Project Study
on
Lessons and Challenges
in
Operation and Maintenance
of
Rural Water Supply Facilities in Sub-Saharan Africa

MARCH 2010

JAPAN INTERNATIONAL COOPERATION AGENCY

EIGHT–JAPAN ENGINEERING CONSULTANTS INC.

GED
JR
10-042

Project Study
on
Lessons and Challenges
in
Operation and Maintenance
of
Rural Water Supply Facilities in Sub-Saharan Africa

MARCH 2010

JAPAN INTERNATIONAL COOPERATION AGENCY

EIGHT–JAPAN ENGINEERING CONSULTANTS INC.

PREFACE

According to a report (2008) compiled by the UNICEF-WHO Joint Monitoring Programme set up to monitor the achievements of the Millennium Development Goals (MDGs), the average rural water supply rate in developing countries is 76%. However, the comparable figure is les than 50% in 23 out of 48 Sub-Saharan countries (the relevant data is unavailable for two countries). The average rate for these 48 countries is as low as 46%. Under these circumstances, many Sub-Saharan countries have formulated their own national development programmes for rural water supply and sanitation, making further efforts to achieve the MDGs. In general, the favourite policies to efficiently and effectively achieve the stated goals appear to be a sector wide approach (SWAp), decentralisation and use of the private sector. Moreover, there are many cases where local people are playing a leading role in the O & M of rural water supply facilities.

In recent years, the rural water supply sector in Sub-Saharan Africa has been subject to wide-ranging policies, including sector reform, SWAp, decentralisation, outsourcing to the private sector and privatisation. The sector has also been experiencing O & M-related uncertainty, such as an unreliable supply chain for parts and difficult access to O & M services. This situation makes it essential for project planners and supervisors to fully understand the overall conditions for project implementation in advance. In fact, different O & M models are being tried to establish a sustainable O & M system and it is extremely important today to identify and analyse the achievements, problems and lessons of past and present technical cooperation projects.

In the face of these challenges, the Global Environment Department, JICA, decided to prepare a reference document compiling useful information and data for the planning and supervision of effective as well as efficient technical cooperation projects etc. by JICA reflecting the actual conditions of the rural water supply sector of Sub-Saharan countries. To this end, the present Study commenced in August, 2009, especially featuring Japan's technical cooperation and grant aid projects, and its findings are compiled in this report.

I sincerely hope that many people will find this report a useful reference for the planning and implementation of O & M projects for rural water supply facilities in developing countries in Africa and other regions of the world.

The implementation of the Study and compilation of the report have been entrusted to Eight Japan Engineering Consultants and the work has been assisted by many people working for JICA and other organizations. I would like to express my gratitude to all those who have provided their kind assistance for the Study.

March, 2010
Kikuo Nakagawa
Global Environment Department
Japan International Cooperation Agency

Location Map of Project Study

Table of Contents

LIST OF FIGURES

LIST OF TABLES

LIST OF BOXES

ABBREVIATIONS

ADC	Area Development Committee
APM	Area Pump Mender
AR	Artisan Reparateur
ASUFOR	Association des Usagers de Forage
AUE	Association d'Usagers de l'Eau
AfDB	African Development Bank
BPF	Brigade des puits et forages (Brigade of well and borehole)
BWO	Basin Water Office
CBO	Community Based Organisation
CDF	Comprehensive Development Framework
CDF	Community Development Fund
CFA franc/ FCFA	Communauté Financière Africaine franc/Franc de la Communauté Financière Africaine
CM	Community Management
CP	Cooperating Partners
CPE	Comité du Point d'Eau
CTB/BTC	Coopération Technique Belge/Belgian Technical Cooperation
CUs	Commercial Utilities
CWF	Collective WASH Fund
CoC	Code of Conduct
D-WASHE	District- Water, Sanitation and Health Education
DANIDA	Danish International Development Agency
DDCC	District Development Coordination Committee
DEM	Direction de l'Exploitation et de la Maintenance
DIP	Decentralisation Implementation Plan
DPG	Development Partners Group
DPOPH	Direcção Provincial das Obras Públicas e Habitação
DRA	Demand Responsive Approach
DWR	Department of Water Resources
DFID	Department for International Development
E/N	Exchange of Notes
EDF	Europian Development Fund
FDRE	Federal Democratic Republic of Ethiopia
FMP	Facility Management Plan
GBS	General Budget Support
GI/GALVI	Galvanized Iron
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
ICWE	International Conference on Water and Environment
ID&CB	Institutional Development and Capacity Development
IDA	International Development Association
IMF	International Monetary Fund
IMS	Information Management System
INGRH	Instituto Nacional de Gestão dos Recursos Hídrocos
IRC	IRC International Water and Sanitation Centre
IWRM	Integrated Water Resource Management
JICA	Japan International Cooperation Agency
LCC	Lusaka City Council
LGA	Local Government Authority
LWSC	Lusaka Water and Sewerage Company Limited
M&E	Monitoring and Evaluation
MDFT	MultiDisciplinary Facilitation Team
MDGs	Millennium Development Goals
MDS	Minimun Safe Distance

MLGH	Ministry of Local Government and Housing
MOU	Memorandum of Understanding
MoFED	Ministry of Finance and Economic Development
MoWI	Ministry of Water and Irrigation
NAWAPO	National Water Policy
NDP	National Decentralisation Policy
NGO	Non Governmental Organisation
NORAD	The Norwegian Agency for Development Cooperation
NRWSSP	National Rural Water Supply and Sanitation Programme
NRWSSP	National Rural Water Supply and Sanitation Programme
NSGRP	The National Strategy for Growth and Reduction of Poverty (Swahili: MKUKUTA)
NWSDS	National Water Sector Development Strategy
O&M	Operation and Maintenance
OECD	Organisation for Economic Co-operation and Development
OJT	On the Job Training
PBM	Program Based Management
PC	Personal Computer
PDM	Project Design Matrix
PEAMR	Programme Eau et Assainissement en Milieu Rural
PEPAM	Programme Eau Potable et Assainissement du Millénaire
PEPAPS	Programme d'Eau Potable et d'Assainissement-Province du Sud
PEPTAC	Project Eau Potable Tous et Appui Aux Activities Communautaires
PIM	Programme Implementation Manual
PMH	Pompes à Motricités Humaine
PNA	Política Nacional de Água
PNEAR	Programme National Eau et Assainissement Rural
PP	o Princpío de Procura
PPP	Public Private Partnership
PRA	Participatory Rural Appraisal
PRS	Poverty Reduction Strategy
PRS	Programme Régional Solaire
PRSP	Poverty Reduction Strategy Paper
PSR	Public Sector Reform
PST	Provincial Support Team
PURA-SANI	Project for Improvement of Water supply and Sanitation in Eastern Province in Rwanda
PVC	Polyvinyl Chloride
RUWASA-CAD	Rural Water Supply and Sanitation Capacity Development Project in Tanzania
RWSEP	Rural Water Supply and Environment Programme
RWSN	Rural Water Supply Network
RWSS	Rural Water Supply and Sanitation
RWSSB	Rokpur Water Supply & Sanitation Board
RWSSP	Rural Water Supply and Sanitation Programme
SAAS	Serviço Autônomo de Água e Saneamento
SAG	Sector Advisory Group
SBS	Sector Budget Support
SOMAP	Sustainable Operation and Maintenance Project for Rural Water Supply
SWAp	Sector Wide Approach
SWSC	Southern Water and Sewerage Company
TAC	Technical Advisory Committee
TANESCO	Tanzania National Electric Supply Company Limited
TICAD	Tokyo International Conference on African Development
TM	Tap Manager
TWS	Town Water Supply
ToR	Terms of Reference

U3M	Uganda 3 Modified Handpump
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
UNICEF	United Nation Children's Fund
UPS	Unplanned Settlement
UWSSP	Urban Water Supply and Sanitation Programme
V-WASHE	Village-Water, Sanitation and Health Education
VG	Village Government
VLOM	Village Level Operation and Maintenance
VWC	Village Water Comittee
WAS-CAP	Water Sector Capacity Enhancement Project
WASH	Water, Sanitation and Health
WASHCO	Water, Sanitation and Hygiene Committee
WATSAN	Water and Sanitation
WEDC	Water, Engineering and Development Centre
WHO	World Health Organization
WRDF	Water Resources Development Fund
WRMP	Water Resource Management Programme
WSDP	Water Sector Development Programme
WSP	Water and Sanitation Programme
WSPS	Water Sector Programme Support
WT	Water Trust
ZMK	Zambian Kwacha

Chapter 1 Background of the Study

1 - 1 Background

According to a report[1] compiled by the UNICEF-WHO Joint Monitoring Programme which has been set up to monitor the achievement of the Millennium Development Goals (MDGs) in the drinking water and sanitation sector, the average rural water supply rate in developing countries is 76%. However, the comparable figure is less than 50% in 23 out of 48 Sub-Saharan countries (the relevant data is unavailable for two countries). The average rate for these 48 countries is as low as 46%.

Under these circumstances, many Sub-Saharan countries have successively formulated national water sector development strategies and programmes under their own national development programmes to underline their determination to achieve the MDGs. Efforts have also been made to (i) introduce the sector wide approach (SWAp) to efficiently and effectively achieve the development goals in the water supply and sanitation sector and (ii) move sector aid coordination, where donor coordination is aligned with the sector programme led by the recipient country, further forward. Decentralisation is promoted in many countries along with domestic reforms, including reform of the water sector to review the role of the central government. In the rural water supply and sanitation sub-sector, several attempts to improve the conditions surrounding the issue of the O & M of rural water supply facilities have been made. Concrete examples of such attempts are the application of the O & M model where local residents play a central role, exploration of the possibility of introducing PPP (public-private partnerships) as attempted in the urban water supply sub-sector and the actual introduction of a PPP scheme.

Despite the implementation of the proactive policies described above, the operating rate of rural water supply facilities in Sub-Saharan Africa is as low as 50 - 80%[2], suggesting that the facilities constructed so far are not fully utilised (the Rural Water Supply Network (RWSN) website provides detailed data

---

[1] UNICEF/WHO (2008), Progress on Drinking Water and Sanitation: Special Focus on Sanitation, UNICEF, New York and WHO, Geneva

[2] JICA (2007), Open Seminar: Sustainable O & M of Rural Water Supply in Sub-Saharan Africa, the Importance of Water and Sanitation in TICAD IV: Programme Approach and SOMAP (Sustainable O & M Approach) in Zambia

on Sub-Saharan countries[3]). The sustainable O & M of facilities is a long-standing challenge in the rural water supply and sanitation sub-sector. Several initiatives have been tried to meet this challenge, such as (i) village-level operation and maintenance (VLOM) with better facilities, (ii) community management (CM) where the concept of resident participation is introduced for O & M activities and (iii) a demand responsive approach (DRA) which treats the demand of water users as a prominent factor in the development of rural water supply. Despite all these efforts, however, many problems remain unsolved. While efforts to introduce PPP are understood to aim at supplementing (or substituting for) the community-led O & M of water supply facilities, this approach is not always suitable for the O & M of rural water supply facilities. Most Sub-Saharan countries are at the stage of trying to find a suitable solution based on a variety of efforts.

1 - 2 Purpose of the Study

Understanding the challenges faced by the rural water supply and sanitation sub-sector, this Study aims at identifying and analysing actual cases of the past and ongoing technical cooperation and grant aid projects of Japan International Cooperation Agency (JICA) to examine pending issues and lessons learned primarily relating to the subjects listed below. The ultimate purpose of the Study is to produce a reference document to assist the formulation and implementation supervision of efficient and effective technical cooperation and other projects of JICA reflecting the actual conditions of recipient countries in the rural water supply and sanitation sub-sector.

① Effective project implementation under the processes of sector aid coordination and decentralisation

② O & M of water supply facilities, including such aspects as a community-led O & M system, collection of the water fee and spare parts supply chain

③ Good practice contributing to the implementation of projects in the coming years

[3] RWSN, http://www.watsan.org/docs/number-of-broken-down-handpumps-in-Africa.pdf

1 - 3 Study Method

(1) Target Countries and Target Projects of the Study

A field survey and review of the relevant documents were conducted in 10 Sub-Saharan countries where JICA has implemented or is implementing a rural water supply project.

The countries and projects studied are listed in Table 1-3-1 and Table 1-3-2 respectively.

The Study features two types of water supply systems: point source system with hand pumps[4] which is called a Level 1 system (or Level 1 facilities) and (ii) piped water supply system with public taps which is called a Level 2 system (or Level 2 facilities). The piped water supply system with individual connection which is called a Level 3 system (or Level 3 facilities) is excluded from the scope of the Study as this system hardly exists[5] in rural areas of Sub-Saharan Africa. However, some Level 2 facilities include individual connection in exceptional cases.

---

[4] The point source system is a general description of water supply facilities where users go to a borehole or spring to fetch water and bring it back to their homes.

[5] Under the aid schemes of Japan, the point source system, piped water supply system with public taps and piped water supply system with individual connection are called a Level 1 system/facilities, Level 2 system/facilities and Level 3 system/facilities respectively. These system titles are unique to Japanese aid and are not used by other donors.

Table 1-3-1 List of Study Areas and Target Projects of the Field Survey

Country	Project Title	Scheme	Facility	Term
Ethiopia	Water Sector Capacity Improvement Project in Southern Nations, Nationalities and Peoples State	T A	Point Source	2007.12 -2011.12
Zambia	Sustainable Operation and Maintenance Project for Rural Water Supply (SOMAP 1)	TA	Point Source	2005.9 -2007.9
	Sustainable Operation and Maintenance Project for Rural Water Supply Phase 2 (SOMAP 2)	TA	Point Source	2007.9 - 2010.9
	Living Environmental Improvement Project for Unplanned Urban Settlements in Lusaka	G A	Piped Water	2003.2 -2006.3
Sierra Leone	Project for Improvement of Water Supply System in Kambia District	T A	Piped Water	2006.12 - 2008.12
Senegal	Project for Safe Drinking Water and Community Activities (PEPTAC 1) Phase 1	T A	Piped Water	2002.12 -2005.3
	Project for Safe Drinking Water and Community Activities (2) Phase 2	T A	Piped / Point Source	2006.11 -2010.3
The Gambia	Project for Rural Water Supply Phase II	G A	Piped Water	2003.7 -2008.3
	Project for Rural Water Supply Phase III	G A	Piped Water	2009.1 -2012.3
Tanzania	Rural Water Supply and Sanitation Capacity Development Project (RUWASA-CAD)	T A	-	2007.9 -2010.9
	Rural Water Supply Project in Lindi and Mtwara Regions	G A	Point Source / Piped	2003.4 -2006.3
Rwanda	Project for Improvement of Water and Sanitation in Eastern Province (PURA-SANI)	T A	Piped Water	2007.4 -2010.8
Mozambique	Project for Promotion of Sustainability of Rural Water Supply, Hygiene and Sanitation in Zambezia Province	T A	Point Source	2007.2 -2011.8

Note: TA: Technical Assistance; GA: Grant Aid Assistance

Table 1-3-2 List of Target Projects for Document Review

Country	Project Title	Scheme	Facility	Term
Burkina Faso	Project for Maintenance of Water Supply Facilities and Sanitation Improvement in Central Plateau Region	T A	Point Source	2009.7 -2013.6
Madagascar	Project for Improvement of Management of Water Supply Systems and Hygiene Behaviour in Atsimo Andrefana Region	TA	Point Source/ Piped	2008.9 -2010.8

(2) Subject Organizations of the Field Survey

The field survey featured the following organizations involved in the construction of rural water supply facilities and/or improvement of the O & M system.

- Counterpart organizations and their supervising organizations (central and local governments) of past or ongoing JICA projects as listed in Table 1-3-1 and Table 1-3-2

- Donor agencies and other aid organizations involved in the capacity building of various organizations (NGOs, etc.) and stakeholders in the rural water supply and sanitation sub-sector, especially in the O & M of Level 1 and Level 2 water supply facilities
- Hand pump manufacturers, their local agents, agents involved in spare parts supply chains and NGOs

- Japanese organizations concerned (JICA offices in the target countries; experts and others involved in the target projects)

(3) Study Stages

The Study was conducted in accordance with the following stages.

- First Stage (Preparatory Work for the Field Survey): Review of (i) existing documents in Japan and abroad to establish the international trends of aid for the water supply and sanitation sector, especially the rural water supply and sanitation sub-sector, and the general trends of aid in Sub-Saharan Africa and (ii) reports of the relevant studies featuring the target countries

- Second Stage (Field Survey): Interviews at organizations related to the Study, site survey at the relevant facilities and gathering of reference materials/data, including photographs and other visual materials which can be used for publicity purposes.

- Third Stage (Analysis and Documentation): Compilation of the study results and recommendations for future technical cooperation projects and preparation of publicity materials and the study report

(4) Compilation of the Study Results

The present report compiles the current trends in the water supply and sanitation sector, especially the rural water supply and sanitation sub-sector, in Sub-Saharan Africa, common problems throughout the region and specific problems faced by individual countries regarding the issue of the O & M of rural water supply facilities, taking the historical background and current activities into consideration. When dealing with a case study (good practice) for a specific theme, the good practice in question is analysed for the Study even if it only constitutes part of the various components of a project instead of representing the general approach of the project concerned. The Study also features not only those projects which have already been completed but also ongoing

projects. This means that approaches and methods which cannot be determined as good practice from the viewpoint of the project goals or state of achievement are included in the Study.

1 - 4 Study Schedule

The overall study schedule is divided into three stages as described below. A more detailed schedule can be found in Annex 3.

- First Stage : Preparatory work for the field survey: August, 2009
- Second Stage : Field survey: 29th August - 16th October, 2009
- Third State : Analysis and documentation of the study findings: October, 2009 - March, 2010

Chapter 2 Trends of Aid in the Rural Water Supply Sub-Sector in Sub-Saharan Africa and Situation of O & M of Rural Water Supply Facilities

2 - 1 Current Situation of Aid

Past debates on the preferable aid approach to be employed by donors culminated in the Paris Declaration on Aid Effectiveness (hereinafter referred to as the "Paris Declaration") announced in 2005 at a high level forum held in Paris. The principles put forward by the Paris Declaration currently constitute the goals for aid for developing countries to achieve.

Aid for the rural water supply and sanitation sub-sector which is currently implemented in Sub-Saharan Africa is closely linked to the aid approach proposed by the Paris Declaration. A proper understanding of the changing environment for aid is essential for the effective implementation of aid for the sub-sector in question in the coming years.

2-1-1 Background of the Paris Declaration

The severe impacts of the global economic crisis in the 1970's and emergency of a debt problem among developing countries in the 1980's led to serious debates on the problem of poverty faced by developing countries, resulting in a profound review of the past aid approach. In an attempt to fundamentally alter the economic structure of developing countries, the World Bank and IMF commenced the introduction of a structural adjustment programme in the mid-1980's. However, there was growing criticism that this programme forced developing countries to uniformly accept a fiscal austerity programme, badly affecting poor people in these countries. The 1980's also saw the introduction of the new public management[6] method designed to facilitate privatisation in developing countries which experiencing so-called aid fatigue because of the little achievement of aid, especially in Africa.

---

[6] Christopher Hood (1995), The "New Public Management" in the 1980's: Variations on a Theme, *Accounting, Organizations and Society*, Volume 20, Issues 2 - 3, February - April, 1995, pp 93 - 109

Fresh moves emerged in the 1990's to make aid more effective within the confinement of limited financial resources. The sector wide approach (SWAp)[7] was one such move and was progressively applied by European countries to their aid for Africa in particular.

The trend of aid then turned towards poverty reduction. In 1998, the World Bank introduced the Comprehensive Development Framework (CDF)[8] and urged individual developing countries to prepare their own poverty reduction strategy paper (PRSP). Once a PRSP is prepared, it tends to be treated as a quasi-national development programme. Programme-based aid began to expand in those countries which had prepared a PRSP.

In September, 2000, the General Assembly representing 189 countries adopted the resolution of the Millennium Declaration which committed the nations to a new global partnership to reduce extreme poverty through the implementation of an agenda identified by PRSPs, in turn reflecting the actual conditions of individual countries. At the same time, the Millennium Development Goals (MDGs) were adopted as common development goals, providing the framework for the entire international community to work together. To expand the financial resources to achieve the MDGs, the UN International Conference on Financing for Development was held in 2002 in Monterrey, Mexico. This was followed by the Rome Declaration on Harmonisation in June, 2003 to coordinate efforts for the higher efficiency of aid. In February, 2004, the International Round Table on Managing Development Results was held in Marrakech, Morocco. The Paris Declaration was the culmination of these efforts to achieve the coordination of development aid involving all stakeholders with the addition of concrete indicators for the development results and mutual accountability of all actors.

2-1-2 Basic Concept of the Paris Declaration and Targets for 2010

After a series of discussions from 28th February to 2nd March, 2005, more than 100 countries and organizations signed the Paris Declaration, the basic concept of which was to halve the

---

[7] Peter Harrold and Associates (1995), The Broad Sector Approach to Investment Lending: Sector Improvement Programs, World Bank Discussion Papers (Africa Technical Development Series) No. 302, Washington D.C.

[8] The CDF represents an aid approach to coordinate all actors in the development process towards implementing a coherent framework of political, (macro) economic and social reforms instead of the conventional prioritised emphasis on economic development.

proportion of people whose income is less than US$ 1 a day between 1990 and 2015 as a step towards the eradication of extreme poverty through the partnership of donors and developing countries to make aid more effective

The Paris Declaration identified five areas requiring a strong commitment, namely ownership, alignment, harmonisation, management for results and mutual accountability.

- Ownership: Partner countries exercise effective leadership over their development policies and strategies and coordinate development actions.

As development strategies and/or programmes cannot function alone, it is crucial to facilitate the linkage between the medium-term expenditure framework/budget and a PRSP as well as a development programme.

- Alignment: Donors base their overall support on partner countries' national development strategies, institutions and procedures.

To be more precise, donors must coordinate their aid efforts in line with the policies of the recipient country. The relevant indicators are the proper accounting of aid in the partner's national budget, use of the partner's procurement and/or public financial management systems and the facilitation of untied bilateral aid.

- Harmonisation: Donors' actions are more harmonised, transparent and collectively effective.

For the implementation of aid, donors should use common arrangements/procedures and enhance the complementarity of their aid, thereby reducing the burden on developing countries when they receive external aid.

- Management for results: Managing resources and improving decision-making for results.

The performance to achieve each desired development result is evaluated using the relevant indicator so that the actual development results can be clearly recognised.

- Mutual accountability: Donors and partners are accountable for the development results.

Part III of the Paris Declaration lists 12 indicators for progress with a target year of 2010 and the achievement of each indicator in 2010 is to be measured nationally. For the monitoring and evaluation of progress, the Paris Declaration proposes that two rounds of monitoring take place prior to 2008 and that a meeting is held in 2008 in a developing country to

evaluate the overall progress of the matters addressed by the Declaration. The Third High Level Forum on Aid Effectiveness (hereinafter referred to as the "Accra Forum") held in Accra in 2008 was such a meeting.

An OECD monitoring report in 2008[9] found that at the halfway point to the target year of 2010, the progress of achieving the targets of the Paris Declaration had been slow. According to this report, only one indicator was achieved as of 2007. This was "to strengthen the capacity by coordinated support: percent of donor capacity-development support provided through coordinated programmes consistent with partners' national development strategies" under the Commitment to Agreement. To be more precise, 50% of technical cooperation should be aligned with national development programmes and should be implemented through coordinated programmes (the actual figure in 2007 was 60%) (see Fig. 2-1-1).

Other indicators which showed reasonable progress by 2007 were "reliable country systems: number of partner countries that have procurement and public financial management systems that either (a) adhere to broad accepted good practice or (b) have a reform programme in place to achieve these" and "aid is untied: percent of bilateral aid that is untied". The progress of all other indicators was very slow.

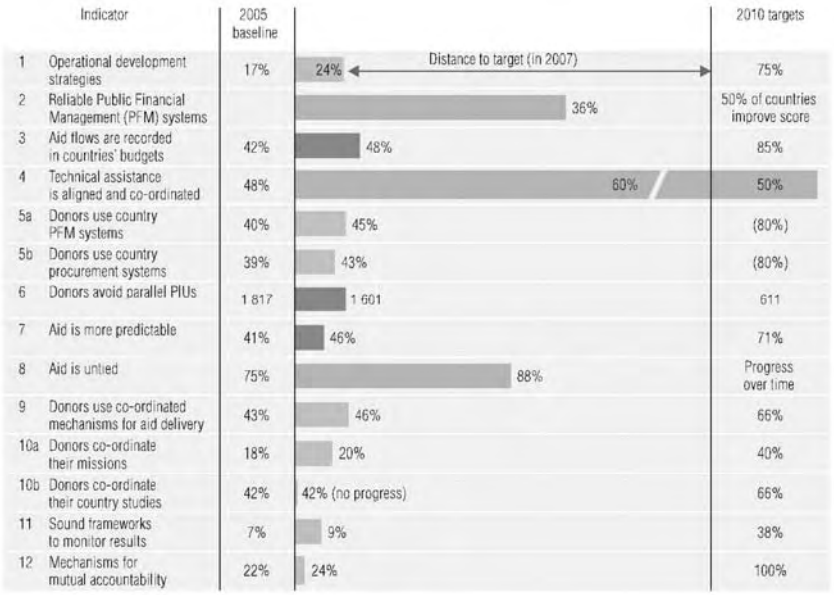


Fig. 2-1-1 Progress by Indicators Stipulated in the Paris Declaration (2007)

Source：OECD Survey on Monitoring the Paris Declaration (2008). http://www.oecd.org/dataoecd/58/44/41202160.pdf

[9] OECD (2009), Journal on Development, Development Cooperation Report, Volume 10, Issue 1

In the said report, the OECD pointed out the following.

- The situation of progress to achieve the 2010 targets considerably varies from one target to another and from one country to another.

- It is extremely important to strictly implement the original pledge to enable the achievement of the set targets of the Paris Declaration.

- Progress depends on the broad involvement of donors, aid organizations and governments of development countries at all levels. The participation of the civil society, private sector and other groups in the process should be secured.

- Based on experience so far, the key principles of the Paris Declaration are very effective but there are new challenges, such as more advanced monitoring and evaluation.

At the Accra Forum, the Accra Agenda for Action was endorsed to indicate areas requiring further progress, including the new challenges mentioned above. The Agenda demands the fundamental readjustment of the relationship between donors and recipient countries with particular emphasis on the following points.

- Donors should use country systems as the first option for aid programmes.

- The predictability and transparency of aid should be increased so that recipient countries can improve the budgeting, planning and implementation of their development strategies.

- Donors should decide the conditionality of their aid jointly with recipient countries based on the development strategies of recipient countries.

- The process of untying aid should be facilitated in a clear and real manner.

- The domestic and international division of labour should be improved to reduce the fragmentation of aid.

2-1-3 International Initiatives in the Water Resources Sector

The International Drinking Water Supply and Sanitation Decade (1981 - 1990) marked the first international initiative in the water resources sector. This was a move to follow the UN Water Conference held in 1977 (at Mar del Plata, Argentina) at which the assessment of water resources and the efficient use of water at the national level were called for along with improvement of the institutional arrangements and legislation. The principal purpose of the Decade was to improve the situation where the lack of access to safe water and a good sanitary environment in developing countries caused not only a high infant mortality rate but also a decline of productivity and income, hindering national development.

In January, 1993, the International Conference on Water and the Environment (ICWE) was held (at Dublin, Ireland) where a new action plan was discussed in preparation for the UN Conference on the Environment and Development (UNCED) (also known as the Earth Summit) to be held later that year. The ICWE accepted the following Four Dublin Principles as international guidelines for the subsequent development of water resources.

Four Dublin Principles

- Finite nature of water resources: Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.

- Participatory development: Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.

- Women's role: Women play a central part in the provision, management and safeguarding of water.

- Water as economic good: Water has an economic value in all its competing uses and should be recognised as an economic good.

The UN Millennium Summit in 2000 adopted the Millennium Development Goals (MDGs) for the global eradication of poverty. Under one of these MDGs, the concrete numerical target of "halving the proportion of the population without sustainable access to safe drinking water by 2015" was adopted for the water sector.

2 - 2 National Development Programme and Water Sector Reform

2-2-1 General Trends

Following the proposal for national PRSPs by the World Bank and the introduction of the MDGs, many developing countries compiled sector development programmes to achieve the MDGs in order to deal with the challenges faced by various sectors. These programmes formed part of their poverty reduction policies. Meanwhile, the UN Johannesburg Summit in 2002 recognised the necessity for integrated water resources management and a new thinking of separating water resources management from water supply began to emerge for reform in the water sector. Thereafter, many national water sector strategies included water resources management, urban water supply and sanitation and rural water supply and sanitation among their components. While the situation of the formulation of a sector development programme and the state of process of its implementation greatly vary from one country to another, the example of Tanzania offers a general picture of the approach under a sector development programme (SWAp) for the water sector (see Box 2-1).

Many countries, including Tanzania, which have adopted the SWAp for the water sector have received financial assistance from the World Bank/Water and Sanitation Programme (World Bank/WSP)[10] and others for reform of the water sector.

[10] The Water and Sanitation Programme (WSP) is a multi-donor partnership administered by the World Bank to help the poor gain sustain access to improved water supply and sanitation services. It is an independent, donor-funded programme administered within the Department of Energy, Water and Transport in the Sustainable Development Network Vice Presidency of the World Bank.

Box 2-1 National Development Programme and Water Sector Reform in Tanzania

In 1998, the Government of Tanzania announced the Tanzania Development Vision 2025 as a national development strategy. The Vision has three targets: ① high quality livelihoods, ② good governance and the rule of law and ③ a strong and competitive economy. Universal access to safe water is listed as a strategy to achieve the first target. This Vision was followed by the formulation of the PRSP in 2000 and the National Strategy for Growth and Reduction of Poverty (NSGRP/MKUKUTA), the second PRSP, in 2005. The NSGRP lists "access to clean, affordable and safe water, sanitation, decent shelter and a safe and sustainable environment" as a goal to improve the quality of life and social well-being. As more direct efforts for water sector reform, the National Water Sector Development Strategy (NWSDS) 2006 - 2015 was introduced in 2008 as a strategy to materialise the National Water Policy adopted in 2002 while the Water Sector Development Programme (WSDP) 2006 - 2025 was formulated in 2006. The WSDP comprises four components (sub-programmes): (i) water resources management, (ii) rural water supply and sanitation services, (iii) urban water supply and sewerage services and (iv) sector institutional strengthening and capacity building.

2-2-2 Trends of Budget Support

One of the indicators of progress adopted by the Paris Declaration is that "the aid flow is aligned with the national priorities (percentage of aid flow to the government sector that is reported in the partners' national budget). The 2010 target for this indicator was to halve the gap, i.e. to halve the proportion of aid flow to the government sector not reported in the government's budget(s) (with at least 85% reported in the budget). This means a change of the accounting practice for donor aid from off-budget to on-budget. Another indicator is "the use of country public financial management systems: percent of donors and aid flow that use public financial management systems in partner countries which either (a) adhere to broadly accepted good practice or (b) have a reform programme in place to achieve good practice". This indicator is intended to measure the progress from project-type support to budget support. As already described in 2-1-2, the progress to achieve this target has been slow along with many other targets.

In regard to budget support, funds are directly provided to the governments of recipient countries by donors. Among such financial aid, that which does not confine government expenditure to specified sectors is classified as general budget support (GBS) while that

which demands government expenditure in specified sectors is classified as sector budget support (SBS). In contrast, the development funds of donors in the case of project-type support are used to implement specific projects and donors maintain control of the finance and management of project funds.

The principal purpose of SBS is to accelerate the implementation of projects, etc. to achieve the sector development targets set by the government. With SBS, the funds of donors are completely integrated to the planning and budgeting process of recipient countries. These funds are transferred to the accounts of recipient countries along with domestic funds and are executed in accordance with the domestic spending procedure. Because of this, the primary issues relating to SBS are monitoring, conditionality and dialogue.

The difference between SBS and a sector basket fund is that while the former follows the standard domestic procedure for the use of funds, the latter follows a specific procedure agreed with donors. When funds are transferred from a basket fund, which is independent from the government account, to the government account for subsequent use along with domestic funds in accordance with the domestic procedure, the funds are then categorised as SBS.[11]

2-2-3 Trends of the SWAp in Sub-Saharan Africa

Donor coordination for budget support has been slow even in such countries as Tanzania and Zambia where a MOU for the SWAp in the water and sanitation sector has been exchanged between each country and donors, including Japan (although the MOU in Zambia only covers the rural water supply and sanitation sub-sector). In Tanzania, a basket fund[12] was established in March, 2007 as part of the WSDP. However, project-type support has not been rejected and the basic stance is the harmonisation of budget support, the basket fund and project-type support within the framework of the SWAp. Tanzania also has the Programme

---

[11] Strategic Partnership with Africa (2005), Sector Budget Support: A Note from the Dublin Workshop of SPA Working Groups, 5 - 6 October, 2005

[12] "Water Basket": The financial contributors are Germany, the Netherlands and the World Bank/Africa Development Bank. This basket fund accounts for US$ 3.5 million out of the WSDP budget for 2006 - 2010 of US$ 9.5 million. Expenditure from the water basket must be approved by a review committee consisting of representatives of the financial contributors and Tanzania.

Implementation Manual (PIM) for the implementation of the WSPP and auxiliary manuals for sub-sectors. These manuals stipulate not only the project planning and budget appropriation procedure using the basket fund but also the basic approach and technical options for the development of the water supply system. As such, they are commonly used by donors for the basket fund as well donors for project-type support.

In Zambia, the National Rural Water Supply and Sanitation Programme (NRWSSP) intends the use of both project-type support and budget support (including the sector basket fund[13]) up to 2010. From 2011, planning, implementation and monitoring will be gradually transferred to local governments based on budget support. Project-type support has been provided during the NRWSSP Phase 1 (adjustment period with continued project-type support and preparation for the adoption of budget support) up to 2010.

In reality, however, it is not easy to establish a common financing mechanism for the sector under the SWAp (for example, one pressing issue in Ethiopia is to unite the different funding flows of individual aid organizations). There are cases where water supply projects are planned based on the assumption that a financing mechanism to be established under the national programme will be used but where the actual implementation of these projects has been hampered because of the lack of the proper functioning of the said mechanism. In the case of Zambia for example, no common financing mechanism for the sub-sector based on budget support or pool funding (see Footnote 13) has yet been established. While the commencement of a financing mechanism study in May, 2009 was planned with the assistance of the World Bank/WSP, the delay of this study means stagnation of the preparatory work to establish a viable financing mechanism.

This example of Zambia is linked to the problem of government morals in developing countries, such as the non-transparent use of the budget at the community as well as central level, and also the problem of the poor capability of the administration as illustrated by the low budget execution rate of local government authorities (LGAs).[14] Because of these problems, donors are implementing projects while ensuring an appropriate financing method

---

[13] In Zambia, the basket fund is called "pool funding".

[14] Local governments are formed at the provincial, state, district and village (commune) levels. In view of their diversity, they are generally referred to as local government authorities (LGAs) in this report unless otherwise specified.

and improvement of the administrative capability of LGAs. There is a strong likelihood that these problems will be repeated in other Sub-Saharan countries which are planning to develop a financing mechanism. It is, therefore, a major challenge for all stakeholders in water sector development to properly implement water supply projects in such an uncertain environment.

In Zambia, the Danish International Development Agency (DANIDA) disburses funds to cover the various activities of LGAs directly to the Ministry of Local Government and Housing (MLGH) under a contract concluded with the MLGH. This represents a realistic response of an aid agency to maintaining its aid for the water sector even though the work to develop a financial mechanism has stalled.

2 - 3 Decentralisation and Public Water Supply Services

2-3-1 Progress of Decentralisation in the Water Sector in Sub-Saharan Africa

In Sub-Saharan Africa, the number of countries which have introduced or which are promoting a decentralisation policy began to increase in the 1990's. The background for this was the emphasis of the poverty reduction strategy (PRS) and public sector reform (PSR) movements on strengthening of the capacity of the administration, both central and local, to provide public services.

This Study has found that public sector reform to strengthen government functions is in progress along with a decentralisation policy designed to improve public services in rural areas in most of the countries studied.

In the case of Tanzania for example, the Local Government Reform Policy Paper was announced in 1998, followed by the Public Service Reform Programme in 2000 to implement the Policy. This move towards decentralisation was reflected in the PRSP prepared in 2000 and the National Water Policy (NAWAPO) in 2002. In the NAWAPO, the role of the central government was changed from that of water provider to a body for the planning, regulation, facilitation and coordination of water supply projects with a call for the transfer of authority to LGAs, implementation of water supply projects led by beneficiaries and promotion of the participation of the private sector.

Decentralisation is progress in the water supply and sanitation sector of other Sub-Saharan countries. However, the actual progress of decentralisation considerably varies from one country to another and from one sector to another because of the insufficient monitoring and coordinating capability of the central government which should provide support for LGAs for project management and other relevant aspects (for example, Zambia and Senegal).[15]

Table 2-3-1 Progress of Decentralisation in the Water and Sanitation Sector

	Planning			Construction of Facilities			Operation & Maintenance			Degree of Decentralisation *
	Central (1)	Mixed (2)	Local (3)	Central (1)	Mixed (2)	Local (3)	Central (1)	Mixed (2)	Local (3)	
Ethiopia		✔			✔				✔	7
Kenya	✔			✔				✔		4
Tanzania		✔			✔				✔	7
Rwanda		✔			✔				✔	7
Zambia	✔					✔			✔	7
Madagascar	✔			✔				✔		4
Mozambique		✔			✔				✔	7
Sierra Leone	✔			✔			✔			3
Senegal		✔		✔				✔		5
The Gambia	✔			✔				✔		4
Nigeria		✔			✔			✔		6
Burkina Faso		✔			✔				✔	7

Source: JICA (2007), Open Seminar- "Decentralisation and Rural Water Supply in Sub-Saharan Africa" with additional information from the field study

* Degree of Decentralisation: the total points for three aspects (1 point for Central, 2 points for Mixed and 3 points for Local)

Decentralisation is generally considered to produce favourable results through "improvement of the service delivery". JICA Research Institute (2007)[16] states four aspects to measure improvement of the service delivery by LGAs as a result of decentralisation.

[15] In Zambia, although the National Decentralisation Policy was adopted in 2004, cabinet approval of the subsequent Decentralisation Implementation Plan has been delayed, hindering the implementation of concrete decentralisation policies. Decentralisation in the water sector where rural water supply services are under the jurisdiction of the MLGH, however, has been making good progress compared to other sectors. In Senegal, while decentralisation has been in progress as a national policy, the rural water supply and sanitation sub-sector is not subject to decentralisation. Therefore, local offices of the central government are still in control of rural water supply services.

[16] JICA Research Institute (2007), Decentralisation and Service Delivery in Africa: Development of Public Service to Reach Local People (in Japanese)

- Effectiveness: realisation of a service which is suited to the needs of the people (degree of target achievement)

- Efficiency: maximum efficiency of the public service (efficiency of inputs)

- Accountability: accountability with the trust of local people (degree of reflection of people's opinions)

- Equity: fair distribution of the service to the poor and among different areas

One common problem with decentralisation in developing countries is that the hasty and/or inadequate introduction of decentralisation has caused an institutional imbalance, absence of an organizational structure for administrative services and shortage of the necessary human resources, hindering the intended "improvement of the service delivery". In the water supply and sanitation sector in particular, there are not many cases of well-functioning decentralisation because of the delay of the actual transfer of authority from the central government and problems relating to human resources, budget, equipment, technology and related infrastructure even after the formulation of a decentralisation policy (preparation of documents) and related regulations. Some common problems following the introduction of decentralisation are listed below.

- Insufficient human resources (even if authority is transferred to LGAs, LGAs currently lack human resources capable of exercising such authority)

- Budgetary limitation faced by LGAs (dependence of LGAs on funding by the central government due to the scarcity of their own revenue sources and absence of such funding due to the lack of development programmes of LGAs)

- Limitation of lack of usable equipment (shortage of vehicles to visit rural villages and shortage of O & M equipment, including portable water quality analysers and water level gauges for boreholes)

- Insufficient office work capability (many staff members in rural areas are incapable of using a PC for clerical work)

- Absence of infrastructure (limited monitoring due to poor roads, poor telecommunication systems and adverse impacts of unstable power supply on office work)

Because it is often the case that the necessary human resources cannot be secured in the water supply and sanitation sector at the national level, it is extremely difficult to recruit capable administrators and technicians/engineers at the local government level. In smaller countries, a small number of engineers working at the local level tend to be central government employees working at local offices (Sierra Leone and The Gambia). LGAs have hardly any human resources with knowledge and experience of the water supply service. Because of the inability of LGAs to appoint staff members to be exclusively responsible for work in the water supply and sanitation sector, those working in other departments, such as the Infrastructure Department (Rwanda) and Planning Department (The Gambia) are required to deal with matters relating to water supply. There are cases where a facility for dialogue involving all stakeholders is set up to promote a LGA-led water supply service as part of the overall efforts to coordinate all development sectors at the local government level. However, the actual function of such a facility varies from one LGA to another and is generally restricted (examples: District Development Coordination Committee (DDCC) in Zambia and Technical Advisory Committee in The Gambia).

The field survey conducted as part of this Study has identified Rwanda as one case where both the trimming down of the administration in general and decentralisation are rapidly progressing. Under the strong drive by the central government, authority and personnel are being transferred from the central government to local governments for the purpose of efficiently implementing projects to reflect the actual local conditions. However, the administration, which has been slimmed down in a short period of time, does not have sufficient manpower to cope with an increased volume of work. This phenomenon is particularly apparent with local governments, the work of which is additionally hampered by their insufficient understanding of the authority newly transferred to them and the resulting work. Consequently, many local governments are finding it difficult to implement and manage public projects. It is common for local governments not to have a person who is exclusively responsible for the water sector and a person in charge of general infrastructure is often responsible for the water sector, making the coordination of rural water supply projects difficult. The situation is made worse by excessive emphasis on performance and also by the extreme zealousness of the anti-corruption movement. The result is a noticeable imbalance between the local administrative system newly established and the actual range of work which it is capable of conducting.

With some governments in remote areas of Mozambique and Zambia, a situation exists where their staff members are assigned work which is beyond their capability.

These findings suggest that there are many issues to be solved before any improvement of "service delivery" is achieved by decentralisation.

2-3-2 Efforts to Use the Private Sector for O & M

When LGAs lack sufficient capacity or system to act as rural water supply service providers during the transitional stage of decentralisation, the expectation that private enterprises will conduct the O & M of rural water supply facilities can be fairly strong from the viewpoint of ensuring slimmed down but efficient public services.

There are many private enterprises which can be expected to participate in the rural water supply service in Sub-Saharan Africa as listed below.

- Individual hand pump repairers
- Tradesmen (plumbers, blacksmiths and others)
- Equipment suppliers and transporters
- Enterprises which can be entrusted to conduct O & M work
- Urban water utilities in nearby towns

As far as equipment supply and the O & M of water supply facilities are concerned in the context of decentralisation, the following problems can be generally pointed out in relation to efforts to achieve the quality improvement and cost reduction of O & M through the use of the private sector in Sub-Saharan Africa.

- Weak activities of domestic private enterprises: few trustworthy enterprises
- Poor domestic and international distribution networks: vast territory and poor infrastructure
- Limited domestic production capability: few countries capable of domestically producing spare parts, etc.
- Uneven distribution of engineers: lack of engineers with the necessary skill in the field of water and sanitation, particularly in rural areas

As the business environment of the private sector greatly differs from one country or area to another, each country is attempting to develop a mechanism to utilise the private sector, to discover hidden resources and to foster such resources.

As described in Chapter 3, some efforts have been made in several projects assisted by Japan to involve the private sector in the rural water supply service as listed below. While most efforts are in line with the national policy or privatisation policy which has become the de facto standard policy, two cases of "supplying spare parts for hand pumps" are based on a constructive proposal made by local stakeholders.

- Supply of spare parts for hand pumps
  - Spare parts supply by commercial utilities (CUs) in the Project for the Sustainable Operation and Maintenance of Rural Water Supply (SOMAP) in Zambia
  - Establishment and trial operation of spare parts supply shops with town water supply (TWS), association of local mechanics, etc. in the Water Sector Capacity Improvement Project in Southern Nations, Nationalities and Peoples State in Ethiopia (WAS-CAP)
- Service management contract between Lusaka Water and Sewerage Company (LWSC) and the Community Water Trust in unplanned urban settlements in Lusaka
- O & M management contract between a private enterprise and village water committee (VWC) for after-sales service in The Gambia
- O & M contract between a private enterprise and a water users association (ASUFOR: Association des Usagers de Forage in French) in the Project for Drinking Water and Community Activities Support (PEPTAC: Project Eau Potable Tous et Appui Aux Activities Communautaires in French) in Senegal

2 - 4 SWAp and Budget Support in the Rural Water Supply and Sanitation Sub-Sector

2-4-1 Trends of Introduction of SWAp in Sub-Saharan Africa

The introduction of the sector wide approach (SWAp) began in the mid-1990's, primarily by the World Bank, the UK and Scandinavian countries, in response to criticism that project-type support had only limited impacts at the sector level and was not efficient due to its high transaction cost.

This new approach was designed to eradicate the inefficient inherent in project-type support and to improve the aid effects. The widely known definition of the SWAp was given by Peter Harold of the World Bank (1995).[17]

- Whole sector is targeted.
- There is a clear and coherent sector strategy.
- Stakeholders of developing countries (government, civil society and NGOs) have initiatives.
- All (principal) donors participate, coordinate and agree in the process in which developing countries have initiatives.
- Common procedures to implement projects (accounting, budgeting, procurement, monitoring and reporting, etc.) (harmonisation of procedures).
- While long-term technical support from outside is kept to a minimum, local human resources are utilised as much as possible.

The following definition given by the OECD[18] is more concrete as it specifies a variety of funding methods.

"(Under SWAp), all significant donor funding support a single, comprehensive sector policy and independent programme, consistent with a sound macro-economic framework, under government leadership. Donor support for a SWAp can take any form (project aid, technical assistance or budget support) although there should be a commitment to progressive reliance on government procedures to disburse and account for all funds as these procedures are strengthened."

Many Sub-Saharan countries are currently introducing or preparing for the introduction of the SWAp to the water supply and sanitation sector. The state of implementation greatly varies from one country to another. The front runners are Tanzania and Zambia where an

---

[17] Harold P. and Associates (1995), the Broad Sector Approach to Investment Lending: Sector Investment Programs, World Bank Discussion Papers (Africa Technical Development Series) No. 302, Washington, D.C., the World Bank, 1995

[18] OECD (2006), DAC Guidelines and Reference Series Applying Strategic Environmental Assessment: Good Practice Guidance for Development Cooperation, OECD, Paris, http://stats.oecd.org/glossary/detail.asp?ID=7240)

institutional mechanism is in place for the adoption of the SWAp in the water supply and sanitation sector. Some other countries have reached the stage of signing a MOU on the SWAp while others are still far from that stage.

Table 2-4-1 Progress of Donor Coordination in the Water Sector in Principal Countries of Sub-Saharan Africa

Progress / Country		1 Strategy in water sector exists	2 Donor coordination is in progress	3 Programme assuming donor coordination in water sector has been prepared (MOU signed)	4 Fund for donor coordination (or similar purpose) exists	5 Budgets are allocated to LGAs from the fund established for donor coordination
East	Tanzania	○	○	○	○	○
	Ethiopia	○	○	(○)	(○)	○
	Kenya	○	○	○	○	△**
	Uganda	○	○	○		
	Rwanda	○	○	△*		
South	Mozambique	○	○	△*		
	Zambia	○	○	○		
	Madagascar	○	○			
Central West	Senegal	○	○	○		
	The Gambia	○	○			
	Sierra Leone	○	○			
	Burkina Faso	○	○	○		

Source: JICA (2007), Open Seminar- "Decentralisation and Rural Water Supply in Sub-Saharan Africa" with additional information from the field study

*: At present, the draft MOU document is in the process of confirmation by donors.

**: Decentralisation is not in progress. The central government directly controls rural water supply.

2-4-2 Pending Issues for Introduction of SWAp and Effectiveness of Project-Type Support

The World Bank specifies the need to restrict the application of the SWAp to countries which satisfy the following three preconditions.[19]

- Certain level of stability of politics and macroeconomics
- Firm commitment of the government to collaborative work
- Minimum level of organizational capacity (Even though such capacity is developed through the implementation of the SWAp, a minimum level of organizational capacity is required to start with for programme development and implementation.)

[19] World Bank (2001), Education and Health in Sub-Saharan Africa, A Review of Sector-Wide Approaches, World Bank Group Human Development Africa Region, Washington

In addition to the above, the World Bank demands that donors must ensure sufficient funding and the appropriate deployment of manpower. In short, the World Bank takes the stance that the SWAp is only effective for countries which meet the above-mentioned three preconditions and that it is not suitable for all countries because of the different circumstances of individual countries.

Meanwhile, the DFID takes the following four criteria in consideration when planning the introduction of the SWAp.

① Link Between Finance and Policy

In the case where the policies of donors differ from those of developing countries or in the case where the policies of developing countries rely on unrealistic financial sources, donors should choose an aid approach which focuses on projects rather than the SWAp.

② Capacity of Macroeconomic Management and Financial Management

In the case where developing countries manage their macroeconomic affairs and finance in good conditions and where there are methods to secure the transparency and accountability of the use of financial resources, there are good foundations for the adoption of a programme approach rather than a project approach. On the other hand, in the case where management of the macroeconomy and finance is vulnerable in developing countries, a programme approach disturbs the implementation of policies. In this case, the most effective intervention by donors is reform of the macroeconomy and improvement of the financial system rather than support for sector programmes.

③ Capacity of Sector Management

In the case of good sector management capacity and vulnerable policies, the focus should be on political dialogue. Conversely, in the case of good policies and vulnerable sector management capacity, a sector approach focusing on capacity building is possible. In the case of weak macroeconomic management, there is a tendency for the deterioration of sector management and it is, therefore, necessary to consider incentives for staff and financial management before the introduction of the SWAp.

④ Level of Aid Dependency

In the case where development aid accounts for a large proportion of the sector and/or total budget in developing countries, a sector programme improves the coherence of policies and reduces the inefficiency of projects implemented on the initiative of donors.

Conversely, in the case where aid dependence is low, the benefits of the introduction of a programme approach are small because the amount of aid is limited.

According to the DFID, the SWAp is not an effective approach in countries which fail to meet these four criteria and project-type support with focused targets is still effective in situations where the SWAp is unsuitable. In short, the DFID agrees that the SWAp is not a universal medicine for all development needs.

When the number of developing countries with a government regime which is suitable for the application of the SWAp is quite limited and especially when the minimum capacity required for financial, organizational and sector management is lacking, various types of capacity building through project-type support should prove to be both feasible and effective.

As shown in Fig. 2-4-1, individual projects do not contradict development policies based on programmes, typically the SWAp, and can be implemented under any programme. The reason why project-type support in the past is considered to be inefficient is that even though individual projects were implemented in line with the government policies of the developing countries concerned, they were implemented using a method or process favoured by each donor without mutual collaboration or coordination under a sector or sub-sector programme. In the case of the SWAp currently being implemented in Tanzania and Zambia, individual projects (activities) are aligned to a higher programme, indicating the effectiveness of project-type support with the SWAp.

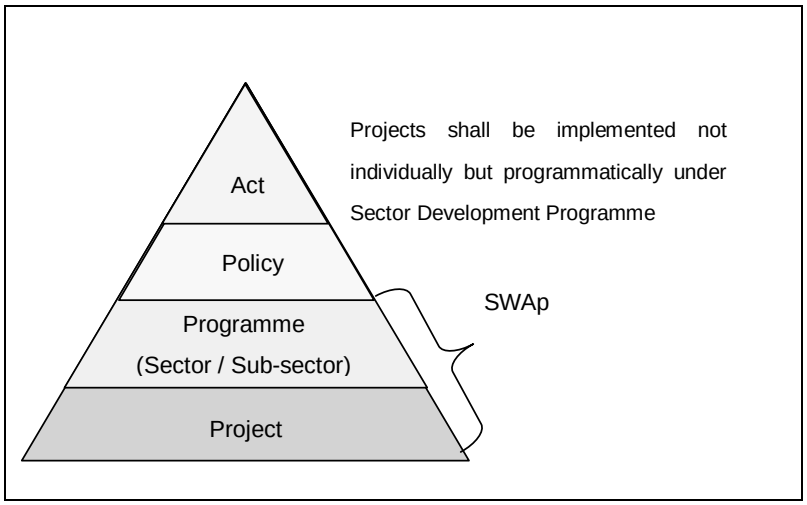


Fig. 2-4-1 Structure of Policy under SWAp

2 - 5 Overview of Rural Water Supply Facilities

2-5-1 Categories and Characteristics of Facilities

Many developing countries divide the water supply service into the urban water supply service and the rural water supply service. The target areas of the former are defined based on administrative jurisdiction (for example, the capital and other designated large cities) and the type of service operator (for example, municipal water supply and sewerage corporation) with other areas being the target areas of the latter. The exact definitions of these two types of water supply service differ from one country to another. In the case of Japan's aid for rural water supply, it is assumed that one water supply system serves a village (the minimum population of which is around 100) up to a group of small cities and/or villages (total population of around 10,000). The existing facilities featured by a technical cooperation project may be quite large, serving more than 20,000 people.

JICA classifies water supply facilities into the following three levels (JICA (2004): Effective Approach to Development Themes: Water Resources).

- Level 1 (point source system with a hand pump): one water tap (point source) without a pipeline
- Level 2 (piped water supply system with public taps): multiple tap stands with a pipeline
- Level 3 (piped water supply system with individual connections): tap installed at each household

This Study features Level 1 facilities (point source system with a hand pump) and Level 2 facilities (piped water supply system with public taps). Level 3 facilities (piped water supply system with individual connections) are not included in the scope of the Study as these are hardly seen in rural areas of Sub-Saharan Africa. Some Level 2 facilities do, however, have partial individual connections.

Table 2-5-1 and Table 2-5-2 show the characteristics of Level 1 facilities and Level 2 facilities respectively in terms of the main facilities, suitable conditions and O & M.

Table 2-5-1 Types of Point Source Systems and Their Characteristics

Intake	Main Facilities	Suitable Conditions for Facility Installation	Required O & M
Protected spring	■ Concrete lining ■ Tap	■ Reliable water production all year round ■ Protection for water quality in the basin	■ Cleaning around facilities
Manual pump (hand-dug shallow well)	■ Rope pump	■ Unconfined aquifer without contamination ■ Generally groundwater level of less than 6 m ■ Anti-dirt sealing and clean environment around the well	■ Access to pump repairer ■ Primarily for agricultural use ■ Serves individuals or small community
	■ Hand pump	■ Unconfined aquifer without contamination ■ Maximum well depth: 10 ～ 20m	■ Chlorination ■ Supply of parts
Manual pump (borehole)	■ Hand pump	■ Confined deep aquifer ■ Max. head 30 - 60 m by pump type	■ Supply of parts
	■ Foot pump	■ Max. head 40 - 100 m (2 people needed) ■ Confined deep aquifer	■ Though durability is high in general, replacement of main parts is costly
Electric motor pump	■ Solar system	■ Limited (e.g. wadi in nomadic regions)	

Note: There are other cases where a hand pump is installed. These include sand dams, underground dams beneath wadi and infiltration galleries by lakes and rivers. Rainwater harvesting is also a type of point source system.

Table 2-5-2 Types of Piped Systems with Public Tap Stand and Their Characteristics

Intake	Facilities	Suitable Conditions for Facility Installation	Required O & M
Protected spring (mountain stream)	Gravity fed water supply + reservoir + flow control reservoir	■ Higher elevation of the intake than the service area ■ Reliable water production all the year round ■ Protection for water quality in the basin	■ Low cost
Pumping well (mechanically-dug large diameter well)	Photovoltaic system Motor pump	■ Enough daylight hours all the year round (water demand to be satisfied with daytime operation only) ■ Confined deep aquifer (deeper the well is, less efficient it becomes) ■ Security of solar panels and inverter (from theft, weather and temperature fluctuations)	■ Regular inspection and adjustment by specialists ■ Vulnerable against physical contact even though efficiency and durability have been improved through technical advancement ■ Expensive repair cost (service life of facilities : 5-10 years)
	■ Commercial electricity ■ Motor pump	■ Stable electricity supply (frequent power failures make the stable water supply difficult) ■ Power extension to the system is possible ■ Confined deep aquifer	■ Not necessarily cheap depending on the electricity tariff ■ Repair and renewal of pump necessary
	Diesel (Generator＋motor pump or diesel engine pump)	■ Confined deep aquifer ■ Population enough to pay O&M cost in relatively small area (village, small town, etc.)	■ Generally the highest O&M cost than others ■ Pump operator necessary ■ Vulnerable against fuel cost fluctuation ■ Permanent fund to cover the current cost is necessary
Direct intake (spring, lake, river)	■ Intake pump ＋reservoir ＋water treatment facility ＋elevated water tank	■ Generally for urban water supply if high level treatment of raw water necessary ■ Applicable for rural small town if necessary water quality and its production are secured by slow sand filters ■ Capable operator recruited	■ Operational cost such as electricity for water intake and transmission (diesel or commercial), agents for treatment, labour cost of operators, etc.

Note: Common routine O & M for all types of piped systems with public tap: repair of leaking pipelines and reservoirs/tanks, checking of taps and water meters. When repairs are outsourced, the transport cost must be taken into consideration, especially for remote areas.

2-5-2 Level 1 Facilities (Point Source System)[20]

(1) Types of Wells

[20] There are many types of manual pumps, including hand pumps and foot pumps, which can be installed at Level 1 facilities. In some areas, foot pumps are commonly used. In this report, all manual pumps are generally called "hand pumps" for convenience.

Wells for which a manual pump is installed are largely classified into hand-dug wells and mechanically-dug wells (boreholes) depending on how they are dug.

When compared, hand-dug wells are easier and less expensive than boreholes to construct. However, they can only use a shallow aquifer (less than 10 - 20 m from the ground surface). The small pumping volume in general means a small service population. The groundwater level is liable to seasonal fluctuations or drought and the groundwater is liable to contamination from the ground surface.

In contrast, the groundwater level of boreholes is less liable to seasonal fluctuations or drought although the construction cost of a borehole is much higher than that of a hand-dug well. The groundwater of boreholes is steadily pumped from a deep aquifer which is less liable to contamination.

(2) Types of Hand (Manual) Pumps

Hand pumps popularly used in Sub-Saharan Africa are classified into several types as shown in Table 2-5-3.

1) Classification by Pumping Method/Head[21]

Table 2-5-3 Classification of Manual Pumps by Structure

Type of Pump	Applicability	Name of Pump (Example)
Rope pump	For hand dug wells (30 - 40 m)	Rope pump
Direct action pump	Mainly for hand dug wells or shallow boreholes (12 - 15 m)	Malda pump Nira pump
Deep well reciprocating pump/piston pump	For boreholes (deep wells) (40 - 50 M0 (80 m: India Mark II Extra Deep, Afridev Pump with bottom support)	India Mark II/III Afridev Volanta Pb Mark II Kardia
Displacement "diaphragm" pump	For boreholes (40 - 50 m) (80 m: Vergnet HPV 100)	Vergnet pump

2) Classification by Proprietary Specifications

[21] SKAT-RWSN (2004), Technology Selection and Buyer's Guide for Public Domain for Hand Pumps for Drinking Water

- Public domain pumps : Afridev, India Mark II, Rope pump and others
- Proprietary pumps : Volanta, Vergnet and others

3) VLOM Pump and Others

A VLOM (village level operation and maintenance) pump means a hand pump which can be operated and maintained by a community. The Afridev is the typical VLOM pump. In contrast, the India Mark II is not a VLOM pump as its raiser pipe may fall during lifting operation without special tools and skills.

4) Classification by Material of Raising Pipe

- Galvanised Iron (GI/GALVI)
  While this type of pipe is highly resistant to external impact or damage, it can corrode when used with corrosive groundwater due to a high level of acidity (high pH value) which turns the water a reddish brown. It is fairly hard work to pull this type of pipe up for maintenance. As the pipes are connected in threads, damaged portions can be replaced fairly easily.

- Polyvinyl Chloride (PVC)
  This type of pipe is suitable for groundwater which is comparatively corrosive due to a high level of acidity. Because it is much lighter than a GI pipe, the work to pull it up for maintenance can be easily conducted. However, as the piles are bonded together, the repair of a damaged section may be difficult depending on the actual condition of the damage.

(3) Characteristics of Level 1 Facilities

The most standard Level 1 facilities consist of a borehole (deep well) and a hand pump. Because there is no pipeline, both the construction cost and the O & M cost are inexpensive. For this reason, Level 1 facilities are the most popular water supply system in rural areas in Sub-Saharan Africa. Most Japanese aid efforts for Level 1 facilities involve the construction of a borehole with a hand pump.

As one hand pump is used by some 100 - 500 people, the system is used for relatively small villages with a population of up to some 3,000. When the time required to fetch water from the hand pump site (time required for a return journey from home to the hand pump site plus waiting time plus time required to pump up the water) is long, local people tend not to use that particular site. It is, therefore, desirable for residential areas to be within a radius of 1,000 m of a water point. When the population of this desirable service area is less than 100, the water supply facilities concerned are said to be difficult to maintain because of the high water fee per user which is required to save the necessary funds to cover the repair and replacement cost. (According to the definition adopted for the MDGs, a water source at a distance of more than 1,000 m does not provide reasonable access to safe drinking water.)[22]

Although the construction cost of hand pump facilities using a shallow well is low, the water should preferably be used for purposes other than drinking because of the strong likelihood of contamination from the ground surface. However, these facilities can supply drinking water provided that the well is covered by a concrete lid or similar and that the water is regularly treated with chlorine. (According to the definition adopted for the MDGs, shallow wells which are covered by a concrete lid are classified as improved water sources (protected dug wells) capable of supplying safe water.)

2-5-3 Level 2 Facilities (Piped System with Public Taps)

(1) Outline of the System

Level 2 facilities (piped water supply system with public taps) consist of a water intake facility, water pipe, reservoir (elevated water tank), distribution pipes and public taps. Some systems may be equipped with a simple purification unit when such a unit is required by the quality of the raw water. Water supply from the elevated water tank to the public taps usually relies on gravity and pumping using some kind of power is required to pump the water to this elevated tank to obtain the necessary water head. When the elevation of the water source is much higher than the reservoir (or an elevated water tank) and service area, water supply to

[22] The definition of reasonable access to safe water under the MDGs puts the basic water supply unit (water availability) at at least 20 litres/person/day from a water source which is within one kilometer of the user's dwelling. The water source must be protected. In the case of a shallow well, the water source must be protected by a lid or similar (see the UNDP Home Page for more details).

the public taps using gravity is possible. Individual users transport water from these public taps to their homes, etc. using containers.

When a purification unit is attached, a full-time operator with specialist knowledge is required. Given the reality of rural water supply in Sub-Saharan countries, it is usually difficult for villagers to operate and maintain this unit. It is, therefore, important to secure a good water source which does not necessitate purification and properly protected spring water or safe groundwater is used in most cases.

Level 2 facilities generally suitable for a relatively large village with an expected service population of several thousand even though the actual application of this system is governed by the volume of the available water as well as the scale of the usable power. When a sufficient volume of water is available, water supply to individual households is possible provided that the cost of installing the connection pipe can be met. However, it is a common practice in rural areas of Sub-Saharan countries to minimise the total length of the distribution pipes and to install public taps with two or more faucets each as measures to reduce the construction and maintenance costs of the water supply system. A piped system with public taps is quite effective to alleviate the heavy burden of fetching water when the water source is located far from a residential area or when there is a good elevational difference between the water source and residential area.

When a spring is located above a residential area, the gravity flow of water to the residential area is possible, almost eliminating the cost of system maintenance. When a well is used as the water source or when water from a spring located below a residential area is used, the water supply system involves the use of a pump which is powered by commercial power, diesel power generator, or photovoltaic power generating unit. The use of a power pump requires careful examination, especially from the financial and technical aspects.

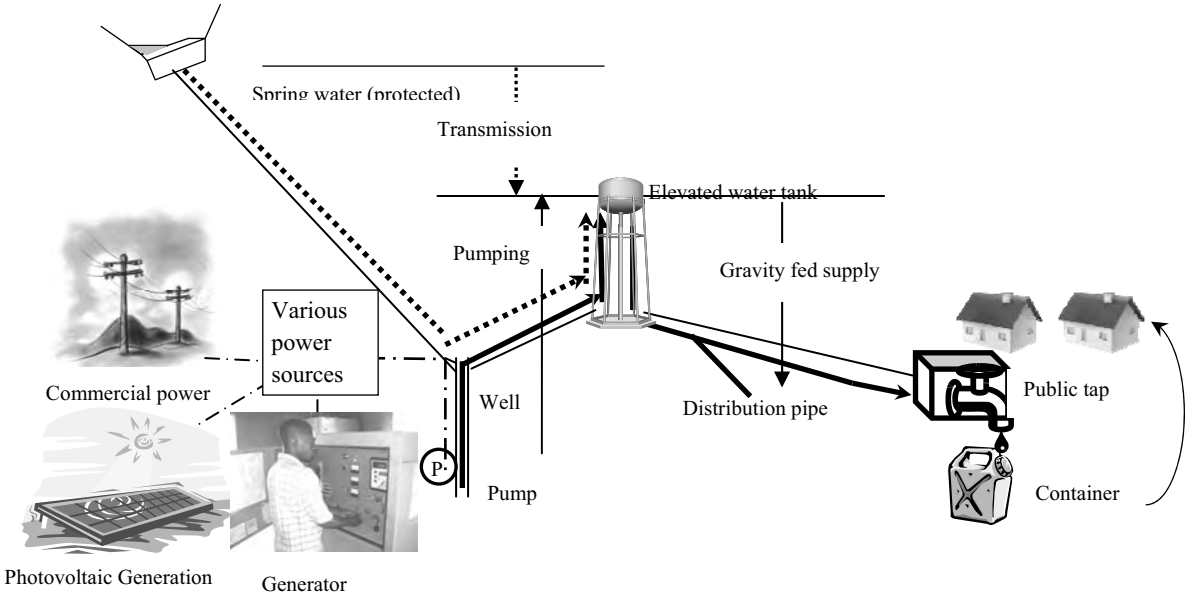


Fig. 2-5-1 Conceptual Drawing of Level 2 Facilities

(2) Basic Problems of the Water Supply System with Public Taps

There are, in fact, many different types of the water supply system even though they share the common feature that water is distributed to public taps using gravity. The actual contents of the maintenance work vary from one type to another. A common problem which must be noted is that the design service population is restricted by the volume of the available water at the source. When a well is to be used as the source, the available water volume can only be determined after the well has been dug. Constant excessive intake above the appropriate level leads to insufficient water supply or even exhaustion of the well. Conversely, when the supply capacity exceeds the demand, expansion of the service area and/or increase of the service population can be considered after the commencement of operation.

Many Level 2 facilities use a motor pump to feed the water to the elevated water tank. The guidelines or manuals often describe the conditions and important points for the introduction of a piped water supply system with public taps. Many of the problems actually encountered originate from the basic problematic matters listed below.

- Maintenance cost: As a generally high fuel cost accounts for most of the overall maintenance cost, users may be unable to sustain their willingness or capacity to pay for the cost of the system.

- Fuel supply: The transportation and supply of fuel may be extremely difficult in the rainy season due to poor road conditions.
- Power supply reliability: In some areas, the voltage of commercial power is unstable and power failures frequently occur.
- Maintenance and repair skills: In some areas, regular maintenance and swift repair cannot be expected.
- Supply of necessary volume of water: In some areas, the water supply capacity is below the level required to meet the demand in a stable manner.
- Large expenditure is required to renew the power generator and/or pump (every 5 to 10 years). The advance determination of who will be responsible for the renewal cost, i.e. users, the administration using its development budget or shared financial burden by both, is necessary. If it is planned to ask users to fund the renewal cost, a system for regular saving must be established.

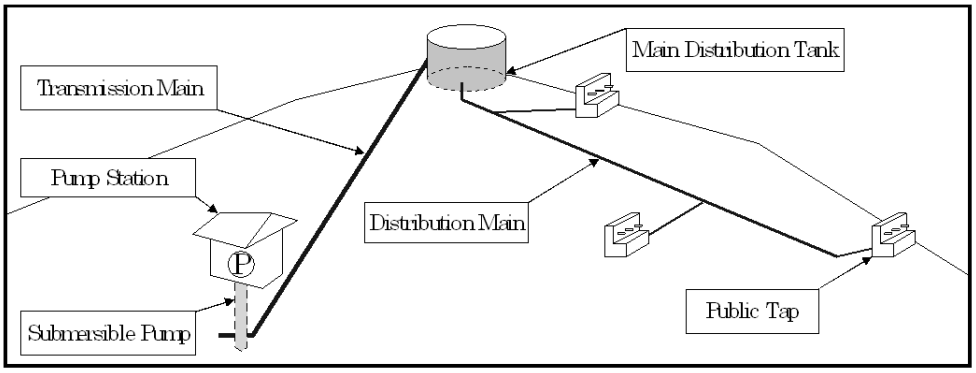
The following criteria must be met when selecting the power pump and power source.

- Equipment to be introduced: This must be operable with the skill level of the operator to be locally recruited.
- Spare parts: Spare parts must be easily obtainable (pumps of the same manufacturer are widely used locally).
- When a system which combines an internal combustion engine with a vertical shaft pump is to be introduced, the initial investment cost is lower than that of the combination of a generator and submerged pump. However, it must be noted that the operation cost of the former is higher than the operation cost of the latter because of the need for constant maintenance work.

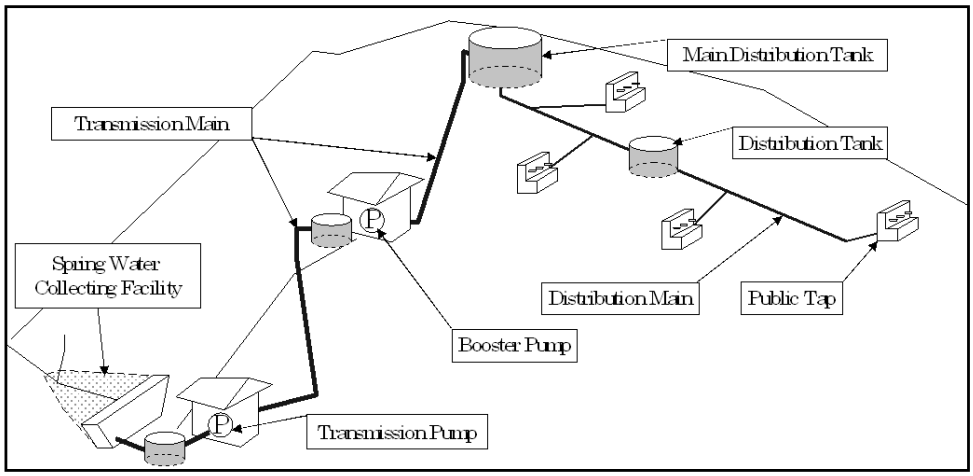
- Users must consent to pay the cost of such consumables as air filters, oil filters and others, cost of periodic inspection and the repair cost.

- The identity of the operator and person responsible for repair must be clearly established.
- Reliable supply sources for the fuel and/or electric power must be clearly identified.

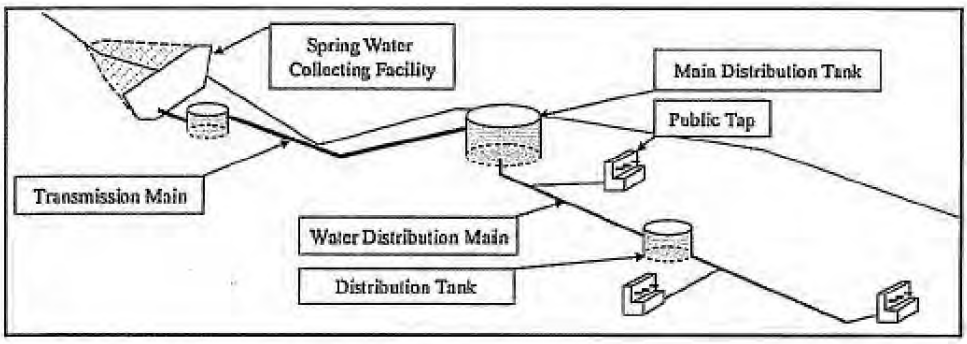
In short, the basic problematic matters are often addressed in the guidelines or operation manuals. Nevertheless, they are still sources of actual problems in many cases.



Source: Groundwater



Source: Spring Water (with Booster Pump)



Source: Spring Water Source (Gravity-Fed System)

Source: Basic Design Study Report for the Project for Rural Water Supply in the Republic of Rwanda (2006)

Fig. 2-5-2 Conceptual Configuration of Level 2 Facilities

2 - 6 Historical Changes of the O & M System

For several decades, the concept and method of the O & M of rural water supply facilities have been the subject of intensive debates and experiments to improve the sustainability of the O & M system. During these years, the roles of each stakeholder have changed. In this section, the efforts of Sub-Saharan countries to improve the O & M system are described.

2-6-1 History of Hand Pumps

During the colonial period, different types of hand pumps for home use which were used in Europe were introduced to many Sub-Saharan countries. These hand pumps were heavy, expensive, difficult to repair locally and unsuitable for the expected mode of operation in African villages (compared to their use for less than one hour per day by European homes, hand pumps in Africa were expected to be used for 10 or more hours per day). Meanwhile, less expensive and easy to repair hand pumps (second generation hand pumps) were developed in the 1970's in India. The India Mark II developed in 1978 in particular had good durability and was extensively adopted for rural water supply projects in Sub-Saharan Africa. Even though repair was much easier than in the case of previous hand pumps, however, the India Mark II still required a heavy special tool and some skill, necessitating the training of local repairers under individual projects. It was also necessary for the government to retain certain equipment and skills in preparation for the rehabilitation of boreholes and other major work which were beyond the capacity of local repairers. As the users, local communities were required to conduct routine cleaning and were responsible for making requests for repair. While local repairers conducted minor repair work, the central government was responsible for the repair of serious hand pump breakdowns and the rehabilitation of boreholes. This O & M system is called the three tier system (Fig. 2-6-1).

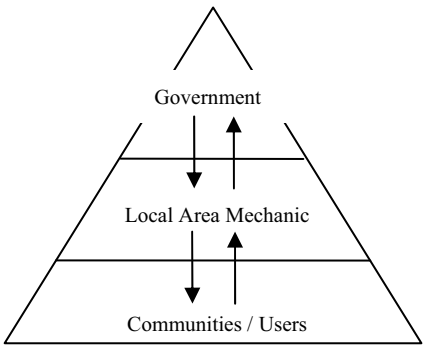


Fig. 2-6-1 Three Tier System

In order to overcome the problem presented by the India Mark II in that the development of a three tier maintenance system was necessary, European hand pump manufacturers developed highly robust and durable manual pumps through improvement of the India Mark II or their own technologies. Typical examples were the pb Mark II (Germany), Kaldia (Germany) and Vergnet (France; food pump) and the use of these pumps spread primarily in West African countries. Meanwhile, the use of traditional European pumps equipped with a large flywheel to produce a large head continued in areas with a deep groundwater level or when pumping to a roof top was required (typical examples were the Volanta from the Netherlands and the Climax from the UK). In West Africa where European pumps were used side by side with the India Mark II, some countries began to demand that pump manufacturers establish local agents and an adequate repair system covering the project areas as conditions for the selection of hand pumps made by these manufacturers.

The 1980's, which were the International Drinking Water Supply and Sanitation Decade, saw a series of rural water supply projects in Sub-Saharan Africa even though their implementation was not matched by the training of a sufficient number of local repairers or the establishment of a pump repair system by local agents of pump manufacturers. The massive increased of installed hand pumps revealed the limitation of central governments to properly maintain these hand pumps and the emergency of many unrepaired hand pumps became a problem. As a solution to this problem, the development of the VLOM system was sought so that hand pumps could be maintained by communities instead of relying on local repairers. The World Bank and the UNDP jointly developed the Afridev, a hand pump which could be maintained by users without special tools or skills, in 1985. There are four key issues regarding the development concept of this VLOM pump.

- Easily maintained by a village caretaker, requiring minimal skills and few tools
- Manufactured in-country, primarily to ensure the availability of spare parts
- Robust and reliable under field conditions
- Cost effective as the cost of the pump proper, spare parts and repair work is sufficiently cheap in view of durability

While the concept of VLOM reduces the O & M burden at the second and third tiers of the three tier system, caretakers at the community level can only be expected to perform simple O & M work. Because of this, a system whereby teams of skilled technicians supported by the central and local governments conduct more serious repair work is still necessary. In the case of the Afridev, the preventive maintenance of regularly replacing rubber and plastic

expendable parts (once or several times a year depending on the individual parts) became necessary in exchange of its low cost, light weight and simple structure. Without such maintenance, the service life would be shortened. Awareness raising among potential users became much more important so that the users themselves could understand their responsibility for the proper maintenance of water supply facilities. Training during the limited period of rural water supply facilities construction projects was often insufficient for the development of the habit of regularly maintaining these facilities in every village. Many hand pumps were left unrepaired when a regular patrol and repair system was not established by the central or local government. Moreover, among the four key issues of VLOM listed above, "domestic manufacture to ensure the availability of spare parts" has not materialised and users in many countries find it difficult to obtain the necessary spare parts. Consequently, there are many areas where the operating rate of the Afridev is rather low.

While VLOM pumps which are easy to maintain constitute a step forward to achieve sustainable rural water supply, it has become obvious that effective support by the government or a public body for communities using VLOM pumps is an issue which cannot be bypassed.

2-6-2 O & M by Users: Evolution of Community Management

With the introduction of VLOM pumps, educational activities (so-called sensitisation) have become more important to create a body representing local people and to provide training for local people on the necessary O & M skills in response to the increased responsibility of users to conduct routine O & M. In the second half of the 1990's, a participatory method for awareness raising was developed for the health sector and the nature of training in the rural water supply and sanitation sub-sector changed from the conventional top-down approach to the participatory approach to stimulate the spontaneous commitment of local people, i.e. water users, to O & M. At the same time, the importance of using clean water and the spread of the use of sanitary facilities was recognised as the supply of safe drinking water would contribute to the health of water users without doubt.

Even when a strong sense of participation is developed among water users, the continual sound maintenance of facilities is largely dependent on regular patrols and repair to be assisted by the government. In many cases, it has been found to be difficult to drastically rectify the situation of left over, broken hand pumps as the shortage of funds, manpower and means of travel on the part of the government leads to the failure of community organizations to properly conduct routine checks and to replace expendable parts. The sustainability of

water supply facilities can only be secured through community management (CM) (see Box 2-2), meaning that communities (villages) have the authority as well as the responsibility to make decisions to solve problems themselves using their own resources (skills, human resources and goods). On its part, the government is required to assist the capacity building of communities and to develop an enabling environment (technical training, monitoring and a reliable supply of spare parts) to achieve CM.

Box 2-2 Characteristics of Community Management（CM)

1. A community makes decisions on the following matters.
   - Local need for water supply and sanitation facilities
   - Selection of the type of water resource to be used and locations of sanitation facilities
   - Technology and service level to be applied
   - Local organisational structure, including the establishment of a water and sanitation committee and the appointment of a caretaker and hand pump repairer, for proper management of the water supply facilities
   - Rules for access, maintenance and use of the facilities
   - Local resources to be mobilised and method to bear the necessary cost
2. Responsibility of the community backed by legitimate authority and effective control
3. Mobilization of local resources (technical, manpower and financial resources)
4. External support to facilitate CM, to conduct capacity building and to maintain an enabling environment (technical training, monitoring and supply of spare parts)

Level 1 facilities are not the only rural water supply facilities for which the O & M requires CM. Level 2 facilities also require CM. The level of the O & M cost for Level 2 facilities is generally higher than that for Level 1 facilities and their construction is planned based on the assumption that this higher cost will be met by users. In reality, however, calculation of an affordable water fee for users at the planning stage based on the socioeconomic conditions of users does not mean the eradication of water supply facilities which are not properly maintained as non-payment by users or payment in arrears can occur, resulting in the return of local people to the use of other existing unhygienic water sources.

One cause of this problem is believed to be the lack of consideration of user needs when project implementing bodies simply decide the design and O & M method for water supply facilities. Around 2000, the World Bank began to emphasise the adoption of the DRA (demand responsive approach) based on the actual demand of water users rather than the supply-driven approach to move CM further forward. Through several rural water supply

projects in subsequent years, the World Bank tidied up the principles and characteristics of rural water supply and sanitation incorporating the concept of the DRA.

One characteristic of the DRA is that user communities have the right to informed choice[23] for the following matters based on information provided by a potential service provider.

- Participation in the service
- Service level corresponding to the level of willingness to pay
- Period, hours and method of the service
- Fund management and method to explain the contents of fund management

An expert meeting of the IRC International Water and Sanitation Centre (hereinafter referred to as the IRC) in 2001 commenced a debate on the scaling up of CM (see Box 2-3). The scaling up of CM actually means efforts to achieve the MDGs as well as (i) the swift improvement of the water supply rate with the extension of water supply and sanitation services from island-like isolated communities to wide area coverage from a geographical point of view and (ii) maintenance of an environment enabling support for communities and community-led O & M from the temporal point of view. The overall aim is to improve the sustainability of water supply and sanitation services.

[23] "Informed choice" is a concept which is a step forward from "informed consent" in the sense that informed persons not only give their consent but also make an actual choice.

Box 2-3 Scaling Up of CM

(Definition)
The scaling up of CM means a departure from the CM of isolated water supply facilities in the past (like islands in the sea) to "firstly, increase of the coverage – reaching more people more quickly; secondly, improvement of the sustainability – making both hardware and the management systems around them last at least until the end of the system design life; and thirdly, scaling up of the quality – without which neither increased coverage nor improved sustainability are possible."

(Conditions to successfully achieve the scaling up of CM)
- Creation of an enabling environment to make scaling up possible (policies, government organizations, finance and human resources, etc. to support communities)
- DRA (demand responsive approach) as well as a comprehensive approach rather than individual approaches
- Approaches at all levels of stakeholders, not only community level

(Methodology)
- Identification and use of models of the successful scaling up of CM
- Analysis of these models in a local context
- Based on these models, development of strategies for promotion and demonstration and the implementation of pilot projects
- Be prepared to change! Monitoring of the situation on a long-term basis and adaptation to changing situations if necessary

Source: IRC (2001), From System to Service – Scaling Up of Community Management, Report of the Conference, 12 - 13 December, 2001, the Hague, Netherlands

Recent debates on scaling up are not confined to CM as application of the concept of scaling up to many other areas is contemplated. These areas include the universal principles of the water supply service as listed below, enabling environment, organizational system, finance, social fairness, water resources management and other environmental issues, monitoring, evaluation and appropriate technologies.

Universal Principles of the Scaling-up

- Access to domestic water supply services of an acceptable level is vital to human well-being and dignity and is widely recognised as a human right. It is, therefore, essential that coverage be universal.

- Once achieved, a given level of service should be sustained indefinitely.

- When scaling up, water supply should be provided within a service delivery model that sees planning, implementation, operation and maintenance and eventual upgrading or replacement of water supply as part of a single continuous management cycle.

- An important aim of the scaling up of domestic water supply services should be to reduce poverty.

- In a scaled up environment, the management of water supply services should still take place at the lowest appropriate level within an adaptive management framework. The most appropriate level for the control of rural water supply services is the community.

2-6-3 Efforts to Involve Private Sector in the O & M of Rural Water Supply Facilities

The repair of broken down hand pumps and the repair of leaking pipelines have historically been conducted by independent pump repairers and plumbers in response to requests made by water users. However, efforts to involve the private sector in the O & M of rural water supply facilities, particularly Level 2 facilities, have been made on a relatively large scale under national policies or the initiatives of donors.

These efforts represent a response to the insufficient capacity of communities or LGAs to conduct proper O & M which has become increasingly apparent in the ongoing process of decentralisation as well as the reform of the water supply and sanitation sector. Meanwhile in this process, the role of the central government has been shifting from that of the service provider to that of the policy planner and coordinator. Decentralisation has changed the identities of the stakeholders in the three tier system as shown in Fig. 2-6-2. From the viewpoint of CM, it is important to consider the use of the private sector as part of the efforts to improve the enabling environment to achieve the sustainability of the rural water supply service.

The current use of the private sector in the target countries of the Study is summarised below and further details are given in 3-1-4 and 3-2-4.

① Blanket O & M contract for multiple piped water supply systems: Rwanda and Senegal

② Regular inspection and free repair of pumping facilities using a solar power generation system (for five years): The Gambia

③ Establishment of supply bases of hand pump spare parts: Zambia and Ethiopia

While some of these cases are based on a national policy (Senegal and Zambia), the use of the private sector in other cases is restricted to the project level. In either case, however, the key question appears to be that whether or not the participation of the private sector in the O & M of individual rural water supply facilities can be decided based on an informed choice made by each community affected.

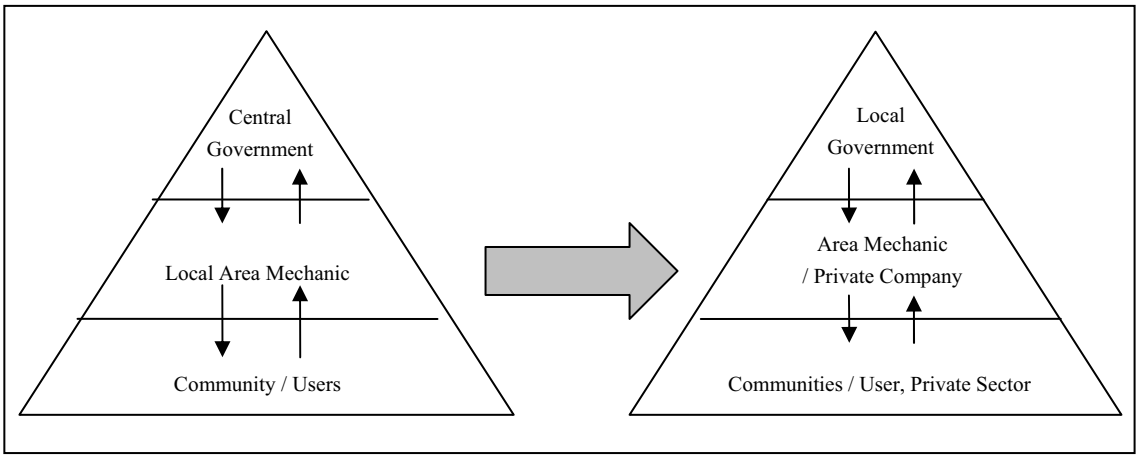


Fig. 2-6-2 Three Tier System after Decentralisation and Private Sector Involvement

Chapter 3 O & M Issues and Lessons for Rural Water Supply Facilities

3 - 1 O & M Issues and Lessons for Level 1 Facilities

In this chapter onwards, a Level 1 facility means a point source system which commonly uses hand pump. As already described in 2-5-1 and 2-5-2, Level 1 facilities use various pumps employing different pumping methods.

3-1-1 Community-Based Organizations for O & M

In the rural water supply sub-sector in Sub-Saharan countries, rural residents are both the users of constructed water supply facilities and the responsible persons for the operation and maintenance of such facilities in general. In other words, villagers are required to implement measures to maintain the water supply facilities and to ensure their sustainable use on their own initiative.

In this section, a community-level organization formed by users themselves to operate and maintain a Level 1 facility and its surrounding environment at the village (community) level is called a community-based organization for operation and maintenance (CBO-OM).[24]

(1) Present State and Pending Issues of CBO-OMs

In the subject countries of the present Study and other Sub-Saharan countries, the O & M of Level 1 facilities by CBO-OMs is regarded as a basic policy or strategy in the rural water supply sub-sector. There are several well-known factors which affect the development of the independent and self-reliant activities of CBO-OMs. These are (i) form of organization and independence, (ii) decision-making process, (iii) operational rules, (iv) legal status, (v) sense of ownership and (vi) O & M capacity. The present state of each factor is described here and the pending issues are identified. While the success factors at the CBO-OM level are explained here, other issues requiring more detailed examination at the institutional level are

24 A CBO-OM is a type of CBO (community-based organization) and is often established in the form of a committee. In reality, a CBO-OM assumes a different name depending on the country, such as Comité de Point d'Eau (CPE), Comité de Gestion de L'Eau (CGE), Water Point Committee or Village Water Committee.

discussed later. The relevant issues are the support system of the LGA, determination and implementation of the water fee and establishment of a spare parts supply chain.

1) Form and Independence of CBO-OMs

Because a CBO-OM conducts the O & M of rural water supply facilities, the scope of which includes the management of the collected water charge, its members must be selected from among and trusted by local community members. To meet such requirement, the executive members of a CBO-OM are selected at a community meeting in most cases. In the case of the soft component for grant aid assistance of JICA or technical cooperation projects, the leading members are selected using a participatory technique, such as PRA[25], as a measure to enhance the sense of ownership on the part of the local community concerned. The selection of such members from the users' community has several advantages.

① Local community members with proven leadership, accounting knowledge or other relevant expertise can be selected.

② As the various activities of leading members can be monitored by the users' community, these leading members are well aware of their reporting obligation (the transparency of the O & M activities of a CBO-OM can be expected to improve through the adequate ex-post guidance as well as operational guidance of the LGA.

③ Because of recognition that the O & M of rural water supply facilities demands mutual cooperation between the users' community and the CBO-OM, the selection of leading members from among the local community marks the first step for increased awareness of ownership among the members of these two organizations.

The independence of a CBO-OM which is established by the above process is an important issue relating to the progress of self-reliant operation. In the case of Tanzania for example, village water committees have been established under the traditional village council led by the village head. As a village water committee is liable to the influence of the village council, there have been reports of the use of the collected water charge for unintended purposes or a lack of transparency of fund management. In another reported

25 PRA: participatory rural appraisal

case, water has been supplied free of charge due to pressure by a local politician. Under these circumstances, water user associations and water user groups are now formed by local community election in a move to create CBO-OMs which are independent from the traditional authorities, such as the village council.

Meanwhile, in communities in countries which are strongly influenced by the Islamic culture, such as Senegal, The Gambia and Sierra Leone, the social order is maintained by powerful community leaders (for example, traditional leaders, religious leaders and wealthy people). The composition of CBO-OM members tends to reflect the relationship between these powerful leaders and other ordinary users. Things do not move in these communities without the consent and leadership of the people in power and the decision-making and financial capacity of the same people dictate the reality of the O & M of water supply facilities. There are cases where O & M is appropriately conducted under the leadership and sound decision-making by people in power. In Senegal, for example, active efforts have been made to invite traditional leaders to join CBO-OMs so that users' communities can share the decision-making process with these traditional leaders. The overall intention is to improve the management of the organization with the participation of all and to improve the transparency by means of regular reporting of the accounts, etc. (ASUFOR in Senegal).

A CBO-OM operating Level 1 facilities generally consists of the members shown in Fig. 3-1-1 even though there are slight variations from one country to another. In reality, there are many different compositions of a CBO-OM depending on the actual conditions faced by each CBO-OM, such as the availability or unavailability of suitable persons, size of the service population and relationship with other maintenance organizations operating at the same site, as these conditions may necessitate the appointment of assistants and/or the assignment of one person to multiple positions. When payment for water use is based on the actual consumption volume (example: payment of a set charge for each 20 litre container) instead of a fixed monthly charge, a water vendor is assigned to each hand pump site. This vendor receives a percentage commission of the total sales as in the case of a repairer and is not an official member of the CBO-OM.

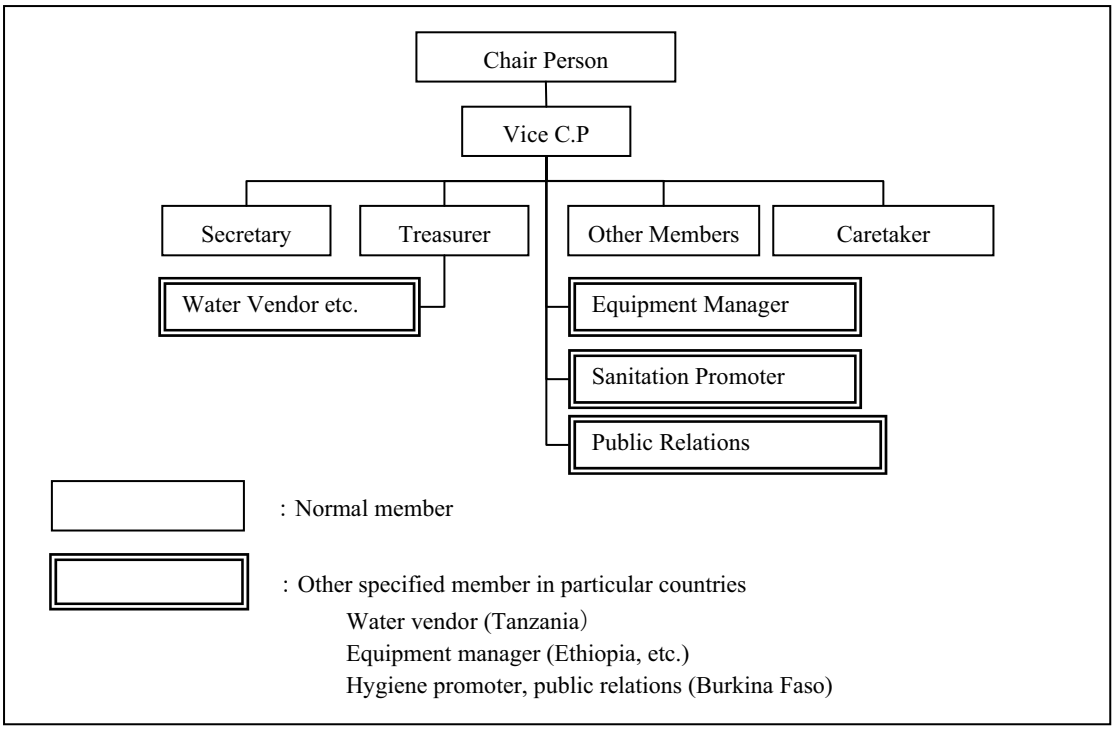


Fig. 3-1-1 Organizational Chart of a Sample CBO-OM

In general, there are three types as outlined below regarding how to conduct the O & M of rural water supply facilities at the community level.

Type 1 : O & M per water source (O & M by an organization formed by the users of each hand pump)

Type 2 : O & M per village (O & M of multiple hand pumps by a single village-level organization)

Type 3 : Control of Type 1 organizations at the water source-level by a higher ranked village-level organization

In most cases, a suitable type of O & M organization is adopted in view of the service population, number of water supply points in the village, historical background of the village (how the village has been formed) and relevant government policies. Table 3-1-1 outlines the advantages and disadvantages of each type of CBO-OM.

Table 3-1-1 Advantages and Disadvantages of Each Type of CBO-OM for Point Source System with Hand Pumps

Type of CBO-OM	Advantages	Disadvantages
Type 1	• The cost sharing of the O&M responsibility is easy to understand because individual water users can be easily recognized in a relatively small water supply area.	• When a hand pump is out of order, the hand pumps of other CBO-OMs must be used. • Because funding for the O&M cost relies on the water fee from users, the total amount of funds might be insufficient to cover the O&M cost in cases where the number of users is very small.
Type 2	• When one pump is out of order, other pumps can be used without hesitation. • The total amount of O&M funds is larger than that of Type 1 so even unexpected large repairs can be easily financed.	• In cases where a lot of money is spent on the repair of hand pumps which are not usually used by a particular person(s), this can be a source of complaint by such person(s) in the same village.
Type 3	• If a common O&M fund is established, the total amount of O&M funds is larger than that of Type 1 so even unexpected large repairs can be easily financed. • The cost sharing of the O&M responsibility is easy to understand because individual water users can be easily recognized in a relatively small water supply area.	• Because the upper CBO-OM manages the lower ones, if there are too many lower CBO-OMs in a village, the upper CBO-OM bears larger transaction cost for securing more transparency in management. • When a hand pump is out of order, the hand pumps of other CBO-OMs must be used.

Type 1 and Type 2 CBO-OMs are often placed under the supervision of the village government with jurisdiction over the villages in question, village development committee or district development committee in line with the recent trend of decentralisation. When a CBO-OM is set up for each hand pump, both the number of users and the amount of the water fee to be collected are small, making O & M relatively easy. Therefore, there is basically no example of the establishment of an association or another form of corporate organization. In the case of Type 2, there is an example in Tanzania of the O & M of 11 hand pumps being conducted by a single village water committee (Nyengedi Village with some 4,200 villagers in the Lindi District). A water vendor is deployed at each hand pump to sell water at a set unit price per container. These vendors then forward the payments received to the accounting section of the village water committee after taking a 10% commission.

In one example of Type 3 in Burkina Faso (see Box 3-6), an AUE (a water users' association) consisting of a representative of each water supply point is established in each village above the organizations manning the individual hand pumps. This AUE is certified as an official water users' association by the administration. With this particular Type 3 CBO-OM in Burkina Faso, a multiple tier system is in place whereby a facility manager

(CBO-OM or individual person) at each water supply point collects the water fee and conducts the daily maintenance in accordance with an agreement with the AUE. Even with this example, the AUE has established the O & M system in collaboration with LGAs (communes) as in the case of Type 1 and Type 2.

2) Decision-Making Process of CBO-OMs

To enhance the sense of ownership of user communities in relation to the O & M of rural water supply facilities, it is essential for decisions on such important matters as the level of the water fee, collection of the water fee, renewal/repair of the facilities and management of the collected water fee to be made with the consent of water users. As explained earlier, the executive members of a Level 1 CBO-OM are selected from among the users and are responsible for daily O & M. The WUAs and WUGs in Tanzania and ASUFORS in Senegal have stipulated in a bylaw for operation that any decisions on important matters must obtain the necessary consent at a general meeting which is ideally attended by representatives of all households in the community. These organizations also have the obligation to regularly report to the general meeting on such matters as the management of the collected water fee and the repair of facilities.

This decision-making process which is based on the consent of the user community is important from the viewpoint of building a sense of ownership. However, examples of Level 1 facilities in Tanzania suggest that such general meetings are only held with the assistance of a donor or NGO in the immediate aftermath of project commencement and that the obligation to regularly convene a general meeting as stipulated in the rules has become a dead letter. Operational guidance and monitoring by the LGA (administration) are, therefore, essential to facilitate the decision-making process requiring a communal consensus.

3) Bylaw for Operation of CBO-OMs

The formulation of a bylaw for operation is effective to facilitate the smooth functioning on CBO-OMs in a self-reliant manner. This bylaw should stipulate the obligations of a CBO-OM, operating rules and penalties. It should clarify the purpose of a CBO-OM, selection method and term of office of executive members, decision-making method and rules/methods for accounting and fund management. It must be noted that the proper formulation of this type of bylaw not only clarifies the responsibilities of CBO-OMs and

the rules for facility use but also enhances the sense of ownership of the user community as well as that of the CBO-OM through consultations and consensus building in the formulation process. Many Sub-Saharan countries, including such target countries of the Study as Tanzania, The Gambia, Zambia and Senegal, do have CBO-OMs possessing such a bylaw. Many Japanese grant aid projects and technical cooperation projects provide assistance for the formulation of a bylaw.

4) Legal Status of CBO-OMs

In the target countries of the Study, there are not many examples where a CBO-OM operating Level 1 facilities has registered with the LGA or competent ministry to obtain corporate status. The only examples found are the WUAs and WUGs in Tanzania. In these cases, a WUA/WUG is required to submit the formulated bylaw to the LGA with a view to concluding a mutual agreement which specifies the obligations of the CBO-OM for the O & M of rural water supply facilities and the responsibilities of each party. Here, it is hoped that this agreement not only clarifies the obligations of the CBO-OM but also assists the development of a sense of ownership as in the case of the formulation of a bylaw described earlier. In regard to actual cases in Tanzania, a delay in following the procedure on the part of LGAs is observed with Japan's grant aid projects even though the WUAs/WUGs have proceeded with the registration procedure for their bylaws. This registration means that a CBO-OM submitting a bylaw is officially recognised by the LGA and that the LGA now has the responsibility to provide technical and operational guidance for the purpose of improving the O & M by the CBO-OM in accordance with the agreement concluded between them on submission of the bylaw. It is, therefore, essential for LGAs to show a strong commitment to the bylaw registration mechanism.

5) Development of a Sense of Ownership and Spontaneity of Residents

The development of a sense of ownership on the part of water users is an important issue to ensure the sustained O & M of the hand pumps by the CBO-OM as the proper operation of the CBO-OM cannot be achieved without the support of water users. The conventional belief is that facilitation of the participation of local people in a development project, such as a rural water supply project, leads to an enhanced sense of ownership on the part of the community, eventually resulting in the establishment of an independent as well as self-reliant water supply service (O & M of the facilities) by the community with efficient

collection of the water fee from users. There are three basic patterns of people's participation as outlined in Table 3-1-2.

Table 3-1-2 Basic Patterns of People's Participation

Pattern	Key Concept	Advantages	Disadvantages
Cheap labour	Participation of local people to provide "cheap labour" for the project; provision of labour as a form of community payment in kind	Economical inputs in terms of materials and funds within the capability of the local community; possible enhancement of the sense of ownership because of the actual involvement of community members in the project	Can result in the one-way communication of information to the community without the voluntary participation of the community based on dialogue; no road map for participation in post-project O & M
Cost sharing	Participation by means of funding to bear part of the project cost	This type of funding can be used to judge the feasibility of saving an O & M fund in the post-project period and to check the willingness of water users to participate, including their payment of a water fee.	Too much emphasis may be placed on the obligation of users to pay the service charge and may fail to materialise a self-reliant water supply service (O & M) by the community.
Communal decision-making	Participation as decision-makers in the project implementation process	Capacity building of the community can be achieved through the analysis of problems, formulation of an action plan and monitoring activities.	As operational guidance should be provided for the community by the LGA (or another type of administration), the total cost will increase.

In many projects, the facilitation of people's participation in a water supply project based on any of the patterns described above does not necessarily enhance the sense of ownership on the part of the community.[26] In other words, it is too simplistic to argue that the "participation" of users automatically leads to an enhanced sense of ownership on the part of the community in relation to the O & M of rural water supply facilities. Based on the findings of their own study in Sub-Saharan countries, Harvey and Reed (2004) point out that most projects are essentially "supply-driven" and that decisions are made by experts and government officials involved in individual projects without fully reflecting the demands of local people who are the actual users of water supply facilities.

26 Peter Harvey & Bob Reed, (2003), Community-managed water supplies in Africa: sustainable or dispensable?; (2004), Rural water supply in Africa: building blocks for hand pump sustainability, Water, Engineering and Development Centre, Loughborough University

The key issue here is that the problem lies with the project implementation methods and not with the idea of "participation" itself. A new approach called DRA[27] (demand responsive approach) has been proposed in recent years. This "demand-driven" approach is now widely incorporated in official policies for the rural water supply and sanitation sub-sector in many Sub-Saharan countries. It has become the basic concept for community O & M and is being introduced to CM (community management). There are still some pending issues, including how to facilitate the participation of water users in a project while meeting their "demands", how to ensure the spontaneity of water users to embark on the O & M of hand pumps and how to establish a sustainable community-level O & M system.

Examples of the Introduction of DRA to Water Sector Policies
Tanzania : one of the main objectives of the "National Water Policy 2002 (NAWAPO 2002)"
Zambia : one of the main development strategies of the "National Rural Water Supply and Sanitation Programme"
Rwanda : one of the main objectives of the "Sectoral Policy on Water and Sanitation (2004)"
Mozambique: stipulated in the Principles for Implementation (Principio de Procura PP) of the National Water Policy (Politica Nacional da Água PNA 1995)

The form and independence of a CBO-OM, selection method of executive members, decision-making process, formulation of a bylaw and official registration and vital components of the method to establish a community (village)-level O & M system. This method should also function as a mechanism to ensure the independence and sustainability of such a system.

6) O & M Capacity of CBO-OMs and Its Enhancement

Many rural communities in Sub-Saharan countries have only a limited O & M capacity without suitable capacity building efforts even if a CBO-OM is formed to manage Level 1 facilities. Improvement of the following skills is essential for user communities, especially CBO-OMs responsible for the O & M of Level 1 facilities.

- Communication skills for consensus building and the easing of tensions within a community

27 For a more detailed explanation of DRA, refer to 2-6-2 Evolution of Community Management..

- Leadership skills to facilitate the participation (including payment of the water fee) of users
- Introduction and collection of the water fee
- Management and accounting (book-keeping) of the collected water fee and reporting of these activities
- Daily inspection and maintenance of hand pumps
- Protection of the water source(s)

These skills are mostly covered in all activities aimed at improving the O & M capacity for Level 1 facilities and training for CBO-OMs under grant aid and technical cooperation projects of Japan and other donors in the target countries of the Study. However, there are often no uniform approaches or methods to establish an O & M system for Level 1 facilities among the development partners, such as aid agencies of donors and NGOs. It is, therefore, necessary to prepare national guidelines and manuals (relevant cases in Zambia and Tanzania regarding the preparation of national O & M guidelines and manuals are described later).

Harvey and Reed (2004) state that an appropriate capacity building method must be implemented to rectify the weaknesses and list concrete themes for training. These are (i) book-keeping, selection method for financially appropriate investment and maintenance work in the case of community members, (ii) financial and contract management, monitoring and evaluation in the case of government officials and (iii) communication method with communities and water fee collection method in the case of private service providers. As the themes for community members are very similar to those listed above, they warn that some time is required for community-level training to produce tangible results.

This warning of Harvey and Reed must be carefully heeded as ample time and continual operational and technical guidance, including follow-up guidance, are required for effective capacity building at the community level. Assistance for improvement of the O & M capacity by development partners is often provided jointly by a donor and the LGA in the recipient country acting as the project implementing body along with the work to construct or repair facilities. It is assumed that the project implementing body will independently conduct follow-up activities in the post-project period. The problem here is that many administrative bodies, such as LGAs, have only limited human and financial resources to allocate to the said activities. This lack of adequate resources is believed to be

the reason for the insufficient manifestation or short life of the positive effects of initial training. It is, therefore, essential to enhance the guidance capacity of the administrative bodies which are expected to provide continual operational and technical guidance for CBO-OMs.

7) Preparation of Guidelines and Manuals

Since the initial establishment of the CM method, the capacity building of CBO-OMs as operating bodies of rural water supply facilities has been a major issue in connection with the O & M of hand pumps. This is because of the fact that the sustainable O & M of a water supply facility with a hand pump requires the operator to have a certain level of O & M capacity. In Sub-Saharan Africa, even though there is growing awareness of the crucial importance of the voluntary participation of the local community in O & M, no national government has formulated let alone implemented a capacity building method to achieve such participation.

At the time when ODA was primarily provided for individual projects, even if a participatory method was widely used in a recipient country, the incorporation of this method in a project was decided on a case by case basis. Moreover, there was no consensus on who to introduce the method to individual projects. There was a case (in Zambia) where the formulation of a concrete capacity building method was followed by the rapid spread of this method nationwide with the assistance of donors after its trial application by some donors. Nevertheless, the problem of the very slow progress of the standardisation or unification of concrete approaches to the establishment of community organizations and their capacity building persisted.
With the progress of sector and coordination-based on the SWAp in more recent years, however, efforts have been made to unify the processes and methods for the formation and capacity building of CBO-OMs. In Sub-Saharan Africa, much progress has been made in the preparation of national guidelines and manuals for the rural water supply service and the capacity building method for CBO-OMs as the operating bodies of water supply facilities has been increasingly standardised. There are many cases today of a donor actively applying these guidelines and/or manuals for its own project.

One example in Tanzania involves the use of a manual designed to facilitate the setting up of CBO-OMs. This manual was included in the programme implementation manual (PIM) package when the Ministry of Water and Irrigation formulated the Water Sector

Development Programme (WSDP) in 2006. In Zambia, the Ministry of Local Government and Housing produced the RWSS O & M manual in 2009 with the assistance of JICA.

(2) Lessons for the Future

1) Formation of CBO-OMs

For water supply facilities with hand pumps, a CBO-OM is, in principle, formed along with the construction of the said facility. At the time of forming a community-level organization, there are several issues relating to the sustainability of O & M activities. These include the "participation of women" and the "independence of the organization and its relationship with the existing social authorities".

As women are the people who most directly and frequently use the water supply facility in daily life, their participation is considered to be important. Many guidelines stipulate a minimum proportion of women in the water management committee (for example, at least three members of such a committee out of seven members must be women in Ethiopia[28]). However, the mere inclusion of women in the committee is not sufficient to judge whether or not the participation of women contributes to improving the sustainability of O & M activities. The deep involvement of women in the wide-ranging activities of a CBO-OM is a precondition to make this judgement as it is pointed out that tokenism may operate behind the participation of women.[29]

When discussing the community-based O & M of rural water supply facilities, the creation of an environment in which a CBO-OM is able to give priority to the long-term interests of the community in its decision-making is important. The selection of leading members of the CBO-OM by the community as a whole is crucial here along with independent decision-making which is not influenced by specific people in power and/or local political groups. The selection of leading members based on community elections is useful as the existing leadership which is trusted by the community can be elected. It is essential for a newly formed CBO-OM to maintain its independent status from the traditional village authorities (such as the village council led by the village head) in order to maintain its integrity throughout its activities, including the O & M of the water supply facilities,

28 Government of Ethiopia, Regional Implementation Guidelines for the Water Supply and Sanitation Programme, National Rural Water Supply and Sanitation Programme (2005 to 2015)

29 Peter Harvey and Bob Reed (2004), op. cit.

collection of the water fee and fund management. In regard to management of the collected water fee in particular, an independent bank account must be opened to prevent the diversion of the funds for purposes other than the O & M of the water supply facilities. As described in the previous section, however, it is necessary to respect the social order maintained by powerful leaders (for example, traditional leaders, religious leaders and wealthy people) in communities which are strongly influenced by Islamic culture. The inclusion of these powerful leaders as supervisors of a CBO-OM enables the CBO-OM to share the decision-making process with them. In other words, the form of independence of a CBO-OM must be carefully selected, taking the local social, cultural and economic conditions into consideration.

2) Bylaw of CBO-OMs and Registration of CBO-OMs

The establishment of a bylaw governing a CBO-OM and the registration of a CBO-OM based on this bylaw with the LGA or competent ministry can be expected to have the effect of clarifying the roles and obligations of this organization and of enhancing the sense of ownership of the user community regarding the O & M of rural water supply facilities.
Such a bylaw (or articles of association) usually stipulates the following matters.

① Purpose of establishment of the organization
② Roles and obligations of the organization
③ Members and their roles and obligations
④ Decision-making process and method
⑤ Frequency of meetings
⑥ Operation method of facilities
⑦ Level of water fee
⑧ Management method of collected water fee
⑨ Selection method and term of office of executive members

The discussion of these issues with community members to clearly establish the intended activities and O & M work by the CBO-OM can be expected to facilitate changes of the awareness and behaviour of the community concerned. The registration of the CBO-OM together with its bylaw with the LGA or administrative body with jurisdiction over CBO-OMs to make the legal status of the CBO-OM clear should encourage a better awareness of the roles and obligations of the CBO-OM among its members as well as other local people.

3) Lessons Learned Regarding Guidelines and Manuals: Necessity for Detailing and Standardisation

In the water supply and sanitation sector in recipient countries where the SWAp is being progressively applied, effective measures to assist the capacity building of CBO-OMs are likely to include the development of an institutional framework (guidelines and manuals) through technical cooperation projects and the creation of an implementation model (creation of a package which can be used by various stakeholders for the implementation of a sector development programme). Especially if the framework for the SWAp is already in place, efficient project implementation with an extensive dissemination effect should be feasible in tandem with financial assistance. The introduction of a standardised guidebook/manual is a useful means of achieving the harmony and proper alignment of multiple projects and programmes for their more effective and efficient implementation.

For example, there are several viable steps to achieve the wide dissemination of the positive outcomes of a technical cooperation project. These are (i) proactive participation in the sector aid coordination process, (ii) dialogue with the stakeholders, including other donors, from the project formulation stage and (iii) examination of a dissemination plan within the framework of the SWAp. It is insufficient to simply present a system or model which has been developed under a technical cooperation project to stakeholders. In the case of Zambia's SOMAP, a common understanding that the project outcomes would be disseminated within the framework of the SWAp was formed through the process of dialogue even before the development of a system and model. The result was the smooth dissemination of the project outcomes throughout the country.

The various requirements for project implementation in line with the SWAp are discussed in more detail in Chapter 4.

4) Ownership and Sustainable O & M

A sense of ownership among the users of water supply facilities and CBO-OM members regarding the said facilities is important for the sustainable O & M of the facilities. As stated earlier, the "participation" of local people as a practice to develop such a sense of ownership does not automatically enhance the sense of ownership. In connection with the

legal aspect and importance of ownership (meaning ownership rights)[30], the World Bank states: "Limited political commitment, weak legal framework and poor governance lead to unstable policy environment for the water sector. This results in under-investment, undefined ownership, poor participation, weak regulation and conflicting priorities." To achieve the sustainable O & M of water supply facilities, the World Bank finds it necessary to establish an appropriate legal framework for ownership (asset ownership).
In a report by the World Bank (2004), ownership is interpreted as a sense of ownership of water resources and assets and the importance of the autonomy of organizations, such as COB-OMs discussed in this Study, is emphasised in relation to the operation of water supply facilities, setting of water tariffs and management of funds. In short, the World Bank argues for the necessity to introduce a legal framework whereby local people can feel that they own resources and assets. When the ownership of facilities (assets) is not clearly defined, the responsibility for O & M can become ambiguous, resulting in the worsening condition of water supply facilities. In such a case, the World Bank argues that the introduction of community-level information systems for the disclosure of appropriate information will enhance the sense of ownership among users in the investment phase and will also encourage ownership, transparency and accountability as well as promote a long-term commitment to the monitoring of O & M.

Advancement from the stage of participation (self-reliant management of facilities) to the stage of ownership development and further to the stage of sustained O & M requires the fostering of ownership of the decision-making process. This can be achieved by the selection of CBO-OM members by the local community through a series of dialogue, preparation of a bylaw and registration of the CBO-OM and its bylaw. Another useful activity is the use of the mechanism for the disclosure of information to determine whether or not O & M and management of the collected water fee are being conducted in accordance with the bylaw. Among the projects examined under the Study, the SOMAP in Zambia and other projects have attempted to improve the sense of participation as well as the sense of ownership on the part of communities through dialogue. In grant aid projects involving the construction of Level 1 facilities in Zambia and Tanzania, emphasis on dialogue with local people at the initial project implementation stage has led to the selection of suitable members of the CBO-OM, preparation of a bylaw and setting of an

30 World Bank (2004), Rural Water Supply and Sanitation Toolkit for Multisector Project, Rural Water Supply and Sanitation and Social Fund Thematic Groups

appropriate water fee, all of which have greatly contributed to the realisation of the sustainable O & M of facilities.

5) Promotion of Educational Activities on Sanitation

Increased awareness of sanitation among local people is an important component of the proper O & M of rural water supply facilities. In its basic policies for cooperation in the rural water supply sector and sanitation sub-sector, JICA considers the improved awareness of sanitation to be an important factor to improve the sustainability of the O & M of water supply facilities as such improved awareness has the effect of facilitating the use of newly constructed facilities and willingness to bear the maintenance cost.[31] Educational activities on water and sanitation have been introduced as a soft component of grant aid projects (for example, the Project to Improve the Environment in Non-Planned Residential Areas in Lusaka in Zambia and the Water Supply Project for Sao Tiago Island of Cape Verde) and also as one of the principal components of technical cooperation projects (for example, Sustainable Water Supply, Sanitation and Hygiene Promotion in Zambezia Province in Mozambique and the Imidugudu Project for Improvement of Water Supply and Sanitation in the Southern Part of East Province in Rwanda).

The WHO and UNICEF consider water supply and sanitation to be inseparable development issues and have been promoting an integral approach covering both issues (the WASH Programming Guidelines[32] have been prepared by the WHO while the sector strategy of the UNICEF is explained in detail in the UNICEF WASH Strategy Paper[33] produced in 2006). Similarly, JICA fully understands the importance of an integral approach and has prepared the Guide for International Cooperation for Rural Sanitation.[34] Riding on this international current, it is necessary to promote the capacity building of the users of water supply facilities to raise their awareness of hygiene.

3-1-2 Collection of Water Fee

(1) Water, a "Public Good" (Basic Human Need) and "Economic Good"

---

31 JICA (2006), Basic Policies for Cooperation in Rural Water Supply Sector in Sub-Saharan Africa (internal document), Study Group on Cooperation Policies for Rural Water Supply in Sub-Saharan Africa

32 WHO (2005), Water, Sanitation and Hygiene, Sanitation and Hygiene Promotion: Programming Guidance

33 UNICEF (2006), Water, Sanitation and Hygiene Strategies for 2006 - 2015, UN Economic and Social Council

34 Prepared by JICA Water Resources Task Force, Global Environment Department in September, 2008

The Dublin Principles in 1992 declared that water is an economic good and called for a charge for its use. This declaration was issued against the background of a global water resources crisis and appealed to users of water resources to bear a fair share of the cost burden. Since this declaration, an intense debate has continued regarding the classification of water as an economic good or public good, i.e. part of the basic human needs (BHNs).

In Tanzania, one of the target countries of the field survey for the Study, the Free Water Policy was introduced for rural areas after its independence and remained in force until the end of the 1980's. It is pointed out that even after the introduction of the beneficiaries-pay principle in 1991 under the new National Water Policy, the change of the way of thinking of rural people towards water proved to be a very slow process (based on an interview with an official of the MoWI in Tanzania).

The shift of the main focus of national development in developing countries to poverty reduction since 2000, however, has stimulated discussion of more realistic themes, including how much of the cost burden can be shouldered by the poor and how the water resources conservation and management costs should be met if the beneficiaries-pay principle is not applicable. Many countries recognise that it is a BHN to receive the supply of clean water. In reality, however, they have adopted a policy of asking users to pay the minimum amount which they can afford or even the full amount of the maintenance cost because of fiscal difficulties faced by the government to pay for the maintenance cost of water supply systems with hand pumps, the use of which has steadily increased since the 1980's, the so-called water and sanitation decade.

Many users of water supply facilities, such as those with hand pumps, have little understanding of the need to save to meet the eventual maintenance cost as such facilities do not incur a daily operating cost. The development of (i) a framework (water fee collection system, mechanism to set a fair water fee level, management system for the collected water fee and transparency of this management system) to make users share the cost burden and (ii) a way of ensuring the working of this framework is a long-standing task.

(2) Method to Set the Water Fee

Some Sub-Saharan countries adopted socialist policies after independence and tried to provide a free water supply service along with other public services on the grounds that water is a BHN. These countries have now adopted a sustainable O & M system based on the

community ownership of rural water supply facilities and have introduced the beneficiaries-pay principle as an important policy to meet the maintenance cost. The background for this policy change is the fact that 60% of rural water supply facilities were out of order in 1990 while the water supply coverage in rural areas increased from 30% in 1980 to 63% in 1990 (IRC, 1991). The inappropriate handling of facilities due to little sense of ownership on the part of communities and theft were believed to be the reasons for this high ratio of out-of-order facilities. Another reason was the fiscal difficulty of the central government to continue to pay the cost of the water supply service, especially the maintenance cost. Under these circumstances, setting of the water fee at a "payable level" by users has become a pressing task so that the O & M cost of a water supply service which meets BHN is within the financial capacity of communities.

Because of the nature of the water supply service as a service to meet BHN, any attempt to set a fair water fee level must firstly examine the ability of people to pay, taking the socioeconomic conditions of the subject area, average income, minimum income and seasonal fluctuations of income of each household into consideration. For this purpose, the actual maintenance cost of the facilities to be installed must be calculated. When a flat rate per household or user is to be adopted, the cost burden per household (user) increases with a fewer number of households (users). It is, therefore, necessary to examine the minimum number of households (users) required to make the service economically viable.

The target countries of the Study generally lack a national policy or strategy for the O & M cost of Level 1 facilities with Zambia being a notable exception. In most cases, the water fee is set for an individual project or by a CBO-OM representing the user community. While it may be difficult to calculate a standard O & M cost due to differences between the hand pump specifications, different ages of each facility and different O & M systems adopted by communities, a rough standard cost should be established in each country to reflect the socio-economic conditions and prevailing O & M system in the country.

1) Calculation of O & M Cost

Harvey and Reed (2004)[35] suggest one formula to calculate the O & M cost of Level 1 facilities as shown in Box 3-1.

35 Harvey and Reed (2004), op. cit.

Box 3-1 Setting of Household Tariff for Hand Pump Water Supply

Annual household tariff (H) = 1.2 x (M + A)/N
(Note)
Annual maintenance cost (M) = cost of minor components + labour cost + profit (if ordered to a private company)
Current replacement cost (R) = current cost of complete facilities or major components
n = estimated number of years before replacement
Annual amount of annuity which must be put aside every year to meet the future replacement cost
Annuity (A) = current replacement cost (R)/annuity factor (AFr, n)
Interest rate in the local economy (r), expected life span of the equipment in years (n)
A contingency factor of 20% can be used to compensate for this and will ensure that users have saved enough to compensate for future price changes of required components

Total annual maintenance cost, M = $35
Current replacement cost, R = $336
Estimated number of years before replacement, n = 5 years
Approximate interest rate, r = 20%
Annuity factor (read from the table in the Annex), AFr, n = 2.83
Annuity, A = R/AFr, n = 336/2.83 - $119
Number of households, N = 50 (300 people)
Annual household tariff, H = 1.2 x {(M + A)/N} = 1.2 x {(35 + 119)/50} = $3.70
This can then be divided by 12 for conversion to a monthly household tariff of $0.30.

Source: Harvey and Reed (2004), Rural Water Supply in Africa, WEDC, Loughborough University

In Box 3-1, the annual water fee per household is calculated based on the annual maintenance cost, estimated number of years before replacement and estimated cost of future repair with the number of households using the facility of 50. The main reason for the difficulty of applying this type of formula to actual O & M is the difficulty of accurately predicting the frequency of facility breakdown, cost of spare parts and repair and price fluctuations due to inflation and other factors. In Zambia, the Study has found that some hand pumps have broken down many times in a short period of time while others produced by the same manufacturer and installed at the same time have been working perfectly without breaking down. Such a discrepancy can occur as the result of the complex combination of the quality of the installation work, depth and conditions of the water source (the wear and tear of parts vary depending on the intensity of the strokes of the hand pump to pump up water), number of users and nature of the daily maintenance or its total absence. The scarcity of empirical data reflecting the reality of the subject countries of the Study means it is extremely difficult to calculate the O & M cost. This kind of calculation with some degree of certainty has, however, become feasible in Zambia because of the fact that the volume of empirical data on the replacement frequency of spare parts and other aspects of operation has been increasing in line with the development of a spare parts supply chain described later.

Zambia's example suggests the importance of developing a spare parts supply chain to ensure a continuous supply of inexpensive spare parts as much as possible and of clearly publicising the prices of spare parts with a view to prompting the collection of the water fee from users. Accumulated sales records of spare parts should provide information on the types of replaced spare parts and the frequency as well as trends of such replacement, making it possible to calculate the general O & M cost and the average breakdown frequency in the service area in question. This information on the actual O & M cost and breakdown frequency can be used to persuade and effectively motivate a CBO-OM to collect the water fee in a more proactive manner.

Box 3-2 Water Fee System for Level 1 Facilities in Zambia

The National Guidelines for Sustainable Operation and Maintenance of Hand Pumps in Rural Areas announced by the MLGH in November, 2007 stipulate that communities pay the O & M cost, etc. as one of five principles. Communities are expected to pay 100% of the O & M cost, 5% of the capital cost and 5% of the facility rehabilitation and replacement cost.

The same Guidelines assume that the need to replace hand pump parts begins to occur two years after the initial construction of the system and estimate the total value of spare parts replacement to be ZMK 750,000 (approximately US$ 162 based on an exchange rate of US$ 1.00 to ZMK 4,635.00) in five years. With the addition of the transportation cost and labour cost, the Guidelines suggest a need to save some ZMK 200,000 (approximately US$ 43) per year for each hand pump.

The number of water users per hand pump affects the level of annual payment per household. Supposing that the annual O & M cost is ZMK 450,000 (approximately US$ 97 using the above exchange rate), the Guidelines indicate a cost burden per household as shown in the following table.

Estimated Payment Amount

No. of Users	No. of Households	Payment HH/Month (ZMK)	Payment per HH/year (ZMK)
400	67	560	6,720
300	50	750	9,000
200	33	1,136	13,632

Note: Estimation assumes 6 persons per household.
Source: Ministry of LGA and Housing (2007), National Guidelines for Sustainable Operation and Maintenance of Hand Pumps in Rural Areas, Republic of Zambia

The RWSS O & M Implementation Manual compiled in 2009 suggests the O & M cost shown in the following table based on actual sales data for spare parts through the established spare parts supply chain and the recommended timing for the replacement of parts by the hand pump manufacturer.

Cost of Replacement Spare Parts for Hand Pump (Afridev) in Five Year Period

Spare Parts	Cost (ZMK) in 2009	Year					Cost for 5 Years (ZMK)
		1	2	3	4	5	
U-seal	10,000		13,225		17,490		30,715
O-rings	8,000		10580		13,992		24,572
Bobbin	10,000		13,225		17,490		30,715
Rod Centraliser	65,000		85,963		113,685		199,648
Bearing (Inner)	10,000	11,500	13,225	1,209	17,490	20,114	77,537
Bearing (outer)	10,000	11,500	13,225	15,209	17,490	20,114	77,537
Plunger	50,000					100,568	100,568
Pipe centraliser	65,000					130,738	130,738
Total (ZMK)		23,000	149,443	30,418	197,638	271,533	672,031

Note: Estimation assumed an annual inflation rate of 15%.

↑ Total Cost for 5 years (ZMK)

Source: Ministry of LGA and Housing (2009), RWSS O & M Implementation Manual , Republic of Zambia

As shown in the above table, the annual cost of spare parts replacement in a five year period considerably varies from ZMK 23,000 to ZMK 271,533. To cushion this huge fluctuation of the annual financial burden, the Manual recommends calculation of the average monthly replacement cost based on the total cost for five years and the saving of this amount from the collected water fee. As the table only shows the cost of spare parts replacement in a five year period, the figures must be increased to meet the greasing cost and payment for hand pump technicians (APM: area pump mender) and caretakers in view of the actual O & M system in place in Zambia. The resulting O & M cost of Level 1 facilities using the Afridev hand pump is shown in the table below.

O & M Cost of Level 1 Facilities (Afridev)

Item	Cost (ZMK)
Spare parts per hand pump (ZMK 672,000/60 months)	11,200
Grease (500g) per hand pump	15,000
Visit of APM every quarter (ZMK 60,000/3 months)	20,000
Payment for caretakers	5,000
Payment for treasurer	10,000
V-WASHE administration cost	20,000
Total cost per hand pump per month	81,200

Source: Ministry of LGA and Housing (2009), RWSS O & M Implementation Manual , Republic of Zambia

According to this table, the monthly O & M cost is ZMK 81,200. Assuming the use of the same system by 40 households, the monthly cost burden per household is approximately ZMK 2,000.

Concrete Example of a JICA Technical Cooperation Project

In JICA's SOMAP Project in Zambia, the district authority manages the bank accounts as part of efforts to promote saving of the water fee through the conventional WASEH scheme in order to reduce the overall downtime of hand pumps.

In the case of the Mumbwa District which is one of the pilot districts of the SOMAP for example, there are some 750 hand pumps and 501 V-WASHE groups throughout the district. The district authority provides education and book-keeping training for these V-WASHE groups for the purpose of encouraging them to make deposits to a common district account to save the necessary funds for future needs (as of October, 2009, some 100 V-WASHE groups are participating). This common account is set up by the district authority to reduce the cost of account management as individually held accounts by V-WASHE groups collectively lose more money due to the monthly deduction of the account management cost by the bank from each account.

(Example)
The Kazungo V-WASHE (with some 300 members) charges an annual repair fee of ZMK 10,000 per household. It joined the common account in 2008 and saves some ZMK 500,000 a year (approximately US$ 108). Since 2004, it has conducted repair work four times.

In the above example, the effective collection of the fee has been made possible by the increased trust of local people in the savings scheme resulting from multiple factors. These factors include the change of the fee collection system to a system which is more acceptable to water users (from monthly payment to lump sum payment after the crop harvesting; actual reduction of the total annual payment from ZMK 12,000 to ZMK 10,000), resulting improvement of the payment ratio as a result of the above change, continual follow-up by the district authority after the initial educational activities and adequate repair of the hand pumps by APMs with the supply of spare parts.

Source: Interviews with staff members of the Mumbwa District Authority, members of the ADC and members of the Kazungo V-WASHE as part of the field survey.

2) Evaluation of Payment Capacity of Users

One way to measure the willingness to pay of water service users is the contingent valuation method (CVM). This method intends the checking of the amount which users are willing to pay in exchange for a project outcome by means of a questionnaire survey, etc. In general, estimation of the willing to pay amount is not very easy because of various biases inherent in the different questionnaire survey methods.[36] Questions may unintentionally be phrased to prompt certain answers, making it necessary to repeat the survey over an unrealistically long period of time. The Basic Design Study (2007) for the Project for Water Supply Development Around the Metropolitan Area, JICA's grant aid project in Tanzania, used the CVM to measure the amount people would be willing to pay for a water supply service with Level 1 facilities. At many sites, the amount indicated was 2 - 3% of the disposal income for Level 1 facilities (some 4 - 5% in the case of Level 2 facilities).

While measurement of the willingness to pay (WTP) is believed to be rather unreliable, evaluation of the users' capacity to pay based on the estimated affordability to pay (ATP) is more reliable. The percentage of the ATP for the water supply service in the household income as recommended by the World Bank and other international organizations is up to 4% of the disposable income in developing countries. Caution is required here as the household income indicated by the respondents to a questionnaire survey is often inaccurate as in the case of the amount of money they are willing to pay. The ATP figure should, therefore, be verified using general socioeconomic and other relevant indices.

There are cases where users pay the water fee even if the level of the fee exceeds the assumed ATP and also cases where users are very reluctant to pay as they do not accept the level of the water fee despite the fact that it is lower than the assumed ATP. It is, therefore, important to rely on the process of determining a water fee level which is accepted by users because of their involvement in the process through meetings, etc. One concrete example is the RWSS O & M Implementation Manual (2009) which recommends the use of a participatory approach to set the water fee as the consent of users can be more easily obtained by providing them with information on the cost items. Another example is Tanzania where any changes of the water fee are made at the community level with full

[36] JICA (2002), Study on Economic Evaluation Methods Which Can be Used for Development Studies

understanding of the required funds to be saved on the part of users (at sites of the Water Supply Project in Lindi and Mtwara Regions, JICA's grant aid project).

When there is a large gap between the required amount for O & M and the amount of the WTP or ATP, it may be necessary to consider the introduction of a government subsidy. None of the countries studied this time have introduced a subsidy to cover the O & M cost of the rural water supply service.

When examining the rural water supply service from the viewpoint of poverty reduction in those communities where there is a massive gap between the rich and poor, the provision of a reliable water supply for poor people who find it difficult to pay a water fee poses a major challenge. Although Level 1 facilities are generally capable of providing clean water at the lowest price, the level of the water fee must be carefully set in the light of the overall economic conditions of the user community. Access to clean water is the right of all people as a BHN and the quality of drinking water should never reflect the income level of the beneficiaries. Under normal circumstances, a social security system designed to guarantee a minimum standard of living for the poor should meet all BHNs. However, many developing countries have been unable to introduce an effective social security system. At the project level, the reality is that the necessary O & M cost is informed to the CBO-OM which is assigned to determine and collect the water fee, taking the income gap between the rich and poor within the community into consideration. As many rural communities have a traditional mutual help system, the use of this system should be considered. In short, the capacity to pay of the community as a whole should be evaluated with due consideration of an alternative method of payment to cash for the poor and possible financial assistance by the rich for the poor.

(3) Water Fee Collection and Fund Management Methods

The common system for water fee collection and fund management at the community level involves the collection of the agreed water fee from users by the CBO-OM which is responsible for the O & M of the water supply facilities and fund management by the treasurer (or another member of the CBO-OM in some cases) as shown in Fig. 3-1-2. There are cases where a fee collector is appointed for each hand pump to collect the water fee per container with the collected water fees being centrally managed by the CBO-OM when there is more than one hand pump in a community. Another system is the establishment of an O & M group for each hand pump with these O & M groups being controlled by a higher ranked committee or association as shown in Fig. 3-1-2.

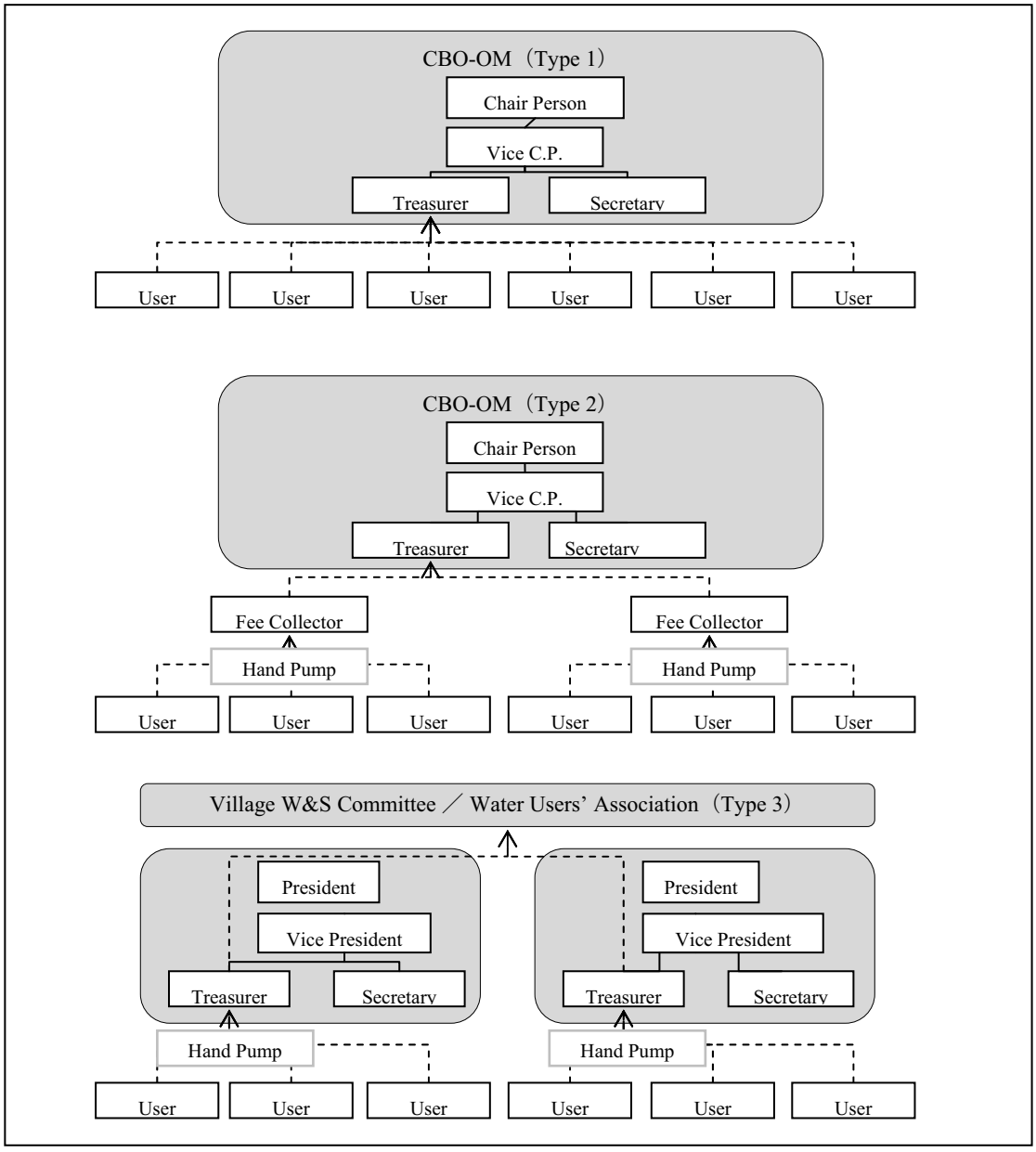


Fig. 3-1-2 Flow of Collected Water Fees

1) Water Fee Collection Methods

The actual water fee collection methods vary from one country to another as shown in Table 3-1-3 in terms of (i) collection unit (20 litre container, person or household), (ii) collection frequency (each purchase, monthly or annually) and (iii) means of payment (cash or in kind, such as crops or labour).

Table 3-1-3 Fee Collection Method for the Point Source System

Country	Unit	Frequency	Paid by	Remarks
Zambia	Household	Monthly or annually	Cash/goods (depending on the decision of the CBO-OM). A suitable method can be adopted according to the guidelines.	There is a stipulation that the cost of hand pump repair must be borne by users but there is no standard method of water fee collection. Special consideration is urged for poor people.
Ethiopia	Family	Monthly	Cash	Findings of the site survey
Senegal	Married men/married women, etc.	Monthly	Cash	No specific rules exist. There is a case of achieving a higher collection rate by setting a lower fee for married women instead of married men (because of the custom of polygamy.
Tanzania	Container (10 litres or 20 litres)	Each time	Cash	The collection method featuring the collection unit, frequency and means of payment is determined by the O & M plan formulated for each facility.
Rwanda	Household (20 litre container)	Monthly or annually (each time)	Cash	There are no regulations or guidelines for water fee collection. (The water fee per container includes the wage for the fee collector, cost of spare parts and replacement cost of the hand pump.)

Even when the water fee collection method for Level 1 facilities is suggested by the relevant guidelines, it is often the case that the actual collection method is decided by the CBO-OM with reference to suggestions put forward under educational activities or examples of nearby communities. Community members are then notified of the decided collection method at a meeting of residents. There are also cases where a proposal made by maintenance personnel of the LGA office is referred to for an intended change of the collection method. (At one village in southern Senegal, the monthly fee of CFA 500 per married man was changed to CFA 200 per married woman in view of the local custom of polygamy, resulting in an increase of the collected fee.

Many different measures have been introduced to assist the poorest people who find it difficult to pay the water fee in cash, including the supply of labour (piece work), payment in kind, such as agricultural products (Zambia), and the use of a smaller bucket to reduce the payment amount each time (Tanzania). In the case of the socially weak who cannot earn an income or have no harvest due to physical disability or other reasons, practical

measures appear to be employed by each CBO-OM. These include exemption from payment based on a village consensus, implicit acceptance by the fee collector of the use of water by such people without payment and proxy payment by the community leader(s), relatively wealthy villagers, relatives and/or friends.

2) Collected Water Fee Management Method

One important aspect of water fee collection is the management of the collected water fee in a transparent manner. The wrongful use of the funds (use for unauthorised purposes or even embezzlement) or ambiguity in terms of the amount built up or actual spending leads to a loss of trust on the part of local people. This can result in the delay of repair work, hampering the continual supply of clean drinking water. When the water fee is not regularly collected, alternative arrangements must be made. In Zambia, there are cases of the amount required for repair being divided by the number of users for collection from each user.

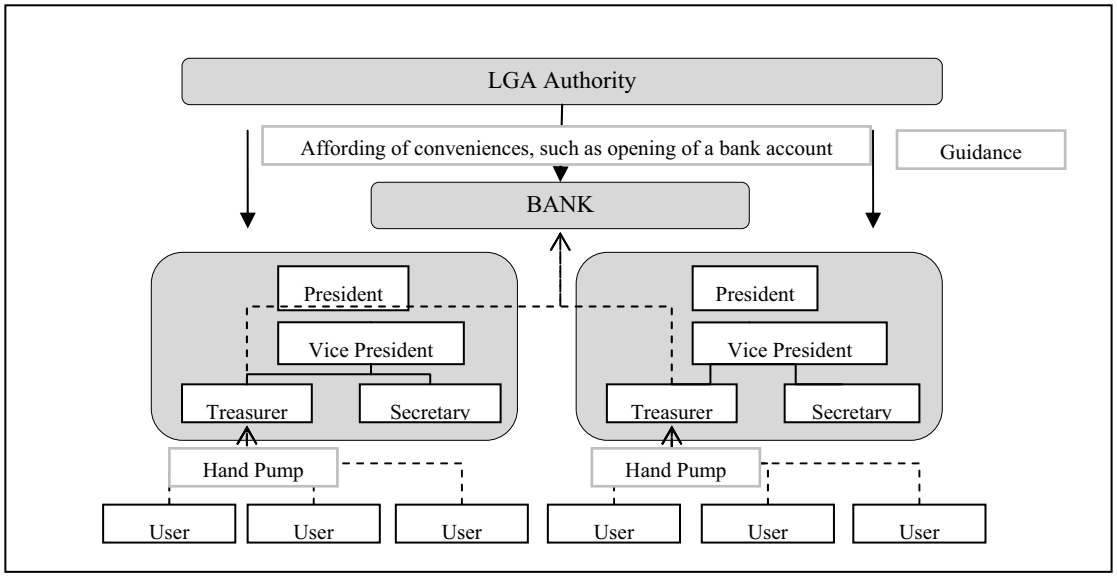


Fig. 3-1-3 Example of Use of Bank Account in Zambia (Mumbwa District)

In the case of some LGAs in Zambia, the collected water fee is paid into a dedicated bank account as shown in Fig. 3-1-3 because of their past experience of the wrongful use or theft of the said fee at the community level. These governments have had the bitter experience in the past of a substantial decline of the exclusive bank account of a CBO-OB due to the regular debit of the account management fee (every quarter or once in several

months) when the account was left unused for some time. This meant that there was not sufficient money in the account when it was necessary to use the account to pay for repair. To avoid any repetition of this, one bank account is now used by a number of CBO-OMs. As this arrangement opens the way for one CBO-OM to withdraw a larger amount than its actual deposited amount, LGAs adopt various measures, including management of the account.

Management of the collected water fee using a bank account is seemingly very effective as it is difficult to withdraw money for a wrongful purpose because of the exact recording of such transaction. The problem is that the people targeted by a rural water supply project tend to live in remote villages, making it difficult for a CBO-OM to frequently use the account.

In the case of Tanzania outlined in Box 3-3, water is sold by measure using a polyethylene container. Compared to the system of a fixed monthly fee per household, it is much more awkward to deal with the daily payment of the water fee by users and to manage the continually increasing amount of accumulated money until it is paid in to the bank account once a month. Nevertheless, the O & M of the facilities is quite steady because of a good understanding of the necessary work among local people due to very clear book-keeping by the caretakers and treasurer of the WATSAN. Regular reporting of the account activities at meetings of community members also contributes to such understanding on the part of water users.

Box 3-3 Water Fee System for the Point Source System with Hand Pumps in Tanzania

The Community Water Supply Management Manual which is annexed to the PIM for the WSDP announced by the MoWI of Tanzania in January, 2006 clearly states that the payment of a commitment fee (5% of the capital cost) and of the entire O & M cost is one of the responsibilities of communities.

The WATSAN committee organized in each community is responsible for the collection of this money and for the management of the resulting funds using a bank account. As the level of the water fee and collection method are to be decided at a community meeting, the VC which plays a central role in the administration at the village level is expected to assist the WATSAN committee by means of urging villagers to pay the water fee. The WATSAN committee prepares a written accounting report and regularly reports on the account to the community.

This Community Water Supply management Manual recommends that non-payment of the water fee should be dealt with by the provision of education for non-payers instead of a penalty as it believes a penalty to be "the last resort to show people that rules must be observed". The actual level of the water fee and the collection method are stipulated by a FMP to be prepared by each community. Local people are required to make their own decisions in line with the relevant guidelines and options as the said Manual does not propose a definitive collection method.

Source: MoWI (2006), Community Water Supply Management Manual, Annex 13 of the PIM, WSDP, United Republic of Tanzania

Relevant Example Under a JICA Grant Aid Project

In the Water Supply Project in the Lindi and Mtwara Regions, a JICA grant aid project in Tanzania, borehole water supply facilities with a hand pump were constructed at Nyengedi Village (population of 4,201 as of October, 2009) in the Lindi District in December, 2006, followed by activities to educate villagers under the soft component added to the project.

At the time of the field survey in October, 2009, the fee collection system using a transparent accounting system is managed by the WATSAN committee with the support of villagers. The fee is set as a unit price per container (Tsh 10/20 litres; same price for a 10 litre container) and users pay the fee to the water vendor each time they fetch water. The amount of the accumulated funds at the time of the field survey is as much as Tsh 2,947,000 (approximately US$ 2,300), suggesting steady management of the facility for three years since its opening.

At the end of each day, the water vendor reports the sales amount to the treasurer of the WATSAN committee. The vendor forwards the total amount of the collected fee to the treasurer once a month. When the forwarded money is deposited in the bank account every month, the WATSAN committee reports it to the Lindi District government. It is apparent that the Lindi District government has a clear picture of the account management by the WATSAN committee. The financial situation is reported to the villagers at regular village meetings.

The transparent water fee system and regular reporting of the financial situation have helped to build the trust of villagers in the management of the water supply service. In turn, this trust has led to understanding of the need to pay the water fee among villagers and the resulting steady growth of the reserve funds. When it is necessary to repair a hand pump, a local shop in the district capital is requested to procure the spare parts. As the required spare parts are dispatched from Dar es Salaam, the scope of reducing the length of the downtime is limited. Nevertheless, the availability of funds due to steady saving makes swift order placement for spare parts possible, thereby contributing to a reduction of the downtime to some extent.

Source: Interviews with staff members of the Lindi District Authority and people in Nygengedi Village as part of the field survey

3) Divided Roles of CBO-OBs, the Administration and Private Sector

In regard to the role played by the administration, its direct involvement in collection of the water fee has not been found during the Study. There are cases where the administration has introduce guidelines on how the water fee can be collected or has provided conveniences when a water management committee hopes to open a bank account. In the case of Level 1 facilities, there are not many cases of a CBO-OM being required to report the account to the LGA in charge. One concrete case is found in southern Tanzania where a WATSAN committee controlling Level 1 facilities at 11 sites following Japanese grant aid reports on the account and other matters to the LGA every month. In this particular case, the WATSAN committee assigns a water vendor to each site and sells water at a unit price per container. As these water vendors are allowed to take a commission at a specified rate (for example, 10%) when they forward the proceeds to the treasurer of the WATSAN committee very month, they can be considered to belong to the private sector in a broader sense. This collection method is believed to make water users aware of the importance of water saving. However, it is a rather difficult method to adopt without trust between the water vendors and users because of the absence of water meters or another means to verify the volume of the water sold.

(4) Pending Issues and Lessons Learned

Level 1 facilities, the repair cost of which is low with no requirement for continual spending for O & M (fuel cost and electricity cost), are a popular choice in rural areas where many people cannot expect to earn regular cash income because of their dependence on rain-fed agriculture and/or grazing for their livelihood. With these facilities, however, even if the water fee is regularly collected in the immediate aftermath of their construction, payment eventually becomes irregular in many cases. Late payment may be accidental due to insufficient cash income caused by a poor harvest but can also occur due to different reasons. These include the amount of the existing fund being judged sufficient to pay for repair, no arrangements to succeed to the work of the treasurers after his relocation or death, discovery of the wrongful use of the funds and refusal to pay the fee on the grounds of poor hygiene at the hand pump site.

1) Setting of Reasonable User Fee for Level 1 Facilities and Its Publicity

As already described, it is not easy to develop a precise model to determine a reasonable user fee for Level 1 facilities because of the diversity of spare parts, quality of the construction work, depth and conditions of the water source and method of use. Nevertheless, some generalisation is possible using the recommended frequency for the replacement of spare parts by the hand pump manufacturer and other information. The O & M cost of these facilities actually consists of the cost of spare parts and the cost of running the O & M system adopted at each site (payment for a hand pump repairer and caretaker and other expenses). Publicity of the overall O & M cost and the necessary level of the user fee per household at the national or regional level should prove to be more efficient and effective to make people aware of these costs compared to similar publicity at the individual project level.

In Zambia, efforts are being made to refine the O & M cost calculation model by means of accumulating real data on the frequency of spare parts replacement based on sales data on spare parts. At the same time, a reliable spare parts supply chain is being developed. This example of Zambia constitutes a good reference as it is increasingly necessary to set the O & M fee (i.e. water fee) charged to users at a reasonable level if a reliable spare parts supply chain is to be developed.

2) Motivation of Water Users to Pay the Water Fee

Several ways can be conceived of to motivate water users to pay the water fee, including a relevant clause in the national policy or guidelines upholding the beneficiaries-pay principle, the bylaw of a CBO-OM to be prepared at the time of project implementation with a penalty clause (such as the temporary suspension of water sale to those violating the bylaw) and "awareness building" (sensitisation) through continual educational activities.

In general, the education of water users relies on the use of illustrations and/or slides in a workshop which is held using a participatory technique, such as PRA. Here, it is necessary to make people think about what will happen if the water fee is not properly collected by their own community and what can be done to prevent the undesirable outcomes of non-payment. As the afore-mentioned case of Zambia illustrates, the use of a participatory technique to involve the local community in the decision on the level of the water fee should help people to obtain a good understanding of the importance of payment. It is essential to gain people's trust in the water fee collection system by means of clearly

explaining the purpose of collection, flow of the collected money and reporting on fund management to maintain the transparency of the water fee collection work.

No case has been found during the Study of the use of a penalty to punish non-payment of the water fee leading to actual payment even though such payment is clearly required under the water supply system in place. In most cases, non-payment is dealt with by deferred payment until the non-payer can afford to pay (which may never occur), a request to pay as much as possible or tacit acceptance. It is, in fact, more realistic to examine a different but feasible way of payment (for example, payment in kind) or to resort to sensitisation (i.e. awareness education). There is a case of such alternatives being included in the national manual (Tanzania).

As a means of motivating people to pay the water fee, persuasion of the necessity for such payment is generally considered to be more effective than draconian measures, such as suspension of the right to use water mentioned above. Promotion of the understanding of the legitimacy of the water fee as a counter payment for the use of the facilities should also prove effective. This can be achieved by calculating the negative cost of the lack of clean water, such as the cost of treating water-borne diseases, as part of sanitation education involving the local community.

The implementation of a water supply project only after full examination of the likely local demand for a stable supply of clean water and also of the feasibility of water fee collection is desirable instead of trying to motivate water users to pay the water fee after the completion of water supply facilities. One way to solve this issue is to request local people to pool their money to create a fund prior to the construction of facilities. The decision of whether or not a project should go ahead should only be taken after sufficient funds have been made available (there are many cases of this approach in Zambia, Tanzania, The Gambia and other countries).

Realistically, it is difficult for one side to cancel a project to construct water supply facilities even if the people benefiting from the project fail to provide sufficient funds prior to the construction of these facilities (especially in the case of a grant aid project). In this case, the adoption of a different approach is necessary. One possible approach is the provision of prioritised assistance for educational activities during the construction period at those sites where fund raising to cover the O & M cost has been slow while regarding

the degree of fund raising achievement as a useful yardstick to determine the required intensity of the subsequent capacity building of the user community.

3) Supervision and Monitoring by the Administration

While the O & M of Level 1 facilities is basically conducted by the local community, supervision and monitoring by the administration, especially the LGA, should prove effective for water fee collection and fund management. The opening and management of WASHE accounts by district authorities under the SOMAP in Zambia is one example of ensuring the transparency of fund management through the intervention of the administration. However, the Study found hardly any examples of the involvement of the administration in the use or management of the collected water fee. In addition to the management of an integral bank account, the administration should try to clarify the responsibility of CBO-OMs in regard to accounting by means of conducting regular monitoring as well as auditing of the accounts of CBO-OMs and also by making the reporting of the account by CBO-OMs to the local community a compulsory requirement.

In those communities where the application of internal pressure on or a penalty for non-payers is difficult because of the traditional social rules or culture, guidance by the administration to minimise non-payment could be effective.

4) Fair Collection of Water Fee

When the amount of the water fee is not a heavy burden for most people, the collection and management of the water fee can be conducted in a transparent manner. The water fee collection system can naturally function well if it is supported by water users.

Any institutional arrangement (for example, a lower fee or exemption) designed to help the poor in a community can be considered to be part of the solution to the problem of how to secure funding by the community for the O & M of water supply facilities. A water supply and sanitation project should emphasise building of the community's ability to identify and solve problems in the process of planning and implementing activities to support the community. There may be a case where it is desirable to plan a project/programme in conjunction with a component to boost the household income. The case in point is that it is difficult to evenly distribute the O & M cost among community members as a large majority of them are poor or that water fee payment constitutes a

heavy burden on family finance. Another important point here is the importance of accurately understanding the traditional mutual help system in a community so that the project planners can discuss new mutual help measures as a further development of the traditional system with the user community.

3-1-3 Strengthening of the O & M System

(1) Background

The hand pump O & M system in Sub-Saharan Africa is believed to originate from the three tier system which was introduced in the development process of the second generation of hand pumps, such as the India Mark II (see 2-6-1 - History of Hand Pumps). This three tier system consists of preventive maintenance involving such non-repair work as cleaning and the replacement of expandable parts which is conducted by the community (first tier), minor repair by a local repairer (second tier) and major repair by a government repair team (third tier).[37]

To ensure the proper functioning of this three tier system, constant efforts have been made to improve both the hardware (for example, development of a VLOM hand pump) and facility management (for example, introduction of a CM technique to CBO-OMs) (see 2-6-2 - Evolution of Community Management). Further efforts are being made in many countries to consolidate the necessary conditions, including the establishment of a spare parts supply chain, for appropriate O & M (see 3-1-4 - Establishment of a Spare Parts Supply Chain).

These efforts have achieved certain positive results to solve the various problems associated with the O & M system for Level 1 facilities. However, sole reliance on individual efforts to realise a truly sustainable O & M system for hand pumps is difficult. This difficulty to achieve a sustainable O & M system is vividly illustrated by the very high non-functioning rate of hand pumps in rural areas of African countries as shown in table 3-1-4.

---

[37] In this Study, preventive maintenance is defined as cleaning around the water point and the replacement of expendable parts, such minor repair as the replacement of broken parts by a local repairer using a toolkit and such major repair by the government as borehole cleaning, hand pump replacement and other major work.

Table 3-1-4 Estimated Non-Functioning Rate of Hand Pumps in Rural Areas of African Countries

No.	Country	Percentage Non-Functioning	No.	Country	Percentage Non-Functioning
1	Angola	30%	11	Madagascar	10%
2	Benin	22%	12	Malawi	40%
3	Burkina Faso	25%	13	Mali	34%
4	Cameroon	25%	14	Mozambique	25%
5	DRC	67%	15	Niger	35%
6	Ethiopia	35%	16	Nigeria	50%
7	Ivory Coast	65%	17	Sierra Leone	65%
8	Guinea	20%	18	Uganda	20%
9	Kenya	30%	19	Zambia	32%
10	Liberia	31%	20	Zimbabwe	30%
				Total	34%

Source: Rural Water Supply Network (May, 2007): Handpump Data, Selected Countries in Sub-Saharan Africa

The O & M of Level 1 facilities is primarily conducted by CBO-OMs. However, it is essential for all stakeholders to function together in a coordinated manner for a CBO-OM to be able to properly conduct O & M work.

In the case of Tanzania for example, the role expected of each stakeholder is clearly defined as shown in Table 3-1-5 to establish an administrative framework for the O & M of rural water supply facilities.

There are cases which indicate that the obligations of each stakeholder are not properly met in addition to the insufficient nurturing of CBO-OMs. The limited reduction of hand pump downtime due to the difficulty of obtaining spare parts despite a good level of savings through the introduction of a VLOM pump is a case in point (Zambia prior to the implementation of the SOMAP). Another example which can be found in many countries (Tanzania and Mozambique to name just two) is that the repair of hand pumps is not properly conducted due to low awareness of the importance of contributing to the O & M fund among local people. This occurs despite the fact that a village in question is located in an area where both spare parts and a hand pump repairer can be easily secured. In this section, the roles to be performed by stakeholders to establish a community-level O & M system are examined from the viewpoint of the three tier system outlined earlier.

Table 3-1-5 Roles of Stakeholders in the Water Supply Service and System Management in Tanzania

Ministry of Water and Irrigation (MOWI)	• Develops sector policies and strategies • Advises EWURA in formulation of technical guidelines/standards • Co-ordinates planning for projects of national importance • Secures finance for national level projects • Monitors performance and regulates COWSOs • Provides technical guidance to Councils • Provides technical guidance and co-ordination for Water Supply and Sanitation Authorities (WSSA) • Co-ordinates and monitors WSSA strategies and plans
Regional Administration and LGA Regional Secretariat	• Representation on WSSA Boards • Provides technical advice and support to LGA authorities • Supervises and monitors LGA authorities
LGA Authorities (Municipal and District Councils)	• Representation on UWASA Boards • Coordinate UWASA budgets within council budgets • Delegated performance monitoring and regulation of COWSOs • Provide and/or promote on-site sanitation • Formulate (and enact) by-laws concerning water supply and sanitation
Water Supply and Sanitation Authority (WSSA)	• Own, manage and develop water supply and sewerage assets • Prepare business plans to provide water supply and sanitation services, including investment plans • Secure finance for capital investment and funding sources for relevant subsidies for service provision • Contract and manage Service Providers • Provide services not contracted out
Service Provider (SP) (Construction company, private sector consultant or other)	• Provide water supply and sewerage services in accordance with contractual requirements • Collect revenues for services • Construct water sector infrastructures, provide consultancy services and supply goods • Train communities in water related aspects
Village Councils	• Promote the establishment of COWSOs and provide representation on COWSO management bodies • Coordinate COWSO budgets within council budgets • Formulate by-laws concerning water supply and sanitation
Community Owned Water Supply Organisation (COWSO)	• Own and manage water supply assets • Operate and maintain water supply assets • Determine consumer tariffs • Collect revenue for the provision of services • Contract and manage Service Providers

Source: Government of Tanzania (2006) National Water Sector Development Programme (WSDP) 2006 to 2015

(2) Examples of Strengthening of O & M System

1) Towards an O & M System as a Balanced Mechanism

In Sub-Saharan Africa, the principal aim of efforts to develop an O & M system has been shifting towards the development of a general mechanism for O & M from the

conventional approach of setting up local O & M systems. This comprehensive approach focuses on not only the capacity building of communities which are expected to play a central role in O & M but also on the surrounding environment and institutional system to support these communities.

In the case of Zambia for example, as the National Guidelines for Sustainable Operation and Maintenance of Hand Pumps in Rural Areas clearly state the necessary conditions for sustainable O & M, concerted efforts are being made to achieve these conditions which include the technical capability of a community, awareness (appreciation of the advantages of a reliable and adequate safe water supply) and adequate fund raising. The Guidelines also mention several matters, the improvement of which is essential for the proper O & M of rural water supply facilities. These are the availability of spare parts, good workmanship, monitoring/evaluation and legal provisions. Emphasis is placed on the necessity to develop a sustainable O & M system as an organic mechanism which combines solutions for individual problems.

Box 3-4 Essential Conditions for Sustainable O & M in Zambia

The national guidelines in Zambia have identified the following essential conditions for an O & M system for a point source system with hand pumps.

- Skills: Capacity building of communities to ensure that they are effective in their participation at the various stages of the RWS programme. Considerable investment should be made in terms of time and funding to effectively carry out capacity building initiatives.
- Awareness: User communities' appreciation of the advantages of reliable and adequate safe water supply. This will see the manifestation of economic and social benefits and improvement in their health status. This is achieved through public campaigns.
- Availability of spare parts: The necessary materials and equipment should easily be available for communities to keep the systems operational using the skills imparted during the capacity building process. Sustainable supply chains should be established at the district level for providing necessary spare parts and materials at a reasonable market price.
- Adequate fundraising by communities: Community financing towards O & M activities at the community level should be developed and enhanced. This should include accurate cost determination of O&M for different available technologies.
- Making funds available for O & M: Identification and facilitation of income generating activities will have to be undertaken by the Government and support agencies. The establishment of loan schemes could be a bridge towards community financial independence in effectively managing their RWS systems.
- Legal provisions: Appropriate legal provisions such as statutory instruments, by-laws, regulations and other similar initiatives should be introduced. This will prompt communities to be committed and to establish clear ownership of the facilities. Local Authorities may have to formulate by-laws to enforce these Guidelines.
- Monitoring and evaluation: There should be effective monitoring of the entire set up of the O & M systems to ensure sustainable O & M is achieved.
- Mechanism of Quality Control: Mechanisms should be developed that will ensure good workmanship of the water supply installations. Poor workmanship is a recipe for failure of efficient and effective O & M systems.

Source: Ministry of Local Government and Housing (2007), National Guidelines for Sustainable Operation and Maintenance of Hand Pumps in Rural Areas, Republic of Zambia

2) Clarification of Roles and Capacity Building

Clarification of the roles to be played by stakeholders in relation to O & M due to the development of policies and guidelines in many countries has now reached the stage where the capacity building of each actor is a pressing issue so that all actors can properly perform their expected role.

Even though the roles of stakeholders in relation to the point source system with hand pumps in rural areas of Sub-Saharan countries have not basically changed from the long-advocated three tier system, there are several areas where the roles of some stakeholders now differ from those under the three tier system. These are (i) the role of the central government in the third tier has been transferred to LGAs and (ii) area pump repairers in the second tier are now approved by LGAs, resulting in the new thinking of including regular inspection, which used to be part of the role performed by the first tier, in the scope of work of these repairers (see Fig. 3-1-4).

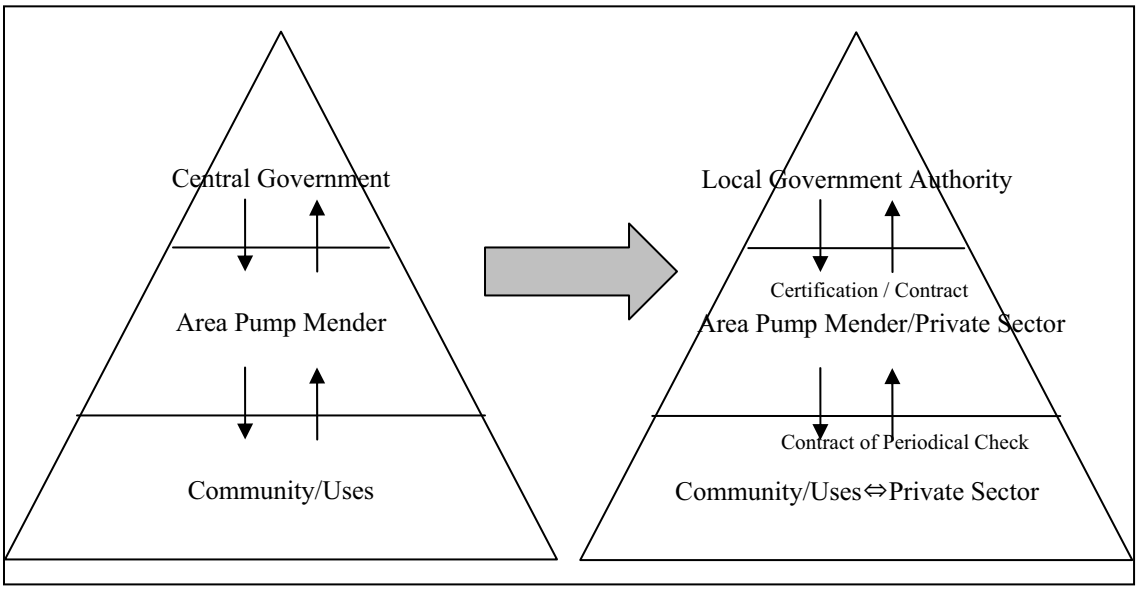


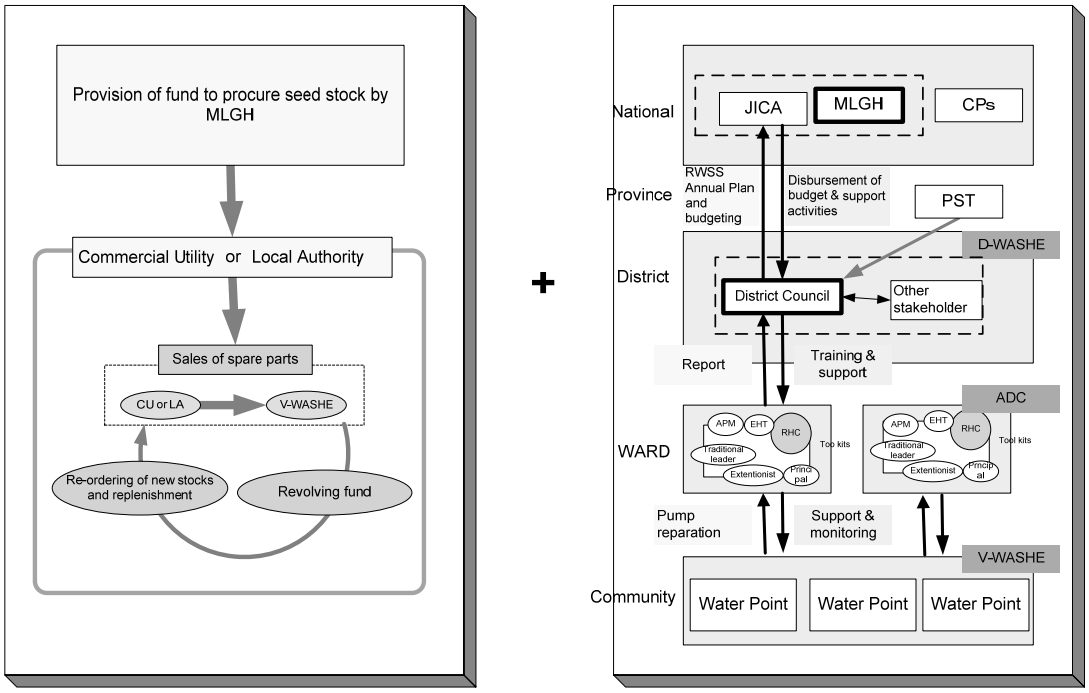
Fig. 3-1-4 Change of Three Tier System by Decentralisation and Participation of Private Sector (Burkina Faso)

The transfer of the central government role to LGAs means that LGAs now provide assistance for complicated repair work instead of the central government. What will be increasingly required of LGAs in the coming years will be less direct involvement in

repair work but the creation of an appropriate environment for an O & M system led by local communities. To be more precise, this environment means indirect technical and financial support for CBO-OMs, bridge-building between CBO-OMs and private enterprises, support for the efforts of local people to form CBO-OMs and supervision and monitoring of the O & M system.

The possibility of entrusting O & M work to the private sector is being examined in some Sub-Saharan countries for Level 2 and Level 3 facilities. As far as the O & M of Level 1 facilities is concerned, there have been few cases and the use of the private sector still remains an option. When the private sector is defined as private enterprises, no progress has been made on the grounds that the management of hand pumps by private enterprises does not fit with the prevailing rural conditions. An official of the Zambian MLGH states that the water supply service is not an attractive business for private enterprises in view of the low profit margin, scattered houses, small population and low cash income of the rural populace. From the viewpoint of local people, participation in a participatory O & M system where they are allowed to pay the water fee in kind, such as agricultural products, may be possible but not in a system where they are required to regularly pay cash to a private enterprise. This observation is likely to be relevant to most rural areas in Sub-Saharan Africa. However, there is a case in Burkina Faso where the contract method is being tried using area pump members (private enterprises) for the O & M of Level 1 facilities (see Box 3-6).

In such technical cooperation projects of JICA as the SOMAP in Zambia and the WAS-CAP in Ethiopia, efforts are being made to strengthen the capacities of stakeholders and their relationship in conjunction with improvement of the hard aspect of facility O & M, i.e. supply of spare parts. The changing roles of stakeholders in the O & M of Level 1 facilities and the necessity to strengthen their capacities lay behind such efforts.



①Establishment of supply chain of spare parts　②Establishment of O&M system from community to MLGH

Source：Document of the SOMAP Phase 2

Fig. 3-1-5　Concept of the SOMAP

In the pilot project for the SOMAP, packaged assistance is being provided, combining assistance for skill and capacity building in the first tier (V-WASHEs) and second tier (area pump members: APMs) of the three tier system and assistance for capacity building of the district authorities in the third tier to monitor and supervise other lower-ranked stakeholders. As shown on the left-hand side of the diagramme in Fig. 3-1-5, district authorities (LGAs) are directly involved in the supply of spare parts (or indirectly if supply is provided by commercial utilities) and supervise the supply chain through sales management, inventory control and price control in this SOMAP model. The district authorities also supervise the activities of the V-WASHEs through the latter's deposit account with the authorities. They also check hand pump repair activities using the repair logs submitted by APMs to the authorities.

(3)　Analysis of the Present Situation

1)　Flow of Repair Work (Strengthening of Inter-Group Relations)

One principal objective of the O & M system for Level 1 facilities is shortening of the downtime from the breakdown of a hand pump to the completion of repair. The capacity building of individual stakeholders does not necessarily lead to a substantial shortening of the downtime without good coordination among the stakeholders. It is essential for LGAs to monitor the satisfactory performance as well as ability to meet their responsibilities of CBO-OMs and hand pump repairers with a view to conducting the capacity building of these groups if necessary. It must be noted that the proper recording and accumulation of repair-related data (sales records of spare parts, nature of breakdowns, data by district, etc., claimed and actual service life of each spare part and others) are essential to ensure efficient and effective O & M activities in the future.

In the SOMAP model, V-WASHEs open an account at the office of a district authority and pay the cost of spare parts to the district authority or CU from this account. An actual request for repair is made to an APM who subsequently submits a repair record to the district authority after completing the repair work.

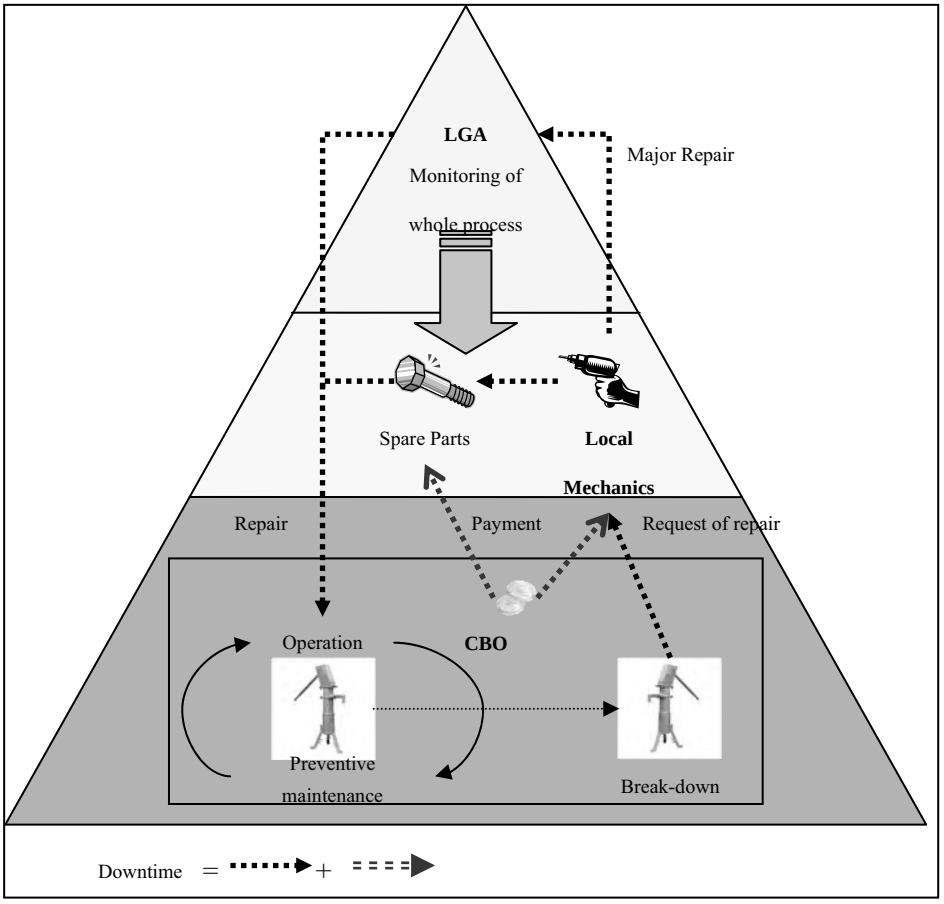


Fig. 3-1-6 Repair Work Flow

2) Role and Status of Hand Pump Repairers

When attempting the capacity building of stakeholders and the establishment of a functional mechanism involving all stakeholders, hand pump repairers who directly conduct repair work are the most important from the technical aspect of this mechanism. In the case of the Afridev pump developed based on the VLOM concept, newly constructed facilities can be handed over to the community after the training of a caretaker of the village water committee. This is because of the fact that routine inspection and the replacement of expendable parts can be conducted using a spanner which comes with the pump. In contrast, a special toolkit is required for the India Mark II pump even for simple repairs. It has been a common practice for Japan's grant aid projects involving this type of pump for repairers of the administration to be provided with such a toolkit before training. As part of a project, however, this training tends to be very short and its contents, including the technical level of the training, are often found to be insufficient. To make matters worse, the toolkits, which can be described as public goods, are not properly controlled in many cases. Some projects of other donors or NGOs train private sector repairers and equip them with the necessary tools as the number of repairers in the public sector is insufficient. Here, there is an inherent risk of these private sector repairers not adequately maintaining their tools as well as skills. Even if a village water committee raises the necessary funds to cover the repair cost or procures spare parts, the inadequate skills of these repairers can quickly result in another breakdown.

To improve this situation, JICA has been attempting to properly control hand pump toolkits (the SOMAP in Zambia as described in Box 3-5) and to introduce an official certification system for hand pump repairers (Mozambique and Burkina Faso as described in Box 3-6) in its technical cooperation projects. In the case of the SOMAP in Zambia, toolkit leasing and repair work reporting systems have been introduced along with the training of private sector repairers (APMs). Efforts have also been made to prepare a manual under the national sector programme. In Burkina Faso, a certification system has been introduced with French assistance based on the SWAp and is being extended to cover the entire rural water supply sector. Both the control of toolkits and the certification system are positive efforts as not only the capacity building of hand pump repairers but also development of the capacity of LGAs to conduct the supervision and monitoring of the O & M system are simultaneously sought from the viewpoint of providing an adequate hand pump repair service.

3) Integration of Repair Processes Corresponding to Different Breakdown Levels

The common notion is that repair processes corresponding to the specific levels of hand pump breakdown are gradually integrated in accordance with the growing clarification of the role(s) of each stakeholder as a result of the introduction of a common O & M system for Level 1 facilities based on the SWAp in the rural water supply and sanitation sub-sector. This integration is expected to achieve a quicker response to a discovered breakdown to shorten the hand pump downtime and also to reduce the number of incidents where erroneous repair work worsens the breakdown condition.

What are critical here are accurate judgement of the level of breakdown and smooth communication. It is essential for all stakeholders to have a good understanding of (i) the entire repair mechanism and (ii) the expected role(s) of each stakeholder. In this context, decentralisation means that LGAs must constantly monitor all aspects of repair work to ensure the normal functioning of the repair mechanism.

Most of the subject countries of the Study have already established an integrated repair mechanism under a government policy or are debating the feasibility of such integration except for Sierra Leone. The Study has found that even in countries where a national repair mechanism at the rural water supply and sanitation sub-sector level is being introduced (for example, Level 1 facilities in Zambia and Level 2 facilities using a solar power generation system in The Gambia), the actual functioning level of this mechanism as an institutionalised arrangement varies from one LGA to another. The prevailing impression among the Study Team members is that the level of O & M for Level 1 facilities is significantly better if those in charge at the LGA level conduct monitoring and guidance based on an accurate understanding of the repair mechanism in place.

Box 3-5 Control of Toolkits for Repair of Hand Pumps (Zambia)

The authority of the pilot district (Mumbwa District in the Central Province) for the SOMAP in Zambia has prepared an inventory book of the toolkits used for the repair of hand pumps. The Area Development Committee (ADC) stores and rents these toolkits for a fee to APMs. the district authority has an exclusive account for the toolkit rental operation and any cost of replacing damaged toolkits is paid from this account. A deadline on the return of the rented toolkits is imposed. The toolkit usage situation can be checked with the relevant reports submitted by the ADC to the district authority, making the efficient (shorter rental period) and sustainable (reduced incidents of toolkit breakage and availability of funds for the replacement of damaged toolkits) use of toolkits possible. On its part, the district authority which receives reports from the ADC can understand the relationship between the APMs and actual contents of the repair work. As the district authority has a good picture of not only the repair work but also the technical ability of each APM (poor skills can lead to more breakdowns), it can control the APMs in an adequate manner.

Example
The ADC of Mukulaikwa in the Mumbwa District rents toolkits to APMs at a rate of ZMK 5,000 (approximately US$ 1 for three days. When return of the toolkit is delayed, an additional ZMK 1,000 is charged per day. The repair work is conducted by an APM for ZMK 50,000 and accepts either cash payment or payment in kind by a V-WASHE. Payment of the rental charge for a toolkit to the ADC must be made in cash.

Source: JICA, SOMAP (2009)

Certification of Hand Pump Repairers (Mozambique)

In Mozambique, an ongoing technical cooperation project of JICA in Zambezia Province is attempting the development of a system whereby the ability and work of hand pump repairers can be easily checked by the administration (at the district and provincial levels) using an ID card for certified repairers, lists of communities served by repairers and agreements signed by the district authority, repairers and communities (water supply committees and village heads). The ID card issued to each repairer, who is judged to have acquired certain skills after training, by the competent district authority has an expiry date. The conformity of the work completed by a repairer with the terms of agreement with a community is judged based on the work completion report. In the case where the performance of a repairer is found to be poor, the repairer must undergo retraining or his certification could be withdrawn. The validity period of certified status initially lasts for one year as a probation period. Once the ability and performed work are judged to be acceptable during this probation period, the validity period of certified status is extended for a further three years. This is an attempt to reduce the downtime of hand pumps by means of clarifying the responsibility of repairers to maintain adequate skills.

Source: JICA Technical Cooperation Project for Promotion of Sustainability of Rural Water Supply, Hygiene and Sanitation in Zambezia Province, Mozambique

(4) Pending Issues

1) Necessity to Develop an Environment for a "Sustainable System" to Function

In Sub-Saharan Africa, the system required to ensure a sustainable water supply service involving Level 1 facilities must be capable of the continual operation of hand pumps with the quick repair of breakdowns. While CBO-OMs are primarily responsible for their own fund raising and preventive maintenance of hand pumps, they should be able to request a

repairer or LGA to conduct repair work which is beyond their capability. The use of private enterprises should also be an option for them.

For the stable O & M of Level 1 facilities, dispersion of the risks and higher efficiency of the service must be sought while upholding the beneficiaries-pay principle. To achieve these requirements, concentration of the roles with a few stakeholders must be avoided and the abilities of each stakeholder should be improved in addition to good coordination between all stakeholders. In short, a sustainable O & M system means a proper functioning mechanism based on the enhanced abilities of the individuals and organizations involved in O & M and good relationships. In the case of the SOMAP for example, the rejuvenation of non-functioning O & M systems is being attempted by means of combining the capacity building of repairers, development of a spare parts supply chain, leasing of toolkits and monitoring based on repair reports. The preferable division of responsibilities and roles between different stakeholders depends on the national and regional-level sector strategies, socio-economic conditions and capacity of the administration. Improvement measures must be based on assessment of the present situation and analysis results of problems.

2) Necessity to Continually Strengthen Individual Stakeholders

The capacity building of CBO-OMs and repairers has been conducted by donors and governments of recipient countries and continued assistance is required. The development of CBO-OMs and promotion of awareness education led by CBO-OMs on the importance of water fee payment are essential for the adequate O & M of Level 1 facilities and the role of CBO-OMs cannot be replaced by other stakeholders. As the skills of repairers directly conducting hand pump repair work determine the service life of hand pumps, the continual training of repairers is a priority. In Sub-Saharan Africa, the entry of private enterprises into the field of the hand pump repair service is not a strong likelihood. This situation increases the importance of repairers operating as small-scale entrepreneurs.

Meanwhile, Burkina Faso has introduced a certification system for pump repairers for each type of pump in its rural water supply and sanitation sub-sector programme. This certification is based on the experience and skills of individual repairers and there is a mechanism for certified repairers to develop their business through contracts with communes. Under such contracts, repairers provide a broad hand pump O & M service which includes not only the repair of broken hand pumps but also regular inspection and patrols. In this way, repairers can build a stable business (see Box 3-6). Conventional

direct assistance for the skill training and capacity building of repairers does not guarantee the perpetual availability of a repair service. This new mechanism of stabilising the income of small-scale entrepreneurs (repairers) while maintaining their skill level is evaluated as being valuable even though it is still at the trial stage.

Box 3-6 O & M Agreement for Level 1 Facilities Between LGAs and CBO-OMs in Burkina Faso

In Burkina Faso, a commune (newly established local administrative unit resulting from the administrative reform under decentralisation; equivalent to a previous district authority) concludes an O & M agreement (Convention de Delegation de Gestion des PHM) with an AUE which is established at the village level to entrust the O & M for Level facilities to the AUE.

The AUE collects the water fee which is determined by the commune and applied throughout the area of its jurisdiction via the CPE and deposits it in the AUE bank account for the purpose of O & M. Part of these funds are paid to the commune by the AEU to pay the cost of regular inspection and patrols (approximately FCFA 6,000 ~ 8,000/year). These funds are also used to cover the routine maintenance cost and repair cost of broken hand pumps (cost of spare parts, travelling cost of the repairer and cost of labour).

O & M Agreement Between AUE and Individual CPEs

The AUE is responsible for the management of all water supply facilities in a village and concludes an O & M agreement with individual CPEs, each of which manages its own water supply points in the village. While the AUE is responsible for fund management and coordination with the commune as well as hand pump repairers, each CPE conducts the following work.

- Continuous water supply service for water users
- Water fee collection and its deposit
- Daily operation and inspection of hand pumps
- Maintenance of proper use of hand pumps
- Prevention of breakdowns and theft of hand pumps
- Cleaning around hand pumps
- Regular reporting to the AUE

Regular Inspection Contract Between Commune and Hand Pump Repairers

Burkina Faso is currently extending the system to officially certify and register those ARs whose skills and experience have reached a certain level as certified hand pump repairers (maintenancièr). Most ARs were originally trained under water supply facility construction projects in the past.

The commune invites certified hand pump repairers to tender for the regular inspection of Level 1 facilities. Hand pump repairers accepting this invitation bid for the bundle of the following cost items and the lowest bidder concludes a contract for regular inspection.

- Regular inspection fee (FCFA/hand pump/visit)
- Repair cost of hand pump above the ground (FCFA/hand pump)
- Repair cost of hand pump under the ground (with less than 10 raiser pipes) (FCFA/raiser pipe)
- Repair cost of hand pump under the ground (with 10 or more raiser pipes) (FCFA/raiser pipe)
- Transport cost (FCFA/km)

This attempt to entrust the O & M of Level 1 facilities to the private sector is currently at the forefront of the SWAp which is actively being promoted in the rural water supply and sanitation sub-sector.

Source: JICA Technical Cooperation Project for Maintenance of Water Supply Facilities and Sanitation Improvement in Central Plateau Region of Burkina Faso

3) Necessity to Coordinate Stakeholders and to Strengthen Coordination Capacity of the Administration

The improved coordination of various stakeholders is necessary for the smooth execution of the O & M service based on a mechanism designed to ensure the well-organised flow of work of individual stakeholders. As the improved capacity of LGAs to perform their O & M-related responsibility is essential to develop and sustain such coordination, assistance for the capacity building of the administration must be provided along with assistance for the capacity building of CBO-OMs and repairers.

Under the current O & M system for Level 1 facilities against the background of ongoing decentralisation, all stakeholders of the conventional three tier system should ideally maintain close contact with communities as aimed at by the SOMAP model in Zambia where the swift supply of spare parts and quick repair can be arranged within the geographical boundary of each LGA.

In regions like Sub-Saharan Africa where the activities of private enterprises are fragile and the development of infrastructure is far from complete, LGAs are practically the only existing organizations which are capable of providing broad services in rural areas (even if both the quality and quantity of these services are inadequate).

The Study has confirmed that the ability of each LGA determines the overall performance of the O & M system. In the Mumbwa District, a pilot district of the SOMAP in Zambia, the ability of the district authority to adequately conduct O & M monitoring as well as provide vital information to other stakeholders has led to transparency of the fund flow for repair work and maintenance of the standard of repair work. Consequently, a desirable cycle is emerging where these achievements bring about growing trust in the O & M system of CBO-OMs, resulting in the acceleration of water fee collection to build up repair funds and the opening of bank accounts at the office of the district authority. In the Monze

District which is another pilot district of the SOMAP, the performance level of the district authority is relatively low,[38] limiting the effectiveness of the SOMAP model of O & M.

It is no exaggeration to say, therefore, that whether or not the progress of the capacity building of individual stakeholders leads to the effective realisation of the primary objective of reducing downtime is almost entirely dependent on the coordination capacity of LGAs.

4) Necessity for National Response to Development of Suitable O & M Environment

In areas where the capacity of the LGA is extremely low, undesirable cases have been discovered by the Study. These include the complete delegation of the O & M responsibility to CBO-OMs regardless of their capacity (this is because of the fact that a staff member may lack the ability to create documentation or to add data using a PC which is necessary to supervise many CBO-OMs and the lack of a means of transportation or shortage of fuel which means that such person finds it extremely difficult to perform even the basic task of visiting actual hand pump sites) and the use of a private enterprise to compensate for the insufficient capacity of CBO-OMs (in Rwanda where a climate of favouring the private sector no matter what appears to exist). Although improvement of the efficiency of the administration is important, it does not mean that the administration has no involvement in O & M. The establishment of a sustainable O & M system is very difficult unless the administration performs its expected role in the system.

The efficient and effective functioning of the O & M system at the LGA level requires a system to continually support the activities of LGAs at the national level. The promotion of an integral SWAp in line with the rural water supply sub-sector programme enables the swift and low cost dissemination of the accumulated data, skills and experience of one area to other areas. In other words, assistance should be provided for the development of a database featuring such data, skills and experience to elaborate the SWAp, detailed analysis of the contents of this database and sharing of the database by stakeholders. One example is the attempt in Zambia to develop an information management system for the rural water supply sub-sector. A database on the sales records of spare parts which is being

[38] The proof of low performance includes (i) inability of the district authority to supervise the sale of spare parts properly performed by CUs and (ii) slow progress of activities to educate (sensitise) CBO-OMs, including promotion of the opening of a bank account at the office of the district authority, even though V-WASHEs are raising funds, i.e. collecting the water fee.

developed under the SOMAP can act as a very useful reference for not only Zambia but also for other countries where a similar type of hand pump is widely used. Assistance for the development of a database with a high level of general applicability should prove to be very effective from the viewpoint of spreading the practice of developing a similar database throughout Sub-Saharan Africa.

Box 3-7 Role of Caretaker and Caretaker Training in Zambia

Role and Responsibilities of Caretaker at Water Point

- Conducts preventive maintenance of the hand pump
- Ensures that the surroundings of the hand pump and platform are clean
- Acts as a motivator to promote good hygiene practices, proper use of the hand pump and sanitation facilities in the village
- Informs the V-WASHE of the maintenance and repair needs of the hand pump

A caretaker is not a cleaner of a water point but a facilitator who ensures that all is well at the water point. A caretaker requires adequate knowledge and skills and should, therefore, undergo training on the role of caretaker.

Duration and Topics of Training

A water point caretaker should have one–and-a-half days of theoretical and practical training. The topics to be covered include the following.

- Importance of safe water
- O&M of the hand pump
- Anatomy of the hand pump (especially the head assembly)
- Role of the V-WASHE and APM
- Role of the caretaker, tools, materials and parts needed for preventive maintenance of the hand pump
- Common hand pump problems
- Monitoring and record-keeping
- Household sanitation
- Practice of greasing the chain and tightening the nuts

Organisation

Local authorities with the support of the D-WASHE members and APMs should organise the training programme. The training should be held at a village centre, church building, rural health centre or school. Practical training should be conducted at a nearby hand pump.

Training Methodology

Participatory training sessions are held to allow participants to contribute fully. Group work/discussion sessions are also held to allow full participation. Hand pump toolkits should be available for assembly and disassembly. The assembly and disassembly of a hand pump will provide practical hands-on training. Visit to the nearest hand pump site will provide additional practical experience.

Source: Ministry of Local Government and Housing (2007), National Guidelines for Sustainable Operation and Maintenance of Hand Pumps in Rural Areas, 1st Edition, Republic of Zambia

3-1-4 Establishment of Spare Parts Supply Chain

(1) Background

The use of many different types of hand pumps spread during the 1980's which was called "International Drinking Water Supply and Sanitation Decade". In the 1990's, a problem emerged of the repair of broken hand pumps not being smoothly conducted. This situation partly arose because of the fact that manufacturers made little effort to develop a permanent supply chain for spare parts despite the appointment of local agents as they only saw a business opportunity for the initial bulk supply of hand pumps under donor projects.

Nevertheless, the actual number of hand pumps in use continually increased in the 1990's and thereafter because of growing assistance by donors, international aid organizations and NGOs for the rural water supply sub-sector. According to Colin (1999), manufacturers judged that the supply of spare parts was not a viable business because of the reasons listed below. As a result, the situation of the supply of spare parts being dependent on the government or donors continued.[39]

- The facilities using hand pumps are scattered in areas away from cities where most economic activities take place.
- The establishment of a profitable and efficient distribution system is difficult because of the low prices of individual parts.
- Payment by inhabitants for spare parts cannot be assured.
- The large variety of hand pumps with many parts means that there is only a small demand for each item.
- There is no chain of sales outlets.
- The market for spare parts is so small that viable profitability cannot be expected when the import and stock costs are taken into consideration.

39 Jeremy Colin (1999), VLOM for Rural Water Supply: Lessons from Experience, WELL (Water and Environmental Health at London and Loughborough)

(2) Examples in Various Countries

The very first task for any attempt to develop a spare parts supply chain is to determine who will play the central role in distribution in view of the specific conditions of a country. This chain may be developed by the private sector but the limited scope of supply as dictated by the progress of the installation of hand pumps requires some kind of administrative intervention in most countries. In short, the development of this chain is either primarily conducted by the administration or by private enterprises based on a contract with the administration.

Private enterprises here can mean many entities, including repairers, metal processing shops, local agents of manufacturers and public utilities, such as small urban water utilities.

1) Ethiopia

Under the WAS-CAP Project in Ethiopia, efforts are being made to select district offices, water service providers in small cities, local unions of repairers and associations of water management committees as sales outlets for spare parts and to compare their actual business performance (Box 3-8). In the past, the central government has formulated a plan to privatise district sales outlets established in other provinces through tender. Because of the absence of private bidders, however, these district offices are still operating as sales outlets. Meanwhile, the national programme of "Sustainable Hand Pump and Spare Parts Supply and Maintenance Arrangements for Community Water Supply System (Final Draft) 2009" puts forward a policy where provincial governments select suppliers through tender to establish chains of sales outlets at the district level. Although the efforts made under the WAS-CAP differ from the approach adopted by the national programme, the latter refers to the WAS-CAP efforts. The actual outcomes of the WAS-CAP and their analysis results are attracting much attention at present.

Under the WAS-CAP Project, water service providers called TWS (town water suppliers) in small cities/towns have begun to operate sales outlets for spare parts. Because they are public bodies, their use as sales outlets can be considered to be the most viable option in terms of not only their experience and knowledge of inventory control and financial management but also the availability of management facilities. The number of TWS and their service areas are not sufficiently large to cover the entire country and the establishment of additional sales outlets through the capacity development of private

bodies (unions of craftsmen and associations of water management committees (WASHCO)) is essential.

According to the sales records of TWS, WASHCOs have purchased and resold some parts (O-rings, U-seals, adhesives and others) for Afridev pumps. Any project on spare parts supply must consider viable solutions to the problems associated with the WASHCO-based supply system, such as mass purchase by a small number of sellers, limitation of purchase to the most frequently replaced parts of Afridev pumps and lack of restocking after the completed sale of the originally purchased spare parts.

2) Zambia

In the case of the SOMAP in Zambia, commercial water utilities (CUs) (private companies which are wholly owned by LGAs) in local cities are acting as sales outlets for spare parts. District authorities or CUs are currently the only stable bodies in Zambia which are capable of providing water supply and sewerage services to cover this vast country. The use of both of these bodies as suppliers of spare parts based on the relevant MOU constitutes a reasonable arrangement in view of the present conditions of the country.

In the pilot districts of the SOMAP 1 which were surveyed this time, the Monze District Authority in the Southern Province sells spare parts via the Southern Water and Sewerage Company (SWSC) while the Mumbwa District Authority in the Central Province directly sells these parts in its office building. Both of these authorities properly conduct sales, inventory control, recording and reporting. Accumulated sales records are extremely important to understand the demand level for each spare part, adequate inventory control, a stable spare parts supply business and sustained business operation.

3) Mozambique

The revised National Water Policy (a Política Nacional da Água: PNA) of Mozambique puts forward a local approach to incorporate residents' associations and private companies for the supply of spare parts for hand pumps and expresses the government's intention of developing a mechanism as well as incentives to establish a hand pump spare parts supply chain. In a Japanese technical cooperation project aimed at developing a spare parts supply system, efforts are being made to establish a supply chain with a supply chain from the

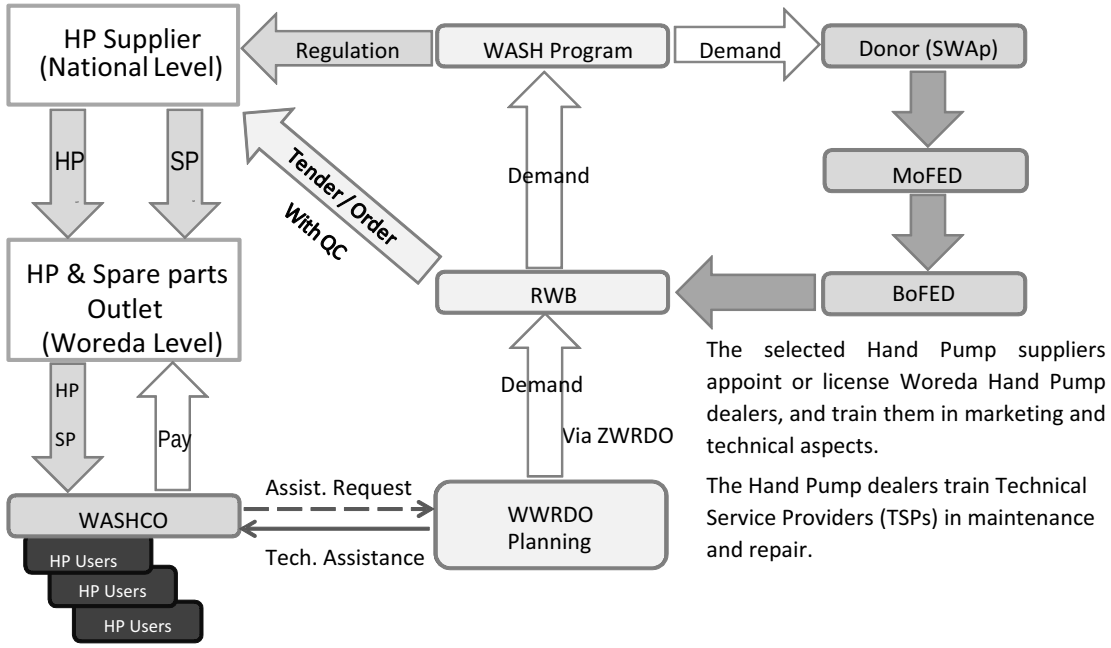
DPOPH to communities via district authorities and hand pump repairers to ensure a smooth supply of spare parts of which the unavailability is a major stumbling block for rural water supply.

4) Sierra Leone

In Sierra Leone where the systematic establishment of a spare parts supply chain has been long delayed due to the civil war, the supply of spare parts (limited to those for the India Mark II pump) is only available at private pump retailers in some local cities. The National Water Supply and Sanitation Policy in 2008, however, demands that district authorities make the necessary arrangements in response to requests by communities. At present, the construction of "water supply and sanitation offices" is in progress along with the construction of a district office building in six district capitals as part of the WASH Programme of the DFID/UNICEF. This Programme also plans the construction of warehouses for the procurement of pumps which should act as seeds for water supply and the delivery of spare parts. In view of the clearly insufficient capacity of LGAs in the water supply and sanitation sector in terms of manpower and technical expertise, it is safe to assume that the necessity for capacity development will be recognised in due course.

Box 3-8 Trial for Establishment of Spare Parts Outlets in Ethiopia（WAS-CAP）

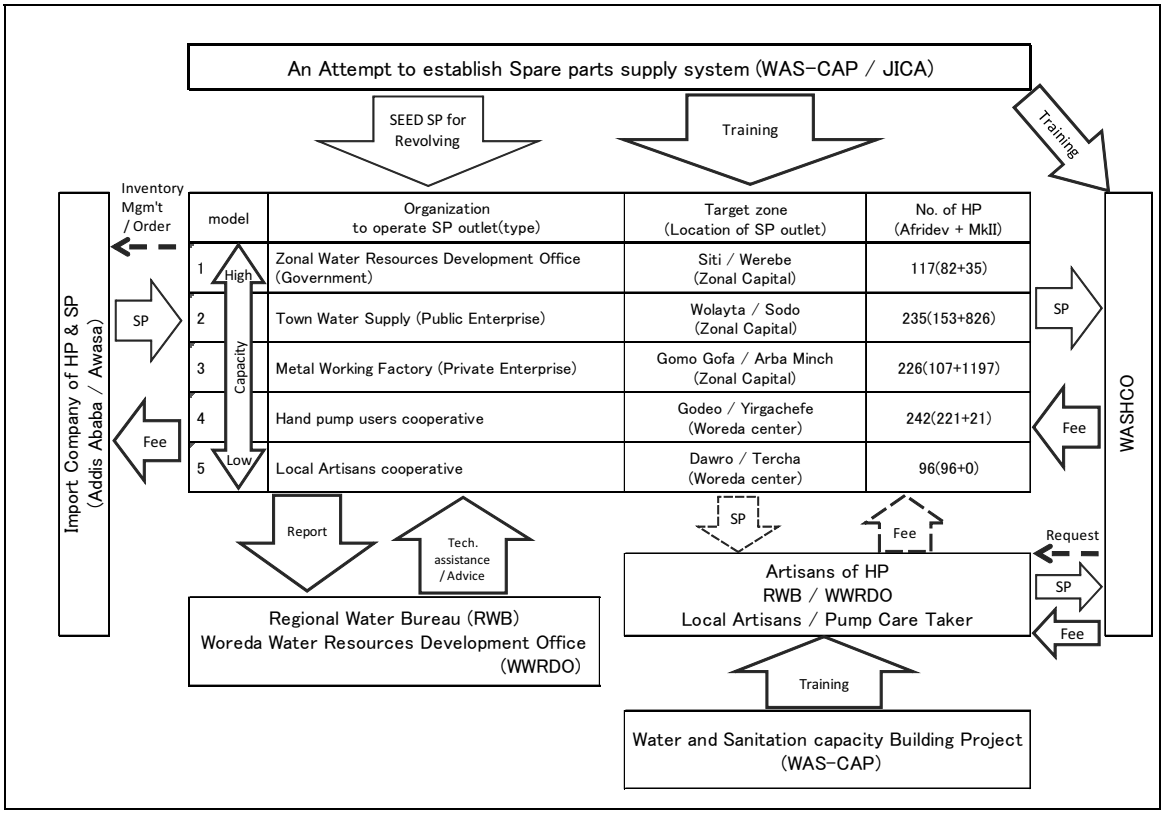
The establishment of a hand pump supply chain is an important component of the O & M framework indicated in the policy* of the Government of Ethiopia. Under this policy, the first step of reform is for each state government to conclude a contract with the central supplier to make the establishment (including training) of district level outlets the obligation of the central supplier.



* Sustainable Hand Pumps and Spare Parts Supply and Maintenance Arrangements for Community Water Supply System (Final Draft) 2009; Min. of Water Resources/FDRE

The Rural Water Supply and Environment Project in Amhara State (RWSEP: FDRE/Finland, 1994 ~ 2002) planned the privatisation of the spare parts distribution business in three steps: (i) transfer of central government control (using the distribution change of animal drugs at the district level) to control by the provincial central workshop to be newly established, (ii) privatisation using a private enterprise operating at the state level and (iii) complete privatisation. Following the supply of seed parts in 2004 under the RWSEP, each district office has set up a warehouse and dedicated bank account to sell spare parts but no private enterprises have been willing to bid for the privatisation of this business.

Even though the government is struggling to achieve this policy, efforts under the WAS-CAP to set up various outlets in southern states through capacity building at multiple levels are expected to significantly contribute to the realisation of this policy by means of providing vital information on realistic options for the establishment of district level outlets.



(3) Standardisation of Level 1 Facilities

In many Sub-Saharan countries, numerous types[40] of hand pumps have been installed in one country or even one area, causing difficulties for effective planning of the further construction of water supply facilities and maintenance of the existing facilities. In the case of Zambia for example, it is pointed out that more than 40 types of hand pumps had already been installed in rural areas by 1995.[41]

- As the distribution of spare parts is inefficient, private enterprises find it difficult to achieve a sufficient level of profitability.

- As the required repair skills vary from one pump to another, finding the right repairer can be difficult. The repair tools also differ and the restocking of damaged tools is not a simple matter.

40 Refer to the website of the Rural Water Supply Chain (RWSN), http://www.rwsn.ch/, for the detailed types and characteristics of hand pumps.

41 Ministry of Local Government and Housing (2007), National Guidelines for Sustainable Operation and Maintenance of Hand Pumps in Rural Areas, Lusaka, Zambia

- When one type of hand pump is to be replaced by another type of hand pump, the foundations must be reconstructed to accommodate the new type. This work is quite costly as well as time-consuming, especially in rural areas.

In Burkina Faso, at least five types of pumps (ABI/Diafa, India Mark II, Kardia, Vergnet and Volanta) are in wide use because of their selection for water supply facility construction projects in the past and other reasons. In the ongoing PAR project,[42] it is planned to officially certify and register those ARs whose skills and experience reach a certain level as certified hand pump repairers (maintenanciers). For Level 1 facilities of which it is assumed that the inspection and repair work is conducted by individual repairers because of their relative simplicity, the certificate specifies the name of the manufacturer. This practice indicates the need to assure the skills of each certificate holder to deal with particular types of hand pumps. In the case of Type 2 facilities for which the repair work can be much more daunting, the recipients of the corresponding certificate are assumed to be enterprises capable of repairing all types of pumps. However, no enterprise has been certified so far. In a country like Burkina Faso where many different types of hand pumps have already been installed, the standardisation of hand pumps is not a realistic option. Because of this, the country is experimenting with a mechanism aimed at maintaining a reliable supply of spare parts and a reasonable level of repair skill to serve many different types of hand pumps.

In Malawi, the Afridev pump developed on the basis of the VLOM concept was quickly declared the standard pump for mechanically dug boreholes in 1991. This standard use of the Afridev pump was followed by concerted efforts of the government and private sector (awarding of a monopoly right to sell spare parts to an existing general store chain) to develop a spare parts supply chain (Box 4-9). In Malawi, the India Mali pump similar to the India Mark II has been domestically produced as the standard hand pump and is distributed by the private sector. However, the establishment of a stable spare parts supply chain for the sustainable O & M of hand pumps is still far from a reality in most Sub-Saharan countries.

The selection criteria for hand pumps are (i) state of the aquifer (groundwater table and water quality), (ii) socioeconomic conditions (population and financial capacity to bear the O & M cost and (iii) access to spare parts in the area concerned. Because of the advantages and

---

[42] Programme d'application de la reforme du systeme de gestion des infrastructures hydrauliques d'approvisionnement en eau potable en milieu rural et semi urbain

disadvantages of each type of hand pump, the standardisation of hand pumps throughout a country is difficult. Nevertheless, standardisation with one or two types of hand pumps has excellent advantages (standardisation of toolkits, simplification of the distribution of spare parts and efficient training of hand pump repairers) as suggested by the national guidelines in Zambia. For reference purposes, Table 3-1-6 compares the hand pumps selected in the Zambian guidelines.

Table 3-1-6 Advantages and Disadvantages of Selected Hand Pumps

Type of Hand Pump	Advantages	Disadvantages
Tara	- Easy to operate and maintain	- Not easily available - Limited head
Malda	- Easy to operate and maintain	- Not available in the country - Limited head
Rope pump	- Local material can be used - Easy to install and operate - Cheap to maintain	- Not widely tested - Durability is questionable
Afridev	- Easy to install and repair - High lift	- Durability is questionable - Spare parts availability is uncertain
India Mark II	- High lift - Spare parts are readily available	- Not a VLOM pump - Expensive working tools

Source: Ministry of Local Government and Housing (2007), National Guidelines for Sustainable Operation and Maintenance of Hand Pumps in Rural Areas, Lusaka, Zambia

In some other Sub-Saharan countries, the standardisation of hand pumps is clearly indicated as a national policy. Typical countries are Malawi, Mozambique (Afridev: domestically produced) and Tanzania (four types of hand pumps, i.e. Walimi, Afridev, Malda and Tanila, all of which are domestically produced). In Rwanda, the Afridev (imported) has become the de-facto standard hand pump because of its popular use up to the present. In Uganda, the U3M hand pump, a hybrid hand pump of the India Mark II and Afridev, has been developed. Generally speaking, it is not an easy task to narrow down the types of hand pumps to be used because of the many different types of hand pumps in actual use.

In countries where several European-made hand pumps with trademark rights are popularly used (typically Senegal, The Gambia, Sierra Leone, Burkina Faso and Madagascar), it is practically impossible for the administration to dictate the use of hand pumps of specific manufacturers.

(4) State of Sales Agents and Scale of Supply Chain

Countries with a relatively large domestic economy (for example, Kenya and Tanzania) do produce hand pumps and their spare parts domestically and possess a supply chain which

extends to local cities. Some of these countries even export products to neighbouring countries and/or distribute them to sales agents in their countries. In contrast, countries with a small domestic economy (for example, The Gambia and Rwanda) rely on imports. The net sale of spare parts in these countries is small due to the small sales volume, making it difficult to sustain the sale of spare parts as a commercial business. The expansion of the domestic supply chain is limited because of such limited business prospects as well as the poor infrastructure (in terms of roads, electricity supply and telecommunications) in rural areas. Table 3-1-7 outlines the current situation of sales agents in several countries.

Table 3-1-7 Sales Agents of Hand Pumps and Spare Parts

Country	Current Situation of Sales Agents
Zambia	• 6 sales agents in Lusaka. No sales agents in rural areas
Tanzania	• More than 20 sales agents in Dar es Salaam • Tax exemption of imported materials for national companies who produce hand pumps • Sales agents exist in rural towns
Rwanda	• Only one sales agent in Kigali[43] • No domestic producer
Mozambique	• One domestic producer in Maputo (Afridev) with limited delivery chain in the domestic market • Import of spare parts from Malawi in border areas
Ethiopia	• Several sales agents in Addis Ababa • Sales agents exist in provincial capital cities but no chains in rural areas
Malawi	• Approx. 5 sales agents in Lilongwe (Afridev of government standard type) • One sales agent is a national grocery chain store (Chipiku Store) which has stores in small and medium size towns but the sales price is slightly higher than others
The Gambia	• Some sales agents in Banjul
Sierra Leone	• Some sales agents in Freetown but too little variety of spare parts to meet the local demand • Sales agents exist in a few rural towns

(5) Pending Issues Relating to Establishment of Spare Parts Supply Chain

1) Method and Transparency of Pricing

The price control of spare parts by the government may have a negative impact on the motivation of manufacturers and sales agents to enter the market and block the development of the market. In principle, it is desirable for the prices of spare parts to be decided by the market to nurture the autonomous development of a spare parts supply

[43] Davis & Shirtliff, http://www.dayliff.com/index.php

chain. One reason for the preferred avoidance of uniform nationwide prices is that these prices are significantly affected by general price fluctuations, foreign exchange fluctuations and regional differences of the transportation cost, making it very difficult to constantly change the prices of spare parts to reflect these fluctuations, etc.

In the case of the spare parts supply chain developed under the SOMAP in Zambia, the sales prices of spare parts are basically divided into two components, i.e. (i) procurement cost and (ii) sales cost. The former consists of the procurement cost and transportation cost while the latter consists of the profit, management and marketing cost, cost equivalent to a price increase when similar spare parts are to be restocked and the monetary value of the foreign exchange risk. In this particular case in Zambia, non-profit making CUs (rural water supply and sewerage corporations) are used as the sales outlets of spare parts. Accordingly, the personnel cost for sales, inventory control and other essential work is substantially contained to keep the sales prices of spare parts low.

2) Capacity Building of Suppliers

In areas of Zambia where there are no non-profit making bodies such as CUs in operation, LGAs act as alternative suppliers of spare parts. The WAS-CAP in Ethiopia is attempting to use TWSs (water supply corporations at the small city and town level) and LGAs as the main suppliers of spare parts. At the same time, the capacity building of local hand pump repairers and village water management committees is actively sought by means of organizing them into unions or associations. The principal aim is to equip these bodies with the capacity to act as the main suppliers of spare parts. As these groups have a direct link with hand pump users, they have the advantage of easily understanding the actual needs of CBO-OMs. However, one disadvantage of this approach is that these groups require training to develop the basic abilities to sustain such business activities as organized activities, record-keeping and marketing from scratch, suggesting a need for continual guidance by LGAs. It is hoped that the analysis of educational activities under the technical cooperation project and outcomes of the sales of spare parts by these unions, etc. will produce valuable suggestions for the development of a more independent spare parts supply chain.

3) Awarding of Protected Trade Rights to Private Enterprises

The scattered and uncertain demand is one reason for the perceived unattractiveness of the spare parts supply business for Level 1 facilities on the part of private enterprises. This situation is made worse when the mixed use of many different types of hand pumps necessitates the handling of many spare parts in small quantities each. One idea to solve this situation is to award protective trade rights with the responsibility to adequately supply spare parts to a private enterprise under a contract with a LGA so that the continued business of this private enterprise can be assured.

In Ethiopia, the introduction of a system for the blanket order of spare parts for each city is planned under a project[44] as the first step towards developing a spare parts supply chain (see Box 3-8). One condition is that the state government selects one private enterprise based in the state capital, etc. in exchange for the development of a sales chain throughout the state by the said private enterprise. In the case of the plan to entrust the O & M work for Level 2 facilities to the private sector in Senegal (described later in Box 4-13), the government divides the country into three zones. In each zone, one private enterprise will be selected to conduct the work entrusted by the ASUFORs. This plan includes the stocking of sufficient quantities of spare parts to serve hand pump facilities in the zone at a depot. Although the plan has not yet materialised, it represents a proactive approach to the development of a spare parts supply chain.

4) Development of Legal Framework for Procurement (Import), Tax Exemption and Other Relevant Matters

It is necessary for countries without domestic production facilities for hand pumps and spare parts (countries other than Tanzania, Kenya, Ghana, Mozambique and some others) to rely on imports to procure these goods for a project and such preferential treatment as the exemption of imported goods from various taxes is often applied (for example, tax exemption of imported goods for Japan's grant aid projects). The actual tax exemption procedure varies from one country to another. In some countries, advance application is required. In others, the responsible ministry for the project pays the tax portion or the importer who has paid the import tax applies for a refund afterwards. Hand pumps and spare parts procured in the domestic market after the completion of a project are

---

[44] Ministry of Water Resources, Ethiopia (2009), Sustainable Hand Pump and Spare Parts Supply and Management Arrangements for Community Water Supply Systems, Final Draft Report

commonly subject to import and other taxes (in Guinea and Burkina Faso, the government policy exempts them from taxes).

Meanwhile, among countries which domestically manufacture hand pumps, there is the case of the exemption of imported raw materials by the manufacturer from the import tax (Tanzania). This type of measure can facilitate domestic production and can be expected to act favourably for the establishment of a sustainable spare parts supply system as long as the quality is not compromised. It is equally possibly to imagine the case where the prices of domestically manufactured spare parts become higher than those of imported spare parts because of the specific economic circumstances of the country (inflation or failure of the principle of economy of scale to function because of the small domestic market).

It is essential to carefully decide the supply source (domestic or overseas) of hand pumps, taking the relevant national policy, tax exemption procedure and time required to complete the procedure, market price and product quality into consideration.

5) Quality Control of Spare Parts

In regard to those hand pumps for which there are no trademark rights (for example, Afridev and India Mark II), their spare parts may not properly fit because of different manufacturers and/or inadequate quality control. A mechanism to ensure the proper quality control or quality assurance of spare parts in the procurement process is, therefore, desirable. In the case of the spare parts supply system currently being examined by the Ethiopian government, LGAs (state governments in the case of Ethiopia) are expected to demand quality control as part of the annual contract awarded to a single private enterprise within each state. This arrangement may be one solution.

(6) Recommendations for development of Spare Parts Supply Chain

1) Monitoring of Reality of Spare Parts Supply

In regard to the SOMAP in Zambia, decisions on the prices of spare parts take the distribution cost, management and sales cost and risk factors relating to price inflation and foreign exchange fluctuations into consideration. The actual supply chain in any country is liable to more than the assumed fluctuations and/or unexpected costs through repeated purchase and sale over time. The capacity building of the supervising bodies (LGAs) may

well be necessary after the surveying and analysis of the reality of spare parts supply as part of a project to enable them to properly maintain a system of revolving funds[45] to ensure the repeated purchase of spare parts and review the retail prices and distribution process if necessary.

2) Reduction of Distribution, Management and Sales Costs

One reason for the private sector's inability to establish a spare parts supply chain is the prohibitively high distribution and sales costs when the actual prices and sales volume are considered because of the necessity to establish scattered sales points throughout the service area. The high distribution and sales costs may be reduced by sharing an existing supply chain for other goods. Past examples of this include the use of a national chain of a retailer in Malawi (Box 3-9) and the experimental use of a revived distribution chain for veterinary drugs in Ethiopia's Amhara State under the RWSEP which was assisted by Finland.[46] There is a possibility of finding a usable existing distribution chain in other countries when the focus is placed on goods which are delivered to rural areas from cities in response to the purchase and consumption behaviour of the rural populace (who are hand pump users).

3) Spare Parts Supply Chain Serving Patented Hand Pumps

This section mainly describes the subject of developing a spare parts supply chain for those hand pumps with no trademark rights, meaning that an agency contract with a manufacturer is unnecessary. In some French-speaking West African countries (notably Niger), imported European hand pumps with propriety rights have been widely installed. As the creation of agents and rural sales outlets by a manufacturer is part of the supplier contract when many new boreholes are constructed under a project, a supply chain for spare parts is developed to some degree (some hand pumps are said to require special repair skills with their spare parts being quite expensive, thereby restricting the scale of such chain). In areas where a spare parts supply chain and the foundations for a repair system are in place by the private sector, the development of a supply chain directly involving the central government or LGAs should not be attempted from the viewpoint of

---

45 A cyclical system of selling materials (seeds) supplied free of charge to use the proceeds for the purchase of the same or equivalent materials.

46 Rural Water Supply and Environmental Programme in Amhara State, 1994 - 2002

avoiding any negative impacts on the existing system. The administration should focus on a survey on private trends, adjustment of extreme regional price gaps and other matters instead.

4) Cross-Border Supply of Spare Parts

There are some exceptional cases of the cross-border supply of spare parts (Box 4-10: a border area of Mozambique near Malawi and a border area of Senegal near Mali). The background of this practice is that as imports are made on an individual basis rather than an organized basis, no import tax is imposed on spare parts. These cases appear to imply that there is a possibility of developing a spare parts supply chain at a lower cost than that of their delivery from the national capital with a high transportation cost if spare parts are exempt from taxation.

Box 3-9 Attempt in Malawi to Establish a Supply Network for Spare Parts for Afridev Pumps

Partly because of its involvement in the development of the Afridev pump by the UNDP, the Malawi Water Authority decided to make the Afridev pump the standard hand pump to be installed at boreholes to be newly installed in 1990 onwards. As a national chain of general stores (Chipiku Store: mainly selling farming-related items with a store in most cities, including small cities) with exclusive right to sell hand pumps existed under the one-party rule led by the life-time president until 1994, the distribution of spare parts for Afridev pumps began using this chain. The Malawi Government imported these spare parts and ensured their sale at each Chipiku store at controlled prices while trying to reduce the level of the overall financial burden by a revolving fund system.

This government-led supply of spare parts continued for several years with additional efforts, including the deployment of a pre-export inspector in India to ensure quality control but the supply network collapsed in 2000 due to (i) the accumulation of trading losses, in turn caused by adverse changes of the foreign exchange rate and commodity prices and (ii) the bankruptcy of the Chipiku Store chain resulting from the transition to a multi-party system and competition with new chains of general stores.

Disregarding the awarding of an exclusive right and poor business management by the chain, the initial decision to use an existing nationwide network of stores for the distribution of spare parts was a good decision from the viewpoint of establishing an inexpensive and stable supply system as a public service.

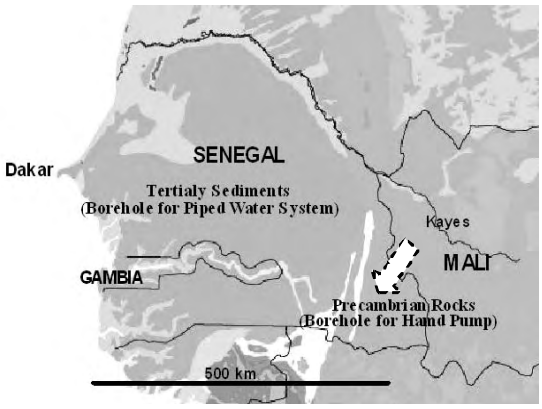
At present, the bankrupt Chipiku Store chain has been rebuilt by a local business group. Even though some unprofitable stores have been closed, the sale of Afridev pumps and their spare parts have recommenced through the restored chain. There is a new move by an Indian pump manufacturer to set up a local agent with a view to selling hand pumps and their spare parts to such large customers as NGOs and others and an affordable price, illustrating the leading role of the private sector in the supply of spare parts for hand pumps.

Source: Groundwater Development Project in Lilongwe West under Japan

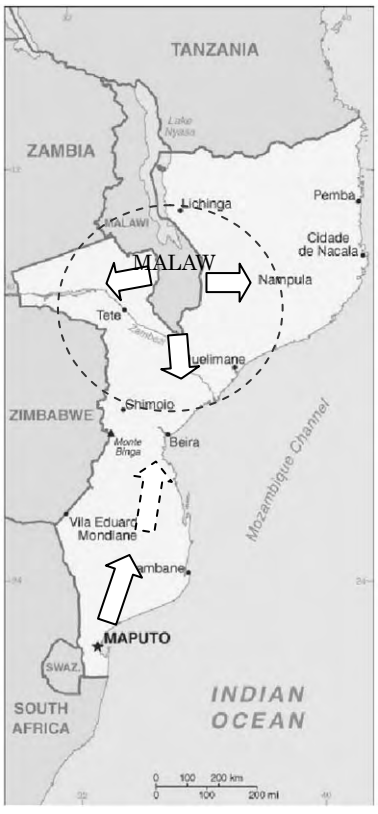
Box 3-10 Cross-Border Trade of Spare Parts

In Eastern Senegal (some 500 km away from the capital) where water is mainly supplied by individual point source systems with hand pumps, there is hardly any system for the supply of spare parts. Most hand pump (India Mark II) users obtain spare parts from a supplier operating in the Kayes Region of neighbouring Mali.

Users in Senegal have to place their orders to the supplier in Mali for the transport of the required spare parts to a border town in Mali. They then have to travel a distance of at least 100 km to cross the border to obtain the spare parts in the said town in Mali. The Precambrian rock zone in Eastern Senegal extends to Mali and several thousand boreholes for point source systems with hand pumps are said to exist in the Kayes Region. Use of the India Mark II as the standard hand pump in this region appears to have created a sales network (including the sale of spare parts) by private companies.



In Mozambique, the Afridev pump has been adopted as the standard hand pump. At present, Agroalfa based in Maputo, the capital, is the only domestic manufacturer of this hand pump and the only parts supplier in the country. However, import of the raw materials is necessary and the sales outlets are restricted to large local cities. It is difficult for villages to obtain spare parts. In the northern provinces which lie more than 500 km away from the capital in the south, some communities import spare parts from neighbouring Malawi where the Afridev pump is extensively used as the standard hand pump.



The DPOPHs (Department of Public Works and Housing) of provincial governments accept that the spare parts supply capacity of Agroalfa is very limited in terms of quantity and delivery period and have not opted for a policy of forcing Agroalfa to expand its sales network.

3-1-5 Facility Design for Better O & M

(1) Background

The RWSN, a group of experts working for international organizations, has compared various factors which determine the sustainability of Level 1 facilities (Table 3-1-8). The factors found to be particularly important include the construction quality in addition to a demand-responsive approach, perceived value of water from an improved source (awareness), spare parts supply and income level (ability to pay the O & M cost).

Table 3-1-8 Primary Factors of Hand Pump Sustainability

Category	Factor of Sustainability	Relative Importance
Technical	Construction quality	A
	Technology choice	B
Social	Demand-responsive approach (including asset management knowledge)	A
	Community organization / cohesion	A-C
	Perceived value of water from improved source	A
Institutional	Spare parts supply	A
	Management model choice*1	B
Financial	Income levels	A
	Credit availability	C
Environmental	Source water protection	B
	Increased groundwater use	A-C
Human Resources	User group capacity building	A-C
	Implementer capacity building	B
Legal	Ownership	C
Others	Political changes, administrative changes, donor/lender effects, etc.	A-C

A = most important C = least important A-C = Depends on local conditions
*1 A management model means a model for monitoring and follow-up activities of community water supply, including those by the government, user union or a private enterprise.
Source: Rural Water Supply Network (2005); RWSN Strategy Paper Sustainable Hand Pumps

(2) Present Situation and Pending Issues

The good quality of a borehole with a hand pump is defined by a continual supply of good quality water. The required borehole specifications to meet this condition are vertical drilling to a very deep aquifer, little seasonal fluctuation of the groundwater table, an acceptable water quality (in terms of health issues, taste and colour) and suitable borehole structure (types and specifications of the screen, gravel packing and others) for the local hydrogeological conditions. How can the required borehole quality be achieved? Although geological prospecting and hydrogeological surveying are important to improve the success

rate of borehole drilling, the actual borehole quality when there is sufficient groundwater is largely dependent on the construction skills to flexibly respond to the actual geological conditions encountered during drilling operation and to achieve a suitable borehole structure. It is practically impossible to restart the entire process with the same borehole if the completed structure is found to be unsuitable. For this reason, quality inspection of the construction work primarily features the borehole performance in the pumping test (whether or not the amount of constantly producible groundwater exceeds the specified volume). However, this test is susceptible to groundwater level fluctuations and some boreholes may become unusable during the dry season when the groundwater table falls. The inadequate finishing of a borehole can cause a fall of the pumping volume within several months. One effective measure to prevent these problems in advance is drilling up to the base of the aquifer instead of stopping operation as soon as the top of the aquifer is reached. Improvement in this context cannot be anticipated as long as the prevailing attitude that achievement of the planned drilling depth is sufficient and/or immediate confirmation of the required pumping rate. It is short-sighted to believe that passing the pumping test is all that is required and such belief can lead to a reduction of the quality and quantity of the packing gravel together with minimum cleaning work to minimise the construction cost which is greatly affected by the quality of and time spent for finishing work (gravel packing around the casing and cleaning inside the borehole). Because of such possibility, the owner must appoint a full-time supervisor to ensure the quality of the work. One characteristic of borehole construction work is the difficulty of ensuring the work quality with the standard work supervision regime for general civil engineering work when a contract is solely based on competitive tender.

The recent increase of Level 1 facility construction work in rural areas in Africa has increased the number of borehole drilling enterprises and contractors for drilling work are primarily decided by competitive tender. There is concern that the inspection system relying on the borehole performance in the immediate aftermath of construction adversely affects the willingness of CBO-OMs to conduct O & M as the number of boreholes which become defunct after only a short period of time is increasing.

(3) Selection of Hand Pump

Many types of hand pumps have been installed in Sub-Saharan Africa. The type of hand pump to be installed is usually determined in consideration of various factors, such as the standardisation policy, hydrogeology of the target villages, expected O & M level in these

villages, type of hand pumps already in use and local supply system for spare parts. It must be noted that the level of the required O & M work is significantly determined by the type of hand pump selected.

The selection of a hand pump generally follows the steps described below.[47]

1) Groundwater level: Maximum lifting head required for a pump from the groundwater level and its seasonal changes. The quantity from the pumping capacity and the capacity of the pump which meets the demand, pH and opposite corrosiveness, etc. are examined.

2) Evaluation of existing pump and policy: Although use of this type in the surrounding area has spread or the pump type standardised by the government is respected, other types should be taken into consideration if the conditions of 1) above are not met.

3) Necessity for O & M: Examination of whether the cost of the O & M of the selected pump is appropriate, i.e. required spare parts, technology, tools, estimated repair and renewal, and the necessary management is examined.

4) Comparison with other pumps: Even if the selected pump is a standardised pump type, comparison with other pump types in regard to 1) and 3) above should be conducted when the selection basis is uncertain.

5) Operation and maintenance capability: The economic strength of such stakeholders engaged in the O & M of the hand pump as the water management committee and local repairers should be examined. The required technology and spare parts supply, etc. as well as the necessity for special tools or spare parts should also be examined.

In the case of JICA's grant aid project in Ethiopia for the construction of rural water supply facilities which preceded the technical cooperation project, the following decisions were made in regard to the selection of the hand pump.

(i) The introduction of two types of hand pumps with a head of up to 40 m and between 40 m and 60 m was judged to be necessary in view of the groundwater table in the

[47] Peter Harvey & Bob Reed (204), *op. cit.*

dry season and existing local borehole data. (Areas with a dynamic level deeper than 60 m were excluded from the project as this is beyond the capability of a hand pump).

(ii) As there were no standardised hand pumps, popularly used hand pumps (Afridev and Afrideep, a deep well type with a bottom support being added to the Afridev) were selected.

The installation proportions of these two types of hand pumps at 214 planned sites were decided to be 60% for the former and 40% for the latter based on existing data.

Education for local people and local government offices was provided as the soft component of this project due to the insufficient capacity to conduct O & M. The bulk supply of spare parts constituting seed stock was made to the state government using the project budget following the example set by another donor (UNICEF). It was assumed that these parts would be distributed/sold in response to requests by district offices which would be in charge of the water supply facilities (as stated in the basic design report). Although no specific comparison with other types was conducted, the actual selection of the two types of hand pumps basically followed the steps described above.

There is becoming wider acceptance of the argument that the success of a programme to spread the use of hand pumps based on the concept of VLOM is limited and that the FLOM approach is especially difficult to implement in Africa.[48] While hand pumps which are capable of responding to the concept of VLOM (typically the Afridev) are still an option, the growing trend is to emphasise an enabling environment instead of a system which makes the communities using hand pumps able to conduct all aspects of O & M except for major repair. To be more precise, this enabling environment means the availability of a general maintenance system, including a repair system for selected hand pumps, at the national and/or regional level. The supply of spare parts, skills of local repairers and a water fee payment method acceptable to users are some concrete components of this system.

(4) Pending Issues and Lessons Learned

[48] Jeremy Colins (1999), *op. cit.*

In addition to technical soundness, the specifications of water supply facilities must be appropriate from the viewpoint of the socioeconomic environment to ensure their adequate O & M. The resent trend is to stress the process of informed choice as an essential principle of the demand-responsive approach. It is now considered to be important for the type of hand pump and the location of borehole drilling to only be finalised with the consent of users from among the available options based on information provided by the project implementing bodies (central government, LGA and/or donor). The participation of users in the process of deciding the drilling points is essential as this decision has direct implications regarding the willingness of local people to sustain the use of specific water points. Even if the suggested drilling points have a poor prospect of success in view of their hydrogeological conditions or drilling based on the potential users preference is unsuccessful, it is important for the project implementing bodies to obtain the consent of local people through dialogue to determine alternative drilling points. Needless to say, the technical issues (distance from nearby sanitation facilities and the findings of geological prospecting as well as actual drilling) must also be taken into consideration. In some cases, it may be necessary to abandon the planned use of groundwater in favour of another source of water supply. This is another accountability issue for project implementing bodies.

From the viewpoint of BHNs, the primary goal should be the achievement of water supply for all people, starting with those at the bottom of the socioeconomic hierarchy. One priority requirement is, therefore, the construction of water supply facilities capable of minimising the cost burden on users. Nonetheless, the examination of feasible future options is necessary to achieve a higher service level when the demand of users changes from Level 1 facilities to Level 2 facilities. A flexible construction plan which takes the hydrogeological and other natural conditions, ability of users to pay the water fee and other socioeconomic conditions and willingness of users to contribute towards the O & M cost of the water supply facilities into consideration is crucial.

Fig. 3-1-7 shows the flow to decide the type of water supply facilities based on the assumption that a sufficient groundwater supply is available with a borehole depth of around 40 m.

Even if the decision is made to opt for Level 1 facilities because of the current socioeconomic conditions, it is essential to consider the possibility of upgrading to piped water supply due to changed demands of the users or service area in the future to ensure the long-term sustainability of the water supply service. This possibility could become a reality when the population size (or population density) increases or when users become capable of paying the

higher O & M cost of a piped water supply system. One important measure to prepare for future upgrading is retention of the pumping test records on the capacity of each borehole even if the drilling depth and finish of the borehole at the time of the construction of Level 1 facilities are determined to ensure the maximum performance of these facilities. The availability of the records in question will be of great assistance when the rehabilitation of existing boreholes and/or drilling of new boreholes are required to upgrade the system.

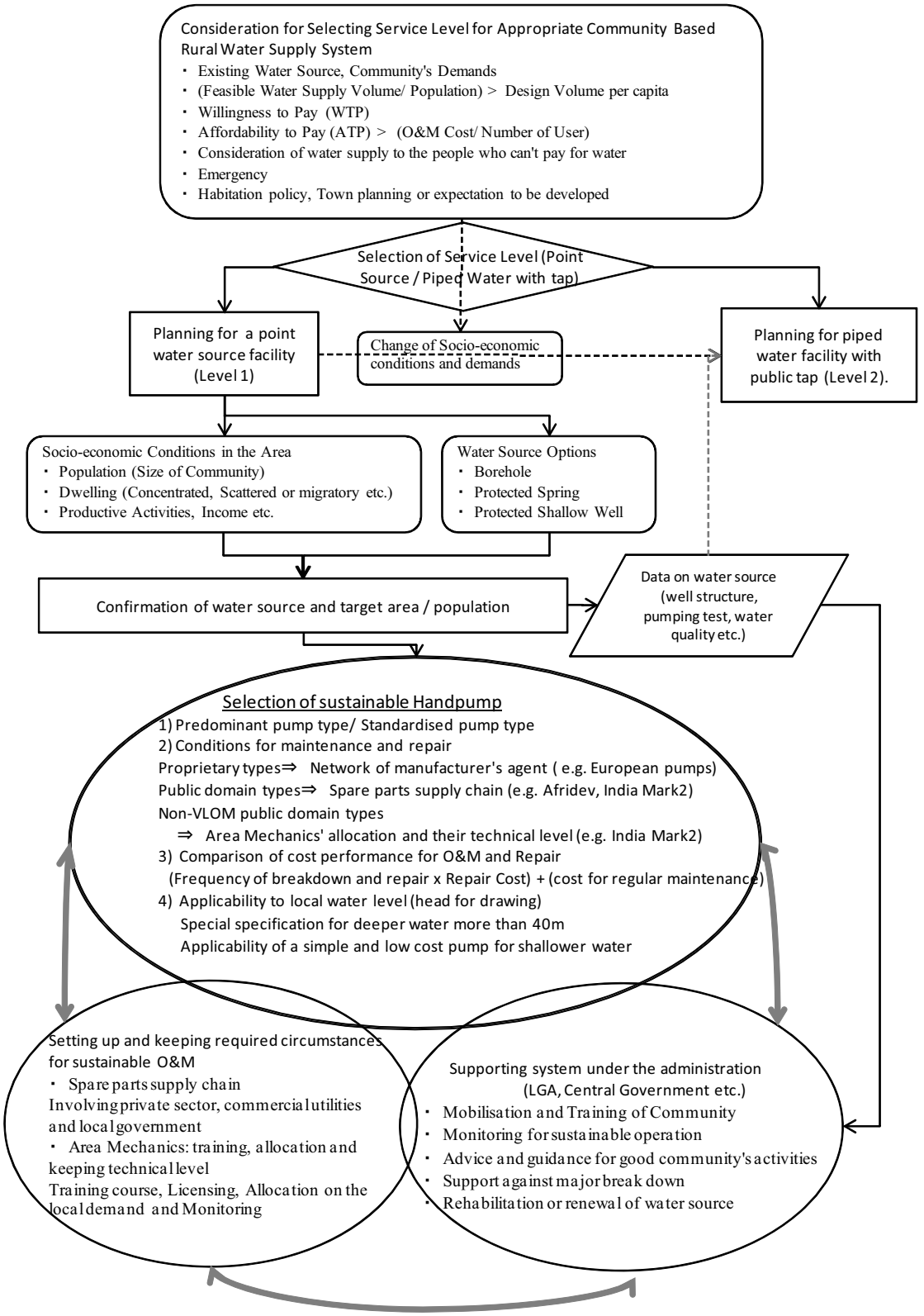


Fig. 3-1-7 Selection of Water Supply Facility Type

3 - 2 O & M of Level 2 Facilities and Pending Issues

3-2-1 Present Situation of Organizations and Capacity Building for Level 2 Facility O & M

(1) Stakeholders in O & M

The typical O & M system for Level 2 facilities in rural areas is managed by a CBO-OM which is assisted by the administration and private sector.

A CBO-OM is either a committee or association as shown in Table 3-2-1 and both types exist in some countries. The committee is formed within a community in the case of Level 1 facilities and is an organization without corporate status. In contrast, an association consists of water users who pay the water fee in accordance with the articles of association and has corporate status which is registered with the administration.

From the viewpoint of supplying water for all members of an existing community, the introduction of a committee is easier. An association tends to be introduced under a government policy or based on the judgement of potential members when it is necessary to clarify the obligations of users (especially the obligation to pay the water fee) and/or roles of a CBO-OM. The relevant cases are the inadequate collection or management of the water fee and coverage of the water supply service over more than one community. In both organizations, the leading members consist of a representative, secretary, treasurer and facility manager, all of which are elected from among association members or councillors representing the area (see Section 3-2-2 and Table 3-2-5).

Table 3-2-1 Different Types of CBO-OMs

Type	Characteristics
Committee	A committee is an organization which represents the community to perform the entrusted O & M of water supply facilities after the construction of such facilities by the administration in the existing community.
Association	An association is a group of water users who receive water supply in exchange for their payment of a water fee at a certain rate. In general, an association notifies the administration of its establishment and receives corporate status which allows the conclusion of a contract with a private enterprise. Its responsibilities and authority for autonomous operation (including the authority to expand the facilities at its own decision depending on the circumstances) are larger than those of a committee. Meanwhile, it has the obligation to report its financial situation to the administration.

On its part, the administration is responsible for (i) the development of an environment in which CBO-OMs can conduct O & M, (ii) monitoring of the activities of users and the private sector and (iii) provision of technical and management advice if necessary. In general, the rehabilitation or redrilling of boreholes (water sources) is part of the administrative services. However, the replacement of borehole components and water supply equipment and/or expansion of the water supply system may be conducted by a CBO-OM, the administration or jointly by both. In some cases, the scope of the responsibilities of the stakeholders is unclear.

The involvement of the private sector, including tradesmen, is usually in the manner shown in Table 3-2-2 even though the roles of the stakeholders and facility management methods considerably vary depending on the configuration of the facilities, capacity of individual CBO-OMs and existing government policies.

Table 3-2-3 describes the present situation and pending issues of Level 2 facilities in six African countries where such facilities are in operation out of the eight countries studied. The organizations related to the O & M of Level 2 facilities and their roles in these six countries are summarised in Table 3-2-4. The examples for The Gambia, Senegal and Lusaka UPS represent the typical situation in the respective country/city. In regard to Rwanda where many types exist, the case of a Japanese project is given as an example. In Sierra Leone, the Japanese case cited in the table is the only example of Level 2 facilities in operation in the country.

Fig. 3-2-1 illustrates the diversity of O & M bodies and supporting stakeholders from the viewpoint of the relationship of users, main water supply service provider and supervisory organizations.

Table 3-2-2 Private Sector and Administration Involved in O & M of Level 2 Facilities

Facilities		Water Source	Intake Facility	Storage Facility	Distribution System	Water Supply Points
Main Equipment Person in charge		• Borehole • Spring/stream	• Pump • Power source[*1] • Spring protection facilities • Booster facilities[*2] • Transmission pipes • Water meter	• Reservoir • Elevated water tank	• Distribution pipeline	• Public taps • Household taps (maintained by each household) • (Water meter)
CBO-OM		Inspection and cleaning	Management • Checking of operating status	Patrol (response to leakage)	Detection of leakage, etc. and request for repair	Detection of leakage, etc. and request for repair
Private Sector	Operator (regular employee)		Operation and management of equipment			
	Tap manager (representat-ive of users)					Opening and closing of water cock • Fee collection
	Plumber and other tradesmen (maintenance and repair)			Maintenance and repair (on request)	Maintenance and repair (on request)	Maintenance and repair (on request)
	O & M enterprise (contract or request)		Inspection and adjustment (repair or replacement)	Repair (on contract)	Inspection and adjustment (repair or replacement)	Inspection and adjustment (repair or replacement)
	Guard (regular employee)		Guarding			
Administration		• Rehabilitation • Renewal	Technical advice (can perform major repair on request) (Renewal if necessary)			

*1 Power source: diesel engine/photovoltaic/commercial electricity supply from grid

*2 Booster facilities: regulating basin, purification plant, pressure pump and power generator

Table 3-2-3 O&M in the Targeted Areas/ Countries

Targeted Country / Area	Tanzania (Lindi / Mutuwara District)	The Gambia	Rwanda	Senegal	Lusaka City, Zambia (Unplanned Settlement)	Sierra Leone (Kambia District)
Operation Body	Village Water Committee (VWC) or Water Users Association (Re-organized from VWC when the area was expanded to surrounding villages)	Village Water Committee (VWC)	Water Users Association (Regie) Private Company, Cooperative and Institution (Schools, Clinics etc.)	Borehole Users Association (ASUFOR)	Water Trust (WT)、Water Committee (WC) LWSC(Lusaka Water-supply and Sanitation Company), LCC: Lusaka City Council (Owner)	Rokpur Water Supply and Sanitation Board (RWSSB)
Supply Population per scheme	3,700～8,700	1,500 – 4,000	Max. 20,000 or more (The pilot project "MKM")	2,000～20,000 or more (1,000 in Minimum for Photovoltaic System)	For Example: 1500～1800 p/scheme, Total 8 Schemes (Blocks) (George Area, 1990)	Approx. 14,000
Legislative Situation	Committee / Association under Village	Committee under Village (not corporative body)	District Government own the facilities. Regie is a voluntary group (Private companies work under PPP contract with District Assembly)	Association legally authorized	Community based organization. WT is entrusted with water supply by LWSC for their area	Service Provider under District Council
Process for organization	VWCs were formulated under the soft component of the Project	1) Application from the village which desired piped water supply system with photovoltaic power generation. 2) Evaluation by Multi D Facilitation Team (MDFT) in Word Level 3) Facilitation of users with community participation method for formation of the committee as an O&M body. Conditions: 1) Taking responsibility for routine O&M activities. 2) Making maintenance contract with a private O&M company for pumping up facilities	Regie: formulated through the sensitization under the Project in consideration of weak cohesion in a community due to the villagisation ("imidugudu" in Rwandans language) programme for ethnic unity movement. Private O&M Company: working under O&M contract made with District Government. A new PPP under PEPAPS (EU/Belgian Project): A private O&M company shall be selected through a public notice and a tender to make a blanket O&M contract which covers all water supply systems in the district between district government, private company and community.	Department of Maintenance (DEM) or donor promote the change from existing Village Water Committees to Water Users Associations (ASUFOR) which shall adopt meter rate system, disclosure of account, democratic operation and reporting to DEM. Formation of association is conditioned on serving water to appropriate scale of population, and expanding supply area which includes small or satellite pastoral villages in the surrounding area. Supply system shall have "potance" (a hanging water tap) for carts and "trough" for domestic animals.	During the construction of facilities, Water Committees were formulated on three levels by water source, by network system and by water tap through the sensitization introducing community participation method under JICA's Project. After legalization of unplanned settlement, WTs/WCs who have managed their water supply system made MOUs with LWSC on water supply in their areas, and continued services. And they receive technical support from LWSC and support for social management from LCC.	Provisional financial statement was made through the analysis of operation of facilities to be rehabilitated. Board members shall be approved by District Council. Board was established under constituted by-law and legally approved by District Council and Parliament. Department of Water, Central Government dispatched redundant technicians for Operation Division of the Board. Board Members recruited staff of Management Division locally. The Project provided training for leaders of users unit for each public tap.
Staff	Ten members (5 Males and 5 Females) Chair Person, Secretary, Treasurer and other 7 members. Operators, Night Guards and Venders are employed.	Five members (volunteer) Night Guards are employed Tap managers are selected by water users group at each tap	Three members for president, vice president and accountant. Six technicians (Operator etc.) 63 Tap Managers and many water vendors under each tap	Nine members (elected from among the councilors consisted 2 councilors represented each village) are working with a little incentive. Operators are employed.	Members are working as employed staff or volunteers receiving a little incentive. Fee collectors are selected from water users at each public tap and receiving a certain part of collected fee.	Ten Board members (with incentive) Operators are sent on loan from WSD tentatively. Staffs of management division were recruited locally. Users Unit select a leader by each tap.
Water Rate	30～50TSh/20L (1.16-1.93 UD$/M^3)	At Water Source 2.1 GMD/m^3, At the ends 3～7 GMD/m^3 (0.11-0.27 US$/m^3)	10-15 Frw/20L (0.90-1.34 US$/m^3)	300-400 fcfa/m^3 (0.68-0.91 US$/m^3)	100 ZKw/20L (1.07 US$/m^3)	5,000 Le/HH/Month: estimated as 1,450 Le/m^3 (0.41 US$/m^3)
Supervision	District (Water Supply and Sanitation Team) Basin Water Office (BWO)	Department of Water Resources (DWR)	District Council	Department of Operations and Maintenance (DEM)	Lusaka Water Supply and Sanitation Company (a sole licensed water supply service provider to the City Area), Lusaka City Council (LCC)	District Council
Supporting System	**District:** Monitoring with monthly reports submitted from Associations or Committees. Provision of assistance for funding from Tanzania Social Action Fund (TASAF) on users' demand for expansion of facilities, and advises for changing power source to grid line when it is available. **BWO**: Provision of technical suggestion for rehabilitation and/or expansion of facilities, such as additional taps and extension of network.	**DWR** pool a part of fee for Communal Maintenance Fund (CMF) in order to provide against replacement of expensive equipment such as inverter and submersible pump, especially for the small communities having few reserved funds. DWR promotes making maintenance contracts between private company and VWCs. Community activities are assisted by MDFT at Ward. Motivators in MDFT assist and advise the committees on community management.	**District council**; Monitoring all associations ("Régie"). Assisting, advising and suggesting them. Districts shall make all associations submit monthly reports regularly and grasp the situations one by one. The capacity needs to be enhanced by sharing information and exchanging views among districts and upper administrations ("Secture") for solving and preventing the problems in Regie.	**DEM** : Monitoring and evaluation of ASUFORs, Supervision of their operation, Advising (Technical support). Promotion of making maintenance contracts between a private maintenance company and associations. Fifteen offices for **Operation and Maintenance Center** (BM: Brigade de Maintenance) provide assistances to ASUFORs, such as technical services for major repair and solving social problems in managing associations)	**LWSC** assists WTs on social development activities through the staff in charge of community development under Area Manager. Such as capacity development, sensitization activities, proposition of annual O&M plan, budgetary plan and financial management. Participation to the member selection and meetings in WT. **LCC** supervises the execution of assistances under the contract between LWSC and WTs.	**District council**: audit to RWSSB. **DWS** provides technical assistances to RWSSB, also financial support for the first one year. * Water rate system is under trial and error. The rate system has been changed to the household based flat rate recently, from the family-based rate depending on shared monthly consumption of related hydrant and on the number of family member, while the supply hours is limited for 5 hours.
Divided Rolls	**Users**: To buy water by container **Operators**: Operation, Recording, Reporting **Night Guards**: Security in night **Vendor**: Fee collection, Recording of sales, daily reporting, monthly payment to the treasurer **Committees**: decision making for expansion of facilities, management of spare parts etc., and reporting expenditure to administration office. **Treasurer**: Receiving reports and payment from vendors, management of funds (book keeping) **Secretary**: Recording of meeting **Chair Person**: To hold monthly meeting, to report the result to the users.	**Users**; Fee payment to VWC, **Operators**; keeping site and panels clear **VWCs**: Making contract out to a private company on maintenance of pumping and storage facilities. Maintenance of pipelines and public taps. Hiring night guards for security and clearance of sites. **Private Maintenance company**: Regular Service provision for photovoltaic pumping up system under the maintenance contract (regulated to be free of charge for the first 5 years after installation). Collection of maintenance fee and also CMF in place of DWR	**Users;** payment to tap manager, proper manner at tap **Tap managers/ Venders**; Fair fee collection and secure payment to the association **Members**; Hearing users' voice. Management of collected fee and appropriate expenditure	**Users**; payment on the invoice issued by the. A group of users can be financed for their productive activities under technical assistance. **ASUFOR**: Hiring operators regularly and other craftsmen occasionally. Holding monthly meeting and disclosing their finance and operation. Decision making for expansion of facilities etc. through the meeting. Reporting it to BM / DEM. **Private Maintenance company (if any)**; Regular service, reporting on breakdown and repair service to O & M office/ DEM	**Users**; Payment to WT on meter rate (flat rate is also applicable) **WT**: Selling water under the contract. Securing water quality. Submission of monthly report. Opening a bank account for O & M. Bearing operation cost. Keeping operation record. **LWSC:** Providing the services to WT: Supervision of operation, charged technical assistance, major repair, water quality test. The engineers and plumbers of LWSC provide technical assistances against break down of water supply facilities.	**Users**; Every registered households shall pay for water on flat rate to the Board individually. **Unit Leader**; management of hydrant. **RWSSB**: Stable water supply. Reading meters with hired meter readers. Fee collection from registered households. Hanging registration plate on the registered house, and cancellation of user's registration against his nonpayment. Financial management. Reporting and disclosing their operation.
Pending Issues	・Development of leadership in the officials in LGA and BWO is found in good relations between VWCs and Districts/BWO after JICA's technical assistance for capacity development. Spread of Capacity Development Programme is expected to country wide under Water Sector Development Programme. ・Procurement of spare parts for motorized system may takes one week if it's available only in the capital city.	・ Insufficient capacity in DWR for formation of MDFT in each area and other activities. (Only 8 motivators are appointed for social activity) ・ VWCs can use only 10 to 20 % of collected fund as remained after payments of fee to O&M company and of communal maintenance fund to DWR. It may cause shortage of fund for repair of pipeline etc. The unified water rate is not enough to keep proper maintenance for communities which have smaller population than 1,000. ・ Promotion of long term maintenance contracts. ・ Management of CMF in DWR.	・No unified methodology for formation of Regie. ・Prevalence of common sense of burdening cost for users, especially who have used water free of charge. ・Few capable service providers in private sector. ・Setting clearly divided roles is required under the National Action Plan through the examination of the stakeholder matrix and current situation. ・Lack of unity in the contents of contract for entrusting maintenance to private sector, such as a right and responsibility on renewal and expansion of facilities. Clear national guideline is expected for establish a sustainable O&M system.	・Spreading improved facilitation tools, such as manuals in local language and hygiene education tools with a picture-story. ・Strict DEM's supervisions on the activities of ASUFORs are required against their irrelevant expansions of facilities and their unsound expenditure for out of the water supply facilities.	・The most poor people are still using shallow wells because of free of charge. ・Increasing water demand for the population flowing into the area. ・Effective sensitization to the people newly flowing into the area.	・Strengthening the capacity of District Council under new Decentralisation. ・Sensitization to Water User Unit on Water Rate ・Feedback of users' view to O&M system is required for full-time operation through a year. ・Changing dispatched official operators to locally recruited operators gradually with technical transfer.

Table 3-2-4 O & M System and roles found in the targeted countries

Organization (Country/ Area)	VWC / Association (Tanzania)	Regie /MKM (Rwanda *1)	ASUFOR (Senegal)	VWC (The Gambia)	Water Trust (UPS, Lusaka City)	RWSSB (Sierra Leone)
O&M Body	Committee(C) / Association (A)	Association (A)	Association(A)	Committee(C)	Trust (T)	Public Utility/ Board (B)
Rights of expansion	Local Government(LG)/ Village government	Local Government (LG)	A	Central Government (G)	T/ LWSC	LG
Responsibility of repair	C / A	A	A	C	T	B
Support for repair	LG / BWO	－	G (pay)	－	(LWSC)	G（Tentative）
Contract out to O&M Company	No	No (under progress)	yes (partly)	Yes (pumping facility only)	No	No
Social Support	LG	(LG: weak)	G (Regional)	(G) LG: MDFT	LG（LCC） Health sector	LG
Tap Management	V（employee）	TM/A	TM / A	TM/C	TM	TM
Meter reading (public tap)	V（employee）	TM/A	A	TM	T	B
Yield meter	C / A	A	OP	P (O&M company)	T	B
Bill	(V：daily informed to C/A)	A→TM	A→ (Metered) TM →(per capita) U	P(metered)→C	WT→TM	B→U
Fee Collection (from users)	Metered (per container) V→C/A	metered（per container） TM / V→A	Semi-metered TM→A	Flat rate（per adult） C→P＞(*2)	metered（per container） TM/ V→WT	Flat rate（per household） TM→B
Fund Management	C / A	A	A	C, G(*2)	T	B
Repair of leakage	C / A	A	A	C	T	B
Repair of Equipment	C / A	?	A	P （＜5 yrs） C （＞5 yrs）	T	B
Regular Employment	V, OP, G	OP	OP	G	OP	(Staff)

VWC : Village Water Committee
UPS : Unplanned Settlement
LWSC : Lusaka Water Supply and Sewage Company
LCC : Lusaka City Council
RWSSB : Rokpur Water Supply and Sanitation Board
G : Central Government
LG : Local Government)
OP / G : Operator / Guard

A : Association (= Regie)
C : Committee
B : Board
T Trust
TM Tap Manager
P : Private Company
V Water Vender
U Water User

*1: include operation under PPP

*2: The government manages part of water fee as a collective fund to prepare for the renewal of pump, inverter, panel and other components.

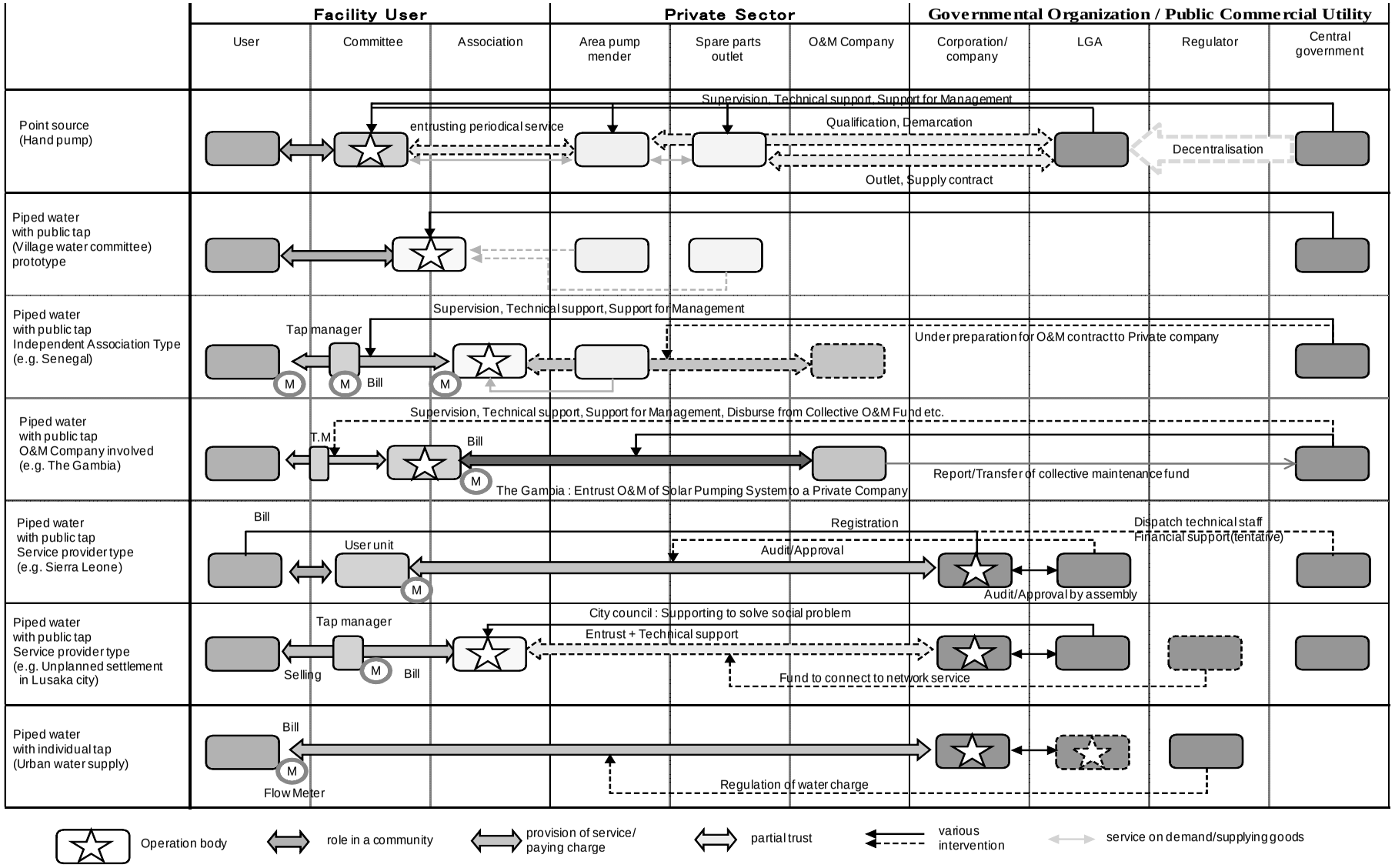


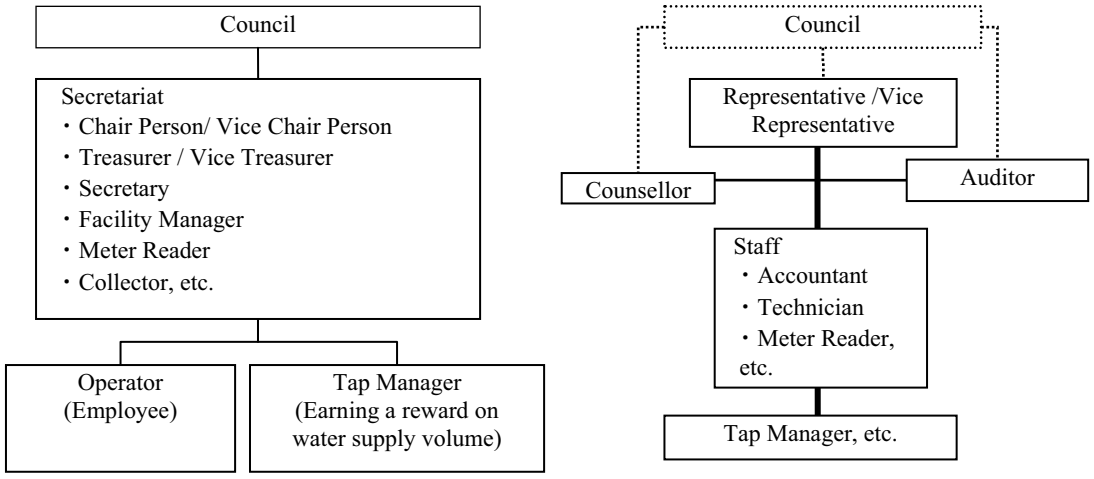
Fig. 3-2-1 Relationship Between Water Users of Level 2 Facilities and Other Stakeholders

(2) Types of CBO-OMs and Membership

The service coverage of Level 2 facilities is relatively large with a service population ranging from some 1,000 to 10,000. The CBO-OMs for these facilities are generally classified into the following two types.

- Type 1 : The service area consists of a single village with one CBO-OM (service area = one village).
- Type 2 : The service area extends beyond the geographical boundary of one village and a CBO-OM is formed by representatives of the villages covered (service area = several villages).

The members of many CBO-OMs for Level 2 facilities which are directly involved in the daily operation of the facilities include a public tap manager (tap attendants, water vendors or others), operators and guards (especially night guards) in addition to such principal members of CBO-OMs for Level 1 facilities (chairperson/representative, secretary, treasurer and their assistants) as shown in Fig. 3-2-2. In general, those members directly involved in daily operation either receive a fixed wage or a fixed rate commission from the water fee. In contrast, the principle members are volunteers who do not receive a wage but may possibly receive a small payment to meet the cost of providing an incentive.



(Left: Senegal, Right: Burkina Faso)

Fig. 3-2-2 Typical Organizational Structure of CBO-OM for Level 2 Facilities

In those cases where local people as the water users pay only a water fee under the water supply service system directly run by a LGA (or private enterprise) (for example, Sierra Leone and Cape Verde), the LGA (or public corporation) is the operator of the rural water supply facilities. In this report, any community organization in such cases is called a community organization rather than a CBO-OM.

(3) Capacity Building of CBO-OM Members

CBO-OMs for Level 2 facilities are required to have higher O & M capability than CBO-OMs for Level 1 facilities because of the larger service population (one borehole serving 1,000 - 10,000 people). The fact that the service area can include several villages and possibly an urbanised area(s) is another factor for the necessity for such higher capability. In general, the following capabilities are the subjects for the capacity building of CBO-OMs for Level 2 facilities.

- Capability to run an organization: The chairperson (representative) must be trustworthy and democratic and transparent meetings of users must be regularly held.

- Capability to manage the finance: The CBO-OM must be able to manage the financial aspects of its operation in a transparent manner. These aspects include the setting of a reasonable water fee level, collection of the water fee, expenditure and saving in preparation for equipment renewal.

- Capability to conduct the O & M of equipment and facilities: The CBO-OM must be able to secure the services of suitable persons to operate the intake facilities, to discover and repair leakages and to ensure the security of the facilities.

Table 3-2-5 shows the O & M-related members of a CBO-OM, their roles and the required capacity building based on past examples. Among these, operators, tap attendants and guards are normally employed by a CBO-OM to perform the duties described in Table 3-2-6. The responsibility for their recruitment falls on the CBO-OM. The roles and issues regarding CBO-OM members are not uniform and vary depending on the policy and situation of the water supply service in each country.

Table 3-2-5 Members of CBO-OM and Capacity Building

Position	Duties/Roles	General Issues	Required Capacity Building	Remarks
Chairperson (representative)	Central figure in the operation of a CBO-OM and responsible for overall fund management and meetings	Regular holding of meetings and democratic operation of the CBO-OM	• Leadership • Facilitation at meetings	
Secretary	Keeping of meeting records (also in charge of general affairs, if necessary)	Keeping and reporting of meeting records (on finance and facility operation)	• Ability to record the proceedings of meetings • Regular reporting	
Treasurer/ Book-Keeper	Meter readings, issue of water bills, collection of the water fee and fund management	• Swift and sure collection • Transparent book-keeping • Fund management using a bank account	• Billing and collection • Dealing with non-payers • Audit by a third party	
Facility Manager	Patrols for leakage and damage; arrangement of repairs	• Route to convey information on detected leakage and other matters	• Detection of signs of problems • Swift response	Publicity on the importance of detecting leakage
Tap Attendant (vendor)	Operation of public taps, collection of the water fee and detection and reporting of leakage near the tap	• Failed collection of the water fee • Reward system	• Strictness regarding the handling of money • Trust of users	
Operator (employed)	Maintenance and repair of pumping equipment and recording of operation	• Technical level *1 • Continuance of adequate operation • Recording and reporting of tap operation • Preparation of a simple and clear manual *2	• Basic structure and operation of equipment • Causes of breakdown, prevention and detection of signs • Recording and reporting of operation	*1 Recruitment criteria (past experience of formal training) *2 Use of illustrations and human senses to assist the detection of problems
Guard (employed)	Guarding of equipment, etc. liable to theft (solar system and water purification plant), weeding and cleaning of solar panels	• Adequate wage • Guard house		

Table 3-2-6 Roles of and Pending Issues Regarding Employed Members

	Duties/Roles	Pending Issues and Required Capacity Building
Tap Attendant	A tap attendant is deployed for a metered water collection system, especially when the water fee is collected at the tap. • Control of each public tap • Guidance on the appropriate use of public taps for users • Collection of the water fee from users at each tap and forwarding of the collected fee to the CBO-OM • Reporting of damaged taps and/or pipelines to the CBO-OM	A tap attendant must have the ability to handle money properly as he/she receives and forwards the water fee to the treasurer of the CBO-OM. A fixed rate commission (10 - 20%) on the collected water fee is paid to the tap attendant in many cases. In some cases, a fixed monthly wage is paid to reduce the burden on users. A tap attendant is also responsible for the detection of leakage from taps and the prevention of water use without payment. In many cases, each public tap has a designated attendant who may be a member of a family living nearby. Such a family may collectively function as a tap attendant. The latter method allows a longer tap operating time while family members can have a job by treating attendance at the tap as a side job.
Operator	An operator is deployed when a pump is operated by a commercial power supply, generator or solar system. • Daily operation of the system: system start and stop and recording of the operating hours • Recording of meter readings: groundwater level (both static and dynamic levels), volume of water production and pressure for water transmission • Cleaning, inspection and maintenance of equipment and tap site; checking and changing of oil and air filter when a diesel generator is used • Reporting of any abnormality or breakdown of the power system to the CBO-OM and advice on the situation	Although an operator is not required to have a very high level of skill, he/she must be able to regularly record the operation and quickly respond to such signs of equipment breakdown as abnormal sound and frequent stoppage. Capacity building for operators is important for the generator and engine, etc. as regular inspection/checking (cleaning and replacement of the air filter and replacement of the oil) prolong the service life of the equipment. In most cases, operators are trained as part of a project. Well-constructed training for easy understanding of the contents by the trainees is important along with the achievement of a certain skill level. In one project (in Senegal), an official training course was set up at a public training institute to achieve the required technical level but was later withdrawn when the financial assistance of the donor ended. As the inspection, etc. of a solar system requires special skills, the maintenance work is often entrusted to a specialist private enterprise. In such a case, the operator simply operates a switch and is given additional jobs, such as cleaning of the solar panel and guarding of the system.
Guard	In the case of a solar-powered water supply system, expensive equipment is installed outdoors. A guard is deployed in those areas where such equipment is often stolen. In some cases, a pump operator also works as a guard. A guard may be deployed at a pump shed where a generator and other equipment are housed (Rwanda). • Patrolling and guarding of facilities at night	The national guidelines in The Gambia demand that a CBO-OM deploys a guard for each solar system, pays the wage from the collected water fee and provides a guard house. However, these guard houses are poorly equipped in general and even a lighting system is not available. The poor conditions of guard houses affect the recruitment of guards and the quality of their work.

(4) Capacity Assessment of CBO-OMs and Capacity Building Efforts

1) Capacity Assessment Method and Contents of Capacity Building

Compared to Level 1 facilities, the proper O & M of Level 2 facilities requires higher organizational management capability, financial management capability in regard to appropriate collection of the water fee and fund management and technical capability to operate and manage the equipment and facilities. It is essential to build these capabilities to the level where adequate O & M can be sustained. These capabilities vary from one village to another, partly because of the different prevailing socio-economic conditions in each village. It is, therefore, imperative to conduct a preliminary survey to assess the existing capabilities in terms of organizational operation, finance and skills so that appropriate educational inputs can be planned which reflect the local characteristics. Understanding of the social and cultural conditions, including possible ethnic and/or religious conflict which could hamper the smooth running of a CBO-OM and other local organizations, is also equally important. The capabilities/capacities of existing public organizations, tradesmen and private enterprises capable of assisting the O & M work of the CBO-OM may also be subjects for capacity assessment in a broad sense.

Table 3-2-7 Focal Points of General Assessment of Organizational Capacity and Contents of Capacity Building Exercise

Focal Points of Capacity Assessment	
Assessment of organization and facilities in preliminary survey	Conditions of existing facilities; existing activities of the community; existence of common assets; literacy; diversity of language and lifestyle; accounting capability; conflict within the community
Support system	Organizations supporting such related matters as health and regional development; organizations with proven management capability, such as schools and hospitals (health centres)
Capabilities of private sector	Tradesmen in the community or nearby areas; technical capability and management base of private enterprises
Capacity building	
Leadership and democratic management	Fair method to select the representative of all users in the service area; leadership; recruitment of persons with experience and various proven capabilities and their capacity building; gender consideration or emphasis on women's groups; responsibilities of the operating body of facilities; request for water fee payment; management of the water fee collection work; organization of a user group for each public tap and education on the rules for use; leadership within each user group of a public tap(s)
Disclosure and accountability to users	Appropriate book-keeping and storage of records and vouchers; regular meetings; briefing of users (at meetings or through a newsletter, etc.)
Lectures and practical training on maintenance of facilities and equipment	Principles and structure of borehole and equipment; routine maintenance procedure; recording and reporting of operation; detection and reporting of abnormalities

2) Various Efforts in Subject Countries of the Study

One typical example of efforts to regularly convene meetings is observed in Senegal.
In Senegal, conventional water management committees operating on the basis of a flat rate system are being transformed to ASUFORs which operate on the basis of a metered charge and which are run in a more democratic and transparent manner for the purpose of creating autonomous and sustainable bodies. Under the PEPTAC, a technical cooperation project, educational activities conducted at 24 sites in Phase I generally produced positive outcomes even though the expected outcomes failed to materialise at some sites due to insufficient understanding of the system and/or different ethnic backgrounds or customs. In Phase II, a deeper understanding was successfully achieved through the use of manuals written in the local ethnic languages and picture-card shows prepared under the project. In the case of those ASUFORs where educational activities have not produced the expected outcomes, conscious efforts are being made to determine the causes through dialogue, examination of ethnicity and analysis of the implemented activities. Such analysis has disclosed that regular meetings and the compilation of records tend to be lacking in the case of those ASUFORs with a combined membership of agricultural farmers and stock farmers. Based on this insight, fresh educational activities have been organized and further opportunities for dialogue arranged to patiently persuade people to regularly organize meetings and to record the proceedings of these meetings. These efforts, including changes of the system to suit the local customs and lifestyle, have led to an improved performance of the ASUFORs in terms of the number of meetings held and preparation of minutes of discussions.

In regard to the issues of appropriate book-keeping/accounting and the storage of accounting records, etc., efforts are being made in Rwanda to deal with the following problems.

- The water fee collected at public taps did not quickly or clearly appear in the accounting books of the water user associations, making it difficult to accurately assess the financial situation surrounding the water supply facilities. This situation also hampered the setting of a reasonable water fee, resulting in groundless rises of the water fee.

- The production of non-revenue earning water adversely affected the operation. This inefficient water production resulting in a loss-making operation and made the introduction of a reasonable water fee difficult.

- Although the continual preparation of operation records is essential, the lack of a manual corresponding to the work of operators (of the main pump and booster pump) made it difficult to conduct appropriate operation and to prepare operation records.

Several measures were adopted to rectify these problems. Firstly, with the problem of water fee collection and subsequent accounting, treasurers were invited to undergo capacity building training using an accounting manual prepared under the project to enable them to prepare and keep various forms for revenue and expenditure and also to prepare a monthly report. The new practices of (i) the daily reporting of the collected water fee based on a unit price per container (20 litres) and (ii) the collection of this water fee on a specified day of the week by the treasurer.

In regard to non-revenue earning water, the stakeholders were urged through training to understand the importance of implementing measures to reduce non-revenue earning water resulting from not only leakage from the pipeline as commonly believed but also from the illegal tampering of water meters, loose fastening of valves, etc. and spillage at the time of selling water. Some improvements have been made through the implementation of better practice.

In regard to operation records, a manual explaining the necessary work in a simple manner for easy understanding was prepared to make operators understand what they are expected to do. Practical guidance using this manual has made it possible for operators to prepare accurate records, contributing to a better and accurate understanding of the operating status of the water supply system. As such understanding is the basis for a quick response to abnormal operation, it is expected to help prevent any major breakdown of the system.

(5) Pending Issues for Capacity Building of CBO-OMs and Lessons Learned

Even though there is no single uniform method to deal with the various issues of capacity building, there is no denying the critical importance of analysis to properly understand uses and CBO-OMs and of passionate persuasion through dialogue. Moreover, capacity building of a project implementing body is essential to ensure its continual follow-up activities in order to maintain the positive outcomes of educational activities during the project period.

The assessment results of capabilities and capacity building in Table 3-2-7 assume the existence of the following conditions for the easy implementation of O & M. There is a risk that the

existing capabilities are incorrectly assessed as low simply because of the absence of these conditions.

- Water fee which is easily understood and agreed by users (including a metered system and preparation of a tariff)
- Clarification of the scope of responsibility when the O & M work is entrusted to the private sector
- Scope of administrative support

(6) Cases of Facility Operation and Maintenance by Organizations Other than CBO-OMs

In Sub-Saharan Africa, a CBO-OM is primarily responsible for the O & M of Level 2 facilities in most cases. In regard to a technical cooperation project in Sierra Leone, however, the principal body for O & M is a public corporation established under the district government which has become the responsible public body for the water supply service in the process of decentralisation. In the case of this project, water supply service operation by a public corporation is judged to be the most appropriate in view of (i) the following conditions and (ii) the need to restore Level 2 facilities destroyed by the civil war.

- Prior to their destruction during the civil war, most water purification plants employed a rapid filtration system. However, it was found to be difficult to sustain their normal operation because of (i) insufficient financial capability to procure flocculants and other chemicals and (ii) insufficient operational skills. At the project site, a spring which produces a stable amount of good quality water is accessible as the water source, making it easy to change to a slow sand filtration system which is easier to operate and costs less than the rapid filtration system.
- While the slow sand filtration system is relatively easy to operate, it requires full-time technicians for operation of the intake and conveying pumps and sand management of the sand filtration tank. The Water Service Department of the central government has technicians who used to operate and maintain the water purification plants which were destroyed. These technicians can be effectively used.
- In the past, the free water supply service in small cities in rural areas was run by the central government. With the progress of decentralisation, a new policy has been introduced of commencing a fee charging system after the restoration of facilities. This policy makes it difficult to foster a sense of ownership on the part of users to conduct O & M.

- The service population (approximately 14,000) is quite large for Level 2 facilities and it is relatively easy to collect a sufficient level of the water fee for the recruitment and deployment of full-time staff. (In Japan, the reasonable staff recruitment rate is said to be one staff member per service population of 2,000 ~ 2,500).
- The fuel cost is relatively small because of the smaller vertical distance to lift the water from the source to the storage tank compared to the use of groundwater.

Even when a public body runs the water supply service, financially independent operation is difficult in a small local city. This is because the lower income level of the users compared to users in a large city means that the business cannot rely on the scale merit. It is, therefore, essential to urge local people to participate in the water supply service (for example, as collectors of the water fee) to reduce the unit water supply cost. In this way, the water supply service can be provided in accordance with the financial ability of local people as well as their willingness to pay. In short, it is important to invite local people to participate in the decision-making process of the water fee by showing them the consequences of their participation or non-participation on the service and water fee levels.

As indicated by the examples of CU in Zambia and Town Water Supply in Ethiopia, the operating body of water supply facilities does not necessarily have to be a CBO-OM provided that the service population is above a certain level (possibly 10,000) and that users agree to share the O & M cost. There are cases where it is appropriate for a public body at the level of LGA or below to be responsible for the O & M of water supply facilities. When local people are found to be reluctant to take up O & M because of their past experience of receiving water supply from a government organization, the transition to an O & M regime for which a CBO-OM is responsible may not be smooth. In this case, it is more effective to establish a public body to be in charge of O & M.

3-2-2 Water Fee Collection Methods

(1) How to Determine the Water Fee?

As explained in 3-1-2 (1), clean, safe water is a BHN and the O & M cost of water supply facilities must be shared by users to allow not only continuous O & M work but also a continuous water supply service. The principle of the beneficiaries-pay is adopted in many countries (see 3-1-2 (2). The actual water supply cost significantly varies depending on the type of power supply used to operate the facilities (generator, commercial grid, solar system and/or

gravity) and is also affected by the size of the service population. In order for a CBO-OM to be able to continually operate and maintain water supply facilities, it is essential for the water fee calculated by the designer of the facilities to meet the O & M cost to be below the amount of the "willingness to pay (WTP)" or "affordability to pay (ATP)" which poor people in the service area can continue to afford. When the total water supply cost cannot be met by an affordable water fee on the part of users, it may well be necessary to restrict the scope of the cost burden on users through the introduction of a policy of subsidising the facility renewal cost, etc.

Table 3-2-8 lists all of the general O & M cost items, some of which may be unnecessary depending on the actual components of individual facilities. Because of many uncertain elements (for example, frequency of breakdowns and repair) in estimation of the O & M cost, the actual costs incurred by similar facilities nearby (assuming their existence) should be checked to determine a reasonable cost. What is important here is that a prior agreement between the stakeholders on the scope of the O & M cost to be paid by users must be reached. To be more precise, this agreement is especially vital in regard to who is expected to pay the renewal cost of such expensive equipment as the pump and generator, i.e. users in the form of the water fee, the administration or both.

The actual amount of the equipment renewal cost depends on the equipment specifications while the timing for equipment renewal depends on the service life (generally 10 ~ 15 years[49] depending on the quality of the maintenance and repair work), service population (water supply volume) and other factors. Unexpected renewal may be required due to operational error, accident, theft or other reasons. In the case where it is assumed that the renewal cost of the generator and motor pump will be paid by the water fee (Senegal), this cost is assumed to account for some 10% of the water fee. However, at the timing of the actual planning of the water fee, a uniform water fee for a district or project area is set instead of setting a water fee for each facility and this fee is reviewed every few years to ensure an appropriate saving level by each CBO-OM (the water fee is usually between FFCFA 200 ~ 400/m^3 in Senegal).

Some cases have been found in the Study where even though funds are being saved for equipment renewal in several years time, the sudden occurrence of a severe breakdown has

[49] For example, a generator is classified as "Electrical Equipment and Other", in turn classified as "Incidental Equipment to Building" in the Table of Service Life of Tangible Assets Subject to Depreciation Other Than Machines and Systems (Attached Table 1) in Japan's taxation system and its service life is stipulated to be 15 years.

caused the long stoppage of water supply because of uncertainty regarding who is responsible for payment of the renewal cost and insufficient savings.

The level of willingness to pay (WTP) can be typically estimated by socioeconomic and other surveys. Meanwhile, one indicator suggests that the level of affordability to pay (ATP) is around 3 ~ 6% of the income. However, this indicator is by no means decisive. While accurate determination of the level of affordability to pay is difficult, it can be estimated by means of comparison with the income level of users as suggested by socioeconomic and other surveys. Actual examples in nearby areas and comparison with other utility charges can also be used to estimate the likely levels of the WTP and ATP (for example, JICA's grant aid project in Rwanda in 2006).

Table 3-2-8 Composition of O & M Cost

Category	Cost Item	Example(s)	Remarks
Routine operation cost	Personnel cost	Treasurer; operator; guard; tap attendant	The treasurer may be an unwaged officer. An operator is usually employed. A guard is employed if necessary. A tap attendant may be employed or receive a commission (10 ~ 20% of water sales) as a water vendor.
Machinery operation cost	Fuel cost; electricity cost	Generator or commercial power supply	• Diesel generator + vertical pump • Diesel generator + submerged pump • Commercial power + submerged pump
	Expendables cost	Chlorine for disinfection	• As required
Maintenance cost	Spare parts	Generator; water meter; tap	• Replaceable parts, such as filters • Replacements (including lubricating oil)
	Repair, etc.	• Pipeline and water tank • Overhaul (every 5 years for generator; every 2 years for pump)	• Entrusted to a plumber or construction company • Entrusted to a specialist company
Administration cost	Meeting cost	• Officers (as incentive) • Stationary	Free of charge or gratuity
Equipment renewal cost	Generator; pump	• Standard service life of generator: 10 years • Depreciation period of pump: 15 years	The scope of the user charge varies and can be unclear.
	Inverter; solar panel	Solar power generation system	In The Gambia, a supplier has the obligation to conduct regular checks and free repair for 5 years.
Facility extension cost	Construction cost	• Extension and distribution of commercial power • Extension of pipeline • Installation of additional taps • Installation of household taps • Other facility construction cost	The scope of the user charge varies and can be unclear. In general, the permission of the administration (proprietor) is required but the actual management of the system may be non-existent.

In one grant aid project in Rwanda (2006), the maintenance cost was estimated to be FRW 5 ~ 10 per 20 litres (FRW: Rwandan franc; US$ 1 = FRW 558.6 (2009)) based on the actual cost of similar facilities nearby. The socioeconomic survey established a level of willingness to pay (WTP) of FRW 5 ~ 15 (more than 50% of the people asked said FRW 10). Assuming the level of affordability to pay (ATP) of 4% of the household expenditure (World Bank indicator: 3 ~ 5%), the actual amount of the ATP was FRW 3/20 litres. With this level of payment, cost recovery was found to be impossible at all of the planned facilities. In this project, it was judged that the level of ATP to cash income could be higher than the suggested percentage (4%) in view of the self-sufficient nature of the local economy. Accordingly, the actual water fee was set at FRW 10/20 litres based on the assumed O & M cost and level of WTP. Facilities for which the expected maintenance cost based on the planned scale greatly exceeded FRW 11/20 litres were removed from the scope of the project.

In a technical cooperation project in Sierra Leone (2008), the LGA was responsible for payment of the equipment renewal cost and facility extension cost. The routine O & M cost was estimated for individual cost items: fixed cost, production cost and fee collection cost, as shown in Table 3-2-9.

Table 3-2-9 Estimation of O & M Cost (Technical Cooperation Project in Sierra Leone)

Category	Cost Item	Cost Calculation	Remarks
Fixed Cost		US$ 1,140/month	
(a)	Wages and allowances	US$ 80 x 10 = US$ 800	
(b)	Office expenses	(a) x 30% = US$ 240	Telecommunication cost; printing cost; transportation cost; commission
(c)	Council administration cost	US$ 100	Meeting expenses; stationary
Production Cost		US$ 98.88/1,000 m^3	
(d)	Fuel cost	US$ 5.67/gallon x 0.5 x 30 hours = US$ 85	0.5 gallons/hr (25 KVA)
(e)	Oil and grease cost	(d) x 10% = US$ 8.5	
(f)	Chemical cost (chlorine for disinfection)	US$ 1.33/kg x 0.5 kg = US$ 0.67	0.5 mg/litre
(g)	Maintenance cost	(d) (e) (f) x 5% = US$ 4.71	
Fee Collection Cost			
(h)	Cost of entrusting fee collection to user units	Maximum: 10% of collected fee	

The fixed cost per person (service population: 11,000) and production cost per m^3 of water were firstly estimated. The fixed cost and production cost were then finalised, taking the fee collection cost into consideration.

Fixed Cost : (US$ 1,140/11,000) x 100/90 (rate of fee collection cost) = US$ 0.115 per person

Production Cost : (US$ 98.88/1,000 m^3) x 100/90 (rate of fee collection cost) = US$ 0.110/m^3

The tariff shown in Table 3-2-10 was set by a different family size (unit: three members) and different consumption volume (unit: m^3/person/month). In general, an increase of the family size is said to reduce the basic consumption unit per person because of the more efficient use of water. In this table, a variation coefficient reflecting such tendency is applied.

Table 3-2-10 Water Tariff (for Public Tap)

Water Consumption (m3/person/month)	Number of Persons per Family (Unit: LE; US$ 1 = LE 3,200)					
	1 ~ 3	4 ~ 6	7 ~ 9	10 ~ 12	13 ~ 15	≥16
0.00 ~ 0.30	1,000	2,300	3,500	4,700	5,900	7,400
0.30 ~ 0.60	1,400	3,000	4,300	5,800	7,000	8,400
0.60 ~ 0.90	1,700	3,800	5,200	6,800	8,100	9,500
0.90 ~ 1.20	2,100	4,500	6,000	7,800	9,200	10,500
≥ 1.20	2,500	5,200	6,800	8,900	10,300	11,500
Variation Coefficient for Basic Consumption Unit (a)	1.80	1.40	1.00	0.90	0.75	0.55

The above tariff accepted at a meeting of the residents was, however, not strictly adhered to. The low fee collection rate led to the temporary suspension of the water supply service and a fixed rate system (LE 5,000/month: the basic unit was changed from a family to a house) was agreed at a meeting of water users. The water supply service was then resumed.

While the main reason for the low fee collection rate may have been a lack of proper understanding of the rather complicated tariff, there may have been other reasons as listed below.

- The area is rich with springs producing relatively clean water and local people can use traditional water sources free of charge.
- A free water supply system was available in the past (in accordance with the government policy even though this service did not last long).

- The introduction of a fee-paying water supply service could affect unfavourably affect election voting for local politicians.

The method adopted by the PEPAC in Senegal is explained next as an example of calculating the maintenance cost and renewal cost of equipment and facilities.

In principle, the ASUFOR raises the necessary funds to conduct minor improvements and repairs, including leakage control and the repair/renewal of the pump and generator, using private enterprises. Although the maintenance cost and service life of the facilities vary depending on the type of power source, daily operation mode and level and quality of the maintenance work, the required level of the bank account balance to meet the O & M cost and amount of savings to cover the major expenditure for equipment renewal are estimated based on the criteria shown in Table 3-2-11 and Table 3-2-12 respectively. Under the project, the estimated values are explained to the ASUFOR as the basis for the decision on the water fee. Advice is provided to add the operating cost (fuel cost, personnel cost and others) to these basic costs before deciding the water fee. (The government is responsible for any major rehabilitation or redrilling due to a breakdown or the end of the service life of a borehole.) Each ASUFOR is required to constantly maintain the full amount required to pay for the O & M cost in a bank account and to restore the account to the deposit level as soon as possible after a payment is made.

Table 3-2-11 O & M Cost to be Borne by ASUFOR

O & M Cost	Main Cost Items and Estimation Method
Pumping facility	There are four types of pumping facility depending on the power source: engine-driven type, generator type, commercial power (SENELEC) type and photovoltaic type. The maintenance cost is estimated by multiplying the initial (investment) cost by the "estimation factor" for each type. Formula: initial cost x estimation factor (2.5 ~ 3.5%)
Public tap/trough/water station for vehicles	The main maintenance cost items are the replacement cost of the tap, float valve and other valves, leakage repair and repair of any damage or cracks to the concrete body. FCFA 30,000 per tap should be saved to meet these costs.
Pipeline	The main maintenance cost item is the repair of pipes of the water supply network and leaking valves, etc. FCFA 120,000 should be saved to meet this cost.
Storage tank	The main maintenance cost items are cleaning inside the tank, painting and the repair of leaking valves, etc. FCFA 30,000 should be saved to meet these costs.
Borehole (cleaning by means of airlifting)	It is desirable to save funds required for airlifting operation (FCFA 800,000/operation) twice in the service life (20 years). In the case of old boreholes, FCFA 13,500/borehole/month should be saved assuming airlifting operation in five years time.

Table 3-2-12 Estimated Facility Renewal Cost to be Borne by ASUFOR

Renewal Cost	Main Cost Items and Estimation Method
Pumping facility	Formula: initial cost x inflation rate x depreciation rate Service life: 8 years (depreciation rate: 12.5% per year), inflation rate: 1.03% per year
Public tap/trough/water station for vehicles	Formula: initial cost x inflation rate x depreciation rate Service life: 30 years (depreciation rate: 3.3% per year), inflation rate: 1.03% per year

The actual O & M cost for water supply facilities also includes fuel and other operation-related costs, cost of entrusting regular inspection, etc. to a private enterprise and personnel and miscellaneous costs for the management of the ASUFOR.

In regard to Level 2 facilities using power, a funding shortage due to insufficient water fee collection can directly result in a fuel shortage and/or suspension of the power supply, making the continuation of water supply operation impossible. The inability to procure the necessary chemicals means inability to supply clean, safe water which is suitable for drinking. In short, the prospect of proper maintenance must be more carefully examined at the planning and design stages of Level 2 facilities than is the case for Level 1 facilities and the level of the water fee must be agreed by the potential users. If it appears unlikely that local people can afford the planned level of the water fee, an alternative water supply method should be considered as in the case of Rwanda. Level 2 facilities should not be the only facilities to be considered at the design stage even if they reflect "the policy of the recipient country" and/or "desire of local people".
When Level 2 facilities are to be managed by a LGA, any decision on the level of the water fee must take such factors as the availability of a policy-based subsidy (for example, for the purpose of covering any deficit) and the existence of a water tariff based on a national policy into consideration.

One example of a subsidy is funding for facility renewal or expansion using the CDF or development budget of LGAs in Tanzania. At grant aid project sites in the Mtwara and Lindi Regions where smooth collaboration between LGAs and water management committees/WUAs, partly due to the successful outcome of capacity building for LGA staff (under the RUWASA-CAD, a technical cooperation project), is observed, LGAs appear to facilitate the use of such funding in response to local requests for the extension of pipelines and installation of additional public taps. A condition for funding is that the water fund accumulated by CBO-OMs should also be used to finance the extension of facilities and renewal of equipment and the proportion of funding by a CBO-OM for each occasion is set. The water fund, which is an internal reserve based on the collected water fee, is also used to finance pipeline repair and the cost of switching from a diesel generator to commercial power.

In contrast, the level of the water fee for water supply facilities using a solar system in The Gambia is set based on the government policy. The official fee is GMD 2.1/m^3 (US$ 1 = GMD 26.17). 50% of the collected fee goes to a maintenance company and 30% goes to a communal maintenance fund management by the government to pay for large expenditure, such as equipment renewal. When the service population is small, the remaining 20% of the collected fee is insufficient to pay water vendors, guards and others. Because of this, a service population of a certain size (minimum: 1,000) is a condition for the planning of new facilities. When the service population is less than 2,000, however, payment of the personnel cost means inability to conduct pipeline repair, etc. To avoid this situation, water management committees adopt a fixed fee system (per adult or other unit) where the actual monthly fee is higher than the unit price set by the government. The metered tariff introduced in The Gambia under the government policy is designed to enable payment of the O & M work entrusted to private enterprises and to clearly suggest the amount to be saved in the communal maintenance fund. There is no guarantee of payment of other maintenance expenses with the remaining funds and it is necessary for CBO-OMs to raise sufficient funds to meet these expenses when necessary.

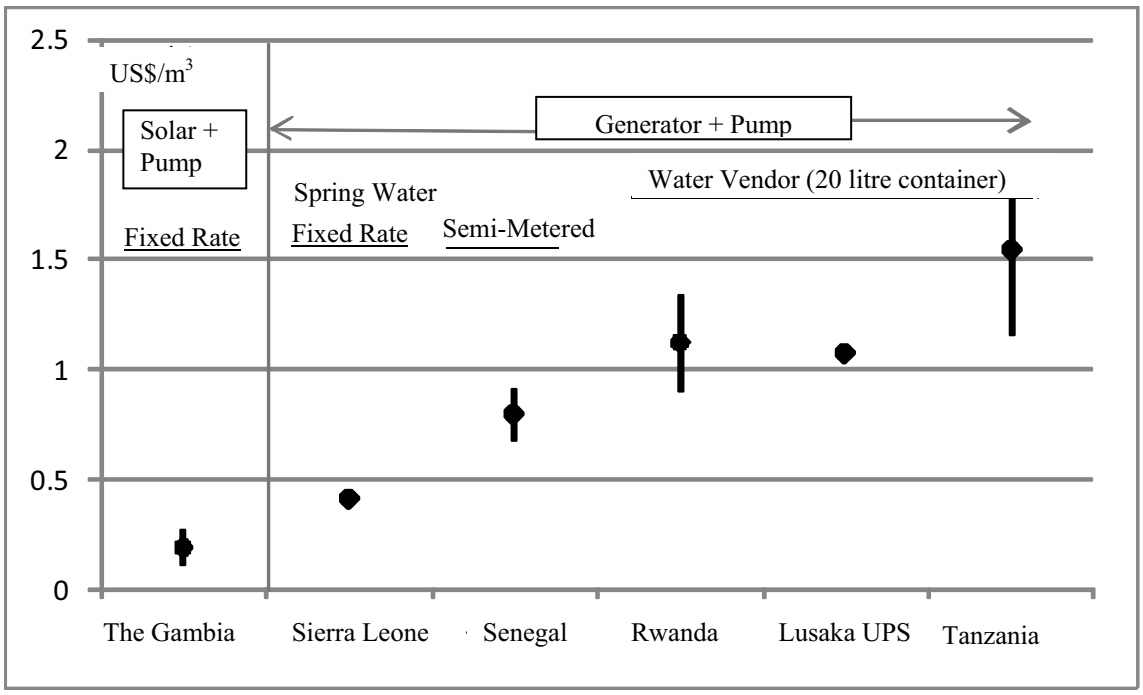
With Level 2 facilities, it is highly desirable that local people understand the possibility of a change of the level of the water fee through discussions with the CBO-OM and of the adoption of cost reduction measures when the amount of water fee collected is insufficient to continue the adequate O & M of these facilities by the CBO-OM. Continual guidance for CBO-OMs is required to ensure the proper recording and reporting of basic operation data, including records of water fee collection, expenditure, pumped water volume and metered water consumption at each public tap. It must be noted that actual O & M is the responsibility of CBO-OMs although they are assisted by various educational and follow-up activities.

(2) Examples of Water Fee (Tariff)

The unit water prices confirmed by the field survey in various countries are shown in Fig. 3-2-3 along with the type of power source used and water fee collection method. In the case of a fixed charge system, the unit price is estimated based on the average number of family members and consumption per person (25 litres/day). The solar system (The Gambia) offers the lowest water fee (approximately US$ 0.08/m^3); the end user fixed charge is approximately US$ 0.1 ~ 0.3/m^3) because there is no power supply cost. Among countries using the generator system, the level of the water fee is low (approximately US$ 0.4/m^3) in Sierra Leone (the service is run by a public

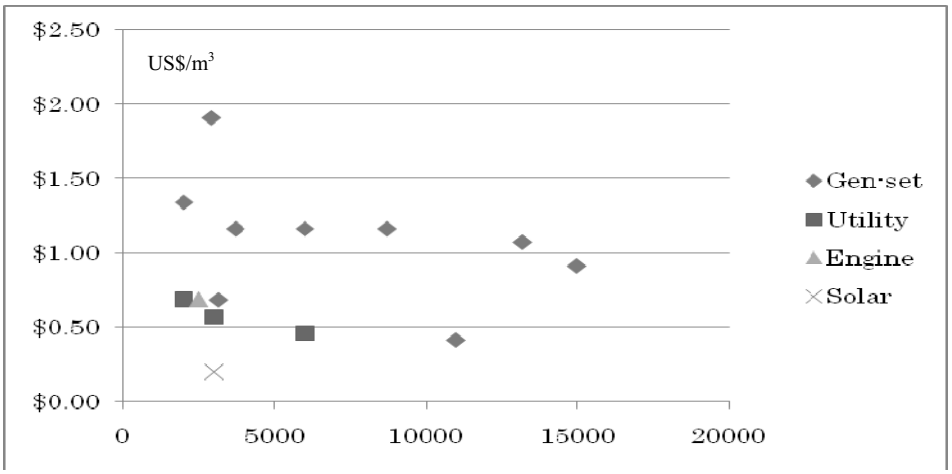
corporation using a slow sand filtration system for spring water). This low user charge is probably because of (i) the cross subsidy system where a higher unit price is set for the police, research institutes and others on the grounds of individual connection and (ii) payment of the equipment renewal cost and network extension cost by LGAs. However, the figures in Fig. 3-2-3 should be only tentatively used in view of the fact that the system is less than one year old. With the pumping system using groundwater, metered water sales at public taps has a relatively high unit price of approximately US$ 1/m^3 even though it includes a commission (10 ~ 20% of the sales) for water vendors. The level of the water fee is the highest in Tanzania but is actually similar to other countries when the facts that it was only recently raised from Tsh 30/20 litres (US$ 1.16/m^3) to Tsh 40 ~ 50 (US$ 1.55 ~ 1.93/m^3) and that an O & M fund is being steadily accumulated (at a rate of 10 ~ 20% of the fee collected) are taken into consideration.

Fig. 3-2-4 shows the relationship between the service population and unit price by type of power source while Fig. 3-2-5 shows the relationship between the service population and unit price by country. It can be observed here that the unit price is far more greatly affected by the type of power source than service population. The use of a generator results in the highest unit price, followed by commercial power. A solar system offers the lowest unit price. The different unit prices in different countries despite the use of a generator as the power source can be presumably attributed to the commission paid to water vendors.



* With the semi-metered system, tap managers pay the collected fee based on the meter readings of public taps to the ASUFOR but the unit price is set lower than the unit fee for users (unit fee for individual connection service).

Fig. 3-2-3 Comparison of Water Fee for Level 2 Facilities
(Country and Type of Water Supply System)



Note: Gen-set: Diesel engine generator for motor pump, Utility: Public power supplying line, Engine: Engine for turbine pump, Solar: Photovoltaic generator

Fig.3-2-4 Comparison of Water Fee for Level 2 Facilities
(Service Population and Type of Power Source)

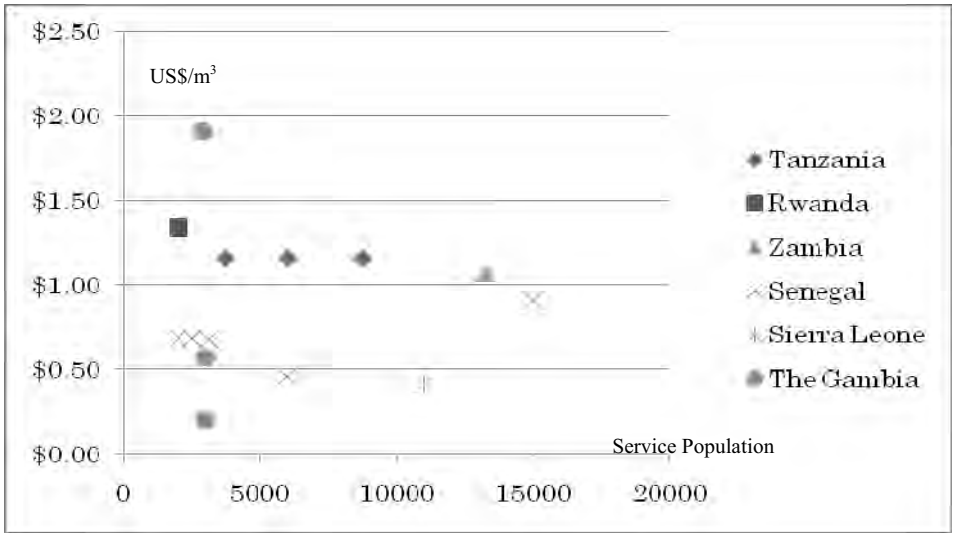


Fig. 3-2-5 Comparison of Water Fee for Level 2 Facilities
(Service Population and Country)

(3) Fee Collection Method and Management of Collected Fee

The field survey found many water fee collection methods. Table 3-2-13 attempts to classify these methods based on the charging method and payment method.

As it is essential for Level 2 facilities using a generator or commercial power supply to secure sufficient income to meet the operating expenses, the water fee is collected in cash in all of the cases studied. In other words, there is no case of payment in kind or quarterly or half-yearly lump sum payment as in the case of Level 1 facilities.

The fixed charge system where a fixed amount of water fee is charged per family or adult regardless of the actual consumption volume as commonly employed for Level 1 facilities has the inherent risk of generating a moral hazard or wasteful consumption. Therefore, a metered system tends to be adopted for Level 2 facilities from the viewpoint of minimising the O & M cost, ensuring the effective use of water resources and raising the preparedness of users to conserve water. The sale of water based on a unit price by container of a certain size demands the presence of a water vendor to handle cash transactions and the personnel cost (commission) of such vendors is added to the cost of operation. The level of commission for vendors (tap managers) tends to be between 10% and 20% of the water fee, increasing the cost burden on users. At grant aid project sites in Tanzania, however, tap managers are paid a monthly wage

which is inferred to be equivalent to 5% of the water fee or less, thereby keeping the cost of deploying tap managers low.

Table 3-2-13 Water Fee Collection Methods (in Studied Countries)

Fee Charging System	Collection Method from Each Tap	Payment to CBO-OM	Country/Area
Metered charge	Cash sale per container	Payment of the sales proceeds by tap managers (water vendors)	Tanzania
		Payment of the sales proceeds from water vendors or users by tap managers who retain a commission (10 ~ 20%) (weekly or monthly payment) (a fixed charge may be opted for in the Lusaka UPS)	Rwanda; Lusaka UPS
		Payment of the billed amount based on the total water supply volume at each tap by each tap manager (either paid at the office desk or collected by an officer of the ASUFOR	Senegal
Charged based on meter reading at the tap	Metered charge (based on a tariff which takes the total water supply volume at the tap and set fee for a family size into consideration)	A bill is sent to each registered family; unit leaders (who also act as tap managers) collect payments and forward the money (minus a maximum commission of 10%).	(Sierra Leone)
	Semi-metered charge (total water supply volume divided by the number of users)	Collection from users and payment to the office by tap managers	The Gambia (in some areas)
Fixed charge	Fixed charge	Payment by tap managers to the committee which then pays the maintenance company based on the meter reading	The Gambia
		Registered households are charged a fixed fee which is collected by employed collectors.	Sierra Leone

Notes
Lusaka UPS : Unplanned settlements in Lusaka, Zambia (now publicly approved)
Senegal : The collection method after public taps varies from one ASUFOR to another. While the same unit price as that for the individual connection service is set, the bill for tap managers is set slightly lower to use the difference for payment of the commission for tap managers.
Sierra Leone : A stratified tariff with a metered system was originally introduced but was later changed to a fixed charge system.

The advantages and disadvantages of these different collection systems are compared in Table 3-2-14.

Table 3-2-14 Comparison of Water Fee Collection Methods at Public Taps

Collection Method	Advantages	Disadvantages	Points to Note
Each time water is sold using a container	• Sense of fairness as the payment is proportionate to the amount of water supplied • Collection of fee corresponding to the consumption volume • Spread of preparedness to conserve water	• Limited operating hours in many cases due to the need for the presence of a tap manager (water vendor) • Slightly high total O & M cost due to the addition of a commission for water vendors to the water fee	• Reduction of spillage when water is supplied to containers • Control of the fee box • Prevention of illegal fetching of water • Reward for fee collectors
Collection of a fixed amount (per family) at regular intervals	• Little time constraint on tap managers as the fee is regularly collected • Less hazardous handling of cash • Provision of some leeway for water supply when the highest monthly supply volume is used as the standard	• Insufficient collection amount in months of heavy consumption • Sense of unfairness due to different levels of consumption • Less preparedness to conserve water • Possible non-collection due to absence or economic conditions	• Water fee per head (with conditions regarding age, gender and others: The Gambia) • Incentives for fee collectors to match their responsibilities
Monthly charge based on the average water use per household in a month (for example, Senegal)	• Smaller work load for fee collectors and some sense of fairness because of the method to determine the monthly charge	• No reflection of the different water consumption volumes by individual persons or families	• Incentives for fee collectors to match their responsibilities
	In the case of Senegal, users of public taps pay the same unit price (FCFA 170/m^3) as the house connection service but tap managers are required to pay at a rate of FCFA 150/m^3. The difference constitutes their commission.		

There are many cases where a specific fee collection is adopted but where the low collection rate causes insufficient repair or operation of the facilities. The PURA-SANI, a JICA project in Rwanda, is one example of efforts to rectify such situation.

In regard to the rural water supply service in Rwanda, water user associations (Regie) are supposed to be responsible for the O & M of facilities. However, the lack of swift and clear reporting of the collected water fee at the public tap level to the treasurer of the regie meant that the financial situation of the water supply facilities was not clearly established. This situation prevented the introduction of an appropriate water fee, resulting in a groundless rise of the water. To rectify the situation, guidance was provided under the PURA-SANI that the collected water fee at each public tap based on a unit price per container should be collected by the treasurer on a set day of the week. Treasurers underwent training for capacity building using an accounting

manual prepared under a technical cooperation project and a system was introduced for treasurers to prepare and store various revenue and expenditure slips and also to prepare a monthly report. As a result, a highly transparent water fee collection system with the trust of local people was successfully realised.

In rural areas with a low cash income level, efforts are being made to accumulate a supplementary O & M fund through increased production activities, including the cultivation of cash crops using the supplied water. In regard to large water supply systems, there is an example of fee-paying additional water supply for vegetable gardens and stock raising by which local people can earn cash (Senegal). When water use for purposes other than domestic use (including the supply of drinking water for livestock reared by nomadic people) increases and exceeds a sensible groundwater pumping volume, such problems as lowering of the groundwater table and a decline of the water pressure (water supply volume per unit time) can occur. From the viewpoint of the sustainable use of water resources, unplanned water use with no consideration of proper water management can damage a sustainable water supply service in the future even if the water fee is properly collected (described in more detail in 3-2-5 - Design of Level 2 Facilities). It is essential for LGAs to supervise the preservation of sound water intake and distribution in addition to such matters as fund raising and the operating days of water supply facilities.

As in the case of Level 1 facilities, the safe and transparent management of the collected water fee is important to ensure the continual O & M of Level 2 facilities. As the amount of the collected water fee is fairly large, it is a common practice to deposit the money in an account held at a nearby bank. The reality of fund management, however, varies from one country to another as shown in Table 3-2-15.

Table 3-2-15 Examples of Fund Management for Level 2 Facilities

Country/Area	Fund Management Method
Tanzania (Lindi and Mtuwara Regions)	Water vendors report the sales amount to the treasurer of the association/committee on a daily basis. Actual payment to the treasurer is made monthly. After deducting the expenses for the month, the treasurer then deposits the remaining amount in a bank account. He/she also reports on the account every one to three months at general meetings of users.
The Gambia	The inspection and maintenance fee (50% of the collected water fee at an official unit price of GMD 2.1/m^3) for solar pumping facilities in response to the bill submitted by the maintenance company) and contribution to the communal maintenance fund operated by the government (30% of the collected water fee) are paid from the collected water fee. The wages for guards and repair cost of the pipeline, etc. are deducted from the remaining 20%. Any remaining amount is then deposited in a bank account.
Rwanda	The water fee collected by water vendors is not swiftly reported to and managed by the treasurers of associations. (Under a technical cooperation project, water vendors are advised to submit a weekly report to the treasurer and undergo capacity building. The administration requires that the associations under its control submit a monthly report and regularly organizes meetings for the sharing of information and experience to solve as well as to prevent problems.)
Senegal	Two bank accounts are used. One is a current account and the other is a savings account to accumulate funds for O & M. Reporting on these accounts is made monthly to the council as well as maintenance centre.
Zambia (Lusaka UPS)	The LWSC employs two management methods. 1) Based on a MOU with the LWSC, a water trust (which is a CBO-OM) conducts the collection and management of the water fee and the O & M of the facilities. The water trust also reports on the state of fund management and O & M to the LWSC. 2) A water committee (a subordinate body of the village (or district) development committee) conducts the sale of water and pays an O & M fee to the LWSC after deducting a commission. The LWSC is responsible for the management of the funds and facilities.
Sierra Leone (Kambia District)	An accounting officer of a public corporation totalises the collected water fee and deposits it in a bank account. Payment from this bank account requires the signature of two persons from among the president of the corporation, district governor and district head of accounting. The bank account is audited by the district government.

(4) Motivation for Payment of Water Fee

In the case of Level 2 facilities which use power to pump water, insufficient collection of the water fee quickly leads to the suspension of operation even if the system is in good working order. Therefore, the necessity for regular collection of the water fee is stronger than in the case of Level 1 facilities.

The water fee can be collected using a combination of various techniques described in 3-1-2 (4) (setting of the water fee based on the estimated cost of participatory O & M, improvement of awareness of the inconvenience as well as negative cost of an unhygienic environment and treatment of water-borne diseases and penalty for non-payers) in the short-term. Nevertheless,

the continuous provision of education (sensitisation) for local people is essential to facilitate their understanding of the adverse impacts of non-payment.

Because of (i) the larger service population, (ii) larger amount of water fee to be collected and (iii) additional expenditure items, including power cost, personnel cost and repair cost, compared to Level 1 facilities, measures to ensure the transparency of the account are particularly important for Level 2 facilities. These measures include clarification of the flow of the collected water fee and the proper reporting of expenditure. When the amount to be handled is large, there is no denying the possibility of temptation for the wrongful use of funds or even embezzlement. When such wrongful use occurs, the support of water users for water fee collection immediately crumbles. This situation must be avoided by establishing a reliable monitoring system (consisting of regular reporting of the account to the village council and a dual check system).

There tends to be a misunderstanding that solar-powered water supply facilities do not incur an O & M cost because of the non-use of fuel and few breakdowns in the first five years or so. The education of local people is, therefore, as necessary as that for water supply facilities using other types of power sources as a solar system involves wages for tap managers, guards and operators, cost of pipeline and tap repair and cost of regular checking and adjustment of the system by a maintenance company.

(5) Balance Between Poverty Alleviation and Water Fee Collection

When the water supply service is considered in the context of poverty alleviation, the balance with the principle of beneficiaries-pay is a very important policy issue for Level 2 facilities as in the case of Level 1 facilities. As the outgoing amount is quite large for Level 2 facilities due to the use of power, the cost burden on the poor is relatively large. Meanwhile, the large service population suggests that the wealth gap between the rich and poor in the service area may be larger than that for Level 1 facilities.

Several measures are observed to enable water supply for the poor in the service area as shown in Table 3-2-16. None of the measures listed here relate to the balance between the necessary O & M costs for water supply facilities and level of water fee charged and the tacit acceptance of non-payment or proxy payment cannot be relied upon as neither represent a systematic approach.

Table 3-2-16 Measures to Assist Water Supply by Level 2 Facilities for the Poorest

Measure	Description	Country
Sale in small quantity using a container	Prioritised purchase of essential drinking water at an affordable amount	Tanzania; Rwanda; Zambia; Lusaka UPS
Availability of free water source	Borehole with a hand pump located at an inconvenient site for the transportation of water	Tanzania; Lusaka UPS
Priority recruitment of poor people as tap attendants (water vendors)	A certain proportion of the sales (10 ~ 20%) constitutes their income in the form of a commission.	Rwanda; Tanzania
Tacit acceptance of non-payment (by tap attendants)	The loss of revenue is compensated for by their own commission	Rwanda
Proxy payment	By community leaders, relatively wealthy villagers, relatives and/or friends	The Gambia

Reliance on the cross-subsidy system where the unit price rises in accordance with a higher consumption to keep the water fee for the poor with a lower consumption low may be an option although the application of this system to Level 2 facilities is difficult because of the difficulty of accurately establishing the water volume supplied to each household.

When access to clean water is considered to be a BHN, water supply to the poor who cannot afford the service charge should, in principle, be subsidised under the social security system. In reality, however, it is a difficult task to certify the subject persons for free water as a welfare benefit in a fair manner. The necessity for the fair collection of a relatively high water fee for the O & M of Level 2 facilities means that relief for the poor must be found within each CBO-OM. It is not easy to find a solution as a consensus for any of the measures shown in Table 3-2-16 may not be reached within the community.

(6) Pending Issues

1) Water Fee Collection and Response to Increased Water Demand in the Future

At the planning stage of new facilities, one presupposition is that an adequate water supply will be provided for the population of the service area in the planned completion year of the facilities,

taking the likely demographic changes in the meantime into consideration. However, it is rather unusual to plan changes of the O & M system. In areas with rapid population growth, expansion of the inhabited areas necessitates the extension of pipelines. It must be clearly determined in advance who will be responsible for the cost of such extension, be it the administration or the CBO-OM.

In The Gambia where the government sets a unit price of water, any request by a water management committee for facility extension is essentially rejected by the government. Even though areas with poor access to a water supply point are likely to emerge in areas with rapid population growth near cities, the water fee set by the government is not designed to cater for the expansion of facilities. The cost of pipeline extension and the installation of new public taps can be paid by a CBO-OM if the water fee is flexibly set in response to the demand to allow saving to pay for the cost of extension, etc. Needless to say, there must be extra room for water production and power generation together with the adequate management of water sources.

In Senegal where ASUFORs set their own water fee level and conduct pipeline extension and the switch to a individual connection system, there are cases of these changes being implemented without notification to or a technical review by the authorities. There is a case where the wrongful use of funds to construct a community hall resulted in a shortage of funds for water supply facility repair.

A grant aid project site in the Lindi District in Tanzania is a successful example of the effective use of the collected water fee for the extension of facilities. The water supply system in Kiwalala Village which commenced operation in 2006 with six public taps had expanded to two neighbouring villages (with a total of four public taps) by 2009. The construction cost is said to have been paid by the community fund (Tsh 4.5 million (approximately US$ 3,500, US$ 1 = Tsh 1,292) representing some 45% of the total funds already accumulated) and the development budget of the district and village authorities. With the expansion of the service area, the water management committee was reorganized into a water users association formed by representatives of the villages involved.

As discussed above, neither the service population nor the requirements of local people are static. The key issue for government support nowadays is how to adequately control the extension of facilities along with control of the financial aspect, including the set level of the water fee and use of the accumulated funds and technical control of the system, taking the limitations of the available pumping volume and pumping capacity into consideration.

2) Contribution to Facility Renewal Cost

There are cases where a certain degree of user contribution to the rehabilitation or renewal of facilities is clearly stipulated by the national policy (Zambia and Tanzania). In reality, however, it is difficult for many Sub-Saharan countries to find the money for leakage repair let alone the extension of existing Level 2 facilities. Even in Senegal where ASUFORs are required to pay the cost of the renewal of the pump and generator and repair of leaking pipelines, not every ASUFOR can afford to do so. Meanwhile, the common O & M fund system in The Gambia in preparation for the renewal of the inverter, etc. of the solar-powered water supply system is still at the initial stage and its effectiveness has yet to be tested in the coming years.

The introduction and collection of a water fee is essential for the adequate O & M of water supply facilities and also from the viewpoint of the efficient and effective use of the precious funds of the government for investment. The formulation of clear national policies on how much users are expected to fund the O & M and other costs (full cost recovery or only ordinary expenses) and how to deal with costs which cannot be met by users even under the beneficiaries-pay principle is necessary.

In Senegal, ASUFORs are, in principle, responsible for payment of the equipment renewal cost. The development budget of the government includes a portion designed to finance such equipment renewal. This portion has actually been used in some cases even though the amount is insufficient to replace all equipment which has reached the end of its service life. Equipment renewal may be achieved with the assistance of donors. What can be done to eliminate a sense of unfairness relating to payment of the renewal cost are (i) pre-arrangement of the proportion of the cost to be borne by ASUFORs and the administration and (ii) establishment of a government-financed fund capable of providing quick loans. At present, the government sets its own budget for equipment renewal. When the form of donor assistance changes to sector-wide financial assistance, the systematic planning of necessary equipment renewal may well be possible.

Large-scale funding will be required if new water sources (especially groundwater) are to be developed to meet the expected water demand increase in the future. It is practically impossible to add the cost of developing new water sources to the current water fee which is designed to pay the O & M cost of existing facilities because this extremely high additional

cost cannot possibly be met by the income level of people in developing countries which currently require external assistance.

3-2-3 Reinforcement of Supporting System for CBO-OMs

(1) Government Efforts and Pending Issues

1) Technical Support and Problems

A decline of the volume of water pumped from a borehole or the occurrence of muddy water may be caused by the deterioration of or damage to the borehole concerned. As such problems requiring major repair demand specialist skills and equipment, the deployment of engineers and equipment at the central government, local governments and/or water service provider are essential to ensure the existence of an adequate system which is capable of providing repair at a reasonable price. A similar support system is required to deal with breakdowns of generators and pumps as their actual operators or local engineers may be unable to conduct the necessary repair work. The technical support systems found in the targeted countries are shown in Table 3-2-17.

Table 3-2-17 Technical Support Systems in Targeted Countries of the Study

Country	Contents of Support
Senegal	35 officers deployed at 15 government maintenance centres nationwide provide guidance/advice (on the fee collection method, necessary repair and others) in response to requests for consultation, etc. from more than 1,000 CBO-OMs. The government provides fee-charging services to conduct relatively large-scale rehabilitation or repair work (excluding the personnel cost) (see Table 3-2-18). The privatisation of repair work is planned in the near future.
The Gambia	Pumping facilities are maintained by a maintenance company. While eight motivators are deployed at local offices of the central government to provide advice for CBO-OMs, the actual repair and maintenance work is conducted by the private sector.
Tanzania	• Basin office: Provides technical guidance/advice on hydrogeological issues and pumping equipment. • District government: Provides advice on the switch to less expensive commercial power from the use of a generator if it is possible. Also arranges the use of the district development fund and national CDF (regional development fund) for the expansion of facilities (pipeline extension, installation of additional water taps and other).
Zambia (Lusaka UPS)	The water company (LWSC) conducts O & M. The work is not free for the water trusts which manage their own funds. The work is free for water committees of which the water fee is managed by the LWSC.
Rwanda	Both the central government and LGAs possess few repair tools or skills. While O & M is contracted to the private sector, both the government and private sector require capacity building.

Table 3-2-18 Implementation System for Water Supply Facility Maintenance Work at Department of Maintenance (DEM) in Senegal

Level	Organization	Main Work Assignment
Central	Department of Maintenance (DEM)	• Formulation and supervision of maintenance plan • Coordination with related organizations and departments
Regional	DEM Regional Headquarters (3 nationwide)	• Inspection and repair of water supply facilities beyond the capability of maintenance centres
Local	Local Branches (15 nationwide)	• Coordination with the local government
	Maintenance Centres (15 nationwide)	• Preventive maintenance and repair of water supply facilities • Emergency water supply (at the time of disrupted water supply, etc.) • Raising of awareness, enlightenment and education of the public about water supply

Among the costs of technical assistance provided by the administration, the personnel cost is commonly borne by the administration while the actual repair cost, including the travel cost and cost of spare parts, is charged in many cases (for example, assistance by maintenance centres for ASUFORs in Senegal and assistance by the LWSC for water trusts in Lusaka UPS). The reasons for the charging of the repair cost to users are to reduce the cost of assistance on the part of the administration and to sustain the service.

Such an assistance programme is unavailable in many countries because of financial difficulties and insufficient technical capability on the part of the administration (for example, Rwanda). Even if such a system is in place, the length of the downtime is often long due to manpower and equipment shortages. (In Senegal, for example, the number of facilities increased from 260 to more than 1,000 in the 20 year period from 1985 while the staff strength of the O & M department was halved from 180 to 88 in the same period. The number of staff deployed at local offices to conduct actual repair work was reduced to 36.) The high travelling cost when a local office of the central government or LGA office is located far from villages is a source of complaint by the CBO-OMs of these villages.

In addition to such background, there has been a tendency for the central government in Senegal and many other countries to adopt a policy of pulling out of direct involvement in O & M. As LGAs lack sufficient capacity to assume the role in question, they find it necessary to opt for the outsourcing of O & M to the private sector. In Senegal, the experimental outsourcing of O & M to a private company has been conducted since 2002 based on the wish of individual ASUFORs. At the same time, efforts have been made to rally donors to seek a

way forward for the gradual transfer of O & M to the private sector (gradual transfer of O & M at the regular check level, small-scale repair level and major repair level to the private sector) under the PEPAM (Drinking Water and Sanitation Programme for the Millennium).[50] In 2009, a tender was held to select a private enterprise to which the O & M of some 500 facilities in the Central Region could be outsourced. By the end of 2009, however, the outsourcing system was suspended because of (i) doubt regarding the technical capability of private enterprises, (ii) lack of a consensus on the reform of government organizations after the transfer of O & M (major repair and rehabilitation) to the private sector and (iii) planned implementation of the administrative reform of the government.

In Rwanda, an O & M system based on PPP is being promoted even before the establishment of a technical support system of the administration. The hasty introduction of PPP and decentralisation has resulted in confusion regarding the respective roles of the administration, private sector and CBO-OMs.

The expected increase of Level 2 facilities in the coming years suggests a need in many countries to clearly determine the mechanism to conduct the repair work of these facilities which demands a high level of technical expertise as such work could be conducted by the central government, LGAs based on their capacity building and/or the private sector. As the actual decision is difficult, it is essential for each country to commence the work of examining a suitable policy and obtaining donor cooperation as soon as possible. It is necessary for Japanese aid projects to (i) check the changing state of the technical support system in their planning of the construction of Level 2 facilities and (ii) carefully monitor the relevant policies in the recipient countries and the trends of other donors.

2) Operational Support for CBO-OMs

The basic requirements for the operation of a CBO-OM are the continuous working of water supply facilities, collection of the water fee and clear recording of accounting and financial matters, regular convening and recording of meetings and the disclosure of information to water users. Another issue of critical importance is revision of the water fee as necessary based on judgement regarding (i) the state of the maintenance and repair of the facilities using

[50] Japan Techno Co., Ltd. and Earth and Human Corporation (2006), Final Report for the Project for Drinking Water and Support for Community Activities

the collected water fee and (ii) the state of savings in preparation for equipment renewal and the major repair of facilities.

Support by the administration means monitoring of the operational and financial state of the management of water supply facilities and the provision of conveniences for feasible fund raising. The most common monitoring methods are (i) regular submission of reports recording the operational and financial state and (ii) travelling guidance by a person in charge.

The following problems are sometimes observed in connection with operational support by the administration for Level 2 facilities.

- A large population served by Level 2 facilities means that people of different ethnic backgrounds and lifestyles, including modes of water use, may use the same facilities, making it difficult to achieve a consensus. (In Senegal, people who rely on agriculture or nomadic grazing use the same facilities in some ASUFORS, making it difficult to even organize regular meetings.) In such a situation, it is not easy to find a solution which is acceptable to everyone. This problem is not restricted to the water supply and sanitation sector and the administration should implement supporting measures, such as acting as the mediator to convene meetings, to solve the problem.

- The insufficient capacity of LGAs (manpower, means of travelling and budget) makes it difficult to conduct regular patrols and to deal with the situation of the late submission of reports by CBO-OMs.

3) Development of Suitable Environment for O & M

There are some examples of efforts by the administration to develop an environment for the smooth, efficient and sustainable O & M of water supply facilities by CBO-OMs as shown in Table 3-2-19. These efforts, however, face their own problems.

Table 3-2-19 Development of Suitable Environment for O & M

Issue	Description	Country	Problems
Donor coordination	Unification or harmonisation of manuals for the establishment and management of CBO-OMs; coordination of the geographical areas for assistance	Zambia; Tanzania; Senegal; The Gambia; Others	There are different levels of coordination, ranging from the formulation of "national guidelines and manuals" to the "convening of regular meetings" and the "sharing of activities and information".
Training of operators	An operator training course is arranged at a vocational training centre to improve the technical level of power pump operators in order to ensure the sustainability of the facilities. The trained status can be used for operator recruitment by CBO-OMs.	Senegal	This training at a centre is no longer available because of the end of the financial assistance by the donor and operators are currently trained under individual projects.
O & M fund	A proportion (10 ~ 30%) of the collected water fee is deposited to a government-controlled common fund on behalf of each CBO-OM in preparation for the renewal of expensive parts. This is used as the funding source for the renewal cost and is especially useful for smaller CBO-OMs when renewal is required even though the accumulated amount of the fund may be insufficient.	The Gambia	A maintenance company collects this fund at the time of collecting the water fee and forwards it to the account. Since the initial introduction of the system, many meetings have been held to discuss the proportion of the O & M cost to be borne by CBO-OMs.
Fostering of Private Enterprises Capable of Conducting O & M	The relevant issues are the discovery of potential enterprises, their fostering, establishment of technical standards and outsourcing procedure and clarification of the contents of outsourcing. The development of a system which can (i) strike a balance between profitability for private enterprises and the cost burden on CBO-OMs and (ii) clearly states the roles and responsibilities of private enterprises based on mutual consent is essential	Senegal; The Gambia; Rwanda	The development of the environment in question has taken several years and the trial and error process is continuing. Because this is beyond the realms of decentralisation, the relevant efforts have been led by the central government with international assistance.

4) M & E and Supervision

Many countries adopt a system of making CBO-OMs, such as committees and associations, regularly report the operating and financial status of water supply facilities to the administration for evaluation purposes (for example, Tanzania, Zambia (Lusaka UPS) and Senegal among the countries studied). Most countries, however, are experiencing a situation where such reports are not prepared due to the absence of the necessary data or meetings for report preparation or a situation where a proper response cannot be made because the

submitted reports are not analysed. The required assistance by the administration, therefore, includes a field survey on the reasons for a CBO-OM's failure to convene meetings and/or prepare reports so that appropriate advice can be provided to rectify this situation which has an adverse impact on sustainable O & M.

In order to provide support to solve local problems, monitoring officers (brigade des puits et forages) are posted at 15 maintenance centres in Senegal and MDFTs (multi-disciplinary facilitation teams) are established together with local branch staff of other ministries in The Gambia. Senegal currently has a working system whereby the Department of Maintenance (DEM) of the central government receives information on a weekly basis on the operational status of each facility from the local maintenance centres via telephone and shares this information with organizations participating in the national programme (PEPAM). When assistance for an ASUFOR is likely to be required, the brigades or a NGO is assigned to check the actual need for assistance. 35 monitoring officers oversee more than 1,200 facilities in Senegal and 8 facilitators oversee more than 200 facilities, meaning that one officer is responsible for approximately 30 facilities in these countries. As the rural water supply sector is under the jurisdiction of a central government ministry in both countries, the monitoring results are gathered at the central government level. This system works fairly well as it is capable of quickly establishing the picture of major events, such as the stoppage of operation, because of growing coverage of the mobile phone network and clarity of the information communication route. The communication of more detailed information on gradually progressing matters, such as worsening of the financial situation and state of organizing regular meetings, does not appear to be sufficient, presumably because of the inadequate transport means and poor road conditions. Other countries are also facing a similar task of continually recording the operational and financial status, making timely and smooth reporting to the supervisory body (administration) and the sharing of information at the CBO-OM level. On its part, the administration should ensure the smooth functioning of the so-called M & E system as the analysis of conveyed information and feedback and guidance for CBO-OMs are currently inadequate.

Amidst the ongoing processes of decentralisation and donor coordination, the creation of a uniform M & E system and the establishment of a reliable capacity building method for LGAs for wide application to rural water supply projects under the umbrella of a national programme are urgently required.

As part of this development process, methods to maximise the use of information communication devices in view of the rapid improvement of the conveniences for mobile phones and Internet users are required even though the economy and development stage of the IT infrastructure must be taken into consideration. One example is an experimental test based on PPP to launch an information service system for the state of the O & M of water supply facilities using the mobile phone and Internet networks in Senegal. Although this test indicated the viability of physical communication and the experimented software, neither the expected cost burden on users nor the relationship involving users, the government and the private operator of the system have been clearly decided. As a result, full-scale operation of the system has not yet started. This example appears to suggest the following regarding the use of IT in the future.

- A new fee-paying service is unsustainable unless its benefits are thought by users to be greater than the cost of the service.

- The service charge must be within the economic capacity (financial affordability) of users.

(2) Utilisation of Private Sector for O & M

1) O & M Support System of Private Sector for Level 2 Facilities

The general O & M work conducted by CBO-OMs is supported by the private sector in various ways as shown in Fig. 3-2-6.

The private sector entities involved in the O & M conducted by CBO-OMs are individual tradesmen, such as plumbers and electricians, and maintenance enterprises who conduct a whole range of O & M work on a contract basis. The predominant business reality of private enterprises, however, is that equipment repair is conducted on request even though an O & M contract, including regular inspections, is awarded to private enterprises in The Gambia and Senegal. Including the case of O & M contracts in Senegal, the repair cost tends to be higher for those Level 2 facilities which are located far from urban areas because of the fact that the travelling cost and procurement cost of parts from distant sources are added to the technical service cost. For this reason, some very autonomous CBO-OMs are trying to train their own technicians to reduce the repair cost.

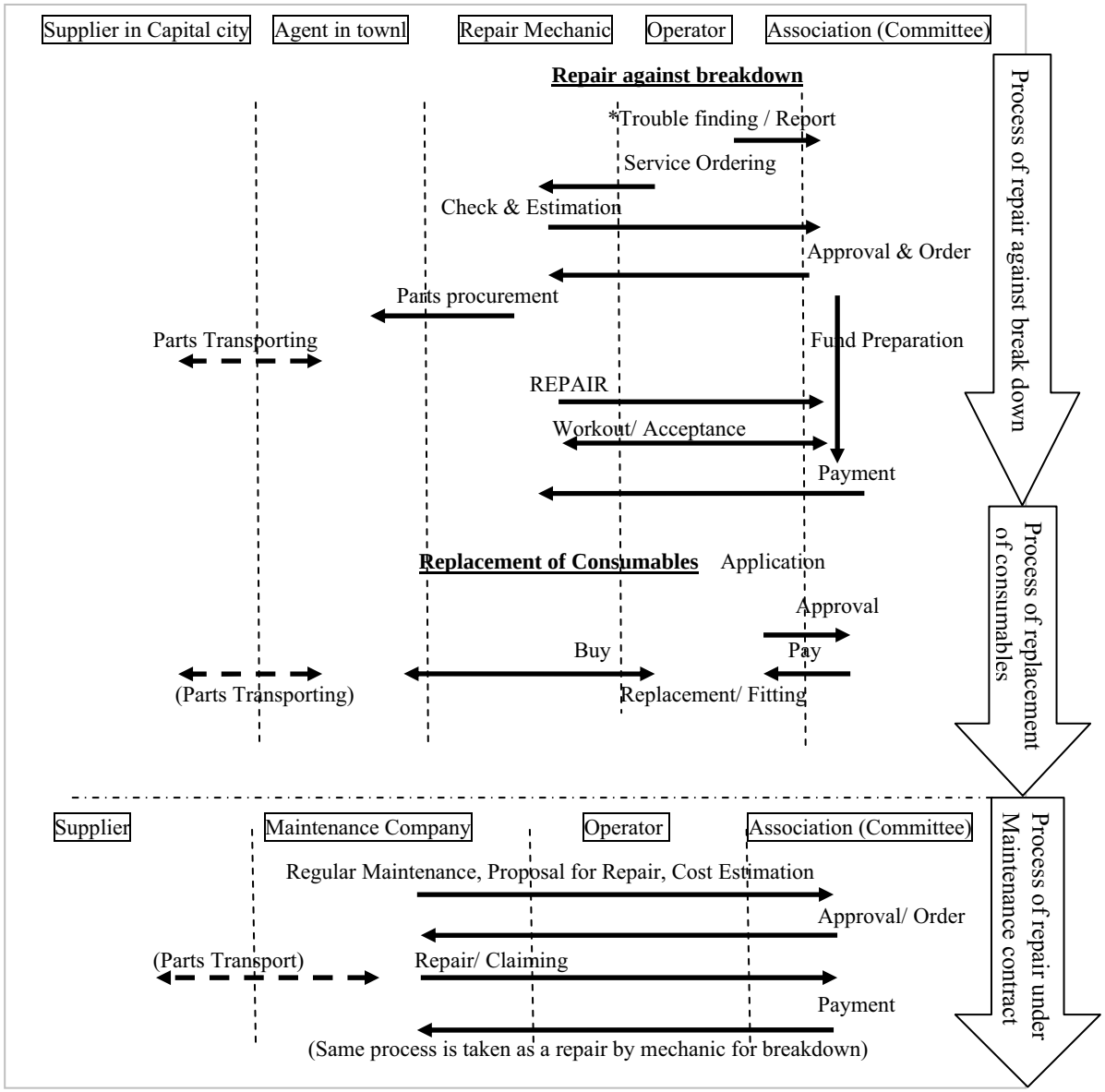


Fig. 3-2-6 Typical Repair Process for Level 2 Facilities under CBO-OM

In The Gambia, some private enterprises are contracted to conduct the O & M, including regular services, of solar systems, generators, pumps and other equipment. Before reaching this stage, there was a national policy of fostering capable enterprises. The services of these enterprises are provided based on a service charge system and the business activities are supervised by the government. In the case of PPP in Rwanda, the hasty use of the private sector has led to problematic contracts as the private sector lacked sufficient capability to perform its assigned roles. Some recent projects have, therefore, included the capacity building of private O & M enterprises as a condition for project implementation.

Table 3-2-20 O & M Skills Relating to Piped System with Public Tap Stand

	Form of Contract	Scope of Outsourced Work	Remuneration	Problems	Actual Examples
Independent Technicians (Tradesmen)	No specific contract in most cases as the work is based on individual requests for repair	Repair of water leakage Replacement of generator parts Readjustment and repair of distribution boards	Negotiable repair fee Actual expenses: travelling cost, parts cost and others	Major repairs are difficult Long time required to obtain parts	Plumbers Electricians
Maintenance Enterprises	The central government selects one company for an area where the number of facilities is likely to ensure profitability (evaluation is based on the relevant criteria) and affords an exclusive contract for the said area.	Contract: regular checking of the pumping system (pump and other power equipment, such as the generator) and advice Repair: charged separately on an individual work basis (The Gambia: free repair and parts replacement for the first five years)	(Senegal: existing system) Unit personnel cost + travel and actual expenses (Senegal: new system; The Gambia: solar system) Pricing based on the unit pumped (water supply) volume (no consideration of the travelling distance)	Contracts for which the service cost is based on the travelling distance are unpopular in remote areas. Forced participation in a contract with a private company may create discontent among associations with a good track record of self-management.	EquiPlus (Senegal) Gamsolar (The Gambia)

2) Important Points for Outsourcing of Maintenance Work to Private Sector

Table 3-2-21 lists the technicians/tradesmen required for facility maintenance. In accordance with verified cases in Senegal and The Gambia, the types of service and maintenance work suitable for outsourcing to the private sector (or those already outsourced in some concrete cases) are the checking/inspection, repair and renewal of a range of equipment for pumping operation, including the pump and generator, engine or solar power generating system to supply power to the pump.

Table 3-2-21 Technicians/Tradesmen Involved in O & M of Piped System with Public Tap Stand and Their Work

Type of Technician/Tradesman	Description of Work	Business Base	Problems, etc.
Plumber	Repair of pipeline leakage, etc.	Self-employed (technician)	Inability to deal with major leakage
Operator	Operation of generator or pump	Management body (full-time employment)	Can conduct minor repairs
Civil/building engineer	Repair of civil engineering facilities	Private construction company	Travelling distance (for self and materials) Repair of leakage from a water tank requires special skills
Engineer for special equipment	Checking and repair of solar system, etc.	Private company specialising in the installation and repair of such systems	Small number of capable companies with the required technical capability
Guardsman	Safety checking of facilities and equipment and security work	Management body (full-time employment)	Powerless against violent burglars Poorly equipped guardhouse
Mechanic/electrician	Repair of generator, engine, distribution board and other types of equipment	Self-employed (technician)	Lengthy time required to obtain parts Travelling distance

Prior to outsourcing of the work, it is necessary to determine the capacity of a candidate private enterprise by evaluating such aspects as (i) the form of enterprise, (ii) financial situation, (iii) past performance and experience, (iv) swiftness of the service offered, (v) staff (engineer) strength and (vi) equipment in possession. In the case of the Senegal's PEPTAC, pre-qualification was conducted for five enterprises which responded to a public notice in the newspapers. A panel of three people (two from the DEM and one from the PEPTAC) conducted a five grade evaluation (+2 ~ 2) of these applicants in regard to each aspect and three companies with a positive overall score were eligible for tender. (As a result of the subsequent bidding, two companies were selected. The actual contract was signed with one ASUFOR but no management work has yet been conducted because of the unprofitability of conducting such work with only one ASUFOR.)

According to the office in charge of the National Programme, there are two reasons for attempts to outsource the physical maintenance work of facilities operated by an ASUFOR, including daily checking and repair, to a specialist private enterprises: (i) national policy of withdrawing from facility and equipment servicing activities, including maintenance, as part of the overall reform of the water sector and (ii) practical need to conduct equipment

maintenance and repair work above a certain level to prolong the equipment life and to reduce the downtime.

For the progress of the outsourcing of O & M to the private sector, it is necessary to clarify the roles of the administration, CBO-OMs and private sector. Table 3-2-22 shows such roles as agreed under the PEPTAC in Senegal.

Table 3-2-22 Division of Roles Between LGA, CBO-OM and Private Sector for Maintenance of Water Supply Facilities

Actor	Roles
LGA	1) Finding, selection and certification of a private enterprise meeting the selection criteria 2) Facilitation of a contract between the CBO-OM and private enterprise 3) Supervision of the maintenance and repair work conducted by the contracted private enterprise 4) Monitoring of the performance of the CBO-OM to abide by the terms of the contract 5) Training of candidate facility operators 6) Mediation for any disputes between the CBO-OM and private enterprise
CBO-OM (ASUFOR)	1) Payment of the facility maintenance and repair work conducted by the private enterprise 2) Provision of materials required for the facility maintenance and repair work to be conducted by the private enterprise 3) Respect in regard to technical advice and recommendations made by the private enterprise 4) Appointment of facility operators who have successfully undergone training organized by the LGA 5) Respect in regard to mediation initiated by the LGA
Private Enterprise	1) Implementation of the maintenance and repair work of the water supply facilities in accordance with the contract 2) Compliance with the technical specifications for the water supply facilities and equipment 3) Provision of technical advice and recommendations for the village association 4) Recording of technical data and preparation of the minutes of meetings 5) Respect in regard to mediation initiated by the LGA

Meanwhile, it is essential to analyse and evaluate the various aspects of individual private enterprises in the following manner prior to any decision to actually allow their participation in the public service.

- Capacity of the enterprise: The technical capability of the enterprise to deal with the diverse types and countries of origin of water supply equipment (such as pumps, generators and photovoltaic power generating equipment, etc.) should be evaluated based on the relevant past performance of the enterprise.

- Profitability and price level: Because the prospective business of the enterprise is part of a public service, it is necessary for the enterprise to be regulated under reasonable pricing standards which are designed to prevent a situation of discontent or even inability to pay on the part of water users due to a sharp increase of the service charge through a mechanism to set a transparent and acceptable service charge level. Meanwhile, the introduction of a service area which is large enough for the enterprise to earn an adequate profit which enables the continuation of the service is important.

- In Senegal, the current outsourcing to the private sector shown in Table 3-2-22 involves only one enterprise which currently has a contract with 85 ASUFORs. As the present pricing mechanism cannot guarantee coverage of those ASUFORs operating in distant areas because of the likely high service charge level, there is a plan to introduce a new mechanism whereby one enterprise is awarded an exclusive maintenance contract which covers a specified area with several hundred facilities. Under this mechanism, the contracted regular inspection fee is based on the actual water consumption volume regardless of the travelling distance to provide the service (the actual service charge is some 5% of the unit water fee charged by an ASUFOR for its users or less).

- Market size and competitiveness: Although it is judged to be necessary for the government to stipulate the standard contract terms and technical specifications to ensure the technical level of the maintenance service, the contract itself is entered into between each CBO-OM and a private enterprise. In this context, there should be a mechanism regarding the selection of the enterprise from the viewpoint of ensuring (i) competition between enterprises hoping to win the contract and (ii) adequate profitability for the selected enterprise. The actual choices include delegation of the power to select an enterprise to each CBO-OM and the offer of exclusive/monopoly rights (franchise) to operate in the specified area to the enterprise selected by the government. In the case of countries which have few Level 2 facilities, such a franchise system may be a good choice because of the small number of capable enterprises and small market size as long as fair competition is guaranteed.

- M & E: After the signing of a maintenance contract, monitoring of the actual execution of the contract and the possible mediation of disputes are necessary. In The Gambia, a contracted maintenance enterprise submits a specified form to the DWR along with payment of the collected money towards the communal maintenance fund (CMF). In fact, the enterprise prepares three forms, i.e. one each for the water management committee, the

government and itself. The entry items on this form are the water consumption volume, equipment conditions, repair details, amount collected based on previous bills and amount collected towards the CMF (payment to the government).

3) Problems of Privatisation

As of early 2010, some 28% of the CBO-OMs operating in Rwanda are said to be using the private sector for the O & M of water supply facilities as promoted by the World Bank/WSP (the ratio declined from some 30% in early 2009 due to the withdrawal of several private enterprises). This is far below the target figure of 35% by the end of 2008. Initially, the number of cases rapidly increased because of the fact that the use of PPP for a certain number of water supply facilities was a condition for a continued loan by the World Bank. However, as many maintenance contracts were hastily concluded with bodies having no corporate status, some facilities have since been abandoned. The use of PPP is being continued by the Rwandan government even though the PNEAR has been completed but little progress has been made, possibly because of the severed tie with the loan and also because of the persistence of the same problems experienced by the conventional "regie".

In Senegal, preparatory work is in progress to transfer O & M work which has been the responsibility of ASUFORs and major repair work so far undertaken by maintenance centres to the private sector together with the obligation to establish sales points for hand pump spare parts. Under the previous scheme of fostering private O & M enterprises, one enterprise has concluded an O & M contract with 85 willing ASUFORs. It is planned to change the water charge system to a metered system whereby the total pumped water volume is measured to eliminate the practice of charging a higher regular inspection cost for distant areas while guaranteeing a monopoly in each of three zones nationwide to secure a reasonable profit for the contracted enterprises. This move to outsource O & M to the private sector is, however, now on hold as concern was raised at the time of the tender regarding the capability of bidders to execute the work (Box 3-11).

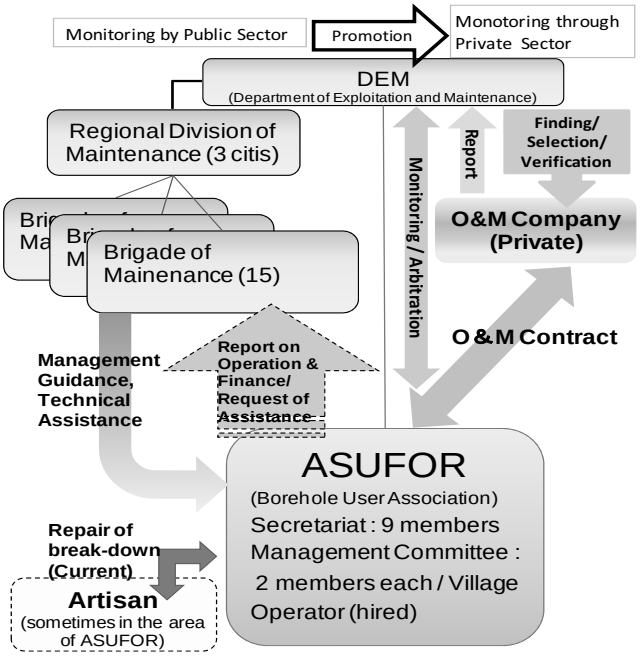
Box 3-11 Maintenance System in Senegal

(Water User Association and Preparations for Introduction of Private Maintenance Enterprises)

In Senegal, the state of the operation/breakdown (type of broken-down equipment or boreholes) of more than 1,200 piped water supply facilities managed by water user associations (ASUFORs) is reported monthly to the Department of Maintenance (DEM) via 15 local maintenance centres. Statistical data based on these reports is passed to aid organizations which are members of the PEPAM (in February, 2009, for example, some 8% of pumps and power equipment are reported to have broken down and some 3% of the facilities are incapable of conducting intake operation). Because of the inclusion of data on the actual date of the breakdown, these reports constitute useful materials for the examination of timely technical assistance to deal with equipment breakdowns.

Meanwhile, the ASUFORs are given the discretionary power to install additional house connections and to lengthen the pipeline as long as the relevant technical standards are met. They also conduct the financial management of the water supply service, including fee collection and decisions on expenditure and deposits. There is no uniform system on the part of the government to monitor and analyse financial data and its only work is for its staff members of local branches to provide limited consultation for individual ASUFORs.

The field survey for the Project found one ASUFOR of which the savings were judged to be inadequate for the sufficient maintenance of the water supply facilities as this ASUFOR had used most of its past savings to meet the construction cost of an assembly hall. Another ASUFOR was reminded by the DEM that its spending on a large facility should have only been executed after application to and evaluation and recommendation by the maintenance centre in accordance with the operating guidelines for ASUFORs.



At present, the DEM is preparing a new maintenance framework where equipment maintenance is conducted based on a contract between an ASUFOR and a private enterprise. One remaining problem is how to ensure proper financial management by ASUFORs under the supervision of the DEM or LGA.

Promotion of maintenance contracts between ASUFORs and private enterprises: The Government of Senegal has decided to transfer the maintenance work for power-operated water supply facilities (i.e. maintenance and repair work conducted by the maintenance centres), for which the DEM has been historically responsible along with such field work as the drilling of boreholes, to the private sector. This new approach to promote maintenance contracts between private enterprises, which have been fostered through technical guidance and training, and ASUFORs hoping to outsource the said work has been in place for almost five years. However, neither side is totally satisfied with this approach because of the limited financial viability for private enterprises due to the insufficient number of contracts and the very high repair cost for those ASUFORs in distant areas as the actual repair cost is based on the personnel cost plus travel and transport costs, both of which reflect the actual travelling distance of the technician, etc., dispatched by the enterprise. In order to rectify this situation, the DEM is now promoting a new type of contract based on the following new terms. ① The scope of the maintenance contract includes regular inspections and the service charge is a metered charge based on the total volume of water supplied. ② The country is divided into three zones. In each zone, the government selects one enterprise which is awarded the exclusive right to conclude a maintenance contract with all ASUFORs in the zone in question. ③ The enterprise awarded the exclusive right keeps spare parts for hand pumps used in its service zone in preparation for the potential demand for these parts. These new arrangements have such perceived advantages as (i) a uniform service charge for all ASUFORs in the same zone, (ii) efficient and viable business operation for private enterprises because of the prospect of profitable operation based on a large number of contracts and (iii) assurance of a certain level of maintenance in each zone from the government perspective. In 2009, a tender was conducted for an area near Dakar but the process was stopped halfway because of concern for the capability of bidders to execute the repair work properly. It may be possible that even if a enterprise is actually selected, those ASUFORs with confidence in their self-reliant maintenance will be reluctant to conclude a contract because of concern regarding a higher overall cost resulting from the contract.

Source: Interview survey conducted in 2009 as part of the field survey for the Project.

(3) Lessons for the Future

1) Informed Choice

It is now widely accepted that organizations constructing rural water supply facilities should employ a demand-responsive approach.

Meanwhile, the national policy of many countries calls for cost recovery on the basis of the beneficiaries-pay principle (although the proportion of the facility renewal cost to be borne by water users varies from one country to another, it is necessary for the routine operation cost to be borne by water users in all of the studied countries except Sierra Leone which is still at the early stage of introducing a water fee). There is a temptation for the central government to enlarge the scope of cost recovery from water users as much as possible by delegating the responsibility for operation of the water supply service to LGAs, the financial foundations of which are still fragile. This is likely to be disadvantageous for water users because of an increase of the water fee.

In some countries (Rwanda and Senegal), there has been a policy change to outsource O & M to the private sector on the grounds of the insufficient capability of CBO-OMs. Some ASUFORs in Senegal, however, have been conducting self-reliant O & M in a sufficient manner and these ASUFORs may view the said policy change as a move to impose an additional financial burden on them. This reaction may be one reason for the suspension of the government's efforts to outsource O & M to the private sector. The promotion of such a national policy must be very carefully conducted as it could go against the interests of water users.

The crucial point here for the administration (water service provider) is to clearly show water users their obligations and the benefits of the water service in order to accurately establish the extent of the preparedness of water users to conduct O & M themselves as demanded by the concept of so-called informed choice and to make the construction and O & M of facilities reflect such preparedness. Here, the obligations of water users include the establishment of a legal O & M body, preparation of internal rules, payment of the water fee, notification to a LGA, convening of regular meetings, recording of the minutes of meetings, reporting of the results of meetings, accumulation and management of an O & M fund and employment of

operators. The benefits for water users are improvement of the sanitation and living conditions in general.

2) Decentralisation and Outsourcing of O & M to Private Sector

When the outsourcing of the O & M of Level 2 facilities to the private sector is planned, it is preferable to place a fair number of facilities under the O & M system operated by one enterprise from the viewpoint of efficiency and profitability. The appropriate number of facilities to be bundled together depends on the density of facilities and outsourcing contract details. In The Gambia where private enterprises undertake the regular inspection as well as maintenance of solar systems, one enterprise has a contract with some 100 facilities. In Senegal where it is planned that a private enterprise will conduct regular inspection and fee-charging repair work, some 500 facilities in the Central Zone will be bundled together. The necessary conditions to effectively outsource O & M to the private sector and to ensure the fulfilment of the contract are clear definition of the roles of the private sector, refined TOR and monitoring.

During the process of decentralisation, the number of facilities under the jurisdiction of each LGA is not large. As in the case of Rwanda, contract documents can contain ambiguities (such as where the authority for facility extension lies), reflecting the insufficient capability of LGAs to develop a reliable outsourcing system. Accordingly, outsourcing resulting from decentralisation must start with the development of a suitable framework. Apart from the capacity building of LGAs, some inventive arrangements are required. One such arrangement is for a LGA to conclude a blanket contract for all of the water supply facilities under its jurisdiction with a local enterprise with the assistance of the central government and a donor(s).

Another way for the central government to transfer the O & M of water supply facilities as part of decentralisation is to establish a public corporation as observed with the Water Supply and Sanitation Board in Sierra Leone, CUs in Zambia and Town Water Supply in Ethiopia. This option offers a more reliable O & M system and should be examined by policy makers.

3-2-4 Procurement of Spare Parts and O & M System

(1) Procurement Time

In general, the maintenance of Level 2 facilities requires spare parts for the power generating equipment, power pump and renewal of the pipeline. As the procurement route for these spare parts is usually planned in the maintenance plan for the facilities to be constructed, the supply of spare parts seldom arises as a serious problem. However, it is true that obtaining spare parts in rural areas is a lengthy process and the original procurement takes place in the capital in many countries.

In one example found in Tanzania, spare parts for the generator, etc. are usually available in a nearby town. However, suspension of the water supply is sometimes necessary as approximately one week is required to obtain spare parts which are not stocked locally. In Senegal, an operator may directly approach a repairer or inform the nature of the breakdown to one of 15 maintenance centres nationwide which will then dispatch its own technician or request a suitable repairer in the area to conduct the necessary repair work. According to the 2005 records included in the PEPTAC 1 Final Report, the partial repair of an engine and pump tends to be done by taking the part(s) requiring repair to the workshop of one of three DEM regional headquarters or a private repair company. In such case, water supply operation is suspended for one or two days according to this report. As more than 1,200 piped systems with public tap stands are in operation in Senegal, the situation of equipment repair appears to be relatively favourable as technicians and general-purpose parts for water supply-related equipment can be found in nearby towns or cities. In one case of the breakdown of the inverter of a solar system, water supply operation was suspended for four days because of the necessity to use a repairer in the capital of Dakar due to the absence of a local enterprise capable of repairing the inverter. Repair necessitating suspension of the water supply can lead to a loss of trust in water supply facilities on the part of water users if breakdowns frequently occur with an uncertain length of suspended water supply each time. Under these circumstances, local people may quickly revert to the use of an unhygienic old water supply source and their willingness to pay for the water service declines. For these reasons, efforts are made in the countries studied to shorten the repair time as much as possible.

(2) Procurement of Spare Parts and Improved Efficiency of O & M Through Outsourcing to Private Sector

In Senegal, ASUFORs are responsible for the renewal of the submersible pump, generator and other equipment. The government is requesting that ASUFORs select the generator, engine and pump from the respective list of recommended equipment based on its own experience of spare

parts procurement and the level of technical expertise of ASUFORs in view of quick and reliable repair.

Senegal has historically had a system of repairing equipment at local bases (DEM regional headquarters and maintenance centres) of the central government and stocked repair tools and spare parts at these bases. As part of the new policy to privatise O & M, the country is divided into three zones (northern, central and southern) to ensure a decent market size for private enterprises which are supposed to conclude an exclusive O & M contract with ASUFORs in each zone. Meanwhile, the contract between the government and these enterprises includes the latter's obligation to stock spare parts for the quick repair of the equipment used by ASUFORs. Once a regular inspection system is in place, it is hoped that repair can be systematically conducted to shorten the suspension period of water supply. (This process of outsourcing has now been suspended, partly because of uncertainty regarding the future of the government maintenance centres after privatisation.)

In The Gambia where the solar water supply system is the standard system, the suppliers of pumping equipment must conclude a free five year repair contract with each VWC and must conduct the necessary repair within 48 hours of being notified. After this five year period, a charge is imposed for any repair or replacement work and VWCs have no obligation to conclude a new maintenance and repair contract with the same enterprise. As of 2009, only one enterprise has concluded such a contract. However, an association of enterprises involved in solar power generation has been established with government guidance to supply the necessary spare parts on request in the post-five year free repair period. Some facilities have now reached the sixth year of operation. While VWCs are continuing to request the original supplier to conduct the O & M of the facilities, some VWCs use individual consultants at a lower fee despite the lack of a technical guarantee of their work. This is possible due to the absence of a rule restricting this type of contract to be concluded with an association member. The development of a legal framework is required to ensure the quality of O & M and repair services, including the procurement of spare parts.

(3) Recommendations

The general picture in the studied countries is that some efforts are being made to shorten the necessary repair period by means of strengthening the repair system, including the procurement of spare parts, to achieve a higher level of efficiency. It is possible to provide administrative guidance to restrict the range of pumping equipment, for example, when the equipment managed

by a CBO is to be renewed. In the case of tender for the construction of new facilities, it may be difficult to designate the equipment types and manufacturers from the viewpoint of ensuring a competitive tender. Even though donors have their own procurement rules, the preparation of technical specifications is essential to ensure that types of equipment which can be repaired by the existing repair system operated by a public body or private sector in the country concerned are procured. If no procedure or required consideration regarding the technical specifications is specified in a development programme for the rural water supply sub-sector, conscious efforts must be made to develop an efficient O & M regime which is capable of shortening the suspension period of water supply by sharing the issues involved with other donors and related organizations in the recipient country based on the principle of sector aid coordination.

3-2-5 Design of Level 2 Facilities

(1) Background

Level 2 facilities are planned to provide the water service for a large village (with a population of some 1,000 or more) or a small local city (with a population of some 20,000 or less). One essential condition is a reliable water source and the water supply facilities from the water source to the water supply points vary depending on the local natural conditions as described in 2-5-3. In some cases where the fuel cost for pumping accounts for a large proportion of the water fee, it may be difficult to establish a sustainable O & M system based on the beneficiaries-pay principle.

While the aspect of O & M is naturally considered at the planning, design and construction stages, some equipment or system problems may only be discovered after the commencement of actual O & M. For example, the initial investment cost of the combination of an engine and vertical shaft pump is lower than that of the combination of a diesel generator and motor pump. However, the former requires much more frequent checks and maintenance and technical problems and spare part replacement are said to occur more frequently when the skill level of the operators is inadequate. Level 2 facilities demand an optimal design, taking the likely overall cost and O & M requirements into consideration, in view of their diversity in terms of the water source (location of spring, river or aquifer, available water volume and water quality) and topography.

① When there is a restriction on the planned service population due to the limited scope of pumping from a borehole(s), it may be necessary to revise the planned overall water supply volume or service area. Poor water quality may make it necessary to reconsider

the water supply plan itself. There is an actual example of a project in which the iron content of the groundwater far exceeded the acceptable level regardless of the location of drilling in certain areas, rendering 10% of the water supply and distribution facilities constructed at the same time as drilling useless. (Conversely, expansion of the service area and/or service population can be considered if there is surplus capacity at the supply source.)

② The operating cost considerably varies depending on the type of power source, affecting the level of the water fee. The cost of transporting water from the source to water points for users is the lowest when gravity is used for the entire process. When a power source is used, the cost is generally the highest for a solar system, followed by commercial power and a generator/engine using fuel oil. Facilities for which the O & M cost is low usually demand certain natural conditions and the scope of their use is restricted accordingly. In the case of using commercial power, the pump can break down if the distribution voltage is unstable or frequent power failures occur.

③ The O & M of each equipment requires specific skills. Careful planning is required to achieve the streamlining of facilities and equipment at the national or regional level, taking the prospect of spare parts procurement, availability of fully capable repairers and necessary training of operators into consideration.

(2) Important Points for Facility Planning

1) Suitable Water Source and Facility Planning

In general, the service area and service population are determined based on a national policy or request by local people, followed by a survey on a possible water source(s) to secure the necessary water supply volume. Ideally, the water supply plan should be designed to efficiently use the water resources in the watershed for people living in the said watershed. Even if the use of the facilities by one community is planned, the survey should feature all water resources in the area of the said community as well as nearby areas with a view to possibly including other communities in the service area depending on the feasible intake volume and/or to designing more efficient facilities.

2) Water and Power Sources to Suit Natural Conditions, Demand and O & M Requirements

① Spring Water

People in Rwanda were reluctant to pay the water fee in those areas where the gravity supply system was changed to a pumping system using a generator under the policy of resettling rural people to hillsides as described earlier in 3-2-2.
In Japanese grant aid projects, conscious efforts are made to adopt the gravity system where possible through a survey on the available water sources in the project area as well as nearby areas.

② Groundwater

Among several water supply systems for the pumping of groundwater to a reservoir, the combination of solar power generation and a submersible pump offers the lowest operating cost. Because of the problems of this system in terms of the durability of the equipment, especially the inverter, and distribution of spare parts in the 1990's, solar power generation has not been an option for Japanese grant aid projects for rural water supply since 2001 except for a few projects. The use of a solar power generation system is not currently rejected as long as its suitability, design and prospective O & M are verified.

Level 2 facilities using a solar power generation system have become the standard facilities in The Gambia because such natural conditions as stable sunshine hours all year round (average of 7 hours/day even during the rainy season) and shallow aquifers suit this type of system. Under a Japanese grant aid project, a diesel-electric system constructed in the 1990's has been replaced by a solar system and a unit price for the metered charge system was set at the same time. In the case of those systems which still use either commercial power or a generator, the end user price of water is set at four times or 10 times that of a solar system. Interviews with water users in a village using a diesel generator system found that villagers will use water from the tap only for drinking with a daily consumption volume of some 5 litres. The sales proceeds are almost entirely used to purchase diesel oil.

Table 3-2-23 Different Water Fees Charged by Power Source (The Gambia)

Power Source	Unit Price for Metered Charge (GMD/m^3)	End User Price (GMD/m^3)	Remarks
Solar	2.1 (US$ 0.08)	3 ~ 7 (US$ 0.11 ~ 0.27)	Estimate based on the fixed charge applied to public tap users
Commercial		20 (US$ 0.77)	As above
Diesel		50 (US$ 1.9)	Estimate based on the unit price for a 20 litre container

Note: US$ 1 = GMD 26

The pumps manufactured to match the conventional solar power generation systems discharge some 100 litres/min with a lifting range of 30 m and can only be operated during the day. As a result, the maximum service population is approximately 3,000 even if the groundwater table is high. Under a grant aid project in Madagascar, a water supply system using solar power generation is planned for areas where the population size falls within a certain range and to which the supply of fuel is difficult.

Table 3-2-24 Planning of Different Water Supply Facilities in Madagascar

Population Size	Condition	Types of Facility to be Introduced
Less than 800		Hand pump
800 - 3,000	Fuel is not readily available	Solar power generation
More than 1,100	Fuel is available	Diesel power generation

③ Other Water Sources

The selection of a water source as well as power source capable of supplying water at low cost is the first principle. When the water fee charged for a water supply system is considerably higher than the system in a nearby area because of different types of water and power sources, the sense of unfairness among people paying the higher water fee can result in their reluctance to pay the water fee or even non-payment. As observed in Rwanda, different water fees are charged for two water supply systems using spring water because of reliance on the gravity system by one and reliance on the pumping system by the other, making it necessary for the administration to examine viable measures to redress this disparity. When installing a generator as part of new water supply facilities, it is desirable for the administration to advise the CBO-OM to save funds or to consider a subsidy for the possible switch to commercial power supply in the future (a good example in Tanzania is included in Table 3-2-17).

3) Facility Design in Consideration of Borehole Capacity

The available pumping volume and water quality of a borehole can only be verified by drilling. As the planning of Level 2 facilities generally involves the drilling of a borehole after finalisation of the service area, any shortage of the available pumping volume of the drilled borehole necessitates changes of the water source plan, including the drilling of an additional borehole(s), at the facility construction stage in order to meet the required water supply volume.

Under an EDF project in The Gambia, a borehole was drilled along with the construction of facilities using a solar power generation system. The high iron content of the groundwater was only discovered after completion of the power generation and water distribution facilities. Because a high iron content was found in the groundwater over a wide area, 15 water supply facilities (10% of the total) were rendered useless despite the drilling of several more boreholes. In a Japanese grant aid project, a borehole was drilled at the basic design stage and the water supply facilities were designed and constructed only at those sites where the available pumping volume and water quality met the relevant criteria to avoid the problem experienced by this EDF project.

In central Senegal, a series of relatively stable aquifers spread below a ground depth of 200 m. When an ASUFOR is organized, administrative guidance is provided to extend the service area to include satellite villages for the effective use of the available pumping capacity of boreholes. This guidance appears to be quite useful to alleviate any sense of unfairness among the people of smaller villages which are often left behind in the planning of new facilities based on requests by communities. Meanwhile, the fact that ASUFORs are permitted to extend the facilities on their own initiative means that many of them extend the pipelines, move on to a house connection system and/or expand the water supply system to cater for agricultural needs. However, such expansion/extension can lead to continual pumping operation long beyond the water use guidelines, causing concern in regard to the emergence of an insufficient water pressure and other problems in the future. The pumping test at the time of borehole construction is primarily designed to provide basic data for educational activities to ensure appropriate pumping for a long period of time. The crucial points here are (i) sufficient time should be spent on the test to that leeway in the pumping volume can be created against the assumed level of actual operation and (ii) the test results should be applied to the facilities plan as well as educational activities on O & M.

4) Informed Choice

It is important to take the preferences of users regarding the selection of the facility type (piped system or point system) as well as pump type into consideration. There can be cases,

however, where the actual O & M cost exceeds the level of affordability to pay on the part of users or a water source (borehole) capable of supplying the desired water volume is difficult to establish.

In these cases, it is essential to clearly present accurate information to local people with a detailed explanation in accordance with the principle of informed choice under the DRA (see 2-6-2). When a suitable facility type and its functions have already been decided, they should be explained to local people with a view to obtaining their consent for facility installation and payment of the forthcoming service. It is also desirable for the government to simultaneously explain its policy for the introduction of water supply facilities in areas with a low hydrogeological potential for water resources at the same time.

5) Metered Water Charge and Installation of Meters

In many areas to be served by Level 2 facilities, water users work in different sectors, including agriculture, stock raising, commerce and manufacturing, and their lifestyles which determine the level of their water consumption are not uniform. Moreover, local communities consist of people which belong to different income groups. In such a situation, the introduction of a metered water charge system is preferable from the viewpoint of ensuring the fair contribution of individual users towards the O & M cost. In the case of a point system, popular water fee collection systems are the application of a unit price per container (Tanzania and Lusaka UPS) and sale by water vendors who read a water meter (at kiosks in Rwanda). With both of these systems, a certain proportion of the water fee is earmarked as commission for the water vendors, including tap attendants (see 3-2-3). The installation of a water meter at each public tap is, therefore, desirable to prevent any irregularities of water fee collection. As water meters can be subject to theft or tampering, adequate protection must be provided, such as a locked box or other.

6) Planning of Public Tap Locations

The number and locations of public taps are planned in line with the guidelines on the necessary water transportation distance and number of facility users while also taking the population size and distribution of households into consideration. The number of public taps served by a single system is determined to minimise the waiting time in view of the service population and water supply hours. One idea is that the heavy burden of fetching water is greatly alleviated if many public taps with one cock each are installed at short intervals (for example, a Japanese grant aid project in The Gambia). The dispersed installation of public taps, however, is not necessary efficient in those cases where tap attendants sell water by

container when the number of required tap attendants and suitable commission level are taken into consideration.

While the guidelines of many countries set the reasonable water transportation distance at up to 250 m or 500 m, a tap deployment plan to meet this rough standard may not be formulated because of differences of the population density from one area to another within the service area. An increase of the transportation distance is likely to generate complaints regarding the level of the water fee, possibly resulting in withdrawal from the water users' association and return to an old, unhygienic water source.

In general, the planned establishment of a number of cocks per public tap with a metered charge system operated by a water vendor is appropriate when the population density within the specified water transportation distance is high enough to provide a sufficient demand to make the commission-based income of each water vendor above a certain level. When the number of users within the said distance is small or the number of users for individual public taps greatly varies, public taps should be located in positions which ensure that the water transportation distance is within the specified distance with a possible reduction of the number of cocks per tap. In this case, commission for water vendors based on a fixed proportion of the sales by container is not an appropriate option and it is necessary to either employ water vendors with a fixed wage even if this means a slight increase of the overall sales cost or to introduce a fixed charge system allowing some instances of non-collection of the water fee and/or the wasteful use of water to some degree. In the case of the latter, the only subject for control is the water supply hours.

In short, the locations and number of taps must be planned from multiple angles, including the water fee system, commission for tap attendants (water vendors) and other aspects of O & M. A plan of the tap locations should be shown to local people prior to the actual construction of the facilities to confirm their willingness to use the taps in accordance with a uniform water fee agreed by the CBO-OM and the commission system for tap attendants.

The facility design usually incorporates the future population growth prospect in the planned service population. Even if the water source and water supply facilities have sufficient capacity to cater for population growth, the expansion of a residential area necessitates extension of the pipelines and the installation of additional public taps. If the state of water supply between the existing residential area and a newly developed area is unfair, the prospects of proper O & M can be badly affected. To avoid this situation, the original facility design should incorporate suitable arrangements (in terms of the pipe size and tap locations) to deal with any future expansion of the service area, taking the local social dynamics into consideration as much as possible. One concrete example of such consideration can be seen

with a grant aid project in The Gambia where careful planning, including the priority siting of the initial public taps at the periphery of an existing residential area along the inferred direction of the future expansion of the said area based on interview results, was required. This type of consideration is particularly important for areas with a high population growth rate near cities.

(3) Recommendations

In the case of Level 2 facilities, especially those requiring a lot of fuel to pump water to a reservoir, a proportion of the collected water fee is used for the purchase of fuel and it is often necessary to set the water fee at a level which is almost beyond the affordability of users. This situation has led to a decline of the water fee collection rate, adversely affecting the operation of water supply facilities. In terms of the operation cost, solar-based systems are overwhelmingly superior due to the non-use of fuel. The advantages and shortcomings of this type of system are listed below.[51]

Advantages

① The system is free from the cost of fuel and consumables.

② The system is essentially maintenance-free. Even though cleaning of the surface of the PV modules is occasionally necessary, the frequency of such cleaning is low. No special skills are required for this cleaning.

③ Operation in remote areas is possible because the supply of fuel and others is unnecessary.

④ The system does not produce any noise or exhaust gas and is environmentally friendly.

Disadvantages

① The system cannot supply water at night or during rainy conditions due to the lack of sunshine (even though this limitation of the operating hours may prevent depletion of the water source due to excessive pumping).

② The system cannot serve a very large population.*

[51] Japan Photovoltaic Energy Association (2009), Photovoltaic Systems for Water Service by Japanese Overseas Aid and International Cooperation

③ The system is liable to theft which occurs for the resale of the solar cells and, therefore, requires measures to prevent theft.

* The required facility size of a solar system is determined by the available pumping volume, lifting height, water supply volume per user and sunshine conditions. Based on past cases in the studied countries, the maximum service population is likely to be around 3,000.

It has long been claimed that the initial investment cost of establishing a water supply system based on a solar power generation system is much higher than that of systems using other power sources. The recent fall of the cost of solar power generation systems, however, is changing this perception of their high initial investment cost. At the same time, there is now a strong call for the use of clean renewable energies to prevent global warming. The expectations for the introduction of solar powered water supply systems are likely to increase in the coming years although some adjustments to the mode of water use, etc., such as the use of rainwater by each household to meet the water demand during the rainy season, will be required to solve or alleviate the disadvantages described earlier.

The most important point for the introduction of a solar power generation system is the availability of an inspection and repair system (including the supply of spare parts) as shown by concrete examples in The Gambia and Senegal. Whether this inspection and repair system is operated by the administration or is outsourced to the private sector is a critical policy decision. If the central government decides to outsource O & M work to the private sector, a certain number of solar systems in a fairly wide area where the necessary sunshine conditions and groundwater conditions are met is essential to create a reasonable market size for the O & M business (to ensure the survival of private enterprises undertaking the work). From the viewpoint of donors, certain conditions must be met prior to their commitment to provide assistance for the construction of solar-based water supply facilities. These are the selection of a suitable area for a solar-based water supply system, fostering of capable private O & M enterprises and clear indication of the policy to create a comprehensive O & M system (including inspection and repair) as a national development policy or, at least, clear indication of the formulation of such a policy. One priority issue here is determination of the principles for strategic assistance within the framework of donor coordination while carefully monitoring the ongoing development of the SWAp.

Chapter 4 Sector Coordination of O & M

4 - 1 Background

In the water and sanitation sector of many Sub-Saharan countries, the sector wide approach (SWAp) is being implemented based on the Five Principles affirmed by the Paris Declaration. As described in 2-2-3, the progress of sector coordination requires a sector development programme as a rallying point for aid coordination. Even though the actual contents and their intensity slightly differ from one country to another, a sector development programme moves forward with funding by donors which have aligned themselves with the programme to finance programme-inspired activities (budget support) or the implementation of relevant projects by donors (project-type support) in addition to the implementation of projects, etc. with the budget of the government of a recipient country. The practice of budgeting all necessary funds, including the development budget of the government of a recipient country, for the implementation of a sector development programme and the financing of this budget with budget support and project-type support is described as being on-budget in a broad sense. When narrowly defined, budget support is the only subject of being on-budget. At present, sector aid coordination using budget support as a key feature is being promoted by the World Bank, AfDB, Denmark, Sweden, the UK, Germany and the EU Water Initiative (EUWI).

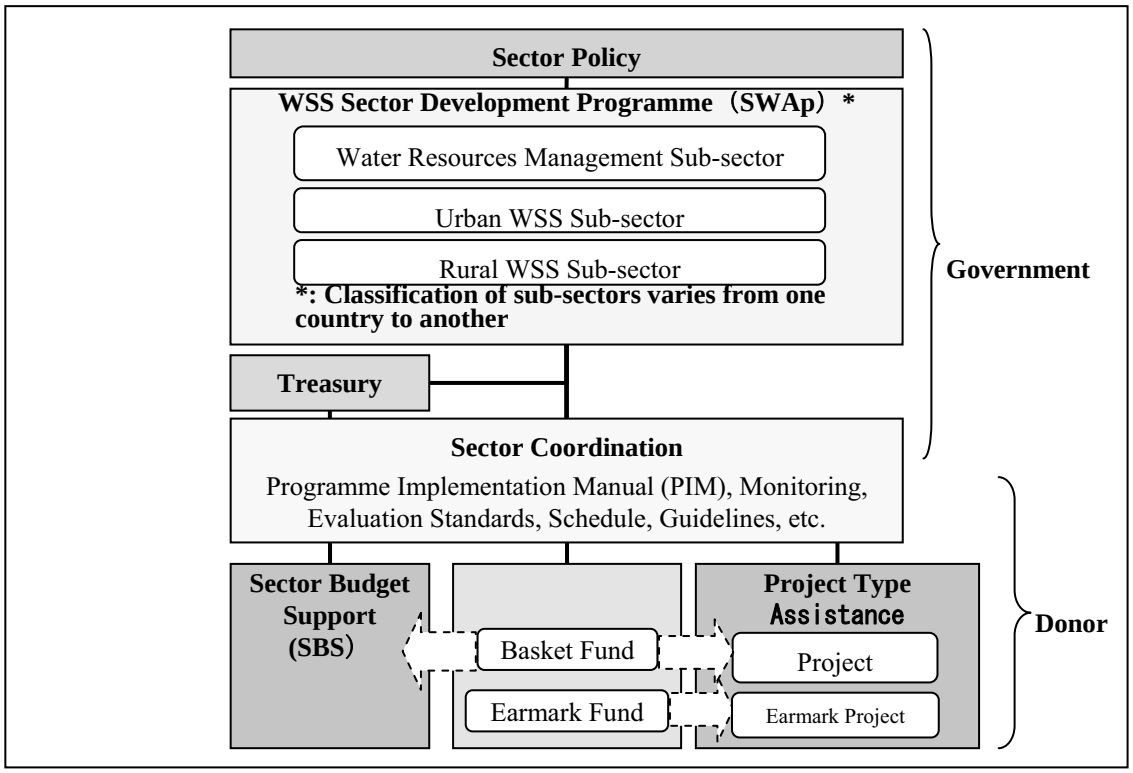


Fig. 4-1-1 Concept of Sector Coordination

4-1-1 Conceptual Framework of O & M and Formulation of O & M Procedure

The first step to tackle the various O & M issues discussed in Chapter 3 in the sector aid coordination process is the development of a conceptual framework (guidelines) for O & M and the formulation of a concrete O & M procedure (manuals) under a sector development programme or sub-sector development programme. In reality, such guidelines and manuals are bundled together in a programme implementation manual (PIM).

O & M guidelines must act as the foundation for the concrete planning of project implementation and must clearly stipulate the general conceptual framework for O & M. The actual components of these guidelines are the roles and responsibilities of the stakeholders involved in the O & M of water supply facilities, the capacity building procedure for these stakeholders and how the necessary conditions (deployment of spare parts and repair tools, standardisation of the applied technologies and other issues) can be developed to effectively conduct O & M.

Prior to the introduction of sector aid coordination, the individual projects of each donor determined their own approach to assist the strengthening of the O & M system. Under the concept of sector aid coordination, however, it is essential for (i) the O & M policies and priority tasks to be clearly indicated and (ii) clear guidelines and manuals to be produced so that an effective O & M system can be developed and operated by all actors based on a unified approach. These conditions are necessary to support efforts to improve access to water supply (i.e. the aim of the sector development programme) from the viewpoint of managing a sustainable water service.

4-1-2 Current Situation of Subject Countries of the Study

Table 4-1-1 shows the current situation of the formulation of O & M guidelines and manuals in each subject country of the Study and also the situation of the sector aid coordination framework. There appears to be a co-relationship between the formulation of a conceptual framework (guidelines) and concrete measures (manuals) and degree of maturity of sector aid coordination (i.e. degree of maturity of the SWAp system). It must be noted, however, that even before the introduction of sector aid coordination, there have been many cases of the formulation of guidelines and manuals by individual projects based on the basic O & M principles indicated by the policies and strategies for the water sector. This means that any attempt to design an institutional O & M framework or to unify the guidelines and manuals as part of sector aid

coordination must examine the potential applicability of the knowledge obtained from the existing system, guidelines and manuals and also from the common practices of projects so that areas where the development of a new system or review of the existing system is required can be identified. The current situation of formulating an O & M framework and implementation procedure are described next for those countries where sector aid coordination is in progress among the subject countries of the Study.

In Tanzania, a development programme for each sub-sector has been formulated around the WSDP which is the main pillar for the SWAp. In the rural water supply and sanitation sub-sector, a project implementation system has been established with LGAs acting as the implementing bodies. As part of these arrangements, guidelines and manuals for the planning, implementation, monitoring, evaluation and follow-up of projects by LGAs have been prepared as annexes to the WSDP Programme Implementation Manual (PIM)[52] and are being used. A system whereby the project budget is financed by the development budget which receives sector budget support (SBS) and general budget support (GBS) in addition to the government budget of the recipient country (Tanzania in this case) is also already operational. Meanwhile, the RWSSP operation manual and district operation manuals (DOMs) explain the roles of each actor, flow of activities, implementation methods and other O & M-related issues as part of the RWSSP implementation cycle. These guidelines and manuals were formulated under the national RWSSP (2002 ~ 2006) which was implemented as a pilot project of the WSDP and were subsequently integrated to the PIM with the commencement of the WSDP. In reality, these guidelines and manuals contain some inconsistencies as well as inadequacies and the MoWI is planning their revision in turn by requesting all stakeholders to pinpoint problems in the application of the PIM during the implementation process of the WSDP and to put forward improvement measures. Capacity building is another pending issue in the rural water supply and sanitation sub-sector from the viewpoint of the adequate planning and implementation of projects in line with the approach and procedure indicated by the PIM (refer to 4-4 for an example of support in this sub-sector by a technical cooperation project of JICA).

---

[52] The relevant guidelines and manuals for the O & M of water supply facilities are listed below. In addition to these, O & M manuals for community use are annexed to the PIM.

- MoWI (2006), PIM Annex 3: Guidelines for Planning and Operation of District Water and Sanitation Grants
- MoWI (2006), PIM Annex 4: Formula-Based Allocation of Financial Resources to Local Government Authorities
- MoWI (2005), PIM Annex 5: Programme Operation Manual (POM)
- MoWI (2005), PIM Annex 6: District Operation Manual (DOM)
- MoWI (?), PIM Annex 7: Guidelines for Facilitation of Community Planning of Water and Sanitation Projects

In Zambia, efforts have been made since the mid-1990's to develop a strategy, approach, methods and manuals and to spread their application nationwide to realise the various principles and basic policies for the rural water supply and sanitation sub-sector put forward by the National Water Policy (1994). With the introduction of the WASHE (Water, Sanitation and Hygiene Education)[53] Strategy for this sub-sector in 1996, the WASHE manual was prepared to explain the activities and methods for the planning and implementation of water supply and sanitation projects primarily by WASHE committees at the district and community levels. Meanwhile, a three tier system (consisting of D-WASHEs, pump repairers and V-WASHEs (caretakers) has spread throughout the country for the efficient repair of hand pumps, primarily the India Mark II. However, the provision of technical training for the actors, establishment of a collaborative relationship between the different tiers and development of a supply chain have been largely dependent on individual projects. Therefore, unification of the guidelines and manuals has not been conducted even though they share the notion of good practice.

Following these efforts, the MLGH produced the Guidelines for the Implementation of Community Water Supply and Sanitation Projects in Rural Areas (2007) and the Guidelines for Sustainable O & M of Hand Pumps in Rural Areas (2007) during the process of harmonising the approaches designed to apply the sector development programme. Later in 2009, the RWSS O & M manual was added to facilitate efforts to strengthen the district-level O & M system in line with the earlier guidelines. (Refer to 4-3 for an example of technical cooperation by JICA for O & M components, including the formulation of the SOMAP guidelines and implementation manual.) While this manual is expected to be used for project implementation at the district level, its funding still requires further clarification. Given the delayed establishment of a budget support system (mainly SBS), the use of project-type support for capacity building and the promotion of O & M activities at the district, area and community levels using the manual is currently being considered.

---

[53] The WASHE embodies the concept that the promotion of (i) the development of the O & M system based on ownership and (ii) the beneficiaries-pay principle and health education together with the development of physical facilities is highly effective for the continual realisation of the positive effects expected from improved water supply and sanitation conditions. The WASHE also puts forward concrete promotion methods. This concept was originally refined under the Rural Water Supply and Sanitation Programme in the Western Region which was implemented from the 1980's with the cooperation of the NORAD. The concept was then applied nationwide through the systematisation of methods and project-type aid of donors by the National WASHE Coordination Team (N-WASHE) which coordinated development efforts in the rural water supply and sanitation sub-sector. This function of the N-WASHE has now been inherited by the RWSS Unit of the Ministry of Local Government and Housing.

In Ethiopia, the formulation of a project implementation method for the water supply and sanitation sector is in progress under the leadership of European donors along with the planning of a concrete O & M manual.

In Mozambique, the Manual for the Implementation of Rural Water Supply Projects was prepared in 2001 by the Ministry of Public Works and Housing and has since been applied in this sector. This manual functions as guidelines as it features the project cycle for rural water supply and sanitation projects, roles and responsibilities of the stakeholders involved in the project implementation process, including O & M, implementation strategy and financial mechanism. In regard to O & M skills, there is the Afridev Hand Pump Installation Manual: 3rd Revised Edition (2007). There are, however, no unified manuals for the planning and implementation of rural water supply and sanitation projects by LGAs or for the promotion of community-led O & M unlike Tanzania and Zambia. O & M is, therefore, largely dependent on the relevant initiatives under each project.

In other countries, no concrete implementation manual has been prepared even though a general O & M framework is shown in the guidelines.

Table 4-1-1 Development of Guidelines and Manuals for O&M and Sector Coordination

	Tanzania	Zambia	Ethiopia	The Gambia	Rwanda	Mozam -bique	Sierra Leone	Senegal
O&M Guideline[54]	◎*	◎	Δ	◎	×	×	×	◎
O&M Implementation Manual	◎*	○	Δ	×	×	×	×	Δ
Financial Support System[55]	◎	Δ	×	×	×	×	×	×
Level of Sector Coordination (5 Grade)*	5	3	5	2	2.5	2.5	2	3

◎ : Established and already implemented
○ : Established and expected to be implemented in future
Δ : Agreed about its framework, but not yet established completely
× : Under consideration
* Tanzania does not have the specific guidelines for O&M, but the relevant subjects are included in the guidelines related to Rural Water Supply and Sanitation Programme (RWSSP) as parts of the implementation cycle of RWSSP
** Source: JICA (2007), Open Seminar- "Decentralisation and Rural Water Supply in Sub-Saharan Africa"; with additional information from the field surveys, the level of sector coordination of Rwanda and Mozambique are amended taking the progress of aid coordination into consideration.

4 - 2 Pending Issues

4-2-1 Capacity Building

In many Sub-Saharan countries, decentralisation is progressing as shown in Table 4-2-1. Sector aid coordination for the water supply and sanitation sector under such circumstance is searching for a system which is capable of efficiently planning and implementing projects with the transfer of the relevant authority and budget to LGAs. For such transition to a rural water supply and sanitation project implementation system led by LGAs, the capacity building of LGA staff and organizations is essential for the formulation and implementation of projects which are suitable for specific areas or communities based on the concept of DRA.

[54] Although the actual contents of the guidelines (covered items and details of each item) vary from one country to another, this aspect is ignored here to classify the existing national guidelines based on their stage in terms of establishment or implementation.

[55] Budget support (loan and grant) based on a bilateral agreement is not included.

In Tanzania, the district authorities are expected to formulate a district-level water supply and sanitation programme with the assistance of consultants with an engineering or social science background and to conduct the tender for construction and procurement, supervision of construction/procurement, capacity building of CBO-OMs and sanitation education. As already described in 4-1-2, while the WSDP-PIM puts forward the planning and implementation procedures for the rural water supply and sanitation projects of district authorities and how to facilitate related activities, the insufficient experience and project implementation capacity of district staff mean the inadequate planning and implementation of projects.

In Zambia, while rural water supply and sanitation projects are being implemented by LGAs based on the National Water Policy (1994) and the Decentralisation Policy (2002), there has been a delay in (i) establishing a section in charge of rural water supply and sanitation at each district authority and (ii) assigning full-time staff to this section. The work of those sections which have already been established is assisted by staff in charge of public works in general and/or the temporary assignment of staff from district offices of the Water Bureau of the Ministry of Energy and Water Development. In recognition of this situation, the NRWSSP calls for (i) capacity building, (ii) strengthening of the functions of district authorities by means of establishing a section in charge of rural water supply and sanitation and (ii) strengthening of the project planning and implementation capacity of district authorities based on the DRA. In short, even though LGAs are regarded as project implementing bodies in sector aid coordination efforts in the midst of the ongoing decentralisation drive, insufficient project planning capacity, implementation supervision capacity and a shortage of manpower on the part of LGAs are becoming apparent.

Table 4-2-1 State of Decentralisation of Water Supply and Sanitation Sector in Studied Countries

Country	Decentralisation Policy	LGA Level	Reality
Tanzania	Local Government Reform Programme (LGRP2: 2009)	District/Village	• "Decentralisation by Devolution (D by D)" • A local government development grant (LGDG) provided by the central government accounts for most of the district council budget. This LGDG has two components: council development grant (CDG) and capacity building grant (CBG).
Rwanda	Five Year Decentralisation Implementation Plan (2004 ~ 2008)	District	• The Five Year Plan was introduced in March, 2004. • The Administrative Division Reform Act was introduced in December, 2005 (to reduce the number of LGAs for rationalisation). • Project planning and budget allocation are based on a three year DDP in line with a performance-based contract concluded between the district and the President. Districts have their own revenue and government grants (block budget grant of which the use can be decided by each district and earmarked grant for each sector).
Ethiopia	Constitution (1994)	State/Zone/ Wereda	• State governments submit their plans and budgets to the federal government based on the development plans of individual weredas. 60 ~ 80% of the federal grant for the state is allocated to weredas (Wereda Block Grant Allocation System: 200"0.
Zambia	National Decentralisation Policy (2004); Local Government Act (1991)	District	• The DIP under the National Decentralisation Policy has not yet been approved by the parliament. The mechanism for fiscal decentralisation (Inter-Fiscal Architecture: IFA) also remains as a draft plan. • Only the water supply and sanitation sector is currently under the jurisdiction of LGAs under the Local Government Act of 1991.
Mozambique	National Water Policy (PNA: 1995); Local State Organizations Act (LOLE: 2003)	Region/District/ Sub-District/ Area	• While the LOLE stipulates the organization, functions and authority of local administrations, continuation of the capacity building of district authorities after the implementation of the Project for Planning and Finance Decentralisation (PPFD: 2003) is necessary. • The decentralisation of the water supply and sanitation sector was indicated in the PNA and the authority to implement projects was transferred from regions to districts after the LOLE.
Senegal	Notification of Rural Development and Decentralisation Policy (1999)	Region	• Decentralisation is called for in eight sectors, including education and health. The rural water supply sector is still controlled by the Ministry of Water Utilisation and its local offices.
The Gambia	Local Government Act (2004; revised in 2006)	Division/Area	• The responsibility for rural water supply falls on area councils which act as the service providers.
Sierra Leone	Local Government Act (2004)	District	• Services in the water supply and sanitation sector are provided by 13 district authorities nationwide which execute the development budget allocated by the central government. At present, project planning and preparation of the budget are the duties of staff dispatched by a central government ministry in all sectors.

Based on the actual situation of individual countries, the capacity building shown in Table 4-2-2 is judged to be necessary.

Table 4-2-2 Problem Areas Necessitating Capacity Building

Subject Matter		Problem Areas
Project planning	Project evaluation; project planning	• LGAs do not have staff specifically assigned to the water supply and sanitation sector (S, L). Even if there is some staff, they have no background in the water supply service. Many also work for other sectors (R). Some staff lack sufficient basic capabilities in terms of the evaluation of past project performance, formulation of an appropriate project implementation plan for the forthcoming year and budgeting, all of which are crucial for project planning (R, L). • The monitoring of existing facilities, monitoring method, technical expertise, manpower and budget are inadequate to conduct a survey to determine the actual demand (E, M). • The capacity to establish the natural, socio-economic and other conditions in the target areas is inadequate (R, G). • When staff are evaluated based on their performance, emphasis is placed on the construction of new facilities, disregarding O & M projects (R). • As there are no set criteria for the outsourcing of O & M to the private sector, the contents of such outsourcing (obligations and powers) are neither clearly established nor uniform (R).
Supervision of project implementa -tion	Supervision of budget execution; service provider contract	• Comparative analysis of the original budget and actual expenditure; progress control • Capacity to prepare documents detailing orders and technical specifications (E, R)
Construction of facilities		• Difficulty of issuing technical instructions to construction companies • Lack of capacity to supervise construction work or no such experience
O & M	Fostering of CBO-OMs	• Lack of know-how on how to strengthen CBO-OMs (L) • Inability to train O & M personnel, such as area repairers (L)
	Training of repairers	• Inability to establish the reality of repair activities (G, S) • Management of repair equipment and tools • Inability to maintain the skill level of local repairers (S)
	Administrative support	• Inability to provide appropriate technical advice for CBO-OMs • Inability to facilitate problem solving in the area of organizational management (G: water fee) • Inability to coordinate with local leaders, such as those enjoying traditional authority • Cooperation with other sectors, such as health and education (L) • Development of a business environment, such as a spare parts supply chain (E, S, L, M) • Framework for budget support (use of the regional development budget, etc., loans and other) (E, R) • Collection and management of a common O & M fund (G)
	Private sector	• Inefficient repair work and high repair cost due to the concentration of technicians and capitals in cities • Lack of an O & M network in rural areas (C) • Insufficient skills and financial basis for private enterprises (R, S)
	Monitoring	• Lack of monitoring resources (vehicles and funding) (E) • Formulation of a monitoring plan • Evaluation of monitoring reports and follow-up

Note: S = Senegal, L - Sierra Leone, G = The Gambia, E = Ethiopia, M = Mozambique, R = Rwanda, C = common to all countries

4-2-2 Planning of Project-Type Support Through Sector Aid Coordination

(1) Programming of Targets for Sector Development Support

When the implementation of project-type support is planned through sector aid coordination in line with the water sector development programme of a recipient country, it is effective to firstly identify problematic areas in the implementation process consisting of the project planning, implementation, monitoring and evaluation stages, followed by support for these areas by means of combining appropriate cooperation schemes under the programme-based approach. Support must focus on both the achievement of the sector development targets and the process of achieving the said targets. This is particularly important in a situation where LGAs nationwide are promoting projects to improve water supply and sanitation with a government grant under a regime of sector budget support while the central government is primarily involved in the formulation of policies and procedures, support for capacity building and supervision/monitoring using sector performance indicators (indices). Tanzania has encountered the following problems in the implementation process of the WSDP.

- Although district authorities have some funds to invest in water supply and sanitation improvement projects using the development grant, improvement of the serve coverage rate is slow in areas where water resources development is technically difficult because of the hydro-geological and other conditions.

- Proper evaluation of the project performance is difficult because of the absence of (i) a system to monitor the performance indicators employed by the sector development programme and (ii) an information management system.

- The difficulty of designing and constructing water supply facilities in an appropriate manner shortens the duration of the subsequent water supply service, resulting in the wasteful use of development funds.

- As the project implementing bodies, LGAs lack sufficient capacity to formulate, implement and supervise projects and to provide support for community-based O & M.

- The inconsistencies and inadequacies of the implementation guidelines and manuals for the sector development programme make the use of these guidelines and manuals difficult.

- The progress of the official registration of CBO-OMs which are responsible for the O & M of rural water supply facilities, setting of an adequate water fee, development of a spare parts supply chain and support for O & M by the private sector has been slow.

Although the above problems are problems experienced by Tanzania, it is quite feasible that other African countries where sector aid coordination is in progress are facing similar problems. There are several approaches to deal with these problems, including (i) the construction of highly reliable water supply facilities with grant aid assistance using Japan's technical strength, (ii) institutional development at the sector level under technical cooperation projects and (iii) feeding back of the lessons learned from field-level activities under a pilot project in a specified area, modelling based on the said lessons and dissemination of a model to other areas. In short, project-type support can assist institutional improvement to achieve the development targets and an efficient implementation process by means of alignment with the relevant sector development programme.

(2) Dissemination of Outcomes of Technical Cooperation Projects Through Sector Development Programme

It is desirable for capacity building models for human resources and organization and system development methods, all of which are developed under technical cooperation projects, to be internalised in the subject sector and then disseminated under initiatives of the country concerned. There are two viable methods here. One is the sharing of models through the dialogue mechanism inherent in the sector development programme while the other is the dissemination of the positive outcomes of technical cooperation projects with the active use of the programme funds. In either method, the necessity to provide technical assistance for planning and budgeting activities by an actor who plans and implements a project using a model system must be examined. Some examples of efforts to disseminate the positive outcomes of Japanese technical cooperation projects through the sector development programme are given below.

One technical cooperation project in Tanzania has been providing assistance for the development of model training systems for (i) LGAs which are the principle implementing bodies for rural water supply and sanitation projects under the WSDP and (ii) provincial and basin water offices which are assigned to support LGAs. Provincial, district and basin water offices nationwide are preparing their own capacity development plans which will be

implemented using the WSDP's basket fund. In view of this situation, the same technical cooperation project is working with the MoWI to institutionalise a training programme which has been developed so that this programme can be used for capacity building in other regions and districts.

In Zambia, a Japanese technical cooperation project has contributed to the preparation of guidelines and manuals for the O & M component of the rural water supply and sanitation programme. The development and refinement of a model is in progress under a pilot project in two regions on the subject of the strengthening of the O & M system, including the development of a spare parts supply chain. It is hoped that this model will spread nationwide through project-type support in each region.

In Senegal, the PCU, the body which coordinates the national programme (PEPAM), jointly holds regular meetings with donors and NGOs to share information on the outcomes of various activities and other matters. The O & M manual produced under a technical cooperation project (PEPTAC) is shared with other donors through these meetings, contributing to the spread of effective educational activities.

4-2-3 Adaptation to Sector Reform

In Rwanda, Level 2 facilities have traditionally been managed by water users association (regie) which are mainly established in each sector (the administrative unit below a district). To be more precise, a regie manages all Level 2 facilities except for privately-owned facilities in its sector. As a regie is a body which is run by untrained people with no specific responsibilities, there have been many cases of interrupted water supply due to cash flow problems or equipment breakdown.

A World Bank project (PEAMR) has been implemented based on the assumption that the process called "privatisation", whereby a district authority concludes a contract with a private body other than a regie, will generate adequate responsibility and that the introduction of the tender process for selection will attract the participation of professionals with proper skills. At first, the number of such contracts rapidly increased because of the fact that one condition of the World Bank loan was the switching of the O & M system to the new system at a specified number of water supply facilities. Many contracts were hastily concluded with organizations which had no corporate status and some facilities were eventually abandoned due to the lack of proper O & M. Since the end of the PEAMR, the Rwandan government has been trying to

maintain the scheme but progress has been very slow, presumably because of the severed tie with the loan and also because of the persistence of the same problems experienced by the regies.

Box 4-1 Chaos of O & M Policy in Rwanda

The National Rural Drinking Water Supply and Sanitation Programme (PNEAR (French abbreviation)) introduced in 2004 adopts four objectives: (i) access to water supply and sanitation facilities, (ii) establishment of a monitoring system and (iii) capacity building for O & M, although these objectives are not clearly put forward from the viewpoint of establishing a general O & M system. Because no MOU has been signed for the water sector (as of October, 2009), aid coordination is still in its infancy and there are no commonly agreed O & M principles throughout the sector.

At the project level, the only ongoing rural water supply and sanitation-related projects which include support for the O & M of water supply facilities are the PURI-SANI, a technical cooperation project of JICA, and the PEPAPS with Belgian assistance. Other projects in the sector primarily feature the construction of new facilities or the rehabilitation of existing facilities. As such, technical cooperation for O & M is not the main subject for foreign aid.[56]

At present, the World Bank/WSP is actively introducing PPP for the O & M of rural water supply facilities. There is an impression that weak ownership on the part of Rwanda is what allows the World Bank/WSP to take the initiative for PPP rather than its implementation based on the SWAp with a consensus among donors. The World Bank did, in fact, implement the PEAMR (2000 ~ 2007) during which it understood the limitations of O & M led by local communities, resulting in assistance for the introduction of PPP for rural water supply (2006 ~ 2008). This assistance, however, was not completed in the planned period and is still in progress as of 2009.

The Belgian PEPAPS is examining the possibility of introducing trilateral contracts involving district authorities, private enterprises and community organizations for the O & M of rural water supply facilities in line with the policy of the World Bank/WSP (at the time of the field survey, a draft agreement was being prepared). According to a Rwandan manager for this project, PPP is not considered to be a definitive solution to replace the idea of CBO-OMs and is actually an attempt to break the deadlock faced by conventional approaches.

Source: Interviews with people concerned during the field survey.

4-2-4 Active Participation in Sector Aid Coordination Process

The Accra Forum held in 2008 to follow up the Paris Declaration acknowledged the slow progress of the achievement of the targets for many indicators while confirming tangible progress in terms of "the proportion of support for capacity development through a compatible programme with the national development strategy of each partner country" which is a target for aid alignment. The Accra Agenda for Action identified three major challenges: (i) strengthening of country ownership, (ii) building of more effective and inclusive partnerships and (iii) achievement of development results and their open accounting. To achieve challenge (i) in particular, donors planning to provide assistance for the public sector are urged to use the

[56] Government of Rwanda (2009), List of Water Supply and Sanitation Projects in Rwanda

systems of recipient countries to the maximum possible extent, to provide the planned assistance in the form of a programme and to promote assistance for recipient countries through trusted systems.

Meanwhile, the Paris Declaration clearly indicated the necessity for the flexible implementation of projects in response to complex situations to boost the aid effects in recipient countries where the governance of administrative organizations, including LGAs, is generally fragile. Therefore, when an administrative organization in a recipient country is found to be fragile, project-type support with more tangible results and the prospect of systematic implementation can be expected to achieve better results. Even in Tanzania and Zambia where sector aid coordination is moving ahead based on the favourable judgement of the various conditions for the application of the SWAp (link between finance and policy, management capability and level of aid dependence; see 2-4-2), project-type support is accepted provided that it is compatible with the sector policy.

In Sub-Saharan Africa where aid coordination in the water supply and sanitation sector is progressing in alignment with the sector programme of each country, Japan should actively participate in the sector aid coordination process from the stage of formulating project-type support (in terms of both technical cooperation and grant aid assistance) with a view to securing a sympathetic view of Japan's bilateral aid within the framework of aid coordination.

As shown by the examples of Tanzania and Zambia, concrete project-type support for capacity building or system development can be as successful as budget support under the sector aid coordination and decentralisation processes. While the projects in question were not necessarily highly evaluated at the outset, they became models for the national programme through their steady achievements in the sector aid coordination process. As described below, these projects are highly evaluated as having functioned as part of the national programme due to the deep involvement of not only experts working for the projects but also staff members of the Japanese embassy and JICA in sector aid coordination.

In Zambia, the MOU was signed in October, 2008 and regular meetings of the Sector Advisory Group (SAG; quarterly), Sub-SAG (quarterly) and Cooperating Partners (CP; 10 times a year with Denmark and Germany being the lead donors) have been held. Japan is represented at these meetings by staff members of the Japanese embassy and local JICA office to obtain as well as provide useful information. For sector aid coordination in Zambia, a viable coordination mechanism for the dispatch of experts and consultants (for technical assistance) is being sought.

What is becoming important for both the Zambian government and donors is to share the TOR for experts and consultants in advance based on the code of conduct for the sector in question. Information on the water supply and sanitation sector in Zambia is shared by experts working in this sector via JICA Zambia office, creating the foundations for Japanese experts and engineers working on the front line to properly respond to new trends in the sector.

In Tanzania, the coordination framework in the water sector is maintained by meetings of theme-specific working groups (six times a year) and the Water Sector Working Group (quarterly) and also by the annual Joint Water Sector Review Meeting. JICA Tanzania office acts as a co-leader of the Institutional Development and Capacity Building Working Group (led by the GTZ) which is one of the theme-specific working groups. Donors also hold monthly meetings of their own Development Partners Group - Water to exchange information and to build a consensus. Japan is represented at these meetings by a staff member responsible for the water supply and sanitation sector of JICA Tanzania office. Japanese experts of a JICA technical cooperation project (RUWASA-CAD) also participate in these meetings as members of the group. The provision of project information at the meetings by such experts is, in fact, stipulated to be an important activity if the PDM for this project. Japanese experts working in Tanzania and JICA personnel regularly hold study meetings on decentralisation and other cross-sectoral themes to obtain and analyse information on the relevant situation in Tanzania.

When budget support or the use of a basket fund becomes the mainstream of sector aid coordination, making the implementation of project-type support difficult, in countries where the water supply and sanitation sector is a priority sector for Japan's aid efforts, a local Japanese task force should be actively involved in aid coordination. It may well be necessary to reinforce the local task force or to examine the possible assistance of professional bodies as well as individual experts to deal with an increased work volume resulting from the involvement in the sector aid coordination process.

4-2-5 Aid in Process of Decentralisation

The strong emphasis on performance which has spread to the LGA level due to the call for "good governance" may be responsible for the inclination towards the construction of new facilities with less emphasis on O & M in the water sector (for example, in Rwanda). The numerical targets of a performance contract are set by an administrator and the achievement of these targets determines the reputation of the said administrator. The construction of new facilities improves the service ratio and directly affects the achievement of other numerical

targets. Because of this, the construction of new facilities acts as an incentive unlike the establishment of an O & M system. In developing countries where clear baseline data is unavailable or is not frequently updated, the breakdown of facilities does not immediately lead to a decline of the declared service ratio. In other words, the improvement of O & M does not immediately enhance personal standing. Even though the importance of O & M is widely acknowledged, the mechanism of improving the operating rate does not always fully function. This is a problem for evaluation of the performance of administrative staff and the situation of a lack of criteria to judge staff performance (implementation of a baseline survey on water supply facilities, compilation of a facility inventory and other work) is partly responsible for this problem.

In the project formulation process, it is important to establish the actual service ratio as baseline data regardless of the project purpose being the construction of new facilities or improvement of the O & M capacity. It is also preferable to examine the existence of a mechanism for the upgrading of information. If such a system is unavailable, a new system should be incorporated as a project component as a tool to urge the introduction of a monitoring system as part of sector coordination.

Given the situation of rapid changes of the water supply and sanitation sector under the decentralisation policy, it is perfectly conceivable that staff members (both senior and general staff members) of LGAs do not fully understand the roles expected of LGAs. When assistance is planned under these circumstances, the implementation of work suggested by direct counterparts may not conform to the aid policy as required by the SWAp for rural water supply services. This possibility indicates the importance of providing guidance for counterparts (LGAs) at the project formulation and subsequent implementation stages to perform their expected roles in due course while carefully monitoring the trends of the water supply and sanitation sector.

4 – 3 Good Practice of O & M Projects in the Process of Sector Aid Coordination: Case of the SOMAP, a Technical Cooperation Project in Zambia

4-3-1 Background

As far as the O & M of water supply facilities in Zambia is concerned, the concept of WASHEs was firmly established at the end of 1990 when V-WASHEs and D-WASHEs were formed at the village and district levels respectively. A V-WASHE is a water management association (CBO-OM), the members of which represent water users in the village, and is assigned to conduct regular maintenance, collection of the water fee and liaisoning as well as information sharing with the competent district authority. In contrast, a D-WASHE is a water supply and sanitation technical committee of the district authority and its technical members include those dispatched by the Ministry of Agriculture, Ministry of Health, Ministry of Local Development and other ministries concerned and also representatives of NGOs. Although the concept of WASHEs has spread on the basis of an O & M system, the actual organizational structure, including the roles and responsibilities of each stakeholder, are not clearly defined, resulting in different modes of O & M from one area to another.

4-3-2 Progress of the Project

Immediately after the commencement of the project (September, 2005), the National Rural Water Supply and Sanitation Programme (NRWSSP) was announced and O & M was declared an important component. It is currently planned to take up the O & M guidelines and manuals formulated in the course of JICA technical cooperation project as national guidelines and a national manual under the framework of the SWAp. Other donors and LGAs will proceed with their own projects based on these national guidelines and manual. Prior to the introduction of the SWAp, individual projects developed their own O & M models and there was no efficient spare parts supply system or repair system. In the coming years, however, a sustainable O & M system will be developed with the establishment of a nationwide approach using the national guidelines and manual.

The SOMAP in Zambia is a good example for the spread of an O & M model. A hand pump O & M system in which the development of a spare parts supply chain plays a pivotal role is upheld as the SOMAP model. As the O & M component of the NRWSSP, this model is now being applied as the national model in projects of various donors. The model appears to be very complementary to the PST (provisional support team) project which is the DANIDA's support

model for the capacity building of the administration involved in the rural water supply sector. As such, the SOMAP model constitutes an interesting model for support for O & M in the sector aid coordination process.

Box 4-2 Status of Rural Water Supply System in Zambia's National Policy

The National Rural Water Supply and Sanitation Programme (NRWSSP 2006 ~ 2015) of 2007 refers to the O & M of water supply facilities as one of its seven components: (i) water supply, (ii) sanitation, (iii) policy development, (iv) capacity building, (v) information management system, (vi) O & M and (vii) R & D. At the same time as the announcement of the NRWSSP, the government also issued the National Guidelines for Sustainable Operation and Maintenance of Hand Pumps in Rural Areas. The SOMAP model developed with the assistance of JICA is now recognised as the national model for the O & M of hand pumps and is being disseminated under sector aid coordination for the water sector.

Source: JICA Zambia Office (2009), Water Sector Review Sheet for Zambia

4-3-3 Prospects

The O & M manual prepared under the SOMAP stipulates the organizational structure and roles of stakeholders for the implementation of O & M in line with the NRWSSP. The coming years will see the completion of a set of three manuals (supply chain management manual, capacity building manual for different levels and O & M management manual for district authorities), making it much easier for the Zambian government and other donors to apply the SOMAP model to their own projects.

4-3-4 Lessons Learned

(1) Entry Point for Technical Cooperation Project Under Sector Development Programme

The SOMAP is considered to provide direct support for the O & M component of the NRWSSP and the outcomes of the SOMAP are expected to form an integral part of the NRWSSP. The reason for the SOMAP model's distinctive status as a national model in the sector development programme is likely the fact the fact that the quick consensus among stakeholders for the development of an O & M component with JICA assistance produced timely outputs through the implementation of the project rather than the assessment of its outputs of being superior to those of other efforts.

Within the framework of sector aid coordination where external support is bundled together under the concept of on-budget, project-type support is integrated with the sector development

programme (i.e. the action plan of the recipient country becomes on-budget). To be more precise, project-type support acts as earmarked funds (earmarked project) designed to support a specific project in the sector development programme. As the goals and outputs of the project are identical to the goals of the sector development programme, the financial contribution of the recipient country must clearly become part of on-budget (see Fig. 4-3-1). In this way, the implementation of project-type support which is aligned with the sector development programme is possible. Once sector budget support, which is often bogged down, begins to proceed smoothly, the positive outputs of projects will widely spread through the national programme for which budget support is an important part.

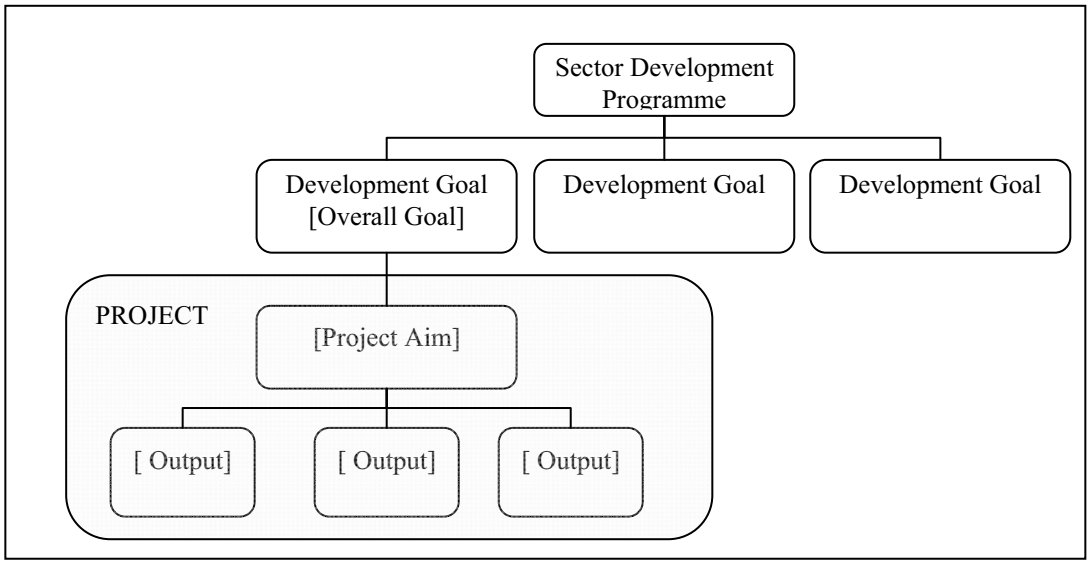


Fig. 4-3-1 Conceptual PDM relating to Sector Development Programme (SOMAP/Zambia)

In Zambia, an O & M framework was developed under the SOMAP. This was followed by modelling of the framework in accordance with the implementation schedule for the development goals for O & M in the sector development programme as shown in Fig. 4-3-2.

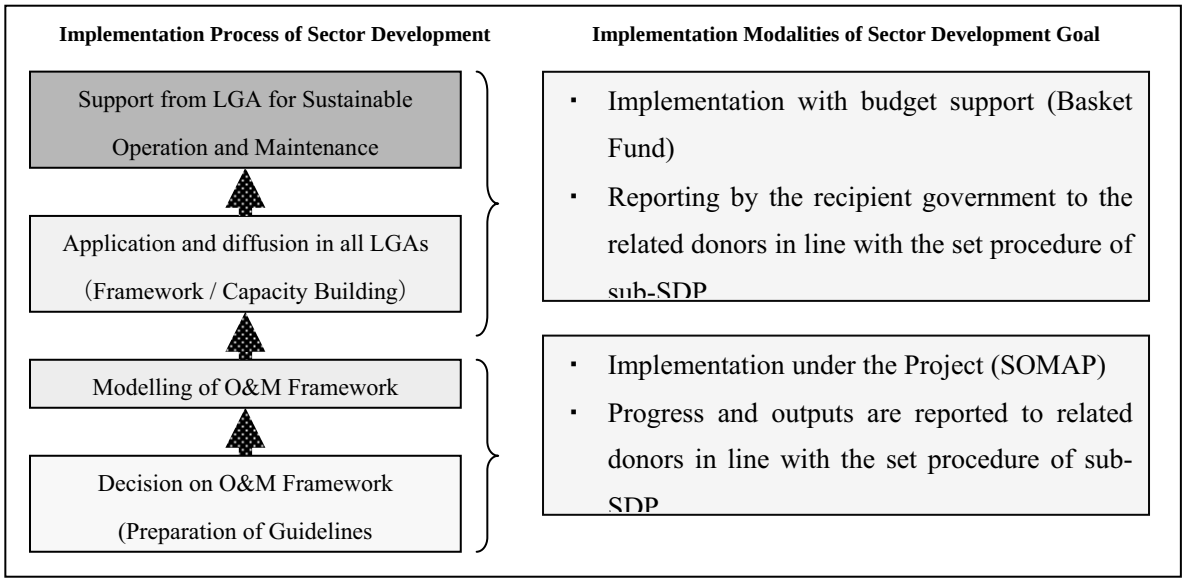


Fig. 4-3-2 Implementation Process and Modalities of Sector Development (Zambia)

Participation in sector aid coordination in this manner enables project implementation effectively utilising both project-type support and budget support. This assists sector development programmes at the global as well as national level to efficiently achieve their goals (Fig. 4-3-3).

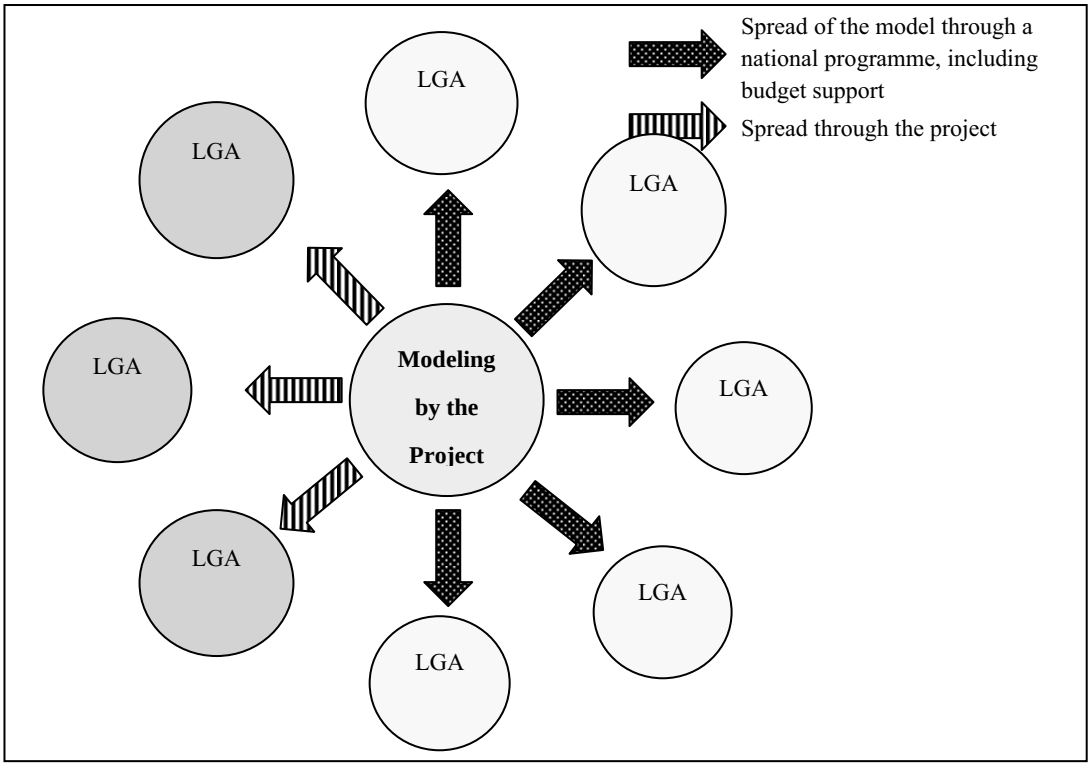


Fig. 4-3-3 Spreading of Outputs of the Project

(2) Active Information Transmission in Sector Aid Coordination Process

At the formulation stage of the draft NRWSSP, the basic sector development principle of strengthening the O & M component with Japanese assistance was decided based on the outcomes of past and present Japanese assistance, including the SOMAP. The transmission of vital information on the project objectives, outline, identified tasks, willingness to coordination with the national programme and progress situation at meetings of donors made the government and other donors fully recognise the project as part of the national programme, creating a useful collaborative relationship between the project and the national programme.

(3) Ownership of Government of Recipient Country

The SOMAP model which promotes the establishment of an O & M system based on the development of a spare parts supply chain and the capacity building of stakeholders was originally perceived as "a JICA project". This perception gradually changed to "a project of the Government of Zambia" assisted by JICA during the process of creating a sector aid coordination system under the NRWSSP and this perception widely spread among the counterpart personnel of the MLGH and staff members of LGAs. This precedent indicates the crucial importance of the recognition of a project by the government and other donors as a project which is in harmony with the national programme under government ownership.

4 - 4 Good Practice of O & M Projects in the Process of Sector Aid Coordination: Case of the RUWASA-CAD, a Technical Cooperation Project in Tanzania

4-4-1 Background

In the water sector in Tanzania, the application of the SWAp was decided in 2006 as the Tanzanian government and donors agreed to promote the WSDP 2006 ~ 2025 using the common procedure under the initiative of the MoWI. In March, 2007, a basket fund for the implementation of the WSDP was created to commence the actual implementation of the programme.

The WSDP has four components: (i) water resources management, (ii) rural water supply and sanitation, (iii) urban water supply and sanitation and (iv) institutional development and capacity building. The RWSSP is to be realised through the implementation of district water supply and sanitation plans which are prepared by 132 district councils[57] nationwide based on the DRA. This means that it is essential for each district council to formulate and implement a plan which reflects the community needs to improve access to water supply and sanitation in rural areas. Meanwhile, communities are responsible for the O & M of water supply facilities.

With the commencement of the WSDP, the MoWI produced the Programme Implementation Manual (PIM) for the WSDP. This manual explains such necessary procedural steps for the implementation of the RWSSP using the WSDP fund as (i) the planning of water supply projects, budget application, work supervision and monitoring and (ii) available methods of district support for community-based O & M. Unfortunately, district councils do not possess either a section or staff members with sufficient knowledge and technical expertise required for the planning and implementation of suitable projects. Even though the MoWI has established the Capacity Building and Training Section in the Community Water Supply Division to make it responsible for the planning and coordination of capacity building training for provincial and district authorities, the stage of systematically planning and implementing training programmes based on the assessed capacity of the target persons has not yet been reached. Furthermore, while provincial governments and BWOs are required to supervise and provide advice on the implementation of the RWSSP at the provincial and basin level, there appears to be insufficient cooperation between these stakeholders.

Against this background, the RUWASA-CAD was planned to strengthen the project implementation, operation and maintenance system of districts to which the authority and responsibility for the planning and implementation of rural water supply and sanitation projects have been transferred. The counterpart for the project is the Community Water Supply Division and the project outline is given in Box 4-3.

---

[57] The RWSSP covers water supply and sanitation improvement in those communities which are not included in the urban water supply networks even though they are under the jurisdiction of an urban authority (city, municipal or town depending on the population size) in addition to rural communities under the jurisdiction of district councils. In this section, "district councils" or "districts" include such urban communities served by the RWSSP for convenience.

Box 4-3 Outline of the RUWASA-CAD in Tanzania

Project period: September, 2009 ~ July, 2010

Project areas: 22 districts in Coast, Dar es Salaam, Lindi and Mtwara Regions where Level 1 or Level 2 facilities have been constructed in the past with Japanese grant aid

[Superior Goal]
The training system used in the project will be incorporated in the WSDP and its actual use will improve the rural water supply and sanitation service on the mainland (Zanzibar is, therefore, excluded).

[Overall Goal]
The rural water supply and sanitation service will be improved in the target districts.

[Project Purpose]
The system to implement new rural water supply projects and the O & M system for rural water supply facilities will be strengthened in the target districts.

[Outputs]
1) The capacity of the Community Water Supply Division of the MoWI to manage capacity building plans in the rural water supply and sanitation sub-sector will be strengthened.
2) In connection with the implementation of rural water supply and sanitation projects, a model training system will be developed for the capacity building of district water and sanitation teams (DWSTs).
3) In connection with the implementation of rural water supply and sanitation projects, the capacity of BWOs to support district councils will be strengthened.
4) In connection with the implementation of rural water supply and sanitation projects, the capacity of regional water and sanitation teams (RWSTs) to support district councils will be strengthened.
5) The RWSS implementation cycle and procedure which are reviewed under the project will be applied to the implementation of the RWSSP in the target districts.

4-4-2 Progress of the Project

(1) Outline of Activities

One essential requirement to enable the RWSSR to proceed in accordance with the appropriate procedure and in line with the water sector policy and strategy is the strengthening of district councils. For this reason, a human resources development plan and training plan have been formulated under the project so that the Community Water Supply Division of the MoWI can implement these plans at three levels, i.e. district, region and BWO levels. The target persons of the training at the district level are members [58] of each DWST which are formed by representatives of the departments involved in water supply and sanitation projects of district councils. At the regional level, members of RWSTs consisting of staff members of the regional

[58] The basic members of a DWST are the chief district officer (acting as the chairperson), district planning officer (vice-chairperson), district water engineer, district development officer, district health officer, district education officer and district finance officer.

government undergo training. In the case of BWOs, the basin management officer, hydrogeological engineer and area development officer undergo training. The capacity building training for staff members of RWSTs and BWOs (which support district councils) in addition to the capacity building of members of DWSTs (which lead the implementation of the RWSSP in individual districts) is expected to enhance the collaboration between these three actors. In regard to the formulation of the human resources development plan and training plan, four issues are evaluated/analysed under the project, i.e. (i) evaluation by means of a field survey on the capacity and training needs in connection with the implementation of the RWSSP in each district, (ii) distribution of tasks and analysis of the required capabilities of stakeholders (DWST, RWST and BWO) in line with the implementation of the RWSSP, (iii) review of the existing training system and plan of the MoWI and (iv) evaluation of local training resources (trainers and resource persons). The human resources development plan formulated based on the evaluation results has the following two special characteristics.

(2) Human Resources Development Plan Corresponding to RWSSP/WSDP Implementation Process

There are ongoing efforts to make the human resources development plan formulated under the RUWASA-CAD compatible with the implementation process of the RWSSP. In the RWSSP, district projects for the construction of new water supply facilities using the basket fund proceed in accordance with the project cycle of project conceptualisation, planning, implementation supervision and support for O & M/follow-up. The maximum project cycle is supposed to be three years in each district. At the time of the commencement of the RUWASA-CAD, public notification was made for the selection of consultants to be responsible for project planning, tender, work supervision, education of local people and capacity building of O & M organizations in the First Cycle of the RWSSP. Taking the implementation schedule for the First Cycle of the RWSSP into consideration, the RUWASA-CAD set five training phases corresponding to the cycle components. The themes and contents of each training phase were decided to make the trainees master the knowledge and skills related to the work to be conducted by DWSTs, RWSTs and BWOs at each stage of the RWSSP implementation cycle. It was also decided that assessment of the training effects and review of the training plan would be conducted by means of monitoring of the actual work by the trainees in the post-training period. Fig. 4-4-1 gives further details of the human resources development plan formulated under the RUWASA-CAD.

(3) Response to Challenges Posed by RWSSP

The contents of the training are determined based on the implementation approach and procedure adopted for the RWSSP. The RUWASA-CAD has identified the following four principal challenges from the viewpoint of implementing the RWSSP and has made them the main goals of the human resources development plan.

- A project plan with consideration of the balance of potential of water resources and the water demand should be formulated while respecting the basic implementation principles for the RWSSP based on the DRA.
- Each DWSP, which is a collection of water supply facility development sub-projects based on requests made by individual villages, should be evaluated at the regional level from the viewpoint of sustainability and economy of scale. If necessary, the integration or coordination of sub-projects should be proposed to the relevant district councils.

- The capacity building of DWSTs should be conducted to enable them to plan and promote projects which incorporate an integral approach to water supply and sanitation, i.e. participation of communities.

- The function of DWSTs of supporting communities should be strengthened in order to enhance the sustainability of rural water supply projects through adequate O & M and follow-up.

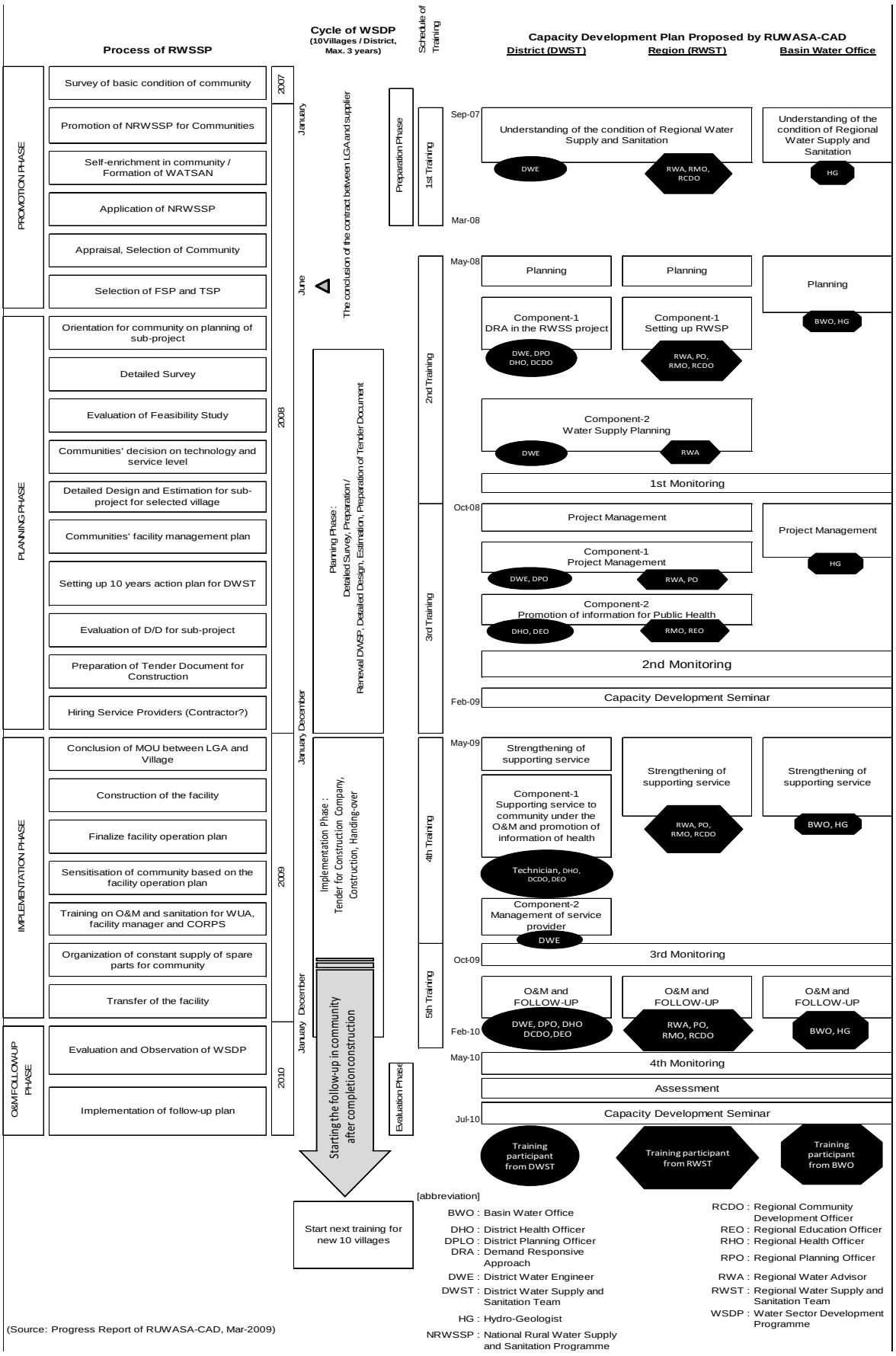


Fig. 4-4-1 Capacity Development Plan by RUWASA-CAD

(4) Status of RUWASA-CAD in WSDP

The WSDP accepts the use of project-type support in addition to support based on a basket fund or earmarked fund. In fact, project-type support is accounted for in the programme budget as a type of cooperation to achieve the goals of the WSDP. The RUWASA-CAD is given the status of a support project for the institutional development and capacity building component of the WSDP. This component promotes capacity development (CD) right across the water resources management, urban water supply and rural water supply sub-sectors.

The main inputs which are planned to assist CD in the rural water supply sub-sector include not only such manpower and goods as the procurement of equipment and vehicles at the regional and district levels, rehabilitation of the office of district water engineers and facilitation of the deployment of water engineers but also the formulation and promotion of CD principles and guidelines for the water sector. Personnel training for CD is another input. Through the activities described in (1) above, the RUWASA-CAD has been producing a series of packages, such as human resources development plans, training systems, training plans, training modules and training aids for district councils which are the implementing bodies of the RWSPP and for regional governments and BWOs assisting district councils. In other words, this project shows the methods and tools to promote CD in the form of training, particularly in the rural water sub-sector, which is part of the institutional development and capacity building component of the WSDP.

(5) Feedback of Project Outputs and Facilitation of Institutionalisation

The RUWASA-CAD feeds back information on the progress of each activity under the project and the outputs of the project through the dialogue mechanism of the WSDP with a view to facilitating the institutionalisation of its own model training system by the MoWI. One channel enabling this feedback is participation in the Institutional Development and Capacity Building Working Group [59] which is one of four thematic working groups

[59] Each thematic working group is chaired by an official of the MoWI while the lead and co-lead selected by the DPG-W convey the opinions of donors and feed back the contents of discussions at regular meetings of the DPG-W. The lead and co-lead of the Institutional Development and Capacity Building Working Group are the GTZ and JICA respectively and an expert working for the RUWASA-CAD also participates in this working group as a regular member. As representative bodies of the DPG-W, the GTZ and JICA

established under the Water Sector Working Group. The second channel is regular meetings of the donor group in the water sector (DPG-Water). By sending experts to these dialogue mechanisms as members, the RUWASA-CAD transmits its own information, checks the progress situation of the WSDP and participates in discussions on the operational policies and issues of the WSDP. Active involvement in the sector-level dialogue mechanisms by the RUWASA-CAD helps those working in the water sector to recognise the contribution of the project's outputs to CD in the rural water supply sub-sector. The presence of the RUWASA-CAD and Japan's aid in general is, therefore, strongly felt in the water sector. As the WSDP moves forward with a consensus among all stakeholders, including the MoWI, donor group, communities and the private sector, it is important to present the positive outcomes of the RUWASA-CAD to the mechanism of forming a sector-level consensus so that such outcomes can be widely recognised to assist the institutionalisation of the model training system. Needless to say, these efforts should complement the internal efforts to the project to make the Community Water Supply Division of the MoWI develop ownership of the project itself.

(6) Prospects

It is hoped that the RUWASA-CAD will contribute to the rural water supply and sanitation sub-sector in Tanzania in regard to the following.

1) Contribution to Implementation Cycle of Revised RWSSP and PIM on Distribution of Tasks Among Stakeholders

As part of the formulation process of the human resources development plan, the RUWASA-CAD reviewed (i) the implementation cycle of the RWSSP and (ii) the roles of the MoWI, regional governments, district councils, BWOs, communities and the private sector at each stage of the cycle. Meanwhile, an implementation manual specifically serving the RWSSP and another manual explaining the range of work of DWSTs are annexed to the PIM. In the course of the work, the RUWASA-CAD found (i) contradictions between the implementation process of the RWSSP and its stated activities and (ii) an unsuitable time axis and contents of the process itself. Moreover, there are no descriptions of the expected roles of RWSTs and

---

have been selected as members of the CD Committee (members consisting of representatives of the MoWI, Ministry of State of the Prime Minister's Office: Regional Administration and Local Government, DPG-W, community organizations and the private sector) which will be set up at the MoWI to coordinate and supervise CD activities in the water sector.

BWOs in the RWSSP. Based on these discoveries, the RWSS project cycle and task distribution matrix with clear roles for each stakeholder were produced based on re-arrangement of the RWSSP cycle and its activities.

The review of the RWSSP implementation cycle aimed at improving the cycle for the rural water supply and sanitation sub-sector and the RUWASA-CAD submitted draft revisions to the WSDP - Programme Coordination Team (PCT) and Community Water Supply Division of the MoWI. As the proposed revisions by the RUWASA-CAD are compatible with the principles of the WSDP, the PTC has already expressed the intention of the MoWI to use the proposed contents for revision of the PIM which should take place by 2012. This intention is shared by the Community Water Supply Division. Accordingly, it is hoped that PIM-related manuals providing references for project implementation by those actors of the RWSSP at the district and other levels will reflect the proposals made by the RUWASA-CAD to improve the overall implementation process of the RWSSP.

2) Spread of Model Training System

The Strategic CD Framework for the Water Sector was introduced in 2008, indicating the basic principle that each stakeholder in the water sector would be primarily responsible for analysis of the present conditions, planning, implementation, monitoring and evaluation of its own CD project/scheme. In the same year, the Guidelines for Promotion of the Implementation of the CD Framework were announced as a tool to realise this principle. In regard to CD in the water sector in general, the Administration and Human Resources Management Division of the MoWI compiles the relevant information and forwards it to the WSDP while those offices responsible for individual sub-sectors promote CD in their own sub-sectors. In the case of the rural water supply and sanitation sub-sector, the Community Water Supply Division promotes capacity assessment and the planning of CD at the national and district levels in line with the guidelines mentioned above.

The RUWASA-CAD has produced a human resources development plan, training plan, training modules outlining the facilitation process for individual training themes and training aids. The purpose is to assist (i) the development of the knowledge and skills required by DWSTs, RWSTs and BWOs to perform their duties and (ii) strengthening of their collaborative relationship. One distinctive feature is a chart whereby a moduled training programme corresponding to the RWSSP implementation process is clearly presented for DWSTs, RWSTs and BWOs. Although similar modules for DWSTs are developed as an annex to the PIM, they do not cover all types of work to be implemented under the RWSSP. Meanwhile, no training modules are available for RWSTs or BWOs. The development of

user-friendly training modules under the RUWASA-CAD facilitates the preparation of a training plan to address the capacity building tasks faced by the target persons or organizations when a regional or district authority plans the preparation of a training plan or when the Community Water Supply Division plans the provision of advice on the necessary training contents for a regional or district authority. The model training system proposed by the RUWASA-CAD contains monitoring and evaluation methods for the progress situation and effects of training and also the necessary tools.

The RUWASA-CAD puts forward the proposal to the MoWI to utilise such methods and tools in the CD plans prepared and implemented by regional and district authorities in line with the CD principles for the water sector. The presentation of this proposal is planned at the forthcoming meeting of the Institutional Development and Capacity Building Working Group and a seminar to be organized under the RUWASA-CAD. It is hoped that understanding of this model will be enhanced through these efforts to facilitate the nationwide application of the model.

(7) Lessons Learned

Although the RUWASA-CAD is project-type support, it has been contributing to the capacity building of personnel and organizations related to the rural water supply sub-component of the WSDP from the viewpoint of the modelling of a training system. The capacity building of the personnel and organization of LGAs, which are the main actors under the process of the decentralisation of rural water supply and sanitation projects using the implementation system of the sector wide development programme incorporating the SWAp, is essential and it is desirable for the implementation principles and support mechanism to form integral parts of the sector wide development programme.

As the RUWASA-CAD is planned with the approach of supporting regions and districts involved in the RWSSP through capacity building training, it is assumed that the project will have such impacts as (i) improvement of the water supply and sanitation service as a result of training in the target districts and (ii) internationalisation of the proposed training system of the project in the water sector and subsequent nationwide spread of this system. The institutionalisation of the model training system will be the decision of the MoWI and is outside the scope of the project. However, from its onset, the project has intended the spread of the model training system nationwide through the WSDP instead of simply being content with positive impacts of training in the 24 target districts in four regions. This approach is consistent

with the basic understanding in the water sector that donors must provide support designed to implement projects nationwide in a uniform manner based on a common procedure for the sector.

To be more precise, the targets for capacity building under the project are not restricted to the Community Water Supply Division of the MoWI which is responsible for the capacity building of stakeholders in the rural water supply and sanitation sub-sector but include DWSTs in the target districts and regional governments and BWOs. Moreover, the action plan includes the feeding back of the project outputs to other donors, etc. using the dialogue mechanism of the WSDP and the proposed institutionalisation of the model training system by the MoWI. A consensus regarding the implementation of the WSDP with sector aid coordination among stakeholders in the water sector is reached at meetings for the water sector joint review and at meetings of the water sector working group and thematic working groups. The securing of a means to transmit information and opinions through the dialogue mechanism of the sector is highly effective in addition to regular coordination meetings held by the RUWASA-CAD for recognition of the work and achievements in the target districts as a contribution to the WSDP and their internalisation in the implementation of the WSDP.

(8) Pending Issues for Effective Implementation of RWSSP and Proposals for Improvement

The training programme formulated under the RUWASA-CAD can be described as a key training programme of the RWSSP as it assists staff members of RWSTs, DWSTs and BWOs to obtain a clear understanding of the basic policies and strategies in the water sector, related concepts, approaches and promotion techniques. Under the project, the present conditions and problems of the rural water supply sub-sector were carefully examined by a review of the PIM and other relevant documents and the baseline survey in the target districts for the preparation of a human resources development plan and training plan. As a result, issues requiring improvement in relation to the project implementation approach and procedure in this sub-sector were found in addition to the need for the capacity building of personnel. The main issues are the RWSSP implementation cycle and distribution of tasks as described in 4-2-2 (6). Many other proposals are made by the RUWASA-CAD, including the positioning of user needs in water supply projects (see Box 4-4) and the planning of water supply taking the economy of scale into consideration. When formulating a human resources development plan and training plan to enhance the practical capabilities at all levels in the water sector, it is essential to examine the existing mechanism, project implementation approach and implementation procedure itself in the water sector. Any pending issues identified in this examination process should be

incorporated in the training. It is also important for any project in the water sector to actively make proposals designed to improve the sector level systems.

Box 4-4 Status of DRA in the Planning Process of Water Supply Projects and Training Under the RUWASA-CAD

The WSDP aims at implementing water supply and sanitation projects which emphasise the development of the ownership and management capability of water users based on the DRA. However, it appears that too much emphasis on facility users has created a situation where projects are planned without proper consideration of the hydrogeological conditions of the area or critical technical aspects of the water supply plan. Although the DRA helps to strengthen awareness of the importance of O & M in the sense that it fosters a sense of ownership among facility users, it is not enough for the successful development of a sustainable O & M system.

Optimisation of the facility plan is the key to sustainable O & M and requires the selection of an appropriate water source in view of the natural conditions of the area and the efficient planning and design of facilities which match the local socioeconomic conditions. One major characteristic of the training under the RUWASA-CAD is that it is implemented in accordance with such requirements. To be more precise, the training adopts the viewpoint of assessing the basin-level water resources and aims at strengthening the technical support service of BWOs as part of the RWSSP to ensure the proper management of water resources.

(9) Impact of Progress of SWDP on Projects

When project-type support is to be implemented in alignment with the SWDP, it is possible that the project in question may be affected by the stage of progress of the SWDP. The project design must be carefully conducted to avoid a situation where any delay of the assumed progress of the SWDP makes this a killer assumption for the project outputs and goals. In the case of the RUWASA-CAD, the process of applying the newly obtained knowledge, etc. of trainees to their actual work under the RWSSP is monitored to check the achievement of the training effects and the effectiveness of the training contents at the level of the practical work of DWSTs, RWSTs and BWOs. Ideally, each stage of the RWSSP implementation cycle should be implemented after the completion of the training phase corresponding to that stage so that trainees can apply their newly obtained knowledge and skills in a concrete manner. The human resources development plan and training plan of the RUWASA-CAD were, in fact, formulated on the basis of this concept.

The reality at present is that the first cycle of new water supply facility construction projects under the RWSSP using the basket fund is greatly lagging behind the original schedule. The scope for practice by trainees is, therefore, quite limited within the first cycle. The RUWASA-CAD has been monitoring the proper digestion of the knowledge and skills taught during the training in addition to behavioural changes by means of including water supply facility

rehabilitation projects which had commenced prior to the new water supply construction projects and which use the earmarked fund and the practical application of the knowledge and skills in question under the project-type support of other donors in the scope of monitoring. The human resources development plan and training plan will be reviewed in due course based on the monitoring results and the actual implementation situation of the training so that the model training system is finalised by the time of the completion of the RUWASA-CAD. In this sense, any delay of the RWSSP should not directly hinder the manifestation of the project outputs. Meanwhile, verification of the general applicability of the training model formulated by the RUWASA-CAD must await the comparative analysis of the problems arising from the RWSSP in the coming years and the contents of the model in question. The MoWI must continually conduct such analysis even after the completion of the RUWASA-CAD.

The crucial point here is examination of the scope of cooperation and a method capable of producing positive outputs on a project basis regardless of the progress situation of the SWDP even though individual projects must be aligned with the SWDP in the sector aid coordination process.

Chapter 5 Conclusions

5 - 1 Conclusions

5-1-1 Responses to Sector Aid Coordination and Decentralisation

(1) Active Participation in Sector Aid Coordination Process

An effective aid programme/project requires thorough analysis focusing on two aspects, i.e. (i) achievement of the declared goals of the water supply and sanitation sector through sector coordination and (ii) implementation process with planning, implementation, monitoring and evaluation stages.

Such analysis usually clarifies a number of problems faced by the sector, ranging from those related to physical facilities to administrative problems. One example of the former is that there tends to be a geographically uneven distribution of facilities due to the specific hydrogeological conditions in each area even if a suitable funding mechanism is in place. Examples of the latter are the absence of a monitoring or information management system, immature design and construction skills as well as their management, absence or inconsistent guidelines and manuals and slow development of a legal registration system for CBO-OMs and a spare parts supply chain. Japan's cooperation in the form of project-type support, including technical cooperation projects designed to achieve development goals or institutional improvement to make the implementation process more efficient and grant aid projects to construct highly reliable water supply facilities, will remain effective in the coming years as long as such projects actively participate in the sector aid coordination process and align themselves with the sector wide development programme.

Within the framework of sector aid coordination, discussions on a system which can effectively utilise various funding sources, such as sector budget support and programme funds, should be held. In this context, the dissemination of the capacity building and institutional development models produced by Japan's technical cooperation projects throughout the sector on the initiative of the recipient countries is highly desirable. With the conventional support provided by individual projects, it is difficult to follow up the process of dissemination to its final phase. Recent experience in Tanzania, Zambia and Senegal illustrates the necessity for Japan to actively participate in the sector aid coordination process, to clarify the status of Japan's

technical cooperation projects in sector wide development programmes and to become involved in the process of spreading the project outputs.

(2) Promotion of Sector Wide Development Programme and Project-Type Support System

Under the circumstances of ongoing sector aid coordination and the prevalence of the SWAp, one effective method to implement project-type support is the systematic input of project-type support to a sector wide development programme receiving budget support (including the use of a common basket fund). The effectiveness of this approach has been proven in Tanzania and Zambia where the multiplication effects between the sector wide development programmes and project-type support can be clearly witnessed. The systematic input of different modalities of support increases the predictability of aid and should contribute to the implementation of effective aid as sought by the Paris Declaration.

Prior to the establishment of a desirable support system, it is essential to clarify the expected status of the project outputs (Project purpose) and impacts (Overall goals) within the sector wide development programme. Once such status is clear, the government of the recipient country can programme (i.e. make the expected financial contribution of the recipient country part of on-budget) the geographical extension of the project outputs and the extension method at the project planning stage. Needless to say, this programming exercise must go through the sector aid coordination process (see 4-3).

(3) Project-Type Support Under Decentralisation System

Water supply projects under the decentralisation system face the challenge of achieving a balance between "the strengthening of governance" and "support for the physical extension of water supply". The recruitment of LGA staff based on performance contracts in some countries has led to excessive emphasis on the superficial number of water supply facilities and increase of the service population while ignoring sustainable O & M after construction which determines the actual service ratio. Even in those countries where such contracts are not used, there is a situation where the policy of the central government of stressing the O & M of water supply facilities is not properly implemented in local areas due to lack of understanding of this policy on the part of LGA staff.

Grant aid projects of JICA for new rural water supply facilities have historically emphasised the importance of O & M by means of incorporating a soft component designed to strengthen the O

& M capability. In the case of rehabilitation projects, however, the incorporation of an O & M component is difficult because of the lack of baseline data or a system for facility upgrading in many countries. Similarly, technical cooperation projects designed to improve the O & M capability have often found it difficult to indicate the target service ratio as a measurable indicator. One critical task for project formulation in the coming years is the establishment of a nationwide monitoring system for water supply facilities based on thorough discussions on the development of an information management system and a monitoring and evaluation system as components of the sector wide development programme as illustrated in Zambia. When the monitoring of water supply facilities using a uniform method and standards becomes possible in the midst of the decentralisation drive, the formulation of a project targeting one area also becomes possible. This is where the significance of the SWAp, which aims at improving the efficiency of aid through sector aid coordination and extending its positive effects, lies (see 2-4).

The rural water supply service is becoming part of the administrative services in rural areas. To ensure that the positive effects of the various projects of JICA in the water supply and sanitation sector reach local people without fail, it is essential for JICA to carefully examine its aid policies and approaches while clearly identifying the likely impacts of its projects. It is also essential for JICA to develop an accurate understanding of the ongoing decentralisation process and resulting changes of the relationship between the central government and LGAs in Sub-Saharan Africa.

5-1-2 Towards Sustainable O & M System

(1) Development of O & M Framework

Sub-Saharan countries adopt a policy of ensuring access to drinking water for all as a minimum policy objective and point out the importance of the sustainable O & M of water supply facilities to achieve this objective. In reality, however, rural water supply facilities constructed by the government or with the assistance of donors in the past have lacked a uniform framework for O & M from both the historical and geographical viewpoints. Moreover, where the responsibility for O & M lies and the roles of stakeholders are not clearly defined. With the increasing emphasis on sustainable O & M in recent years, most countries have formulated national policies stipulating the desirable rural water supply system and the responsibilities of the government as well as water users. However, there are some requirements for these government policies and assistance provided by multiple donors and NGOs to function efficiently and effectively for the development of a sustainable O & M system. In this context, the priority task should be the development of a framework, including much greater clarification of the national

rural water supply policy, the formulation of a national water supply programme in which O & M is upheld as an important component of the national policy and the stipulation of an O & M system, guidelines and manuals. In the process of developing this framework, careful attention must be paid to the following points.

- As the stipulated system, guidelines and manuals assume certain conditions, their review and modification, if necessary, at the community and project levels is required.

- Although it is important to aim at establishing a system and guidelines which conform to a higher policy, the problems associated with their actual application must be properly understood. Also important is a willingness to learn from new approaches or attempts under the past and present projects of others.

(2) Capacity Building

Capacity building in relation to O & M must be conducted at various levels. The underlying reasons for the need for capacity building in the studied countries are outlined in Table 4-2-2.

The findings of the field survey in the studied countries suggest that the following issues require special attention in connection with capacity building.

① Conditions for Capacity Building of LGAs

In many countries, the decentralisation policy is facing such problems as "a gap between the system and the reality", "insufficient practical capability" and "a shortage of human resources". Effective capacity building must satisfy two conditions: (i) firm identification of the target organizations and persons and (ii) existence of a system which allows the full-time employment of persons who have undergone capacity building in the water supply and sanitation sector. It must be noted that the effects of capacity building cannot be sustained in an environment where both personnel matters and the organizational structure are in a state of flux due to ongoing sector reform and other reasons.

② Distribution of Roles and Capacity Building of Individuals and Organizations

Clarification of the roles of the central government, LGAs and communities (and the private sector, if necessary) is essential so that the responsibility for O & M does not entirely fall on a single level. It should also be understood that the effects of capacity building for communities are limited.

③ Continual Capacity Building

The monitoring, evaluation and management capacity of LGAs should be strengthened so that the private sector and CBO-OMs can maintain the necessary capability to continue their O & M activities at a pre-determined level after the completion of a project. A framework for the execution of the current budget for this purpose should also be established.

④ Collaboration and Solidarity Among Stakeholders

In order for communities to continue and improve the O & M system, constant collaboration is required with the administration which is assigned to supervise and assist communities. Both communities and LGAs must maintain their sense of O & M ownership and interactive dialogue. There are some good examples, such as the use of a fund set up by the central or local government to support communities and advice on switching the power source from a fuel oil-dependent generator to less expensive commercial power.

(3) Fair Collection and Management of Water Fee

In general, there are two methods to collect the water fee for Level 1 facilities: flat rate for each household and metered charge per container. The latter method is more complicated as it involves the daily collection of the metered water fee and management of the collected money for a month before its payment to a bank account. Given one example (in Tanzania) where this system is in successful operation based on its favourable assessment by local people due to clear accounting by water vendors and treasurers of CBO-OMs and regular reporting at community meetings, this slightly complicated method is accepted and can function well as long as the collection and management of the water fee remain transparent and the support of local people is solid. This does not mean rejection of the flat rate system which may be the preferred option depending on the management capability of local people, traditional customs and/or social background. For both of these methods, it is essential to indicate "the amount of money required for O & M" and to establish "the willingness or capacity of local people to pay". This must be

followed by wide acceptance of the water fee system through sensitisation and education designed to allow an informed choice to ensure continued collection and management.

In the case of Level 2 facilities, although the importance of the participation in and consent of local people for the process of setting the water fee level is the same, much more careful consideration (in terms of the monitoring system, dual verification system and others) is required to ensure transparency by means of clarification of the money flow after collection and clear reporting of the account to the supervising LGA and local people. This additional consideration is essential in view of the much larger collection amount and larger service population compared to Level 1 facilities and also the greater number of expenditure items, including power supply, commission and repair.

The pending issues for the long-term O & M of Level 2 facilities include the question of whether or not the renewal cost of the generator and other expensive equipment should be included in the water fee to be paid by users and what proportion of such renewal cost users should be expected to pay. There are examples of users being clearly required to pay a proportion of the rehabilitation or renewal cost of facilities/equipment under the national policy (Zambia and Tanzania). In Senegal, the full cost recovery, including the equipment renewal cost, from ASUFORs is institutionalised even though this does not mean that equipment has been renewed in a satisfactory manner at all facilities. The scope of user contribution for many Level 2 facilities in Sub-Saharan countries extends as far as the replacement of parts as this appears to represent the limit of the willingness to pay or affordability to pay on the part of users in many cases. In reality, the renewal of a generator unit or other expensive equipment or large-scale leakage repair work tends to rely on a rehabilitation project financed by a donor. An increase of the facilities and progressive deterioration of equipment mean an increased demand for rehabilitation or renewal which cannot be paid for by the collected water fee. It is, therefore, necessary for a future rehabilitation project to consider switching to equipment of which the cost of O & M is lower. Other subjects for future support are strengthening (including review of the level of the water fee and method to build a reserve fund) of facility management bodies and examination of the possible introduction of an institutionalised cost sharing (funding) system.

(4) Spare Parts Supply Chain

Each country has been searching for a type of spare parts supply chain which is suitable for its own O & M system, taking the types of popularly used hand pumps, density of their installation and capacity as well as geographical distribution of organizations which can possibly provide a

supply base into consideration. The spare parts for hand pumps considerably vary from one type of pump to another while the recommended frequency of replacement, prices and required level of repair skill also vary. The currently available hand pumps can be roughly classified into two groups from the viewpoint of spare parts: (i) those requiring the relatively frequent replacement of spare parts, such as the India Mark II (and III) and Afridev although the unit prices of the spare parts are low and (ii) European pumps requiring the less frequent replacement of spare parts but for which the unit prices of the spare parts are high.

The development of a spare parts supply chain for the former has been slow because the low level of profitability has deterred the private sector from independently operating a chain without support from the public sector. There have been some recent efforts or plans to develop a system designed to provide an incentive for the private sector with intervention by the central government and/or LGAs to make large orders to private service providers possible. To be more precise, these are (i) the procurement and sale of spare parts by the government or LGAs which act as a supply source, (ii) the procurement and sale of spare parts by water service providers in local cities, (iii) exclusive outsourcing to one private company by a LGA in exchange for the establishment of a supply base(s) within its geographical area of jurisdiction and (iv) inclusion of the supply of spare parts in an O & M contract concluded by the central government or LGS with a private body (association of tradesmen, such as local repairers, local O & M enterprise or other).

Meanwhile, European hand pumps have spread in West African countries and the establishment of a local spare parts supply base by the pump supplier at the time of the construction of water supply facilities is a condition of most projects. Because of this, the central government and LGAs have little involvement in the supply chain. Some countries (Burkina Faso and Senegal) have recently adopted a policy of including the supply of spare parts in the O & M contract with a private enterprise for facilities in a certain area.

The private bodies involved in the O & M of water supply facilities range from individual local repairers of hand pumps to enterprises operating spare parts supply bases, enterprises contracted to conduct the O & M of Level 2 facilities and enterprises in charge of monitoring. The general picture at present is that all of these private bodies are looking for ways to provide a stable service. The business environment for the private sector considerably varies from one country or area to another in terms of the national policy, legal system, number and density of target facilities of the service and skill level as well as number of operating enterprises in the private sector. When it is planned to include the private sector in the planned support for the

establishment/strengthening of the O & M system, it is crucial to check the compatibility of private sector involvement with the national policy and/or donor coordination process and to examine the feasibility of private sector involvement (including the need for the capacity building of the private sector) based on a full understanding of the present conditions and business environment of the private sector.

The existence of a national policy for the desirable O & M system, including the establishment of a spare parts supply chain and use of the private sector, does not necessarily mean that this policy is realised. For the planning and implementation of a project designed to strengthen the O & M system for a specified area or facilities, the intentions of the national policy and the applicability of the policy to the project area must be properly examined. Another challenge is the formulation of a project which can contribute to the refinement of the national policy or the development of a model national policy while trying to make the project compatible with the national policy through discussions with the national policy coordination organization as well as members of the donor group. Even in the case of project-type support for the proposal of a new O & M model, it is desirable for the project contents to be fully recognised through discussions to formulate the national policy and sector aid coordination process, to be in harmony with the national policy and to function as a model for the development of an O & M framework.

5 - 2 Important Points for Project Implementation

5-2-1 Impact on Implementation Schedule

When a project to be implemented is in alignment with the sector wide development programme, there is a possibility that achievement of the intended outputs of programmes which are not included in the project will become a precondition for project implementation, resulting in a negative impact on the systematic implementation of the project.

In Zambia, for example, there is the case of the development of an O & M component by the IMS (Information Management System) in addition to components developed by a technical cooperation project. The idea was to apply baseline data provided by the IMS component to the project. In reality, however, the delayed implementation of the IMS component made it impossible to conduct the baseline survey, creating a possibility of no baseline data for the project. This situation made it necessary for the project to use its own budget to gather baseline data in accordance with the procedure designed for the IMS component.

The likelihood of such an impact on project implementation increases when the collaboration with or linkage to other components increases. In general, progress of activities depending on budget support (for example, the IMS component referred to above) tends to be slow. Widely perceived insufficient capacity of LGAs may be the cause of such slow progress.

5-2-2 Social and Cultural Factors

The capacity building of a community produces different effects depending on the community even if the same approach is employed. It may be possible to find the cause in the different ethnicities and lifestyles as described below.

- There are distinctive differences between Islamic communities where the social order is maintained by powerful community leaders (traditional leaders, religious leaders and wealthy people) and Christian communities where democracy tends to prevail.

- There are differences between nomadic groups where household leaders can be absent from home for a long time due to the migratory nature of stock raising, making regular meetings difficult to organize, and agrarian groups of which the members tend to refrain from communal activities during the harvesting and other busy periods even though they live in permanent dwellings.

The case of Senegal is useful to overcome these differences as educational activities with due consideration of the different ethnicities are being implemented using experts and local resources with suitable knowledge. Another lesson learned during the course of the study is that problems relating to the management of an organization are more likely to occur when the same facilities are used by different ethnic groups.

5-2-3 Gaps Between Policy and Reality

It is very important for project/programme planners to keep in mind the gaps between the institutional O & M system formulated under the policy of decentralisation and the actual organizational, human and financial capacities (for planning, budgeting, management of implementation, budget control and others) of LGAs.

5-2-4 Collaboration With and Utilisation of Private Sector

At present, many efforts are being made to utilise the private sector in many different ways, including the use of local hand pump repairers, establishment of spare parts supply bases and the blanket outsourcing of the O & M of many facilities to a single enterprise (see 2-3-2 and 3-2-3). However, it must be understood that the utilisation of the private sector is only one means of improving the water supply service and that there is no guarantee of the permanent commitment of the entrusted private enterprises as their business conditions cannot remain static.

(1) Preservation of Service Level

For Level 1 facilities, it is desirable for LGAs to manage/control such matters as the training of local repairers, their certification and registration based on performance, reporting of the repair work undertaken, evaluation and monitoring of the workmanship by water users and retraining at the time of registration renewal. It is also necessary for LGAs to ensure the sound purchase, sale and management of the spare parts supply business through the regular inventory control of supply bases, account reporting and auditing.

For Level 2 facilities, the most important matter is to secure and maintain the skill level of employed operators. Operators are mostly trained at the time of facility construction at the project level. There are hardly any countries or areas which have an established reliable method of inheriting or ensuring the existing skill level when operators are replaced after the construction of facilities. When problems are not mentioned in a monthly report, inappropriate operation can continue unnoticed. The minimum requirements in this context are (i) the preparation of an operation manual which clearly explains how to operate the equipment and how to detect signs of breakdown and (ii) its inclusion in educational activities so that the replacement of operators can be conducted in a planned manner. When the demand for operators increases due to the introduction of many new facilities, a system to conduct training at a public institution as was once the case in Senegal is desirable.

(2) Transparent Water Fee for the Service and Consent of Users

The service for Level 1 facilities consists of inspection, replacement of expendable parts and breakdown repair. While the common practice is to request this service following a breakdown of the water supply system, the securing of such service on contract has been gradually spreading in recent years. A periodic inspection contract mainly specifies the annual number of inspections to set the annual service fee while separately invoicing the repair work based on an

hourly labour charge and the actual cost of the spare parts used. In some contracts, however, the travelling cost and spare parts procurement cost are not clearly defined and these costs are negotiated on a case by case basis. It is necessary for a contract to clearly stipulate these costs to obtain their advance consent by water users.

In the case of CBO-OMs for Level 2 facilities, the wages for full-time operators, etc. are set by each CBO-OM, taking the relevant wages at nearby facilities and the specifications and scale of the facilities in question into consideration. When a blanket contract which includes periodic inspections is awarded to a private enterprise, the central government stipulates a set charge in the studied case. In Senegal, the periodic inspection charge is determined based on the travelling cost and personnel cost and is much higher for distant communities. Because of increasing discontent among these communities, it is now planned to replace the current system by the metered system. In The Gambia, an O & M contract for a solar system can only be awarded to the supplier of the system and one distinctive characteristic of this arrangement is free repair for the first five years. In general, the unit repair cost comprises the travelling cost, personnel cost and spare parts cost.

(3) Profitability of Entrusted Work

In the studied countries, the work of local repairers for Level 1 facilities is assumed to be a side business and the number of facilities covered by individual repairers and the repair fee payable to individual repairers appear to be determined on this basis. There are no clear standards or criteria to ensure the profitability of this business.

The common practice regarding the spare parts supply chain is that it is the obligation of manufacturers to supply spare parts in the case of hand pumps with trademark rights while readily available retail sale is confined to the capital and other major cities for those pumps in the public domain because of the little profitability of establishing a supply chain in rural areas for general suppliers. Therefore, many attempts to extend the supply chain to rural areas use non-profit making public bodies or LGAs as the local suppliers (Zambia, Ethiopia and Sierra Leone). In Ethiopia, an attempt has been made to assign the work to transport spare parts and to sell them at sales bases to unions of repairers and borehole drillers and to CBO-OMs. There is another plan where an LGA concludes an annual contract with a single supplier in exchange for the establishment of a local supply network.

In the case of Level 2 facilities, efforts have been made to award monopoly O & M rights to an enterprise winning a tender so that the contract can be based on the annual service fee discussed in the previous section (Senegal, Burkina Faso and Rwanda).

(4) Trustworthy O & M Capability of Private Sector

Any attempt in Sub-Saharan Africa to outsource the O & M of Level 2 facilities to the private sector is likely to encounter an insufficient skill level as well as business size of potential contractors. In Senegal and The Gambia where such outsourcing is currently in place, the present situation has been achieved by government efforts to find or even foster capable enterprises. In Rwanda, private enterprises are publicly invited to tender for O & M contracts based on the assumption that these enterprises have been trained under projects of donors. This arrangement appears to have become necessary due to Rwanda's acceptance of the policy proposed by the World Bank to rapidly shift the responsibility for the O & M of water supply facilities to the private sector.

There is a clear national policy behind the transfer of the O & M of Level 2 facilities to the private sector. Without such a policy, this transfer of the O & M responsibility cannot be achieved at the project level or should not be pursued.

(5) Clarification of Roles and Responsibilities of Administration, CBO-OMs and Private Sector

The basic roles of these three types of organizations are already outlined in Table 3-2-22. At present, the private sector is essentially restricted to conducting the O & M of existing facilities on contract. It must be noted that confusion reigns in some countries because of the outsourcing of O & M to the private sector without clarification of their right to extend facilities using the profit. No efforts have been made in the studied countries to expand the scope of outsourcing to the private sector to include the operational matters such as extension of the existing facilities.

(6) Legal Framework for Outsourcing Contracts

Clarification of the legal status of both CBO-OMs which award outsourcing contracts and private bodies which receive such contracts by means of providing a legal basis for outsourcing contracts for O & M is important so that legal procedure against default, etc. can be set up clearly.

5 - 3 Prospects of Cooperation by Scheme

5-3-1 Technical Cooperation

In many Sub-Saharan countries, the rural water supply and sanitation sub-sector is being decentralised and many of the functions of the rural water supply service are now performed by LGAs and other local organizations. Meanwhile, effective and efficient investment in sector development is being sought through the promotion of the SWAp and one important task in this context is the capacity building (or capacity development: CD) of the actors involved in O & M in the rural water supply and sanitation sub-sector (especially project implementing bodies, such as LGAs, hand pump repairers, private enterprises, CBO-OMs and others). Technical cooperation projects are probably best suited to capacity building for O & M in the sector in question as these projects can identify and analyse the development issues through various surveys, jointly formulate and implement projects with counterparts and conduct monitoring in a consistent manner.

The subject matters for capacity building for O & M in this sector are quite diverse and the development issues vary depending on the principal actor(s) (central government, LGAs, private sector and CBO-OMs) at each stage of the overall O & M system. The subject organizations for which capacity building should prove effective to improve the O & M of rural water supply facilities are described next along with the relevant development approaches.

(1) Support for Formulation, Implementation and Monitoring of O & M Plans by LGAs

In recent years, the development of the rural water supply and sanitation sub-sector in Sub-Saharan countries is often being sought in the form of a package of a decentralisation policy and the SWAp (this is particularly noticeable in such East African countries as Zambia, Tanzania and Ethiopia among the studied countries). This packaged approach for the development of the rural water supply and sanitation sub-sector is characterised by the implementation of development projects based on the governance (capacity to formulate, implement and monitor rural water supply and sanitation development projects) of administrative organizations in the country, especially LGAs. In short, the self-reliant development of this sub-sector depends on the capacity of LGAs to formulate, implement and monitor projects in line with the national policy, strategy and investment programme.

In the case of Tanzania's RUWASA-CAD, a system is created to train staff members of regional governments and district councils with a view to improving the overall capacity of these organizations to formulate, implement and monitor rural water supply and sanitation development programmes (especially those at the district level) through capacity building for the improved governance of the administration. As the RUWASA-CAD concentrates on training, its actual effect on strengthening of the O & M system in rural areas must be evaluated through monitoring in the coming years. Nevertheless, the project has already considerably contributed to the capacity building of LGAs.

The training conducted under the RUWASA-CAD has been greatly contributing to the capacity of LGAs to formulate rural water supply and sanitation sub-sector development projects and it is hoped that the training system will spread throughout the country in the future using the training package developed under this project. From the perspective of Sub-Saharan Africa, the development of a model for project implementation by LGAs should be considered (as the next step of assistance) by means of selecting a target LGA(s) and supporting the actual process of formulating, implementing and monitoring a project designed to strengthen O & M in the sub-sector by the said LGA under a pilot project. Unlike cooperation for a training project, this cooperation will emphasise capacity building to strengthen the O & M system of the counterpart LGA, focusing on the "process" leading to the implementation of actual projects by LGAs. In general, this cooperation should be implemented in the following manner.

- Establishment of the present conditions of O & M in the subject area (baseline survey)
- Formulation of an O & M strengthening plan
- Identification of the required capacity for the LGA to implement the formulated plan
- Formulation of a capacity building plan (training project, OJT and other) for the LGA
- Implementation of the capacity building plan
- Implementation and monitoring of the O & M strengthening plan

Because of the use of an approach emphasising the "process", the above cooperation has the advantage that its O & M strengthening plan and capacity building plan serve the actual needs. The difficulty is the formulation of a detailed plan from the beginning. This means that the LGA must arrange a flexible budget to accommodate those costs which arise later. In Tanzania, capacity building programmes are being formulated by LGAs under the WSDP and these programmes will be implemented using the basket fund for the WSDP. Such an approach is effective in an environment where a sector support system is firmly established. From the

viewpoint of efficiently conducting capacity building, it is important for LGAs to possess an internal capacity building mechanism. This internal mechanism has a spiral structure, starting with "the planning of capacity building" to "capacity building", "project implementation", "monitoring and evaluation", "improvement of the capacity building plan" and "further capacity building", and is developed based on an understanding of the gaps between the O & M strengthening plan and the actual capacity of the LGA concerned.

(2) Cooperation for Sub-Sector

Possible cooperation for the improvement of certain aspects of the rural water supply and sanitation sub-sector discussed throughout this report and listed below should also be examined in addition to possible cooperation for strengthening of the O & M system discussed above.

- Preparation of O & M guidelines and manuals
- Development of a hand pump spare parts supply chain
- Training of hand pump repairers
- Outsourcing of the water supply service to the private sector
- Introduction of a reasonable water fee and improvement of its collection

5-3-2 Development Studies

A development study aimed at improving the rural water supply service generally produces an O & M plan for the rural water supply facilities to be constructed in addition to a groundwater or other water source development plan as well as a water supply plan covering a relatively wide area. This O & M plan produced by a development study is commonly based on the examination results of the following matters.

- O & M policies and strategy for the rural water supply and sanitation sub-sector in the country

- Suitability of the water supply unit and type of facilities adopted for the water supply plan based on data provided by a social conditions survey

- Estimation of the O & M cost of the water supply facilities

- Setting of a water fee based on the estimated O & M cost and comparison between the affordability to pay and willingness to pay of users

- Water fee collection and fund management methods

- Operating system of the rural water supply facilities and required skills and management capacity

- Establishment of a CBO-OM or another operating body, decision on its obligations and a capacity building plan

- Contents of guidance provided by LGA on the operation and skills of the CBO-OM, etc.

An O & M plan for rural water supply facilities is formulated only after examination of the matters listed above. When a development study is implemented with future assistance in the form of a grant aid project in mind, an outline soft component plan for the project is formulated by the development study as a capacity building plan for O & M.

According to the Soft Component Guidelines of JICA (2004), the purpose of a soft component is either (i) to assist the smooth launch of a project(s) (especially those to be implemented by a recipient country or (ii) to ensure at least the sustainability of the positive outputs of Japan's assistance. As the inputs for capacity building are directly related to the project proper, their scope tends to be limited. To fill the gaps left by the limited scope of inputs for capacity building in order to further develop the O & M system throughout the project area, it is desirable for the capacity building efforts to collaborate with technical cooperation projects featuring the development of a spare parts supply chain, training of hand pump repairers, preparation of O & M guidelines and other matters with a relatively wide area coverage.

It is also necessary to examine the possibility of implementing a development study of which the purpose is to prepare the groundwork for O & M capacity development throughout the rural water supply and sanitation sub-sector. This study should include recommendations for O & M policies and strategies for the sub-sector and anticipate the formulation of a capacity building plan for the central government, LGAs, CBO-OMs and the private sector by the central government with sector aid coordination. One example of this is in Tanzania where the Strategic Framework for Capacity Development in the Water Sector was prepared in 2008 with the cooperation of donors involved in sector aid coordination. Detailed capacity development plans have since been formulated based on this framework, i.e. strategy, and have been implemented. It is worth considering the formulation of a similar strategy by a development study under the

regime of sector aid coordination, followed by the wide application of this strategy under a technical cooperation project.

5-3-3 Grant Aid

As already described, the development of an O & M system with the soft component of a grant aid project tends to be limited because of the direct link of such development with the project proper. The stated purpose of "a soft component" of "at least aiming at ensuring the sustainability of positive aid outputs" also limits the scope of development of an O & M system. The packaging of such a soft component with a technical cooperation project is important to ensure the strengthening of the O & M capacity throughout the subject area of the grant aid project. This combination is likely to assure the achievement of the expected effects of the grant aid project.

In recent years, a new approach of using a grant aid project for the outsourcing of the construction of Level 1 facilities to local enterprises is being considered for better efficiency. However, it has been reported that the cost reduction effect of this approach compared to the cost of a conventional grant aid project is limited due to the need for the input of several local consultants to secure the quality of the borehole construction work. The quality of the borehole as the water source is the very basis for the sustainable O & M of rural water supply facilities.

Technical cooperation projects for the O & M of rural water supply facilities in Sub-Saharan Africa have so far been implemented to achieve such objectives as the capacity building of the operating bodies of facilities, capacity building of supporting actors and development of an O & M environment/system. Many of these projects were, in fact, formulated to proactively solve O & M problems arising from past grant aid projects. The lessons learned from these projects suggest the desirability of setting targets for construction work based on a package (programme) which combines a technical cooperation project with assistance under other aid schemes, such as a development study and grant aid, to ensure effective and efficient assistance for the water supply and sanitation sector in the coming years.

5 - 4 Use of Pending Issues Check Sheet

The pending issues check sheet in Appendix 5 should be used for reference purposes only as it outlines the important points for the formulation of a project for the purpose of promoting the

thorough examination of all relevant matters by planners. It is important that this check sheet is treated as neither exhaustive nor definitive.

INDEX

S

T

APPENDICES

A1 Photograph

A2 List of Interviewee

A3 List of Collected Data

A4 References

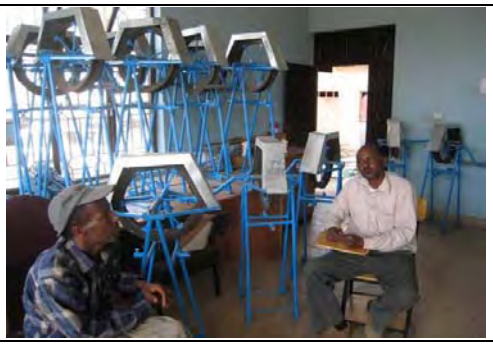
A5 Issue-wise Check Sheet

Photograph 1/3

ETIOPIA

(Project for Improvement of Water Supply Technology in Southern Nations, Nationalities and People's Regional State)

Spare parts shop in SNNP
(Direct management of farmers' cooperative)



Workshop of Rope Pump

ZAMBIA

(Project for the Sustainable Operation and Maintenance for Rural Water Supply)

Spare parts shop
(Mumbwa in Central Region)

Taking stock of spare parts / The shelf in the shop

SIERRA LEONE

(Project for Improvement of Water Supply System in Kambia District)

Meeting for Preparation of Establishment of the Board

Community meeting

Training of the operators for Treatment Plant
(Transmission pump)

Seminar for technical transfer

Photograph 2/3

SENEGAL

(Project for Safe Drinking Water and Community Activities (PEPTAC))

	
The investigation of needs ranking by PRA method	Meeting on the contract of Operation and maintenance with ASUFOR (Association of Borehole Water Usere)
	
Standardization of manual for Rural Water Supply (Portable manual kit)	Chicken farming (Diversification Productive Activities)

TANZANIA

(Rural Water Supply and Sanitation Capacity Development Project (RUWASA-CAD))

	
Course of Project Management for The District staffs in charge of Rural Water Supply and Sanitation	Course of Water Resource Management for staffs of Basin Water Office who support Rural Water Supply under Local Government Authority (Reading of Hydro-Geological Map)

GAMBIA

(The Project for Rural Water Supply)

	
WSS with photovoltaic power	Water Supply System with Public tap

Photograph 3/3

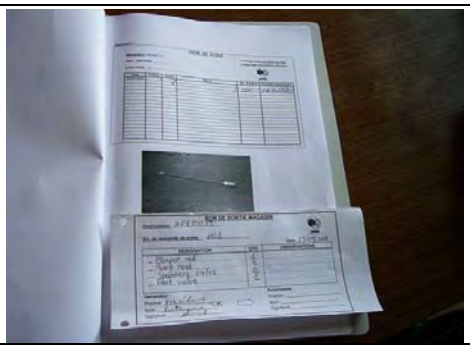
MOZAMBIQUE

(Project for Promotion of Sustainability in Rural Water Supply, Hygiene and Sanitation in Zambezia Province)

	
Spare Parts Supply System / Guideline of the monitaring system	Review of The Operation and Maintenance of Water Supply (Water and Sanitation Committee)
	
Traininng on the constraction of Improved Pit Latrine	Plan of Monitoring Activities (Counterparts from Province and District)

RWANDA

(Project for Improvement of Water and Sanitation in Eastern Province (PURA-SANI))

	
Sanitation facility in the primary school at the demonstration site of targeted district (rainwater tank for washing hand)	On the Job Training for the selling management of spare parts (check and ledger)
	
On the Job Training of the handpump repair for Caretakers	Seminar of investigation of water leakage : Explanation of the method to calculate of uncounted water

Photograph

LIST OF INTERVIEWEE

Name	Organization	Title
ETHIOPIA		
Japanese Side		
SHINICHIROU FUTAMI	JICA Etiopia Office	
AKIRA KAMADA	JICA Underground Water Development and Plan of Water Supply Trainning	Chief Adviser
MASAHIKO IKEMOTO	JICA Underground Water Development and Plan of Water Supply Trainning	Trainning Management
TOSHIKO SUZUKI	JICA / JOCV	Member（W-SAT）
Ethiopian Side		
Nuredin Asaro	Water Resources Development Bureau (WRDB), SNNPR	Director of Water Supply and sanitation,
Alemayhu Negash	WRDB, SNNPR	Electro-mechanical Engineer
Berhanu Shuyo	Woreda Water Office, Boloso sore	Head of Woreda Water Office
Hadiss Zekarias	Sodo Town Water Supply	Manager,
Donors		
Yitbarek Tessema	World Bank Country Office	Senior Water and Sanitation Specialist,
Tesfaye Bekalu	World Bank Country Office	Water and Sanitation Specialist, WB Country office
SENEGAL		
Japanese Side		
MADOKA FUNATSU	Embassy of Japan in Republic of Senegal	The First Secretary（Chief od Economic Cooperation）
TAKUYA SEI	Embassy of Japan in Republic of Senegal	The First Secretary
HISANAO NODA	JICA Senegal Office	Deputy Resident Representative
YOKO KOTOURA	JICA Senegal Office	Staff
YOSIO FUKAI	JICA PEPTAC Phase-II	Chief Adviser
SIGERU INOUE	JICA PEPTAC Phase-II	Expert
SATORU ISHIDA	JICA PEPTAC Phase-II	Expert
Senegalese Side		
Babou SARR	Directueur de l'Exploitation Et de la Maintenace (DEM), Ministere de l'Hydraulque	Directeur
Lamine KA	DEM	Ingenieur Hydraulique
Mass NIANG	DEM	Coordinateur du projet, homolosue de l'expert
Mounirou BERTHE	DHR	Controleue de tavaux
Manadoo THIARE	BPF, Lingre	BPF
M. KURIBARI	BPF, Louga	Assistant
M. BODIAN	BPF, Goudiry	BPF
Papa BACKHOUM	BPF, Tambacounda	Chef de BPF

Name	Organization	Title
Donors		
Joseph van Loon	Cooperation Technique Belge (CTB)	Coresponsable
Alassane Tairou NDIAYE	LUX-DEVELOPMENT	Coordonnatueu Projet PEPAM
Mandir SECK	Programme Regional Solarie	Inginieur des T.A. Responsible du Volet Technique
Amadou DIALLO	MANOBI	Monitoring & Evaluation Specialist
GAMBIA		
Japanese Side		
MADOKA FUNATSU	Embassy of Japan in Republic of Senegal	The First Secretary（Chief of Economic Cooperation)
KZUMI HONDA	JICA The Project for Rural Water Supply Phase III	Member of Study Team
Gambian Side		
Lamin NYABALLI	Ministry of Fisheries, Water Resources and National Assembly Matters (MoFWR&NAM)	Permanent Secretary (P.S.)
Suwareh JABBAI	MoFWR&NAM	Deputy P.S.,
Ami JARRA	MoFWR&NAM, Department of Water Resources (DWR)	Deputy Director
Alhaji JABBI	MoFWR&NAM, DWR	Chief Counterpart of Rural Water Supply Project
Ousman JARJUSEY	MoFWR&NAM, DWR	Coordinator of EDF-9 Project (EU Funded)
David BROWNE	MoFWR&NAM, DWR	Technical Assistant on Policy Matter of EDF-9
Moro CEESAY	MoFWR&NAM, DWR	Coordinator, RSP-II Project (EU Funded)
Isatou Ida SISSOHO	MoFWR&NAM, DWR	Project Coordinator of IDB/GOTG Rural Water Supply
Almomi SONNEH	MoFWR&NAM, DWR in Western Region	Motivator
Foni BREFET	Western Region, Brikama Area Council	Ismile Ward Councillor
Donors		
Min-Wee KANG	UNICEF the Gambia Office	Resident Representative
Musa DRAMMEH	UNICEF the Gambia Office	Water Sanitation and Hygiene Specialist
Private Compaany		
Hans NOTEBOOM	Gam-Solar Energy & Engineering Company	Director
Reynold CARROL	Renewable Energy Association of the Gambia (REAGAM)	Chairman
SIERRA LEONE		
Japanese Side		
AKIKO TATSUTA	JICA Sierra Leone Field Office	Project Planning Adviser

Name	Organization	Title
KAZUMI KATSUDA	JICA Rural Town Water in Republic of Sierra Lenone	Expart (Rural Town Water Supply)
Sierra Leonean Side		
Wosum A. KOROMA	Ministry of Energy and Water Resources (MoEWR), Water Supply Division (WSD)	Chief Engineer
Francis MOIJUE	MoEWR, WSD	Senior Executive Engineer (Civil)
Ahmed MANSARAY	MoEWR, WSD	Superintendent
Francis KAMARA	MoEWR, WSD in Kambia District	District Supervisor of Water & Sanitation
S.S.A. SANKOH	Kambia District Council (CDC)	Council Chairman
Foday M. BANGURA	CDC	Deputy Chairman
Morlai P. KAMARA	CDC	Financial Officer
Musa MEHMOOD	Rokupr Water Supply and Sanitation Board (RWSSB)	Chairman
Alfer KAMARA	RWSSB, Administration	Manager
Memuna KAMARA	RWSSB, Administration	Procurement officer
Zeinabu S. KAMARA	RWSSB, Administration	Secretary
Mohamed TURAY	RWSSB, Operation	Officer in charge (Dispatched from WSD)
Bureh KAMARA	RWSSB, Operation	Mechanic (Dispatched from WSD)
Donors		
Rumishel SHOO	UNICEF Sierra Leone Office	Chief of Child Survival & Development
Arnold COLE	UNICEF Sierra Leone Office	Water, Environment & Sanitation Specialist
Abdul P.A. BANGURA	AfDB Sierra Leone Office	Infrastructure Specialist
Tennyson WILLIAMS	ActionAid international, Sierra Leone Office	Country Director
RWANDA		
Japanese Side		
HIROSI INOUE	JICA Rwanda Office	Resident Representative
MARI KOINUMA	JICA Rwanda Office	Deputy Resident Representative
SINGO KIKUCHI	JICA Rwanda Office	Assistant Resident
MASASI FUJII	JICA Project for Improvement of Water and Sanitation in Eastern Province (PURA-SANI)	Chief Adviser
JUN YOSIKAWA	JICA Project for Improvement of Water and Sanitation in Eastern Province (PURA-SANI)	Expert
YASUO OONO	JICA Project for Improvement of Water and Sanitation in Eastern Province (PURA-SANI)	Expert
TOSIAKI HOSODA	JICA Project for Improvement of Water and Sanitation in Eastern Province (PURA-SANI)	Expert

Name	Organization	Title
Rwandan Side		
Albert YARAMBA	Programme National Eau et Assainissement Rural (PNEAR)	Chief Engineer, Water and Sanitation Specialist
Benoit NYIRIGIRA	Ministry of Infrastracture (MININFRA) - PNEAR	Water and Sanitation Engineer
Theoneste MINANI	Rwandan Water and Sanitation Corporation (RWASCO)	Head of Planning Section and Water Development Study
Emanuel UWIRINGIYIMANA	MKM Water User Association, Rwamagana District, Eastern Province	President
Donors		
Goretti BUHIGA	Programme d'Eau Potable et d' Assainissement-Province du Sud	Director of Intervention
Christine NIWEMUGENI	Evaluation Unit, PEPAPS, BTC	Coordinator
Joseph UWIZEYE	Drinking Water Unit, PEPAPS, BTC	Coordinator
Césaire Gatabazi	Sanitation Unit, , PEPAPS, BTC	Coordinator
Anniek VAN DEN STEEN	Facilitation and Communication Unit, PEPAPS, BTC	Coordinator
Hsanase YESHINE	Facilitation and Communication Unit, PEPAPS, BTC	Coordinator
Coryse LEHEMBRE	Gender Unit, PEPAPS, BTC	Coordinator
Bruno MWANAFUNZI	Water and Sanitation Program (WSP), World Bank	Water and Sanitation Specialist
Radjab NSABIYUMVA	WSP, WB	PPP Consultant in Water and Sanitation Service
Private Compaany		
Richard MUGO	Davis & Shirtliff Ltd. Rwanda Office	General Manager
TANZANIA		
Japanese Side		
TETSUYA YAMAMOTO	JICA Tanzania Office	Water and Sanitation Sector
YUICHI HATA	JICA Rural Water Supply and Sanitation Capacity Development Project (RUWASA-CAD)	Chief Adviser
MIKIKO HIGASHI	JICA Rural Water Supply and Sanitation Capacity Development Project (RUWASA-CAD)	Expert
Tanzanian Side		
John MKUMWA	Community Water Supply Division (CWSD), Ministry of Water and Irrigation (MoWI)	Director
Amani MAFURU	CWSD/Community Management Support Section, MoWI	Assistant Director
Abdalhah ABDULRAHMANI	MoWI	Executive Engineer
Elisamehe C. MZIRAY	CWSD/Community Management Support Section, MoWI	Senior Technical Advisor
Valentine FREDRIC	Technical Support Section, MoWI	Assistant Director
Lawrence S. J. NKYA	MoWI	Principal Engineer
Salum M. CHUSI	MoWI	Principal Engineer

Name	Organization	Title
Walter W. MASANZA	MoWI	Principal Engineer
Mbaraka M. KILANGAI	Lindi District	DWST Member
Deogratins Simos	Lindi District	DWST Member
Vicent J. MASSAO	Lindi District	DWST Member
Mfaume H. HEMEDI	Lindi District	Assistant District Health
Yamis YUNAH	Lindi District	District Planning Officer
Selemani S. NGAMEJE	Lindi District	Acting District Executive
Charles G. WHAUIA	Lindi District	District Engineer
Paul J. HAMISI	Mtwara District	DWST Member
Rose B. Mikanbi	Mtwara District	DWST Member
Dicson C. BENJAMIN	Mtwara District	District Water Engineer
Gerald B. SASITA	Mtwara District	DWST Member
Jaida CHANDE	Mtwara District	DWST Member
Donors		
Ernst DOERING	GTZ Tanzania Office	Head of Programme of Support to the Development of the Water Sector
Fred LERISE	GTZ Tanzania Office	Coordinator and advisor
Jason CARDOSI	World Bank (WB), Tanzania Office	WSP Country Coordinator, Water and Sanitation Specialist
Kaposo Boniface MWAMBULI	WB Tanzania Office	WSP District Coordinator
Satoru UEDA	WB Tanzania Office	Lead Water Resource Specialist
ZAMBIA		
Japanese Side		
YUUKI SIBUTANI	JICA Zambia Office	Staff
YOKO MATSUYA	JICAProject for the Sustainable Operation and Maintenance for Rural Water Supply Phase-II(SOMAP2)	Expert
SEIKO YOSHIZAWA	JICAProject for the Sustainable Operation and Maintenance for Rural Water Supply Phase-II(SOMAP2)	Expert
Norbert Gandize	JICAProject for the Sustainable Operation and Maintenance for Rural Water Supply Phase-II(SOMAP2)	Expert
SYUNSUKE TACHIBANA	JICAProject for the Sustainable Operation and Maintenance for Rural Water Supply Phase-II(SOMAP2)	Expert
Zambian Side		
Davy NGOMA	Ministry of Local Government and Housing (MLGH), Rural Water Supply and Sanitation Unit (RWSSU)	Acting Head

Name	Organization	Title
Beatrice CHIBWE	Lusaka Water Sewerage Company (LWSC), Peri-urban Department,	Zone Manager
Godfridah H. KAYANDA	Kalikiliki Water Trust	Scheme Manager
Golden W. KAMULETE	Kalikiliki Water Trust	Project Accountant
Clement NONDE	Kalikiliki Water Trust	Board Member
Moonga CHIZELA	Rural Water Supply and Sanitation Unit, Monse District, Southern Province, MLGH	Officer
John BANDA	Munbwa District, Central Province	District Planning Officer
Alufeyo MUWANZA	Mukulaikwa Rural Health Centre, Munbwa District, Central Province	Environment Health Technician (EHT)
Ronald SIKAZWE	Mukulaikwa Catchment Area, Munbwa District, Central Province	Area Pump Mender (APM)
Nyirenda MAPOPA	Chibombo District, Central Province	District Planning Officer
Terry SHUMBANO	Chibombo District, Central Province	Focul Point Person, Rural Water Supply Sanitation,
Tembo PATRICK	MLGH	Provincial Support Team Manager of Lusaka and
Donors		
Layford JERE	WaterAid Monze District Office, Southern Province	Programme Officer
Mutibo KENNETH	Divelopment Aid People to People(DAPP) Child Aid Project in Chibombo, Central Province	Project Leader
Rees MWASAMBILI	Zambia Country Office, AfDB/AfDF	Water and Sanitation Specialist
Stephen DOLLERY	COWI Africa (DANIDA consultant for MLGH)	Civil Engineer
MOZAMBIQUE		
Japanese Side		
JUN HIRASHIMA	JICA Mozambique Office	Assistant Resident
NOBUYUKI ISHII	JICA Project for Promotion of Sustainability in Rural Water Supply, Hygiene and Sanitation in Zambezia Province	Chief Adviser
Tatiana Ayako Taura	JICA Project for Promotion of Sustainability in Rural Water Supply, Hygiene and Sanitation in Zambezia Province	Expert
Mozambican Side		
Francisco ÁLVARO	Ministério das Obras Publicas e Habitação (MOPH), Direcção	Director
Luís BERNARDO	Departamento de Planificação e Controlo, MOPH	Officer

Name	Organization	Title
Francisca Cadalamba MULUANA	Direcção Provincial das Obras Pú blicas e Habitação（DPOPH-Zambezia）	Director Provincial
Graciano ARTUR	Departamento Águas e Saneamento (DAS), DPOPH-Zambezia	Head of Department
António Molde GUSSE	Mocuba District, Zambézia Province	Administrador
Gabriel José OPINCAI	Serviço Distrital da Planificação e Infra-estrutura, Mocuba Distrito, Zambézia Province	Director
Filimone MANIQUE	Serviço Distrital da Planificação e Infra-estrutura, Mocuba Distrito, Zambézia Province	Officer
Moisés Sebastião NGOMANE	Serviço Distrital da Planificação e Infra-estrutura, Ile Distrito, Zambé zia Province	Officer
Donors		
Samuel IFAULUÇA	UNICEF Moçambique Office	Officer
Ufuoma Steven ATARE	CitiGate, Local Consultant	Project Leader

LIST OF COLLECTED DATA

Ethiopia

1) EU Water Initiative (2006); Financing Strategy for the Water Supply and Sanitation Sector, Ethiopia; Executive Report Draft 1.1
2) Ministry of Water Resources (MoWR), Federal Democratic Republic of Ethiopia (2001); Ethiopian Water Sector Strategy
3) Ministry of Water Resources (MoWR), Federal Democratic Republic of Ethiopia (Feb. 2009); Review of Rural Water Supply UAP Implementation and Reformulation of Plans and Strategies for Accelerated Implementation (Summarized Version)
4) Ministry of Water Resources (MoWR), Federal Democratic Republic of Ethiopia (March, 2009); Hand Pump and Spare Parts Supply and Maintenance for Community Water Supply System (Draft Report) / With Assistance from the World Bank Under the Bank Netherlands Water Partnership
5) Water Resource Bureau (WRB), South Nations Nationalities Peoples Regional State (SNNPR) (July, 2009); Report On Water supply Access Coverage on Woreda, Zone and Regional Level
6) WHO/UNICEF (July, 2008); Joint Monitoring Programme for Water Supply and Sanitation Coverage Estimates, Improved Drinking Water; updated in July 2008; Ethiopia

Gambia

1) Department of State for Fisheries and Water Resources (July 2006), NATIONAL WATER POLICY
2) GAM-Solar Energy & Engineering Co., Ltd (2008).; Solar Water Supply After Warranty Maintenance Contract (Form) -MODEL 2008-
3) Momodu Njie (December 2009), Blue Gold Solution, IWMR ROADMAP FOR THE GAMBIA
4) Monodou Njie (Dec.2008), IWRM Roadmap for the Gambia
5) Oulaye CAMARA, Senior Assistant Secretary, MoFWR&NA 'Nov.2008); Policy on Management and Sustainability of Rural Water Supply Solar Pumping Systems (DRAFT)
6) R.C Engineering (June 2008), New Payment Modality for Community-Based Solar-Powered Water Supply System
7) R.C Engineering (June 2008), PAYMENT MODARITY MANUAL - A Guide to Implementation Management and Sustainability of Community-Based Solar Water Pumping Systems

8) REGIONAL SOLAR PROGRAMME (RSP-II), Project Profile 2009
9) Regional Water Supply Support Programme Development of Water Resource (2008), A TRAINING DUIDE FOR FIELD WORKERS, MOTIVATION MANUAL, TOWARDS SUSTAINED SOLAOR WATER SYSTEMS
10) The Republic of the Gambia (Nov. 2006), POVERTY REDUCTION STRATEGIC PAPER; 2007-2011

Zambia

1) DAPP Zambia, Development Aid from People to People, < http://www.dappzambia.org/Articel.asp?NewsID=7>
2) GRZ/CP Joint Review Team (2007), Joint Zambia Water Sector Review, Final Report, Lusaka, Zambia
3) GRZ/CP Joint Review Team (2009), Final Report, Technical Review, National Rural Water Supply and Sanitation Programme, Lusaka, Zambia
4) GRZ/CP Joint Review Team(2009), Joint Annual Water Sector Review 2009, STAGE 1, REPORT, 27 August 2009, Lusaka, Zambia
5) Lukanga WSC (Pamphlet)
6) LWSC, Water Supply Service Required: Target as Minimum service level
7) LWSC/Water Committee of WDC Agreement, Peri-Urban Department, LWSC, Lusaka, Zambia
8) Ministry of Foreign Affairs of Denmark(2009), Identification Report, Final Draft, Water Supply and Sanitation Programme, phase 2 in Zambia
9) MLGH(2004), Guidelines for Implementing Community Water Supply and Sanitation Projects in Rural Areas, DRAFT AMENDED VERSION, Lusaka, Zambia
10) MLGH(2007), National Rural Water Supply and Sanitation Programme(NRWSSP) 2006 – 2015, Lusaka, Zambia
11) MLGH/JICA(2007), National Guidelines for Sustainable Operation and Maintenance of Hand Pumps in Rural Areas 1st Edition, Lusaka, Zambia
12) MLGH/JICA(2008), Supply Chain Management Manual for Rural Water Supply 1st Edition June 2008, Lusaka, Zambia
13) MLGH/DANIDA(2009),TOR for Development of Standard Procedures and Design for Construction of Protected Water Points for Rural Water Supply, Lusaka, Zambia
14) MLGH/DISS (2009), Memorandum of Understanding for Implementation of the National Rural Water Supply and Sanitation Programme with XXXXX District Council, Department of Infrastructure and Support Services, Lusaka, Zambia (Draft delivered on February 2009)
15) MLGH(2009), Provincial Support Teams Terms of Reference and Job Descriptions (Draft), DHID, DISS, Ministry of Local Government and Housing (Note: Delivered in

the SAG Meeting on June 25, 2009)

16) MLGH(2008), Report on Functional Analysis of District Support Teams, Water Sector Programme

17) Support-Component 1: Support to Rural Water Supply and Sanitation, Ministry of Local Government and Housing, Lusaka, Zambia

18) MLGH/DHID(2009), Component 4, Capacity Development, Work Plan 2009(draft), Lusaka, Zambia

19) MLGH/JICA(2009), Sustainable Operation and Maintenance Programme for Rural Water Supply, O&M Activities Management Manual for District Local Authorities, Lusaka, Zambia

20) NWASCO(2009), Urban and Peri-Urban Water Supply and Sanitation Sector Report 2007/2008, National Water Supply and Sanitation Council, Lusaka, Zambia

21) SAG (2007), Guideline to Standard Procedures for Design and Construction of Protected Water Points, Minutes of the First Working Group Meeting Held on 9th April 2007 at Ministry of Local Government and Housing, LUSAKA, Zambia

22) SAG(2009), Proposed Structure of Guideline to Standard Procedures for Design and Construction of Protected Water 9 Points, Working Group Meeting I, Lusaka, Zambia

23) SAG(2008), Concept note on NRWSSP Reporting Formats, (Note: Delivered in the SAG Meeting on September, 2008)

24) SAG(2009), NRWSSP, Component 4 - Capacity Development, Annual Work Plan (Note: Delivered in the SAG Meeting on June 2009)

25) Service Management Contract Between LWSC and Water Trust, Lusaka, Zambia

26) User Registration Card, Kalikiliki Water Trust, Lusaka, Zambia

Sierra Leone

1) Ministry of Energy and Water Resources (June 2009); Road Map for Integrated Water Resources Management (IWRM) in Sierra Leone

2) Ministry of Energy and Power (Aug. 2008); National Water and Sanitation Policy

3) United Nations Economic Commission for Africa (March 2007); Water Supply and Sanitation Policy for Sierra Leone

4) Government of Sierra Leone / DFID, UNICEF (Nov. 2007); PROJECT MEMORANDUM: HYGIENE, SANITATION AND WATER SUPPLY PROGRAMME (2008-2013)

5) Government of the Sierra Leone / UN Economic commission for Africa (March 2005); NATIONAL POLICY GUIDELINE AND ACTION PLAN ON WATER SUPPLY AND SANITATION; ACTION PLAN FOR IMPLEMENTING THE WATER SUPPLY AND

SANITATION POLICY

6) Government of the Sierra Leone / UN Economic commission for Africa (March 2005); NATIONAL POLICY GUIDELINE AND ACTION PLAN ON WATER SUPPLY AND SANITATION; WATER SUPPLY AND SANITATION POLICY FOR SIERRA LEONE

Senegal

1) Programme Régional Solaire Phase 2(2008), APPUI POUR UNE GOUVENANCE LOCALE DE L'EAU, L'EXPERIENCE DES MESURES D'ACCOMPAGNEMENT DU PRS POUR UNE DESTION DURABLE DES OUVRAGES
2) DIRECTION DE L'EXPLOITATION ET DE LA MAINTENANCE(2009), SITUATION DES FORAGES A L'ARRET
3) PEPAM(2008), Revue annuelle Conjointe 2008, Résumé Global
4) PEPTAC2(2008), ACTIVITES RETATVIES AUX POMPES MANUELLES ET AUX ARTISANS REPARATEURS
5) PROGRAMME REGIONAL SOLAIRE PHASE DEUX (2009), ACTIVITES DU PROGRAMME REGIONAL SOLAIRE PHASE 2
6) PEPAM (2007), UNITE DE COORDINATION, RAPPORT D'AVANCEMENT
7) PEPAM (2009), Revue Annuelle conjointe 2009, Rapport de Présentation
8) USAID, SENEGAL Water and Sanitation Profile
9) PEPAM (2007), REVUE ANNUELLE DU PEPAM, DOCUMENTS ANNEXES
10) PEPAM (2007), REVUE ANNUELLE DU PEPAM, ATELIER N°1

Tanzania

1) Ben Taylor (2009), Addressing the Sustainability Crisis; Lessons from research on managing rural water projects, Dar es Salaam, WaterAid Tanzania
2) Diana Nkongo(2009), Management and Regulation for Sustainable Water Supply Schemes in Rural Communities, WaterAid, Dar es Salaam, Tanzania
3) Fred Simon Lerise (2005), Politics in Land and Water Management: Study in Kilimanjaro, Tanzania, Dar es Salaarm, Tanzania
4) GTZ(2007), MDG monitoring for urban water supply and sanitation: Catching up with reality in Sub-Saharan Africa,
5) GTZ(2008), Water Supply and Sanitation Sector Reforms in Kenya, Tanzania, Uganda and Zambia: Challenges and Lessons,
6) Ministry of Water and Irrigation (2008), Strategic Framework for Capacity Development in the Water Sector in Tanzania, Water Sector Working Group, Thematic Working Group on Institutional Development and Capacity Building, Tanzania
7) Sam Moon(2006), Private Operation in the Rural Water Supply in Central Tanzania: Quick Fixes and Slow Transitions, Dar es Salaam, WaterAid Tanzania

Mozambique

1) DPOPH/JICA(2008), Tarefas e Responsabilidades na Circulação de Peças Sobressalentes e Relatório de Monitoria, Projecto de Promoção de Sustentabilidade no Abastecimento de Água, Higiene e Saneamento Rural na Província da Zambézia, Governo da Província da Zambézia, República de Moçambique
2) DPOPH-Zambezia (2007), Plano Director Provincial do Sub-Sector de Astecimento de Água e Saneamento na Província da Zambézia, Direcção Provincial das Obras Públicas e Habitação, Quelimane, Moçambique
3) DPOPH-Zambezia (2007), Relatório Diagnostico do Plano Diretor Provincial do Sub-Sector de Astecimento de Água e Saneamento na Província da Zambézia, Direcção Provincial das Obras Públicas e Habitação, Quelimane, Moçambique
4) MOPH-DNA (2001), Manual de Implementação dos Projectos de Abastecimento de Água Rural, Ministério de Obras Publicas e Habitação, Direcção Nacional de Agua, Departamento de Agua Rural, Maputo
5) MOPH-DNA (2006), Politica de Águas, Junho de 2006, Ministério de Obras Publicas e Habitação, Direcção Nacional de Agua, Maputo
6) MOPH-DNA (2007), Plano Estratégico de Água e Saneamento Rural – Documento Final, Ministério de Obras Publicas e Habitação, Direcção Nacional de Agua, Maputo
7) MOPH-DNA (2007), “Programa de Agua e Saneamento Rural”: PASR, Rural Water Supply and Sanitation Programme, Situational Analysis and Rationale for PASR Common Fund, Technical Document 4, Ministério de Obras Publicas e Habitação, Direcção Nacional de Agua, Maputo
8) MOPH-DNA (2007), Code of Conduct Between the Republic of Mozambique Represented by the Ministry Of Public Works and Housing and Signatory Partners; To Guide the Partnership for Water and Sanitation Development in Mozambique, Maputo, Mozambique
9) MOPH-DNA (2007), Establishment of Water Sector SWAP: Strategic Overview, Progress to Date, Outstanding Issues and Next Steps, Ministério de Obras Publicas e Habitação, Direcção Nacional de Agua, Maputo
10) Conselho de Ministros (2005), Regulamento da Lei dos Órgãos Locais do Estado, Governo de Moçambique, Maputo
11) Conselho de Ministros (2007), Estratégia Nacional de Estratégia Nacional de Gestão de Recursos 8 Hídricos, Governo de Moçambique, Maputo
12) MOPH-DNA (2007), PASR Common Fund Financial Flow Chart, Technical Document 1, Ministério de Obras Publicas e Habitação, Direcção Nacional de Agua, Maputo
13) MOPH-DNA (2009), Documento do Programa Nacional de Abastecimento de Água e Saneamento Rural – Versão Final – Março de 2009, Ministério de Obras Publicas e

Habitação, Direcção Nacional de Agua, Maputo

14) Republic of Mozambique(2008), Provincial Budget Allocations in the Health, Education and Water Sectors: An Analysis 2003-06, Discussion papers No. 58E, National Directorate of Studies and Policy Analysis, Ministry of Planning and Development
15) UNICEF(2009), Mozambique Annual Report 2008
16) UNICEF(2009), The One Million Initiative Final Report – WASH Baseline Survey, Water, sanitation and hygiene, Findings of a household survey conducted in 18 districts of Mozambique
17) USAID(不明), Mozambique Water and Sanitation Profile, U.S. Agency for International Cooperation
18) WSP(2004), The Case for Marketing Sanitation, Field Note August 2004, Water and Sanitation Programme

Rwanda

1) Belgium Technical Cooperation-BTC(2009), Tender Document for Water Supply System Project in Southern Province (Draft Paper), BTC-PEPAPS, Rwanda Davis & Shirtliff (LW) Ltd. Company Brochure
2) Government of Rwanda(2008), Law establishing Rwanda Water and Sanitation Corporation and determining its responsibilities, organisation and functioning (RWASCO), Official Gazette of the Republic of Rwanda
3) Government of Rwanda and the development partners (2009), Memorandum of Understanding Entered into between The Government of the Republic of Rwanda Represented by The Ministry of Infrastructure And The Development Partners For A Sector Wide Approach In The Water Supply and Sanitation Sector
4) MININFRA-PNEAR (2009), List & Map of Water and Sanitation Projects in Rwanda up to March 2009, Ministry of Infrastructure, Programme National d'Alimentation en Eau Potable et Assainissement en Milieu Rural
5) RWASCO (2009), Organisatinal Chart, Rwanda Water and Sanitation Corporation
6) WSP(2009),Development of a Financing Mechanism for Rural Water Systems in Rwanda, Water and Sanitation Program Rwanda
7) WATSAN SWG(2009), Overview Report of WATSAN SWG that discussed the SWAp, Water and Sanitation Sector Working Group in Rwanda
8) WSP(2009), Mission to analyze and document the delegated management of rural water supply systems, Final Report – Tome 1 Final version, Water and Sanitation Program Rwanda
9) WSP(2009), Tariff Recommendation for the Rural Water Sector in Rwanda, Final Report, Water and Sanitation Program Rwanda

REFERENCES

1. SWAp (Budget Support, Donner Coordination etc.)

OECD (2009), *Journal on Development: Development Co-operation Report 2009 Volume 10 Issue 1*
<http://www.oecd.org/dataoecd/37/54/42400742.pdf>

P. Harrold and Associates (1995), *The Broad Sector Approach to Investment Lending: Sector Investment Programs*: World Bank Discussion Papers （Africa Technical Department Series） no.302. Washington, D.C.: The World Bank
<http://books.google.com/books?printsec=frontcover&vid=LCCN95219854#v=onepage&q=&f=false>

Strategic Partnership with Africa (2005), Sector Budget Support: A Note from the Dublin Workshop of SPA Working Groups, 5-6 October 2005
<http://www.spa-psa.org/resources/SPA7/Sector%20Budget%20Support%20A%20Note%20from%20the%20Dublin%20Workshop.pdf>

JICA(2002), *Condition and Risk on Supporting SWAps in Health Sector: Case Study in Zambia and Ghana (in Japanese)*, JICA Research Institute
<http://www.jica.go.jp/jica-ri/publication/archives/jica/kyakuin/pdf/200207_01.pdf>

World Bank (2001), *Education and Health in Sub-Saharan Africa: A Review of Sector-Wide Approaches*, World Bank Group Human Development Africa Region; Washington.
<http://books.google.com/books?printsec=frontcover&vid=ISBN0821348574&vid=LCCN00049535#v=onepage&q=&f=false>

OECD (2008), Survey on Monitoring the Paris Declaration.
<http://www.oecd.org/dataoecd/58/44/41202160.pdf>

2. Decentrazation

JICA (2007), *Decentralisation and Service Delivery in Africa (in Japanese)*, JICA Research Institute
<http://www.jica.or.id/jica-ri/publication/archives/jica/field/pdf/200711_gov_00.pdf>

JICA (2007) Open Seminar “Decentralisation and Rural Water Supply in Sub-Saharan Africa”
<http://gwweb.jica.go.jp/km/FSubject0301.nsf/03a114c1448e2ca449256f2b003e6f57/b25dfcde7d3ef7c34925737f002d242c/$FILE/4%20%E3%82%B5%E3%83%96%E3%82%B5%E3%83%8F%E3%83%A9%E3%82%A2%E3%83%95%E3%83%AA%E3%82%AB%E3%81%AB%E3%81%8A%E3%81%91%E3%82%8B%E5%9C%B0%E6%96%B9%E5%88%86%E6%A8%A9%E5%8C%96%E3%81%A8%E6%9D%91%E8%90%BD%E7%B5%A6%E6%B0%B4.pdf>

3. Privatization・Using a Private sector

UN (2005), *Public-Private Partnerships for Service Delivery: Water and Sanitation,* <http://www.uneca.org/chdcs/chdcs3/ppps_chdcs_3.pdf>

World Bank (2006), *Approaches to Private Participation in Water Service,* Economic and Social Council, Economic Commission for Africa <http://rru.worldbank.org/Documents/Toolkits/Water/Water_Full.pdf>

Mike Webster and Kevin Sansom (1999), *Public-Private Partnership and the Poor: An Initial Review,* WELL Study No.164, WELL, London, <http://www.lboro.ac.uk/well/resources/well-studies/full-reports-pdf/task0164.pdf>

4. Organisation of O & M Framework and Capacity Building of APM

Jeremy Colin (1999), *VLOM for Rural Water Supply: Lessons from experience*, WELL Study No.162, WELL, London, London School of Hygiene & Tropical Medicine, UK, WEDC, Loughborough University, UK <http://info.lut.ac.uk/well/resources/well-studies/full-reports-pdf/task0162.pdf>

N. Mori, Y. Maruo, I Takamatsu (2000), *Attempt at Community Participation in Japan's Grant Aid Cooperation - Case Study of Water Supply Project in Satellite Area of Lusaka -*, Kokusai Kyoryoku Kenkyu vol.16, No.1, JICA <http://203.179.38.26/jica-ri/publication/archives/jica/kenkyu/00_31/31_05.pdf>

IRC(2001), *From System to Service –Scaling up Community Management*, Report of the conference, 12-13 December 2001, The Hague, The Netherlands

5. VLOM, DRA, Community Management etc.

Jeremy Colin (1999), *VLOM for Rural Water Supply: Lessons from experience,* WELL Study No.162, WELL, London, <http://www.lboro.ac.uk/well/resources/well-studies/full-reports-pdf/task0162.pdf>

IRC Community Water Supply Management, <http://www2.irc.nl/manage/index.html>

Peter Harvey & Bob Reed (2004), *Rural Water in Africa: Building Blocks for Handpump Sustainability,* WEDC, Loughborough University, <http://wedc.lboro.ac.uk/publications/pdfs/rwsa/rwsa.pdf>

World Bank (2004), *Rural Water Supply and Sanitation Toolkit for Multisector Projects,* Rural Water Supply and Sanitation and Social Funds Thematic Groups, <http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2005/07/29/000012009_20050729090303/Rendered/PDF/331630rev0PAPER0ENGLISH0rwss1pub.pdf>

<http://www-wds.worldbank.org/external/default/main?pagePK=64193027&piPK=64187937&theSitePK=523679&menuPK=64187510&searchMenuPK=64187283&theSitePK=523679&entityID=000012009_20050729090303&searchMenuPK=64187283&theSitePK=523679>

6. “Scaling up”

WSP(2008), *Water and Sanitation Program, FY2009-2018 Global Strategy: Scaling up Sustainable Services*, <http://www.wsp.org/UserFiles/file/Global_Strategy_July2008.pdf>

Thematic Group Scaling Up Rural Water Service: Sustainability through Support for Community Management (2005), *Scaling Up Rural Water Supply, A framework for achieving sustainable universal coverage through community management, version 1*: 31 August 2005
http://www.scalingup.watsan.net/

CHRISTOPHER HOOD(1995), The “New Public Management” in the 1980s: Variations on a Theme, *London School of Economics and Political Science*

7. Others

IRC International Water and Sanitation Centre,
<http://www.irc.nl/>

Scaling up Community Management of Rural Water Supply,
<http://www.scalingup.watsan.net/>

WEDC Water Engineering Development Centre,
<http://wedc.lboro.ac.uk/index.php>

WELL, managed by WEDC, LSHTM and IRC,
<http://www.lboro.ac.uk/well/>

WELL Technical Briefs,
<http://www.lboro.ac.uk/well/resources/technical-briefs/technical-briefs.htm>

JICA gweb.

JICA (2009.02), *Subject-wise Guide - Water Resources- (in Japanese)*
<http://gwweb.jica.go.jp/km/FSubject0301.nsf/ff4eb182720efa0f49256bc20018fd25/b967e687666ee027492572e6002526e3/$FILE/%E8%AA%B2%E9%A1%8C%E5%88%A5%E6%8C%87%E9%87%9D%EF%BC%88%E6%B0%B4%E8%B3%87%E6%BA%90%EF%BC%892009%E5%B9%B42%E6%9C%88.pdf>

JICA (2004.8), *Effective Approaches to Issues in Development- Water Resources – (in Japanese)*
<http://203.179.38.26/jica-ri/publication/archives/jica/field/pdf/200408_01.pdf>

JICA (2001), *Basic Research on Poverty Reduction (in Japanese)*, JICA Research Institute
<http://www.jica.or.id/jica-ri/publication/archives/jica/kenkyu/01_33/33_10.pdf>

Ministry of Local Government and Housing (2007), National Guidelines for Sustainable Operation and Maintenance of Hand Pumps in Rural Areas, Lusaka, Zambia <http://www.danidadevforum.um.dk/NR/rdonlyres/1DF67975-598E-4C17-81AA-5FE0DE94FF2F/0/Zambia_SH_Component_Overview_090922.pdf>

Government of the Gambia(2008), *Policy on management and sustainability of rural water supply*: Solar pumping systems

ISSEU-WISE CHECK SHEET (1/2)

		CURRENT CONDITION	MEASURE	REF.
Environment which surrounds Operation and Management of a village water supply system	National Plan	Lack of Sector Policy /Plan	Assisting establishment of sector policy / plan. Project formation based on Basic Human Needs	Chap.2, Chap.5
		Concrete activity is not specified although there is a national plan.	Presentation and deliberations of the deployment proposal to an activity plan	Chap.2, Chap.5
		The definition of the coverage of the national plan (a rural water supply sub sector) is	Re-evaluates with international organisation data etc.	Chap.2, Chap.5
		There is not a national sector development programme (activity and budget plan of middle	Assistance with project type support	Chap.2, Chap.5
		There is a national sector development programme led by the government.	To adjust so that the result and target of projected type support may make a part of development goal of a programme.	Chap.2, Chap.5
		There is not a (common) guideline about Operation and Maintenance.	Deliberations between the government and donors towards guideline creation.	Chap.2, Chap.5
		There is no implementation manual about Operation and Maintenance.	Track record investigation in the donor project which participates in assistance cooperation. Unification manual preparation as a project and propose pilot implementation. Adjust the development goal of a sector project, and it positions in a part of programme implementation.	Chap.2, Chap.5
	SWAp	There is no common framework because each donor carries out individual cooperation.	Project is carried out based on a middle plan. Duplication with other donors is avoided by adjustment including the government and a donor.	Chap.2, Chap.5
		It is in the examination stage of enforcement framework between the government and donors.	Participation to deliberations between the government and donors (in the case of the sector is considered concerned significantly)	Chap.2, Chap.5
		It is becoming concentrated in a budget support type.	The check of governmental financial management ability and deliberations between the government and donors are considered for the right or wrong of through and financial support.	Chap.2, Chap.5
		Support framework including projected type support is also prepared.	Issue formation of the programme type support which can perform positioning which becomes a part of a national programme.	Chap.2, Chap.5
		Framework is fluid although the projected type is not eliminated at present.	Issue formation of the programme type support which can perform positioning which becomes a part of a national programme.	Chap.2, Chap.5
	Decentralization	Decentralization is not examined at all.	The central ministries which take charge are made into C/P.	Chap.2, Chap.5
		Although the decentralization law is enacted, the delegation of power is not carried out.	The central ministries in charge are made into C/P, and LGA representation participates in project.	Chap.2, Chap.5
		Based on the decentralization law, decentralization of authority (human resources, budget) is progressing gradually.	human resources : The candidate of an organisation and CD, Budget: It is conditions that the flow of planning execution is decided. Institution construction issue: Clarify the responsibility of a local government in O&M framework, and the support framework of the central ministries which take charge.	Chap.2, Chap.5
		Decentralization is completed in some areas.	It examines whether the central ministries in charge are made into C/P, or it centres on the capacity building below LGA for every region.	Chap.2, Chap.5
		Although decentralization progressed and the organisation and the staff were secured, the enterprise enforcement capability of water supply and sanitation sector is insufficient.	Capacity development of the person in charge below LGA	Chap.2, Chap.5
		The national policy is not understood by the local government level. (Private sector practical use plan, User residents' cost burden, Using of a kind of community development funds. etc.)	Capability building and cooperation strengthening by holding of the personnel joint seminar of centre and regional.	Chap.2, Chap.5

ISSUE-WISE CHECK SHEET (2/2)

		CURRENT CONDITION	MEASURE	REF.
Operation and Management Framework	Role assignment	Main actor of Operation and Maintenance is undecided.	Consider the validity of residents organisations and public-service corporation etc.	Chap.4
		Authority is transferred so that a Operation and maintenance may become main actor.	Check the legal authority	Chap.4
		The cooperation relation between the persons concerned's role and responsibility, and the persons concerned is not clearly defined as a guideline and an enforcement manual.	Support to creation and revision of Operation and Maintenance system's manual. (The role and responsibility of all organisations and persons)	Chap.4
		There is no composition of a resident organisation in a guideline and a manual.	Clarifies by condition investigation of an area.	Chap.4
	Spare Parts Supplying system	There is no sales base of a Spare Part in regional (it is in a capital city).	Consider the possibility of establishment, commission, and capacity building of a sales base.	Chap.4
		Various pumps are intermingled (pump with the Europe trademark)	Examination of the obligation system of the store network installation by a maker etc.	Chap.4
		Various pumps are intermingled (Mixture of proprietary pump / generic pump)	To make the Spare Parts supply system for every manufacture or pump type under the O & M framework.	Chap.4
		A small number of pump type is a substantial standard.	1) Utilize a local public-utilities object as a supply base. Or supply by the LGA itself. 2) examination of systematisation and capacity building of small-scale private sector. (craftsman etc.) 3) A local government grants private enterprises the exclusive rights of spare part supply into a pipe, and imposes a duty of store network maintenance.	Chap.4
		There is no sales base of a Spare Part in rural areas (it is also not in a capital city).	Training of a national - private sector	Chap.4
		The quality of Spare Parts is not secured.	Order to the private sector contractor on condition of a quality control	Chap.4
Operation and Management Framework	Fee system	A user's burden is not clear as a national policy.	Clarification of the user burden range. (Operation and Maintenance cost, institution construction costs, renewal expense of equipments, riverhead development expense)	
		The amount of a burden of a user's maintenance management cost is excessive to the income of villagers.	If it is the whole village, creation of a bounty system and Operation and maintenance by the government. (part) . reconsideration of service or facility level. (adjust volume of a water supply per one person , the level 2 => level 1, a deep well pump => rope pump, etc.)	
		Users do not accept cost burden.	The education activities based on a national policy. Osmosis of the national policy by the politician or an administration person in charge.	Chap.4
	Capacity Building(Main Actor of Operation and Management)	The gap of the wealth and poverty in a community, consideration of socially vulnerable groups	While the alternatives to payment in kind, service, etc. are shown, concrete management is supported so that it may be determined by the problem-solving capability inside a community.	Chap.4
		The shortage of literacy for manual understanding	Creation of the district tribe language version manual. Development of a visual tool, such as a picture-card show. The Operation and maintenance short course based on the senses.	Chap.4
		Lack of ability of accounts and financial management	Election of two or more accountants. Implementation of accounts training. Production of environment about fund management (administration executes management of a bank account by proxy).	Chap.4
	Capacity Building (administration)	Low of human resources in LGA	It waits for technical cooperation project implementation to proper human resources arrangement. Capacity building to the personnel of water and sanitation sector devotion (a plan, enterprise implementation, M&E, etc.)	Chap.4
		Shortage of major repair capability	Consider to use a state organisation and a private sector.	Chap.4
		Monitoring and evaluation: The monitor of the performance of water supply cannot be carried out correctly and continuously.	Unification of the report form to the Operation and Maintenance organisation - local administration - government - central government.	Chap.4


JICA