therefore is becoming a focus area for many Bank projects in Indonesia and the wider region.
2.2 Asset management and new investments

Introduction of asset management principles in the preparation of new infrastructure investments is a logical further step in the integrated decision making process:

- technical design (1950s),
- economic feasibility (1960s),
- environmental and social impact assessment (1970s),
- operation and maintenance (1980s),
- financial analysis in view of commercialisation, corporatisation or privatisation of the infrastructure and related services (1990s),
- good governance (2000s)

In a broad perspective, the latter three steps may be summarised as the required steps for proper asset management. Economic feasibility, environmental and social impact assessments and the financial analysis have been gradually incorporated in the normal practice and procedures set by the international donor agencies such as the World Bank for the preparation of new investments. The other aspects of asset management should be included likewise, completing the investment preparation process. Even more: in a life-cycle approach to investments in the water-related infrastructure, asset management (rationalised, reliable, transparent and sustainable operation and maintenance of the system, complying with the service levels set and quality standards agreed) should be the focal point and leading principle for the decision making process.

2.3 Legal, financial and institutional reform

In all cases the organisation responsible for the construction, operation and maintenance of the infrastructure and the related services will have to change from a budget-driven service supplier to a demand-driven, performance-oriented organisation. By nature, this is new for many public organisations.

The change process requires legal, financial and institutional reform and is comparable to the transition process of Eastern European nations shifting from a centrally guided economy towards a market-oriented economy. The analyses required are also similar to those that are addressed in commercialisation, corporatisation and privatisation processes and that eventually lead to the preparation of a life-cycle based business plan for the construction, operation and maintenance of the infrastructure and for the service to be rendered.

2.4 Long-term commitment

It has to be acknowledged that the introduction of asset management principles in the developing world will require an extensive reform of the existing legal, institutional and financial structures. A long-term commitment of institutional strengthening and capacity building will have to be considered.

2.5 Respecting local conditions and cultural setting

Although the change processes required in different countries are comparable, the particular local conditions and cultural setting and development should be respected when facilitating legal, financial and institutional reform regarding the introduction of asset management principles. The scope and focus of any (international) assistance for this process should respect the specific local conditions and cultural setting and differentiate between:

- developing countries with a specific Dutch, French, British, Spanish or Portuguese colonial history and the associated specific institutional and legal systems;
• developing countries formerly linked to the former Soviet Union political system and now in the process of transition from a centrally guided economy towards a market/demand oriented economy.

3 Key issues of asset management

3.1 Water-related services and asset management

Asset management has been defined as:

Management of infrastructure natural and capital assets in order to minimise the total life-cycle cost of construction, operation and maintenance for a sustainable deliverance of the services to the customers at the required quality level.

This definition includes life-cycle engineering and financing, rationalisation and prioritisation of operation and maintenance in line with policies developed, operational targets set and quality standards agreed (service level and performance contracts) between supplier and consumer of the services provided through the infrastructure. Hence, the starting point for the management of the water-related infrastructure (asset management) is the delivery of water-related services. The figure below illustrates the relation between asset management and the organisation of providing water-related services.

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1 This figure is derived from a presentation of Luitzen Bijlsma on Asset Management in a workshop on Asset Management in Jakarta in September 2002, specifically designed to reflect the Indonesian situation.
3.2 Public/private, centralised/decentralised

When analysing the water-related services, it can be concluded that not all of them can be organised in the same way. Bulk water supply, flood control, water quality and sanitation, navigation, drinking water supply, industrial water supply, irrigation, drainage, recreation, etc. may be combined or require separate appropriate organisations depending to a large extent on the specific cultural setting and physical conditions. Traditionally most of these services are public. The key issue is a business-like approach to the provision of the services and the management of the associated infrastructure. Therefore, for each of the services, or combination thereof, it should be decided, on the basis of the appropriate criteria (effectivity and efficiency), to what extent private sector involvement and decentralisation are required.

Where no direct relation exists between the beneficiary and the services provided and general public national interests prevail (flood control, drainage, etc.) a public national budget-driven entity may be established to provide these services. The integrated costs may then be covered from the national budget. Wherever appropriate decentralisation of the services, shifting the responsibility to local government authorities should be considered. In some cases such services may be subject to commercialisation and corporatisation and/or even outsourced to the private sector (management contracts, concessions, etc.), if clear and transparent targets, service levels and quality standards can be defined.

To the extent a more specific relation can be established between the beneficiary of a service and the provider of the service (irrigation, drinking water supply, industrial water supply, sewerage, etc.), the providing organisation may enter in direct negotiations with the beneficiaries about targets, service levels, and quality standards. A user-based cost-recovery system may be developed under national rules and regulations. Such demand/market-driven organisations, in general, provide more opportunities for decentralisation and private sector involvement.

3.3 Multi-functionality and risk

Important issues playing a role in the organisation of water-related services are the complexity and multi-functionality of the water-related infrastructure and the risks associated with providing the services. Examples are that the same infrastructure serves different purposes and coherence of the structure and the services call for a single managing and operating organisation. Investment, financial and operational risks (the probability of the event times the expected damage) may exceed the capacity of the private or regional community and calling for a government organisation to exercise the final and overall responsibility.
3.4 Success factors

Critical success factors for an adequate organisation of water-related services are: (a) establishing as close a link as possible between the stakeholders and the organisation providing the services, (b) introducing a direct use(r)-based cost recovery mechanism, and (c) stakeholders being represented in the supervising board of the organisation. The central government is to focus providing adequate rules and regulations for the services, establishing an investment policy and setting conditions for private sector involvement. This will enhance efficiency and effectivity, transparency and accountability of the organisation. It ensures good communication between the stakeholders and the provider of the services. It facilitates budget control, quality assurance and benchmarking of the services. It aims at securing the willingness to pay of the stakeholders and a long-term commitment of government budgets whenever required beyond political whims.

3.5 Optimisation of water-related services and asset management

3.5.1 Objective of asset management

The final objective of proper management of the water-related infrastructure is to optimise the services for what the infrastructure has been built. A demand-driven, market-oriented and business-like approach requires the assessment of a number of external conditions and a life-cycle based analysis of the services to be rendered, the infrastructure needed, its operation and maintenance, the organisational set-up and the financial arrangements.

3.5.2 External conditions

Important external conditions that highly determine the way a water-related service is rendered and how the associated infrastructure will have to be managed are the existing legal framework, institutional arrangements and the local conditions and cultural setting.

**legal framework**

The existing legal and regulatory framework has to be analysed, together with the existing policy and planning procedures. These analyses will give indications to what extent tasks, responsibilities, authority and means of the organisation are supported, or to what extent modifications of the rules and regulations are recommended. Another key issue is evaluating to what extent the rules and regulations enable the service-providing organisation to enforce the law upon the beneficiaries.

**institutional arrangements**

The analysis of the existing institutional framework indicates whether it enables an efficient and effective organisation of the services, or to what extent adjustments are required. Key issues to evaluate are to what extent the existing framework supports decentralisation of the service and/or private sector involvement. Regarding the latter, it is important to evaluate to what extent the principles of commercialisation and/or corporatisation of government institutions and/or public-private partnership (PPP) constructions are applicable. Finally it is important assessing to what extent the existing institutional framework ensures good governance. Key issues here are transparency of decision making, reliability, political stability and absence of corruption.

**local conditions and cultural setting**

The past is important for the future. Decisions on the organisational and financial set-up of providing the water-related services have to be based on respect for, and understanding of the way these services were provided in the past, the way the responsible authorities have developed and the attitude/willingness of the authorities/customers/stakeholders.
3.5.3 **Assessment of the service providing organisation**

Within these conditions the performance of an existing organisation providing water-related services will have to be evaluated. This evaluation will include:

- an analysis of the Strengths, Weaknesses, Opportunities and Threats (SWOT) of the organisation providing the services,
- a Value Chain Analysis (VCA) assessing the added value of each of the primary processes (production) and all supporting activities (overhead),
- a Due Diligence Analysis assessing the managerial, operational and financial competence and performance of the organisation.

These analyses concern the demand of the services, the valuation of the assets (maintenance and operation), the organisational set-up and the financial system.

**Demand analysis** When analysing the demand for a service, a market analysis involving the stakeholders (beneficiaries/users) will determine the targets, service level and quality standards required by the stakeholders. Furthermore it will yield performance indicators that can be used to evaluate and monitor the services rendered but also to benchmark the services for comparison with competitive suppliers. Another important result should be a communication and marketing plan, specifying how the stakeholders and other interested parties will be kept informed about the services to be rendered.

**Asset valuation (operation and maintenance)** A valuation of the existing water-related infrastructure requires a (multi-)functional and technical analysis of the assets, the definition of critical technical and operational levels where the infrastructure ceases to perform as required, assessments of the associated risks and the definition of intervention levels where maintenance and/or re-investments are required. This evaluation will provide an optimised plan for operation and maintenance of the assets and an associated investment plan.

**Organisational set-up (efficiency and effectiveness)** Within the legal and institutional framework and taking into account the local conditions and cultural setting, decisions should be made about improvements of the existing organisations, or about the most efficient and effective organisational set-up for each of the water-related services. The objective should be to develop an organisation capable of meeting the targets, service level and quality standards agreed. Key issues are the degree of public/private partnership (PPP), the degree of (de)centralisation, ownership, responsibility, transparency, accountability, stakeholder involvement, communication, management, staffing, ways and means to enforce the laws and
regulations. The results of this analysis are elaborated in a number of specific plans: operations, communication and marketing, institutional strengthening and human resources development.

financial system (cost-recovery) Asset management requires standardisation of costs, allowing (a) benchmarking activities, (b) relating costs of services to outcome (quality and reliability of services), (c) setting management targets, (d) prioritising services, and (e) formulating policies. For a sustainable provision of the services standardisation of costs should be based on integrated life-cycle costing principles. All financial costs of construction (investments, depreciation, interest), operation including monitoring and supervision (organisation, staff, consumables), maintenance (repair, rehabilitation, re-investment) of the services should be assessed. Furthermore an appropriate cost-recovery system should be designed, preferably based on use- or user-related contributions (fixed and variable fees, surcharges and taxes). The results will be summarised in a plan of finance and cost-recovery.

3.6 Business plan
Common commercial practice is the preparation of a business plan where, based on a life-cycle approach, the required inputs are related to the expected outcome of the activities. A business plan is the basis for banks and donor agencies to invest in the activities. It is recommended that such integrated plans be developed for providing water-related services based on the analysis of the external conditions and the assessment of the service providing organisation outlined in the previous sections.

Key elements of a business plan are: a service contract/agreement with the stakeholders specifying targets, service levels and quality standards, a communication and marketing plan, an operational plan, a maintenance plan, an investment plan, a finance and cost-recovery plan, an institutional and human resources development plan. In this way asset management (rationalised operation and maintenance of the infrastructure) is embedded and integrated in an overall plan for the provision of the water-related service.

4 Lessons learned from the Dutch experience

4.1 The Netherlands - from building to managing
The Dutch have been fighting the water for centuries, learned to live with it and considering it enemy and friend at the same time. Half of the Netherlands would be flooded without flood control measures and related infrastructure: dunes, dams, dikes, sluices, pumping stations, etc. protect the densely populated country, the fully developed infrastructure and the people living there.

Since the Middle Ages the Dutch have been developing their polder systems, providing to its inhabitants, apart from effective flood control, important water-related services such as water level control, drainage, navigation, water supply, and also, since the past thirty years, successful surface water sanitation and waste water treatment. Together with the polder systems, also a specific system for management of the water-related infrastructure has been developed: the Water Boards, being the oldest form of local government in the Netherlands.

With the central government, the provincial and municipal authorities and the water supply companies, the Water Boards in the Netherlands share the responsibility for the management of the water-related infrastructure: surface water and groundwater, quantity and quality at the
national and local level. In the past decades a gradual shift from investments to asset management, *from building to managing*, has developed for four major reasons:

- increasing budget requirements for operation and maintenance after a long period of huge investments (river normalisation and canalisation works, river dike improvements, Zuiderzee and Delta Works)
- social pressure (surface water pollution, environmental degradation, population growth)
- increasing complexity of decision making process with stakeholder involvement and the role of non-government organisations (NGOs) and the media
- reduced availability of public funds and increasing private sector involvement

4.2 Asset management is the key to success

The most important lesson learned from the asset management practice developed in the Netherlands is that rationalised operation and maintenance of the infrastructure (asset management), not investments, should be the starting point when considering improvement of the infrastructure, or the preparation of new infrastructure investments. (Re-)structuring the management organisation for providing the water-related services will yield sustainable, cost-effective operation and maintenance. Without proper (institutional) arrangements for operation and maintenance no investments should be made. Proper management of the existing assets may delay, or even avoid new investments.

4.3 Legal, financial and institutional reform: asset management = change management

Being flood prone for more than 50% of their area, most of which below sea level, and other water-related challenges developing over time (agriculture, land reform, land reclamation, water quality, etc.) have always been driving forces for the Dutch to develop an efficient water-related infrastructure and an adequate water management system, including a user-based financial mechanism for recovering the costs of construction, operation and maintenance.

The exceptional Dutch practice, experience and expertise in management of the water-related assets is not so much associated with the historic development of the water board system, nor with the recent re-organisation of that system. Its particular character refers to the proper legal and financial system developed between central government, regional and local government institutes concerned with the water-related infrastructure. The success of the water management structure, however, largely depends on the agreement of the local population, NGOs, etc. and its willingness to contribute financially. The legal and financial system (decrees, regulations, tributary system and licenses) developed over the past centuries enables the local (government) authorities (Water Boards) to establish, on a democratic basis, close and direct institutional and financial links between the users of the water systems and the management. The development of an appropriate legal, institutional and financial system is an ever-changing dynamic process, which requires continuous attention.

4.4 Long-term commitment: asset management = people management

Another major lesson learned from the development and introduction of rationalised asset management in the Netherlands is that it needs a long-term commitment, not only of the management and key-staff of the organisations, but most and for all of the staff at the working level in the field!
The introduction of asset management plans in the Rijkswaterstaat organisation started in 1990 as a five-year programme; the programme to support to the management divisions with the introduction of the process and the procedures, however, was extended twice and is now envisaged up to 2005. Changing a (government) organisation from a budget-driven to a demand-driven and performance-oriented institution requires a tremendous change of corporate culture and attitude of management and staff: the human factor! This process must be addressed and facilitated explicitly and requires continuous attention and specific activities that should be included in the human resources development plan of the organisation. In addition, successful implementation of asset management principles and practices requires will, commitment, enthusiasm and determination from the management as well as willingness and corporate loyalty of the staff.

A successful development needs incentives/pressure at all staff levels and patience (time). Identification and highlighting the driving forces is essential. In the Netherlands the driving forces were: public funds available becoming scarce and increasing stakeholder pressure (society becoming more open, citizens more demanding and explicit, decision making processes more complex by involvement of NGOs and media).

4.5 Local conditions and cultural setting

The specific asset management experience and expertise developed in the Netherlands cannot be transferred to other management organisations without considering and respecting the specific local conditions and cultural setting. The specific knowledge and experience gained in the Netherlands related to the processes of developing an asset management oriented attitude and introducing asset management practices, however, can be very valuable to share with other governments.

4.6 Tools are only instrumental

The management will have to focus on facilitating the introduction of processes and developing the right attitude (social and cultural aspects) and not on the development of tools. Tools are indeed only instrumental! They are readily available in the market, but require normally adjustments to the specific conditions of the service providing institution.

5 How can the Dutch expertise and experience be made available?

5.1 Rationale

The Dutch experience gained over the past decades may be beneficial to other governments and donor agencies when considering improvement of the operation and maintenance of the infrastructure and/or preparing new investments. The Government of the Netherlands contributes on an annual basis some billions of euros in multilateral and bilateral co-operation programmes. A considerable part is related to investments in the water-related infrastructure of the receiving nations. It is in the interest of the international community and of the Dutch
government to facilitate the governments of these nations in guaranteeing the outcome of these investments by the introduction of proper asset management principles. By sharing its expertise and experience in the management of the water-related infrastructure, the Government of the Netherlands will help establishing *good governance* and capable water sector management organisations.

### 5.2 Assistance offered

*Institutional strengthening and capacity building*

Asset management is a legal, financial and institutional challenge. Theory on technical and financial means and ways of asset management is not the key issue. Many private and commercially operating organisations have developed extensive experience in asset management (real estate companies, lease companies, airlines, industrial production companies, international hotel chains, etc.).

For asset management of government owned assets, however, appropriate financial mechanisms for operation and maintenance and cost recovery mechanisms are generally absent. Moreover, a business-like approach (commercialisation, corporatisation) is generally not the culture of government institutions or the way they operate. The legal and financial supporting framework is generally not tuned to the specific needs for proper asset management of public infrastructure.

It is acknowledged that for specific social, cultural or political considerations water-related services are not always eligible for private sector involvement. Sound asset management principles, however, should also be applied to Government-owned and operated infrastructure and services.

The assistance that the Dutch can offer to international donor agencies and other governments therefore focuses on *transferring/sharing* the Dutch expertise and experience concerning the process of introducing asset management principles, rather than on *exporting* the asset management toolboxes specifically developed for use in the Netherlands situation.

*Toolboxes*

Toolboxes are not stand-alone instruments that without major adjustments can be used in all conditions. What is required for asset management is a well-developed database on the assets to manage, providing sufficient data for planning, prioritising, and financing operations and management. The database can then be extended to include tools for analyses, planning and prioritising. These tools are, however, always specifically tuned to the characteristics of the organisation, country, culture, institutional setting, laws and regulations, including acceptable procedures and mechanisms for control and enforcement. It is therefore advisable to *transfer/share* the Dutch expertise and experience (*lessons learned*) in developing these tools, rather than transferring the tools themselves.

### 5.3 Ways and means

#### 5.3.1 Bilateral co-operation

The Dutch expertise and experience may be made available to interested nations via:

- infrastructure attachés at the Dutch Embassy in relevant countries;
- secondments of water experts in (government) organisations in relevant developing countries;
- specific Memoranda of Understanding (MoU) with relevant governments, Go-Go\(^3\) missions and exchange programmes;

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\(^3\) Go-Go: Government-to-Government
twinning agreements to facilitate change management: from building and investing to functional managing organisations in legal, financial and institutional assistance programmes;

- Global Distant-Learning Network via internet
- (Private sector) assistance for the development of the required tool boxes (guidelines, data base and information systems, communication, risk analysis, planning, financing, coaching, etc.)

5.3.2 Multilateral co-operation

The Dutch experience can also be transferred to other governments associated with programmes of international donor agencies such as the World Bank. This experience could be offered by:

- continuing Dutch programmes with the international donor agencies, such as the BNWPP-WINDOWS 4 programme within the World Bank;
- secondments of staff with the international donor agencies;
- Go-Go agreements piggy-backed to (investment) programmes, where the costs of the Go-Go agreement activities are included in the economic and financial assessment of the projects. Implementation of such agreement should be a condition for the loan agreement.

For financing Go-Go agreements use may be made of existing ways and means such as trust funds available to the international donor agencies.

More countries could be interested in this type of Go-Go agreements associated with (investment) projects and loan agreements: Sweden, Denmark, Norway, Germany, France, Great Britain, USA, Canada, New Zealand, Australia, Japan to mention just a few.

5.3.3 Organisation

The Dutch expertise and experience can be made available through:

- Partners for Water, an interdepartmental government organisation in which the ministries of Foreign Affairs (BuZa) 5, Economic Affairs (EZ) 6, Transport, Public Works and Water Management (V&W) 7, Housing, Spatial Planning and Environment (VROM) 8, Agriculture, Nature Management and Fisheries (LNV) 9 participate.
- Other (semi-government) authorities: provincial authorities (IPO) 10, the Water Boards (UvW) 11, municipal authorities (VNG) 12, and drinking water supply companies (VEWIN) 13,
- The private sector: represented by NWP 14 that already is involved in Partners for Water as an observer.

Partners for Water could assume the responsibility for the co-ordination of the Dutch assistance, but this is still subject to consultation and decision-making between all institutions mentioned above.

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4. The (World) Bank-Netherlands Water Partnership Programme WINDOWS (…)
5. BuZa: Buitenlandse Zaken
6. EZ: Economische Zaken
7. V&W: Verkeer en Waterstaat
8. VROM: Volksgezondheid, Ruimtelijke Ordening en Milieu
9. LNV: Landbouw, Natuurbeheer en Visserij
10. IPO (Interprovinciaal Overleg): Interprovincial Consultation Board
11. UvW (Unie van Waterschappen): Association of Water Boards
12. VNG (Vereniging Nederlandse Gemeenten): Association of Dutch Cities
13. VEWIN (Vereniging van Waterleidingbedrijven In Nederland): Association of Drinking Water Supply Companies
14. Netherlands Water Partnership
5.3.4 Long-term commitments
Introduction of rationalised operation and maintenance of the infrastructure requires long-term ongoing commitments in implementation: time-consuming institutional reform and strengthening, legal and financial reform processes. It requires a long-term follow-up of investment projects, being normal practice in a business environment, but often absent in a public environment. The Dutch assistance offered intends to meet the need for such long-term commitments.

**Bangladesh Water Development Board**
Over the past 30 years many investments have been made in the water-related infrastructure in Bangladesh. Bangladesh Water Development Board (BWDB) of the Bangladesh Ministry of Water Resources (MoWR) is the Government institution, responsible for the implementation of these investment projects. The Government of Bangladesh and the World Bank are in the process to develop the Water Management Improvement Programme aiming at strengthening and reforming the Bangladesh government institutes involved in the management of the national water resources.

**Twinning agreement**
In November 2000 the Government of Bangladesh (GOB) and the Government of the Netherlands (GON) signed a five-year twinning agreement in which GON offers the Dutch expertise and experience related to water management to GOB.

**Institutional reform of BWDB**
The first action identified by the Bangladesh Government and being undertaken within the framework of the twinning agreement concerns providing Dutch assistance to the institutional reform process of BWDB.
While focusing on changing BWDB from a building and investing organisation into a managing agency, in a number of expert missions BWDB officials have identified a series of specific and critical tasks and designed an action programme accordingly. With strong commitment of the management and the staff of MoWR and BWDB this action programme is now being implemented. The own staff and management of BWDB carry out the specific activities identified, assisted by extern experts and consultants when and where required. Apart from the costs of the Dutch support, all costs of the action programme are borne by BWDB. Evaluation of the results of the specific activities and regular revision of the action programme is a joint effort of Dutch and Bangladesh experts in regular missions. Although the commitment of management, staff and experts involved is strong and the progress made so far is encouraging, the capacity to sustain the change process is low and long-term external support is strongly needed.

**Success of twinning between Water Supply Companies**
The Suriname Drinking water Supply Company (SWM) is an autonomous company with a large service area (Paramaribo and surroundings) and a relative small number of inhabitants (approximately 300,000). In order to keep the organisation lean and mean additional and ad-hoc expertise is obtained via a twinning agreement with WMO (Water Supply Company Overijssel) and GWA (Municipal Water Supply Company Amsterdam). This agreement started with WMO in 1993 and in 1997 with GWA. It proved to be very beneficial for both parties with excellent results at low cost both for solving current operational and maintenance problems regarding the distribution system, and for assisting the preparation of investment projects for additional water production capacity.

**Corporación Autónoma Regional del Valle del Cauca (CVC)**
CVC is a water authority established in the 1950s in Cali, Colombia, responsible for the management of the water resources in the river basin of the Cauca River, including the Cauca Valley and the Pacific Coast. The services include: flood control, drainage, industrial and agricultural water supply, (hydro)power generation and distribution.
A twinning agreement from the start until the 1970s with the Tennesey Valley Authority helped the institution being established. The successful operation and stability of CVC may be demonstrated by the fact that the organisation only had three General Directors in the first thirty years of existence.
Annex 1 Acknowledgements

The report has been prepared by Henry J. Opdam of WL | Delft Hydraulics under a contract with Partners for Water. The report, however, could not have been written without the views and comments of the following persons:

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
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<tbody>
<tr>
<td>G. Alaerts</td>
<td>World Bank,</td>
</tr>
<tr>
<td>L. Bijlsma</td>
<td>Rijkswaterstaat1 - World Bank (BNWPP)</td>
</tr>
<tr>
<td>D. de Bruin</td>
<td>Rijkswaterstaat Head Quarters</td>
</tr>
<tr>
<td>J.M. Goppelt</td>
<td>Rijkswaterstaat Head Quarters</td>
</tr>
<tr>
<td>H.J.M. Havekes</td>
<td>Association of Water Boards</td>
</tr>
<tr>
<td>A. Hoekstra</td>
<td>Rijkswaterstaat Directorate Zeeland</td>
</tr>
<tr>
<td>P. Huisman</td>
<td>Rijkswaterstaat RIZA (National Institute for Inland Water Management and Waste Water Treatment)</td>
</tr>
<tr>
<td>H.E. Klatter</td>
<td>Rijkswaterstaat Bouwdienst Bouwdienst (Civil Engineering Department)</td>
</tr>
<tr>
<td>S. Schaap</td>
<td>Water Board of Groot Salland</td>
</tr>
<tr>
<td>E. Schultz</td>
<td>Rijkswaterstaat Bouwdienst (Design and Construction Department)</td>
</tr>
<tr>
<td>G. Spencer</td>
<td>World Bank</td>
</tr>
<tr>
<td>A.J. Veraart</td>
<td>Rijkswaterstaat Head Quarters</td>
</tr>
<tr>
<td>D.C. Verhage</td>
<td>Rijkswaterstaat Partners for Water</td>
</tr>
<tr>
<td>P. Wilderom</td>
<td>Rijkswaterstaat Directorate Zeeland</td>
</tr>
<tr>
<td>M. van Zetten</td>
<td>Rijkswaterstaat RIKZ (National Institute for Coastal and Marine Management)</td>
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The views and comments have been discussed during the interviews held and the draft report has been subject to discussion in a number of meetings with the key team members. Although the report is based on many thoughts and views of the interviewees, the author takes full responsibility for its contents, findings, conclusions and recommendations.

Associated with the report a presentation has been prepared and issued on CD-ROM:

*asset management of water-related infrastructure, the dutch experience*

The photographs used in this presentation have been made available by Rijkswaterstaat from different sources:

- *Rijkswaterstaat*, Survey Department
- *Rijkswaterstaat*, Wat er staat, Dick de Bruin, 2001

Delft,
September 2002