The Republic of Zambia
Ministry of Local Government and Housing

THE PROJECT FOR SUPPORT IN NATIONAL ROLL-OUT OF SUSTAINABLE OPERATION AND MAINTENENCT PROGRAMME (SOMAP 3) IN THE REPUBLIC OF ZAMBIA

PROJECT COMPLETION REPORT

February 2017

JAPAN INTERNATIONAL COOPERATION AGENCY

JAPAN TECHNO CO., LTD.

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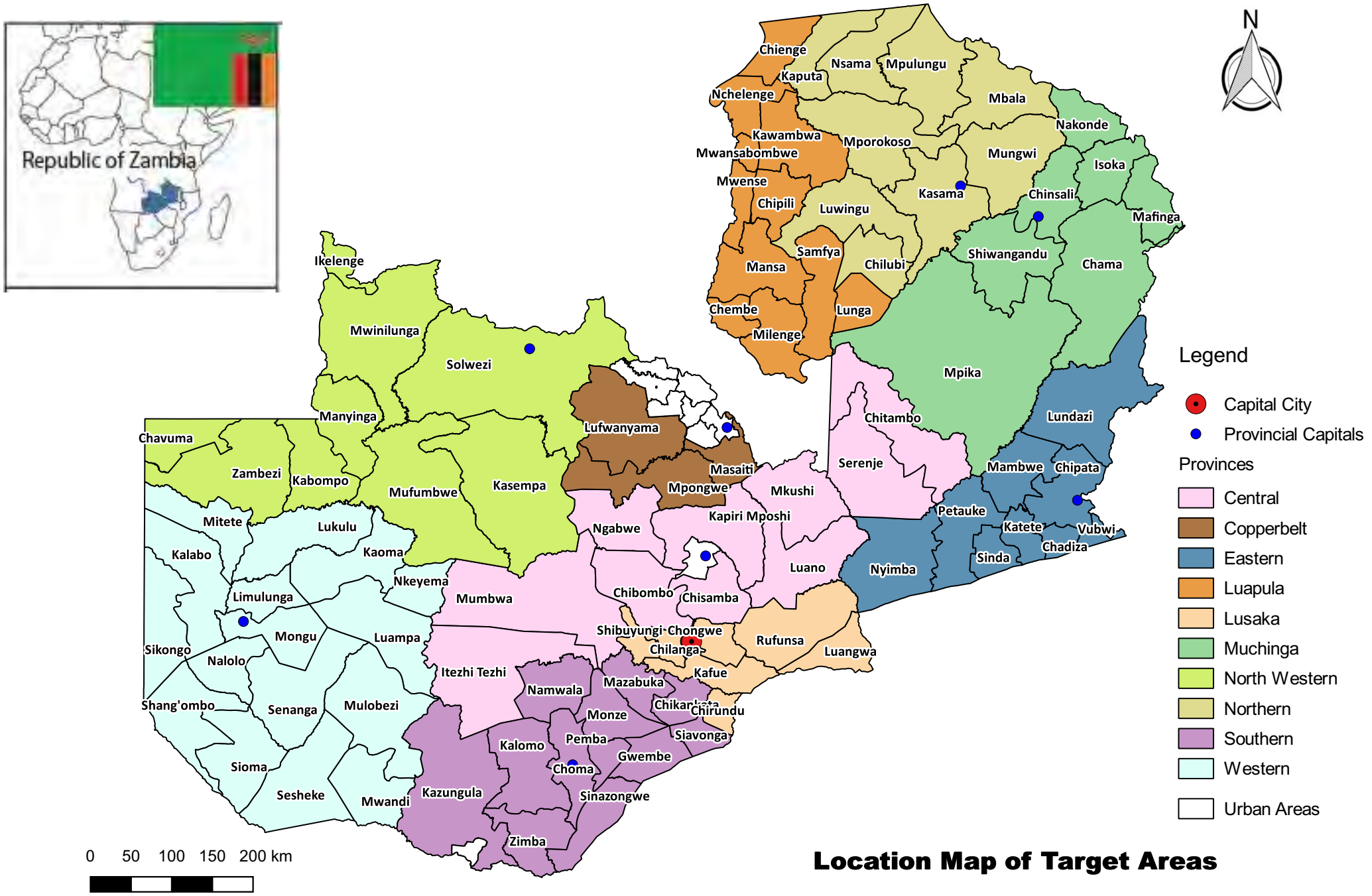
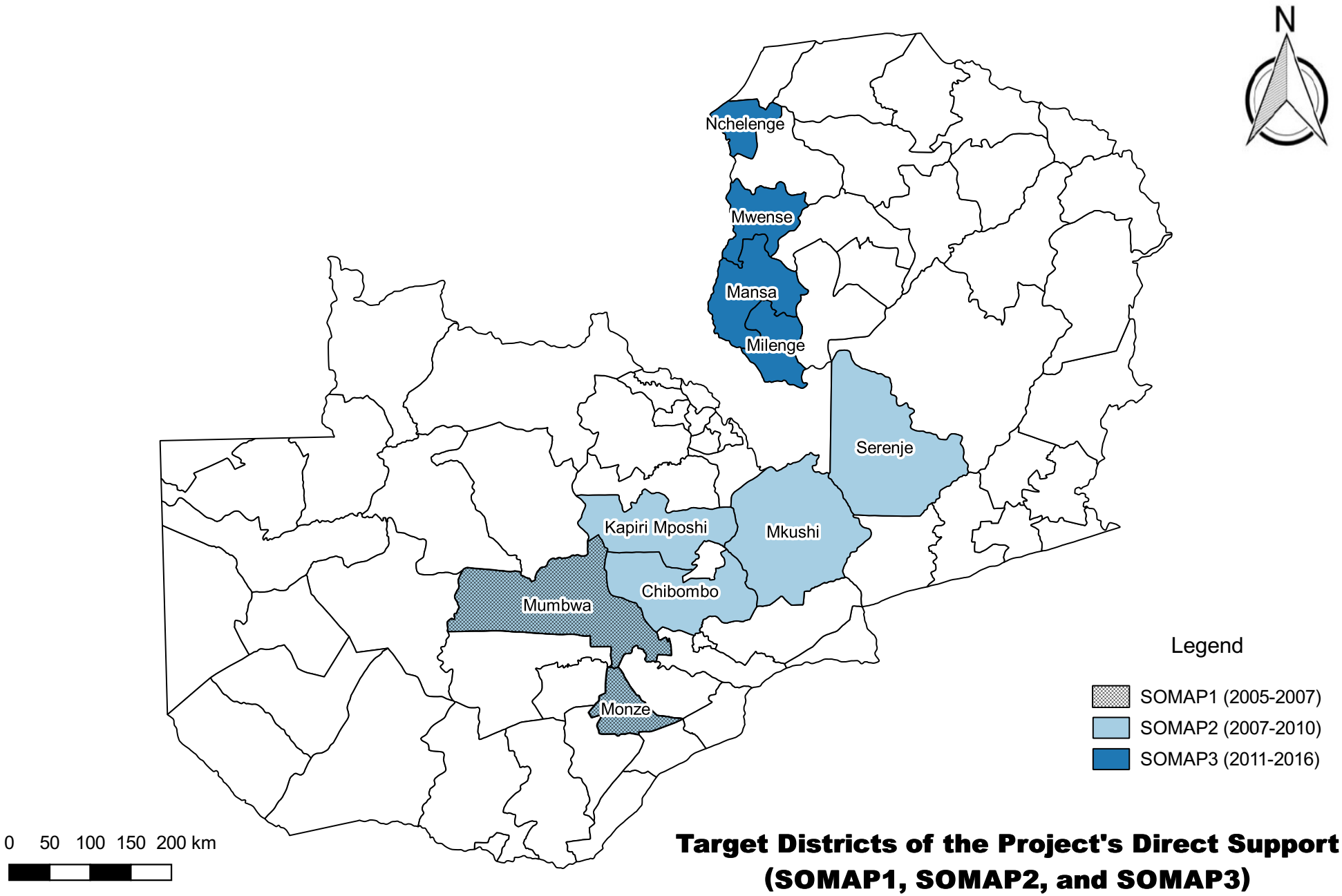


Location Map of Target Areas



Target Districts of the Project's Direct Support (SOMAP1, SOMAP2, and SOMAP3)

Photograph of Project Activities

1. Baseline Survey（2012）and End-line Survey（2016）

Interview with District Local Authority (DLA)（6th Feb, 2012　Mufumbwe District Council）

Interview with V-WASHE（22nd Mar, 2012hanyezi, Lundazi District）

Interview with V-WASHE (1st Oct, 2016 Chitumbo, Chongwe District)

Direct Observation of Water Supply Facility (23rd Aug, 2016 Mulilima Basic School, Serenje District,）

2.　Capacity Development of DHID/MLGH in Implementation of O&M Component (Output 1)

Consultative Meeting/Workshop for Revision of the Supply Chain Management Manual (3rd Apr, 2012 Siavonga)

Preparation of the Work Plan of PDHID/PST (28th Nov, 2012　Livingstone, Sothern Province)

Orientation for PDHID/PST about O&M Model (16 Jan, 2013, Siavonga, Southern Province)


Consultative Meeting for Revision of RWSS O&M Manual (24th Jun, 2014 Kabwe, Central Province)


On-Site Survey for Preparation of Case Study Document on O&M (4th Aug, 2016 Chisoni, Nimba District)


On-Site Survey for Preparation of Case Study Document on Improved O&M
Left: Kaputa District Council (14th Sep, 2016) Right: Chashele A, Kaputa District (15th Sep, 2016)

3. Implementation of SOMAP O&M Model in NRWSSP Target Districts (Output 2)


Training of Trainer (ToT) for Provincial Facilitators
Left: Training Course “Facilitation for the District O&M Action Plan Formulation” (12th May, 2014 Ndola, CopperBelt Province)
Right: Trainig Course “Spare Parts Supply Chain Management” (29th May, 2014 Ndola, Copperbelt)

Orientation Workshop on the Prepatation of District O&M Action Plan Left: Workshop for District Stakeholders in Northern and Mutinga Provinces (20th May, 2013 Kasama, Nortehr Province)
Right: Workshop for District Stakeholders in Copperbelt Province (24the Aug, 2015 Luansha, Copperbelt Prov.)

Training in Supply Chain Management of Hand Pump Spare Parts
Left: Training for DLAs in Lusaka Province (19th Nov, 2013 Siavonga, Southern Province)
Right: Training for DLAs in Southern Province (11th Jan, 2016 Livingstone, Southern Province)

Training in Supply Chain Management of Hand Pump Spare Parts
Left: Training for DLAs in EasternProvince (13th Aug, 2015 Petauke, Northern Province)
Right: Training for DLAs in Muchinga Province (11th Jan, 2016 Nakonde, Muchinga Province)

Monitoring Visit by PDHID to DLAs
Left: Mambwe District Council (16th May, 2016)
Right: Spare Parts Shop of Senanga District Council (30th May, 2016)

Intriduction of O&M Model in District: Spare Parts Shop of Nyimba District Council Constructed with Support by UNICEF (3rd Jun, 2015)

Ditto: Spare Parts Shop of Kalomo District Council Constructed with Support by DANIDA (13th Apr, 2016)

Ditto: Spare Parts Shop of Lufwanyama District Council Constructed with Support by UNICEF (5th May, 2016)

4. Direct Support in Four Districts in Luapla Province for Implementation of O&M Model (Output 3)

Orientation of District Stakeholders on NRWSSP and O&M Model (12th April, 2012Mansa)

DLA staff of Milenge and Mwense District Preparing District O&M Action Plan (3rd Apr, 2013 Mansa)

Orientation for Area Development Committtee on NRWSSP and O&M (20th Jun, 2013 Nchelenge)

Sensitisation of Community (22nd Jan, 2014 Chabwuwe, Mansa District)

Practical Trainig for Area Pump Menders (APMs) (6th Feb, 2015)

Installation of Hand Pump by APM on the Newly Constructed Well (11th Oct, 2016 Mwense)

Management of Spare Parts Shop (1st Sep, 2016 Mwense District Council)

Monitoring on O&M Activities of V-WASHE (1st Sep, 2016 Chakwa, Mwense District)

Caretaker of the Well fitted with Hand Pump (7th Sep, 2016 Mwilimu Kunda, Milenge District)

Community Installing Fence aound Well fitted with Hand Pump (8th Oct, 2016 Milenge District)

Effects of Undertakings in Direct Support for Four Districts in Lulapula Province: Spare Parts Shop of Samfya District Council Constructed with Support by Water Aid and dAfDB (30th Sep, 2016)

5. Thematic Working Group for O&M Comoponent and Evaluation of the Project

Thematic Working Group for O&M Component
（17th Jan, 2012 MLGHConference Room）

Thematic Working Group for O&M Component
（20th Dec, 2016 MLGHConference Room）

Presentation on the Results of Terminal Evaluation of the Project (28th Jul, 2015 MLGH Conference Room)

Conclustion of Minutes on the Brief Terminal Evaluation (16th Nov, 2016 Office of Director, DHID)

6. The Workshop on Review of National Roll-out of Sustainable O&M Model

The Workshop for Line Ministries, CPs and Private Sector (17th Nov, 2016 Lusaka)

The Workshop for PDHID and DLAs
(30th Nov, 2016 Kabwe, Central Provice)

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List of Abbreviation and Acronyms

ABP	Area-Based Programme
ADC	Area Development Committee
AfDB	African Development Bank
APM	Area Pump Mender
AWP	Annual Work Plan
CBM	Community-Based Management
CBO	Community-Based Organisation
CLTS	Community-Led Total Sanitation
CP	Cooperating Partner (donor)
CS	Council Secretary
CU	Commercial Utility
DANIDA	Danish International Development Agency
DHID	Department of Housing and Infrastructure Development
DHS	Demographic and Health Survey
DLA	District Local Authority
DoE	Department of Education
DoH	Department of Health
DoW	Director of Works
DPO	District Planning Officer
DWA	Department of Water Affairs
D-WASHE	District Water, Sanitation and Health and Education
EC	Electric Conductivity
EHT	Environmental Health Technician
FBO	Faith-Based Organisation
GIZ	Gesellschaft für Internationale Zusammenarbeit
GRN	Goods Received Note
GRZ	Government of the Republic of Zambia
HTN	Handpump Technology Network
IMS	Information Management System
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt Für Wiederaufbau
LCMS	Living Conditions Monitoring Survey
M&E	Monitoring and Evaluation
MCDMCH	Ministry of Community Development, Mother and Child Health
MER	Monitoring, Evaluation, and Reporting
MEWD	Ministry of Energy and Water Development
MIS	Management Information System
MLGH	Ministry of Local Government and Housing
MoA	Ministry of Agriculture
MoCTA	Ministry of Chiefs and Traditional Affairs
MoF	Ministry of Finance

MoGE	Ministry of General Education
MoH	Ministry of Health
MoU	Memorandum of Understanding
MWDSEP	Ministry of Water Development, Sanitation, and Environmental Protection
NRWSSP	National Rural Water Supply and Sanitation Programme
O&M	Operation and Maintenance
ODF	Open Defecation Free
OJT	On-the-Job Training
PDHID	Provincial DHID (office)
PDM	Project Design Matrix
PLGO	Provincial Local Government Office
PST	Provincial Support Team
R/D	Record of Discussions
RHC	Rural Health Centre
RWM	Repair Work Mechanism
RWSS	Rural Water Supply and Sanitation
SAG	Sanitation Action Group
SCM	Supply Chain Management
SKAT	Swiss Resources Centre and Consultancies for Development
SMS	Short Message Service
SOMAP	Sustainable Operation and Maintenance Programme/Project for Rural Water Supply
TWG	Thematic Working Group
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
V-WASHE	Village Water, Sanitation and Health Education
WASAZA	Water and Sanitation Association of Zambia
WASH	Water, Sanitation and Hygiene
WASHE	Water, Sanitation and Health Education
WBS	Work Breakdown Structure
WDC	Ward Development Committee
WHO	World Health Organization
WSPS	Water Sector Programme Support
WSSC	Water Supply and Sanitation Coordinator
WSS	Water Supply and Sanitation

Chapter 1 Project Outline

Chapter 1 Project Outline

1.1 Background

The rate of access to safe water in rural areas of Zambia was 50% at the commencement of this project in 2011 while that of Sub-Saharan Africa as a whole was 51%[1]. The rural water supply sector in Zambia remains one of the highest priority development issues in the country. The Government of Japan has been contributing to the improvement of the rate of access to safe water in Zambia through borehole construction under Grant Aid Assistance since the 1980s and by 2010 about 1,200 boreholes with hand pumps had been constructed. "The Follow-up Study on the Projects for Groundwater Development and Water Supply Projects" conducted by Japan International Cooperation Agency (JICA) in 2004 found that more than 80% of the boreholes were functional among the facilities that were constructed under Japanese grant aid projects and that were surveyed in the study. At the same time, the follow-up study revealed several problems, such as the lack of a spare parts supply chain necessary for hand pump repairs, the lack of a clear definition of the roles of each stakeholder, and insufficient skills and quantities of Area Pump Menders (APMs), so it is necessary to improve and strengthen Operation and Maintenance (O&M) of rural water supply facilities.

In view of this situation, JICA rendered technical cooperation for the implementation of "the Sustainable Operation and Maintenance Project for Rural Water Supply (SOMAP1)" (2005-2007) with the aim of establishing and strengthening the O&M system of rural water supply facilities following a request from the Government of Zambia (GRZ). SOMAP1 realised the formulation of the National Guidelines for Sustainable Operation and Maintenance of Hand Pumps in Rural Areas (O&M Guidelines) and clearly defined the requirements for O&M of hand pumps as the mechanisms for O&M. Through the pilot projects in Monze District in Southern Province and Mumwba District in Central Province, the project also established an approach called the SOMAP O&M model which demonstrates a combination of various activities for the implementation of O&M mechanisms, such as clarification of responsibilities of stakeholders, community sensitisation, and capacity development. The pilot projects in SOMAP1 had the effect of drastically reducing the downtime of the facilities. In November 2007, GRZ promulgated the National Rural Water Supply and Sanitation Programme (NRWSSP) (2006-2015) and adopted the O&M Guidelines formulated in SOMAP1 in administering the O&M component of NRWSSP[2].

GRZ further requested technical cooperation from JICA for implementation of "the Sustainable Operation and Maintenance Project for Rural Water Supply Phase 2 (SOMAP2)" with the aim of elaborating the SOMAP O&M model required for nationwide roll-out through pilot activities in the districts in Central Province and disseminating it to other provinces that were supported by other Cooperating Partners (CPs). Based on this request, JICA funded SOMAP2 (2007–2010) to elaborate the O&M Model including the development of manuals describing approaches and methodologies for various activities for the establishment of O&M in districts, and directly supported the implementation of the O&M model in four districts in Central Province, namely Serenje, Mkushi, Kapiri Mposhi, and Chibombo. The project also facilitated dissemination of the O&M model to 22 districts in two provinces where UNICEF and the African Development Bank (AfDB) had been financing rural water supply projects. As a result of SOMAP2, the

[1] WHO and UNICEF (2013), Progress on Sanitation and Drinking-Water: 2013 Update, WHO and UNICEF, 33-35p
According to the same report, the rate of access to safe water in urban areas in Sub-Saharan Africa as a whole is 84% while that of Zambia is 86%.

[2] NRWSSP initially consisted of seven components. The Communication and Advocacy component was added to the programme in 2012 as the eighth component.

operation rate of hand pumps in the four districts under direct support from the project reached over 80%, which exceeded the output target of the O&M component in NRWSSP.

In the sense of the nationwide expansion of the O&M system as a national policy, and due to the obvious effects of SOMAP1 and SOMAP2 in terms of improving the situation of rural water supply, GRZ requested "the Project for Support in National Roll-Out of Sustainable Operation and Maintenance Programme (SOMAP3)" with the aim of further improving the operation rate of rural water supply facilities.

Based on the above request, JICA dispatched a detailed planning survey team in December 2010 and February 2011 and reached an agreement on the outline of SOMAP3. In June 2011, the Ministry of Local Government and Housing (MLGH) and JICA Zambia Office signed and exchanged the Record of Discussion (R/D), which was followed by the commencement of the project in October 2011. Although the completion of the project was scheduled for February 2016, as a result of the joint terminal evaluation of the project conducted by JICA and MLGH in July 2015, the implementation period was extended for one year up to March 2017 in order to provide additional support for the realisation of expected project effects. This Project Final Report compiles the results from the implemented activities and the achievement of outputs brought about through works in Zambia and Japan during the entire project period of October 2011 – March 2017, which was divided into the first to fourth stages.

1.2 National and Sector Development Programmes

This section outlines NRWSSP as an overarching programme of SOMAP3. The programme document of NRWSSP[3] indicates that the SOMAP O&M model is to be rolled out to all of the target districts of NRWSSP in accordance with the O&M Guidelines as a measure to achieve the expected output of the O&M component. SOMAP3 was designed to contribute to NRWSSP, the development programme for RWSS sub-sector in Zambia, and to provide technical cooperation particularly for the implementation of the O&M component in line with the programme and implementation framework of NRWSSP.

As the implementation period of NRWSSP came to an end in December 2015, MLGH conducted an End of Term Evaluation of the programme in November 2015 and has been developing a programme for the second phase since 2016. According to MLGH, the programme for the second phase of NRWSSP is expected to be formulated by June 2017.

1.2.1 National Development Plan and NRWSSP

The long-term development plan of GRZ is established in Vision 2030 (2006), which is implemented through medium-term national development plans for the gradual achievement of its goals. NRWSSP is a sector development programme designed particularly for the realisation of the development goals of RWSS, which are indicated in the Fifth National Development Plan (2006-2010), Sixth National Development Plan (2011-2015), and Revised Sixth National Development Plan (2013-2016). ***Table 1-1*** shows the development goals for the water and sanitation sector stipulated in the Revised Sixth National Development Plan as well as Vision 2030.

[3] Ministry of Local Government and Housing (2007) National Rural Water Supply and Sanitation Programme 2006-2015

Table 1-1 Development Goals of Water and Sanitation Sector Stipulated in the National Development Plans

Plans	Development Goals of Water and Sanitation Sector
Vision 2030	Sector Visions: Clean and safe water supply and sanitation for all by 2030 Targets/Goals: 1. Improve access to appropriate, environmental friendly sanitation by all Zambians; 2. Attainment of 80% access to clean water supply to all by 2015 and 100 percent by 2030; 3. Attainment of 68% access to all by 2015 and 90% by 2030; and 4. Fully integrated and sustainable water resource management.
Revised Sixth National Development Plan	1. Increase access to safe water to 80% in rural areas and 88% in urban by 2016. 2. Increase access to adequate sanitation to 65% in rural areas and 75% in urban by 2016.

Source:
- Republic of Zambia (2006) Vision 2030
- Republic of Zambia, Ministry of Finance (2014) Revised Sixth National Development Plan 2013-2016, 114p

1.2.2 Overview of NRWSSP

NRWSSP initially targeted 64 rural districts out of a total of 74 districts in Zambia. Since the commencement of the programme, the number of District Local Authorities (DLAs) in the country has increased to 106 as of January 2017 due to the establishment of new districts, of which 96 are categorised as rural districts which are covered by NRWSSP. However, three districts[4] out of the 96 do not yet have fully functional district administration functions, as the establishment of these districts was just recently announced by the government. At the time of the preparation of this report, the three districts are still treated by MLGH as part of their mother districts in the programme support in RWSS. The number of NRWSSP target districts is, therefore, noted as 93 in the report.

NRWSSP sets out the programme objectives based on three main areas of development issues, namely, water supply, sanitation, and capacity development. The category of capacity development is further divided into five sub-categories: policy and institutional development, Management Information System (MIS)[5], O&M, Research and Development (R&D), and communication and advocacy. NRWSSP is composed of these eight components (***Figure 1-1***) and is characterised by the comprehensive and effective contribution made by the programme to sector development by ensuring synergic effects among these components. ***Table 1-2*** summarises the programme objectives, overall objective, expected outputs, and activities in the logical framework (log frame)[6] of NRWSSP.

[4] These districts are Kalumbila and Mushindamo which were divided from Solwezi in North Western Province and Senga Hill which was formerly part of Mbala in Northern Province.
[5] It was initially called Information Management System (IMS) at the formulation of NRWSSP, which is now referred to as MIS after MLGH conducted a review of IMS and an examination of a new M&E framework and system development in 2013.
[6] The term logical framework (log frame) is used synonymously with the Project Design Matrix (PDM) in this report.

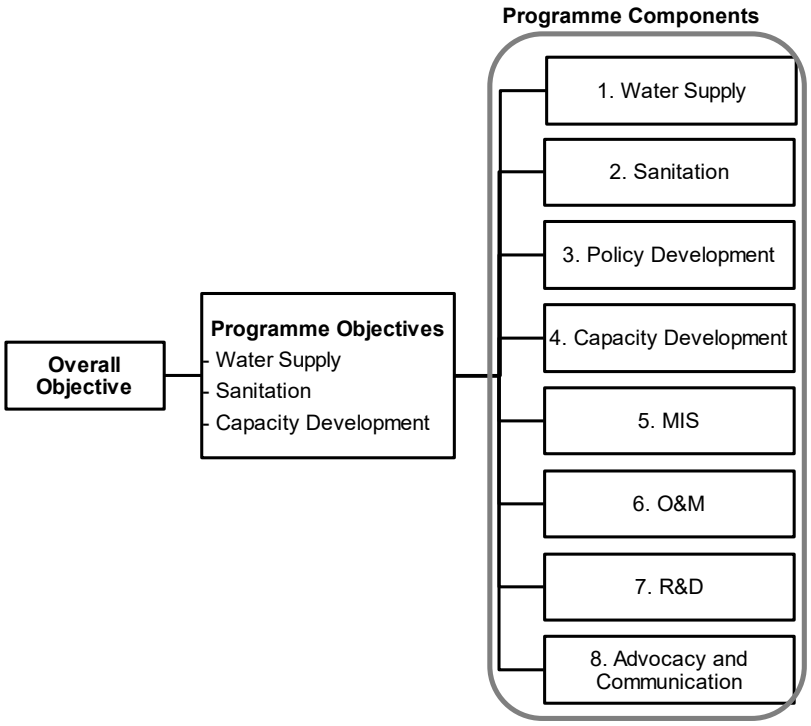


Figure 1-1 Programme Components of NRWSSP

Table 1-2 Summary of the Logical Framework of NRWSSP

Overall Objective	
To provide sustainable and equitable access to safe water supply and proper sanitation to meet basic needs for improved health and poverty alleviation for Zambia's rural population and contribute to achievement of Millennium Development Goal for water.	
Programme Objectives	
Water Supply	To increase and improve the number of functioning water supply facilities in rural areas through systematic investments in new facilities and rehabilitation of existing facilities on basis of a single comprehensive national RWSS programme.
Sanitation	To increase and improve the number of adequate sanitation facilities in rural areas through promotion of household latrine construction, health and hygiene education, and strategic demonstration facilities.
Capacity Development	To improve the performance of the RWSS sub-sector in planning, implementation and operation and maintenance of RWSS facilities through policy and institutional reforms, capacity building, comprehensive and sustainable management information system and effective advocacy and communication.
Results/Outputs	
1. Water Supply	1.1 Increased number of people with access to functioning rural water supply facilities (Water supply coverage increased from 37% (2005) to 60% (2010) and finally to 75% by 2015)
2. Sanitation	2.1 Formulation of a National Sanitation Programme 2.2 Increased number of people in rural areas using safe sanitation facilities (Sanitation coverage from 13% (2005) to 35% (2010) and finally to 60% by 2015)

	2.3 Sanitation and hygiene promotion programmes in all districts achieving behavioural change in sanitation practices and improved utilisation of sanitation facilities
3. Policy Development	3.1 A comprehensive Water Supply and Sanitation Policy Framework that gives clear direction and well defined roles and responsibilities on the development and management of WSS sector in Zambia
4. Capacity Development	4.1 MLGH and local authorities (districts) have sufficient capacity to facilitate and deliver RWSS services more effectively. 4.2 Effective RWSS planning and programming leading to equitable, transparent and efficient allocation of resources
5. MIS	5.1 A sustainable national and district based RWSS management information system providing up-to-date RWSS information for national and district level planning, monitoring and decision-making processes 5.2 The profile of the WSS sector raised in national planning and allocation of resources and increased stakeholder participation and buy in into the RWSS programme
6. O&M	6.1 Between 70% - 80% of rural water supply facilities operational all the time
7. R&D	7.1 Technically, financially and socially appropriate technologies for WSS facilities in rural areas
Activities	
1. Water Supply	1.1.1 Planning and implementation of construction and rehabilitation of RWS facilities Target: 9,640 new facilities and 6,890 rehabilitated facilities Technology options: borehole with hand pump (65%), hand dug well with windlass or hand pump (30%), intermediate options such as use of solar energy (5%)
2. Sanitation	2.1.1 Design and launch the National Sanitation Programme 2.2.1 Implement the National Sanitation Programme 2.3.1 Design and implement health and hygiene education programme as integral components in RWSS projects
3. Policy Development	3.1.1 Review and elaborate a national WSS policy 3.1.2 Review and revise WSS sector legislation in line with the revised policy
4. Capacity Development	4.1.1 Establish and strengthen operational units responsible for RWSS in local authorities with additional policy staffing, transport and equipment as necessary 4.1.2 Carry out training needs assessment and develop and implement capacity building programmes for WSS staff at national (MLGH) and district levels 4.2.1 Develop a consultative and participatory district based planning model based on the WASHE strategy that fees into the national planning process and in line with the decentralisation policy 4.2.2 Develop, through targeted training, capacities of relevant agencies to apply the planning model at community, district and national levels
5. MIS	5.1.1 Extend and consolidate the RWSS MIS 5.1.2 Provide for necessary capacity strengthening to establish and sustain MIS

	activities at district level 5.1.3 Develop and implement a comprehensive Monitoring and Evaluation (M&E) system for RWSS 5.2.1 Develop and implement an advocacy and communication strategy for RWSS
6. O&M	6.1.1 Design appropriate multi-tier O&M systems suited to different types of technologies drawing on the pilot initiatives in MLGH (SOMAP). 6.1.2 Provide capacity building for relevant agencies at national, district and community levels to ensure successful implementation of the O&M systems.
7. R&D	7.1.1 Develop a WSS Centre of Excellence to provide appropriate training for WSS 7.1.2 Carry out applied research on technologies for RWSS

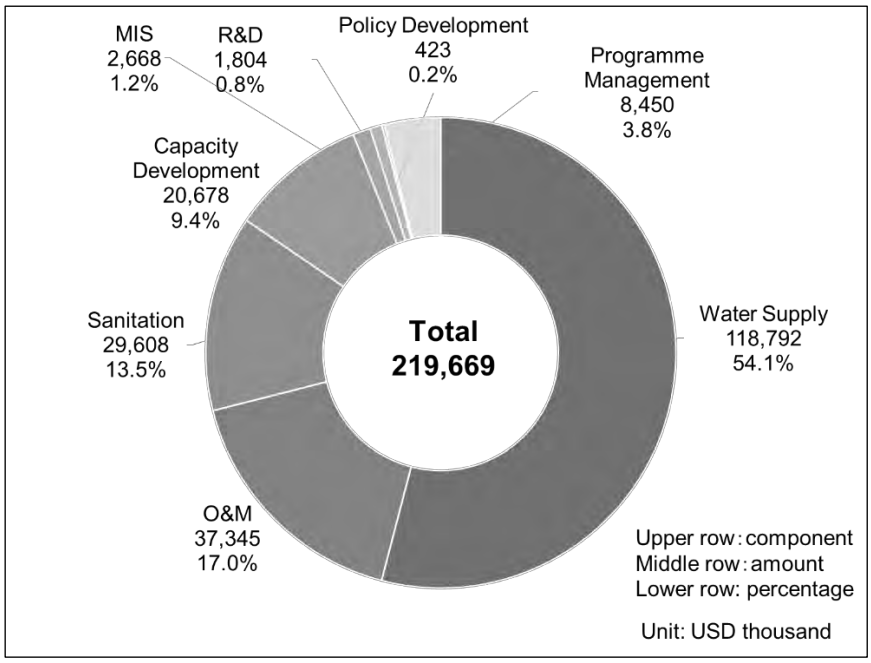
Source: Ministry of Local Government and Housing (2007) National Rural Water Supply and Sanitation Programme 2006-2015

Note: The advocacy and communication component is not clearly mentioned in the log frame of NRWSSP as it was not included in the programme components when NRWSSP was developed. It is considered that Result No. 5.2 and Activity No. 5.2.1 in the log frame fall under the current advocacy and communication component.

1.2.3 Programme Budget and Financing

Figure 1-2 shows the estimated total expenditure budget and its breakdown by component for the 10-year programme period of NRWSSP. Further, ***Figure 1-3*** indicates the planned share of funding for programme implementation for the same period. The estimated budget for the O&M component for the 10-year period is USD 37.35 million which accounts for approximately 17% of the programme budget, the highest allocation after the water supply component. Calculated on the basis of the annual average of the approved budget for the O&M component for 2013-2016 after the commencement of SOMAP3, the actual budget allocation for the component has been almost equal to the estimated amount, although the amount varied every year. However, the disbursement of funds has never been as per the approved budget, which hindered the implementation of planned activities for the nationwide roll-out of the O&M model. Chapter 7 of this report details the influence of GRZ funding delays on the implementation of the project activities.

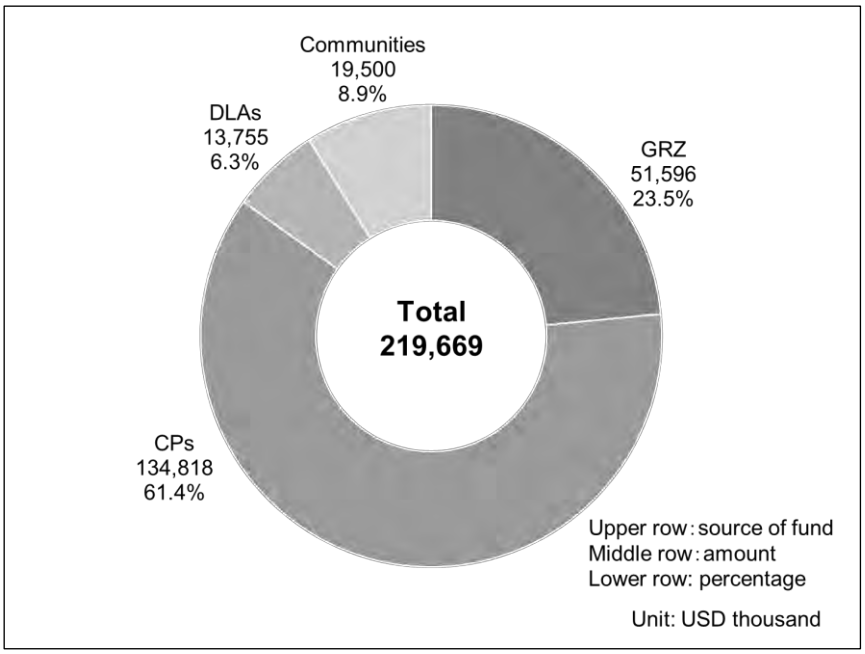
The main sources of finance for the programme are GRZ budget, assistance from the Cooperating Partners (CPs), revenues of DLAs, and community contributions towards construction/rehabilitation and O&M of water supply facilities in RWSS projects. Funds from CPs contribute to 61% of the total requirement for programme financing. Although MLGH intends to manage the programme funds with a basket fund mechanism for the implementation of NRWSSP, it is still at the pilot stage in 49 districts in five provinces under the support of KfW and, at the time of the compilation of this report, only GRZ and KfW contribute to the RWSS basket fund. Other CPs such as AfDB, DANIDA, GIZ, JICA, UNICEF, and USAID have been providing project-based grant aid and/or technical cooperation in RWSS for specific provinces and districts within the framework of NRWSSP.



Source: Andrew Chitembo Consultancy (2015) Final Report: End of Term Evaluation of the National Rural Water Supply and Sanitation Programme (NRWSSP) 2006-2015, p. 6

Note: The programme budget estimated in Zambian Kwacha in the NRWSSP programme document is converted to US Dollars in the report referred to as the source.

Figure 1-2 Estimated Expenditure Budget for the 10-Year Period of NRWSSP by the Programme Components



Source: Andrew Chitembo Consultancy (2015) Final Report: End of Term Evaluation of the National Rural Water Supply and Sanitation Programme (NRWSSP) 2006-2015, p. 6-7

Note: The programme financing calculated in Zambian Kwacha in the NRWSSP programme document is converted to US Dollars in the report referred to as the source.

Figure 1-3 Breakdown of Financing for NRWSSP (Planned)

1.3 Outline of SOMAP1 and SOMAP2

Pilot activities conducted in SOMAP1 and SOMAP2 resulted in the development of the basic concept of the O&M model and its implementation guidelines/manuals which are already adopted in the O&M component of NRWSSP and expected to be disseminated nationwide in SOMAP3. ***Table 1-3*** and ***Table 1-4*** describe project outlines and outputs of SOMAP1 and SOMAP2 while ***Figure 1-4*** shows the timeline for technical cooperation through three phases of SOMAP.

In particular, the official approval of MLGH to adopt the O&M Guidelines developed in SOMAP1 as the operational guidelines for the O&M component led to the provision of a framework for collaboration among stakeholders for support of the component. Furthermore, in SOMAP2, a series of approaches was elaborated as the O&M model that covered planning, implementation, and monitoring of district action plans for the establishment of sustainable O&M systems. These approaches/methodologies were compiled into "Rural Water Supply and Sanitation Operation and Maintenance Implementation Manual and User Guide (O&M Manual)" (1st edition, June 2010) and "Supply Chain Management Manual for Rural Water Supply (SCM Manual)" (1st edition, June 2008), which was able to suggest some standard activities for the enhancement of O&M for rural water supply facilities in CP-funded projects and interventions by DLAs.

Based on these outputs from the preceding projects, in SOMAP3, the Project Team studied the progress made by the districts in the implementation of the O&M model and changes brought about in the sector environment in the implementation of RWSS since completion of SOMAP2. The team also examined measures to utilise lessons drawn from SOMAP1 and SOMAP2 and piloted them in the project. Through this process, the O&M model was further refined, and the O&M guidelines and manuals were revised for introduction to NRWSSP target districts. Details of revisions to the O&M model and guidelines/manuals are explained hereafter in Section 4-1, Chapter 4.

In addition to the development of the O&M model and guidelines/manuals, the two preceding projects of SOMAP3 also directly supported the formulation and implementation of district O&M action plans by DLAs in target districts with funding from JICA Zambia Office. When administering direct support activities for four districts in Luapula Province in SOMAP3, reference was made to the methodologies for the facilitation of these activities in the districts and the procedures for the preparation of activity and financial reports in these projects.

Table 1-3 Outline of SOMAP1

Project Name	Sustainable Operation and Maintenance Project for Rural Water Supply (SOMAP)
Duration	September 2005 – August 2007
Target Area	Monze District in Southern Province Mumbwa District in Central Province
Target Group	• RWSS Unit, Department of Infrastructure and Support Services (DISS) • DLAs and District Water, Sanitation and Health Education Committees (D-WASHEs) in Monze and Mumbwa • Environmental Health Technicians (EHTs), Area Pump Menders (APMs), Village Water, Sanitation and Health Education Committees (V-WASHEs)
Overall Goal	1. O&M system established as a model by the project becomes a standard for other projects and districts. 2. Accessibility to safe drinking water is improved in the projects sites throughout year.

Project Purpose	Shorten the downtime and establish sustainable O&M system (supply system) in the project site which can be applied to other projects/districts with support by other donors/NGOs.
Output	1. Institutional support network for repair work is strengthened. 2. Necessary personnel with skill are appointed in order to strengthen O&M activities and further capacity development in the district. 3. Spare parts of hand pump are supplied at any time sustainably in the district. 4. Members of community and D-WASHE understand their roles and responsibility and can manage preventive as well as remedial measures. 5. O&M process is monitored at the district. 6. Layout the dissemination plan for framework of the O&M system to other districts.
Achievement of Output	Output 1: Institutional support network for repair work is strengthened. • Redefinition of roles and responsibilities of stakeholders involved in repairs of hand pumps • Implementation and monitoring of repair works of hand pumps • Implementation of pilot activities to establish management systems for maintenance tools for hand pumps, i.e. introduction of the tool kit centres and tool kit user fee Output 2: Necessary skilled personnel are appointed in order to strengthen O&M activities and to enhance capacity development in the district. • Training of APMs on their roles and responsibilities, O&M principles, and skills for installation and repair of hand pumps • Training of EHTs on operation of the spare parts shop by DLA, facilitation of community contributions for O&M, management of maintenance tools, and monitoring activities Output 3: Spare parts for hand pumps are sustainably supplied at any time in the district. • Procurement of seed stock of hand pump spare parts, construction/rehabilitation of facilities for spare parts shops, and establishment of a spare parts shop directly run by DLA in Mumbwa and the one operated by Southern Water and Sewerage Company Ltd. in Monze • Development of Financial Management Manual and Stock Management Manual Output 4: Members of community and D-WASHE understand their roles and responsibilities and can manage preventive as well as remedial measures. • Implementation of community sensitisation activities • Piloting a communal bank account for management of O&M funds raised by different communities Output 5: O&M process is monitored at the district. • Planning and implementation of a monitoring mechanism for O&M activities

	Output 6: Layout the dissemination plan for the framework of the O&M system to other districts. • Formulation and launch of the O&M Guidelines which defines the O&M principles, implementation structure, and approaches (November 2007)

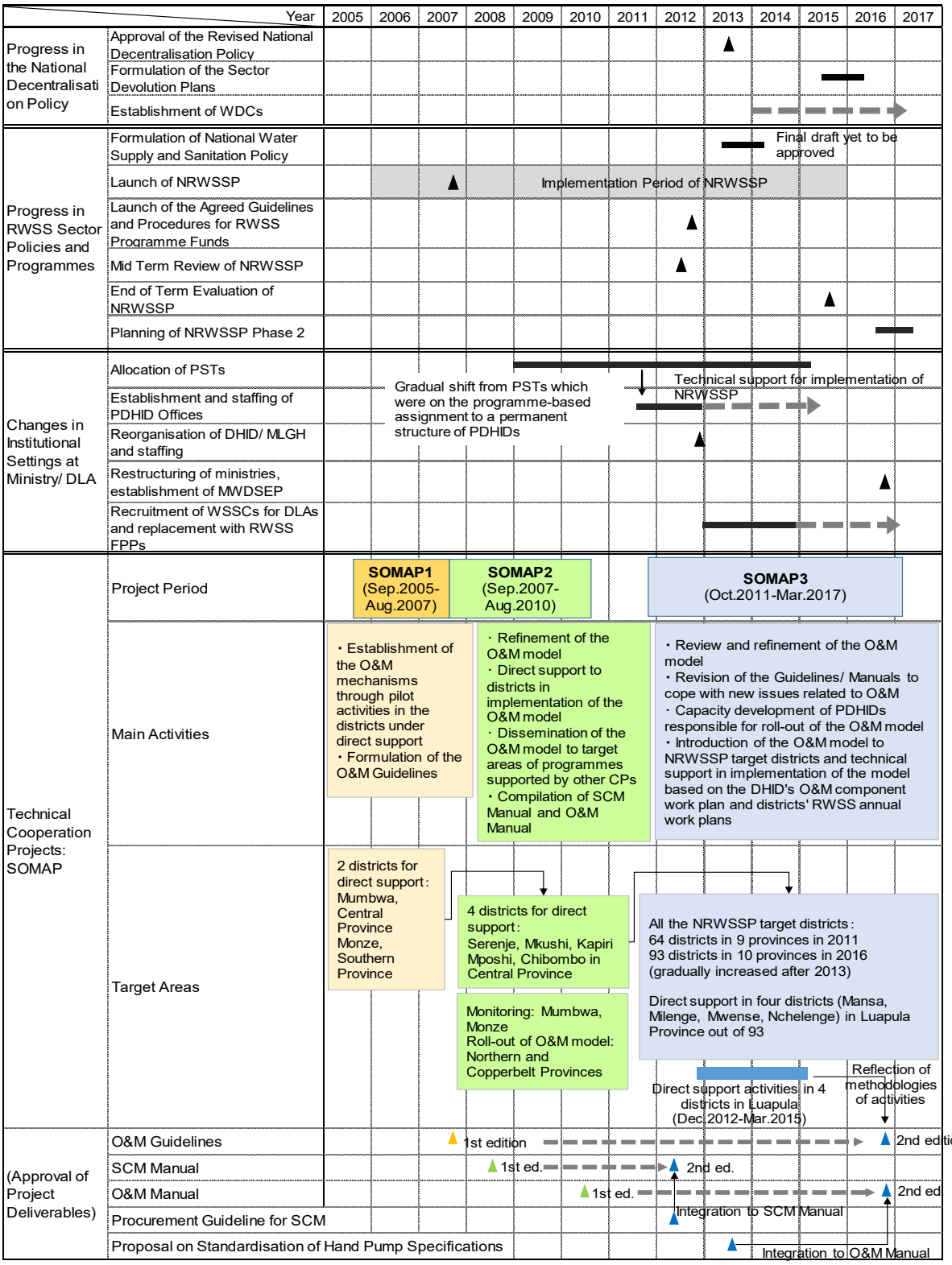
Source:
- MLGH and JICA (2007) Final Report for the Sustainable Operation and Maintenance Project for Rural Water Supply (SOMAP)
- Government of Zambia and JICA (2010) Project Final Report: Sustainable Operation and Maintenance Project for Rural Water Supply II (SOMAP2)

Table 1-4 Outline of SOMAP2

Project Name	Sustainable Operation and Maintenance Project for Rural Water Supply II (SOMAP2)
Duration	September 2007 – September 2010
Target Area	Output 1: Monze District in Southern Province and Mumbwa District in Central Province Output 2: Districts of Serenje, Mkushi, Kapiri Mposhi, and Chibombo in Central Province Output 3: Project/programme target areas supported by other CPs
Target Group	• RWSS Unit, Department of Housing and Infrastructure Development (DHID) • DLAs and D-WASHEs in six districts: Monze, Mumbwa, Serenje, Mkushi, Kapiri Mposhi, and Chibombo • Southern Water and Sewerage Company Ltd. and Lukanga Water and Sewerage Company Ltd. • Provincial Support Teams (PSTs) • Area Development Committees (ADCs), APMs, V-WASHEs.
Overall Goal	Operation rate of hand pumps will be improved.
Project Purpose	The state of operation of water points fitted with hand pumps is sustained through wider application of O&M principles and SOMAP O&M model.
Output	1. SOMAP O&M model is defined in Monze and Mumbwa Districts. 2. SOMAP O&M model is implemented in four Districts in Central Province. 3. O&M principles are commenced where other Area Based Programmes (ABPs) are working.
Achievement of Output	Output 1: SOMAP O&M model is defined in Monze and Mumbwa Districts. • Compilation of the SCM Manual (1st edition, June 2008) • Compilation of the O&M Manual (1st edition, June 2010) • Follow-up and monitoring of O&M implementation in Monze and Mumbwa, especially on incorporation of O&M action plans into annual plans of DLAs, and progress in repair works of hand pumps, tool kit management, sales of spare parts, and community contributions for O&M Output 2: SOMAP O&M model is implemented in four Districts in Central Province. • Preparation of O&M action plans and integration into the councils' annual plans • Implementation of activities based on O&M action plans - Training of D-WASHE members as trainers on O&M activities

	- Training of ADCs in their roles and responsibilities in O&M activities, monitoring, and tool kit management - Training of APMs - Sensitisation of traditional leaders and councillors - Sensitisation of community members - Training of V-WASHEs and caretakers - Procurement and delivery of maintenance tools - Collection of baseline data for IMS - Procurement of seed stock of spare parts, installation of containers to be used as spare parts shops, and the establishment of spare parts shops, the operation of which was commissioned by DLAs to Lukanga Water and Sewerage Company Ltd. Output 3: O&M principles are commenced where other Area Based Programmes (ABPs) are working. • Northern, Copperbelt, and Luapula Provinces - Provision of orientation on roll-out of the O&M model and formulation of O&M action plans through SOMAP O&M dissemination workshops - Support to PSTs in facilitation of formulation of district O&M action plans and budget in 12 districts in Northern Province, three districts in Copperbelt Province, and seven districts in Luapula Province • Other areas - Provision of technical advice to PST on preparation of O&M action plans for Senanga and Sesheke Districts in Western Province - Support in preparation of O&M action plans in Mongu and Kaoma Districts in Western Province and Choma and Gwembe Districts in Southern Province

Source:
- Government of Zambia, JICA (2010) Project Final Report: Sustainable Operation and Maintenance Project for Rural Water Supply II (SOMAP2)



WDC: Ward Development Committee
PST: Provincial Support Team
DHID: Department of Housing and Infrastructure Development
PDHID: Provincial DHID Office
MWDSEP: Ministry of Water Development, Sanitation and Environmental Protection
WSSC: Water Supply and Sanitation Coordinator
RWSS FPP: Focal Point Person
SCM: Supply Chain Management

Figure 1-4 Timeline of Technical Cooperation in Three Phases of SOMAP

1.4 SOMAP O&M Model

The SOMAP O&M model was developed and piloted in SOMAP1 and SOMAP2 and further refined in SOMAP3 with the aim of realising sustainable O&M for protected water points with hand pumps in rural areas. The O&M model has been officially adopted by GRZ as the basic concept and strategy of the O&M component in NRWSSP, which is the national development programme for the RWSS sub-sector. The O&M model defines approaches to establish sustainable O&M systems in districts, organisational structures, and methodologies and processes for the planning, implementation, and monitoring of O&M activities involved in achieving the aim.

As illustrated in Figure 1-5, the SOMAP O&M model encourages DLAs to establish and maintain three mechanisms in the districts for harmonious operation, that is, 1) Community-Based Management (CBM), 2) Repair Work Mechanism (RWM), and 3) Supply Chain Management (SCM). This is a result of a re-examination and adjustment of the relationship between and concepts behind five O&M mechanisms developed through SOMAP1 and SOMAP2: 1) CBM, 2) RWM, 3) SCM, 4) tool kit management, and 5) monitoring. The five mechanisms have been reorganised into three mechanisms that include monitoring activities related to each mechanism. Where these three mechanisms are introduced comprehensively, it is expected that the SOMAP O&M model is established firmly with a synergic effect between the O&M mechanisms. ***Table 1-5***, ***Table 1-6***, and

Table 1-7 outline the concept of each mechanism and the main activities to be conducted for its realisation. The implementation structures of the O&M mechanisms are shown in ***Figure 1-6***, ***Figure 1-7***, and ***Figure 1-8***

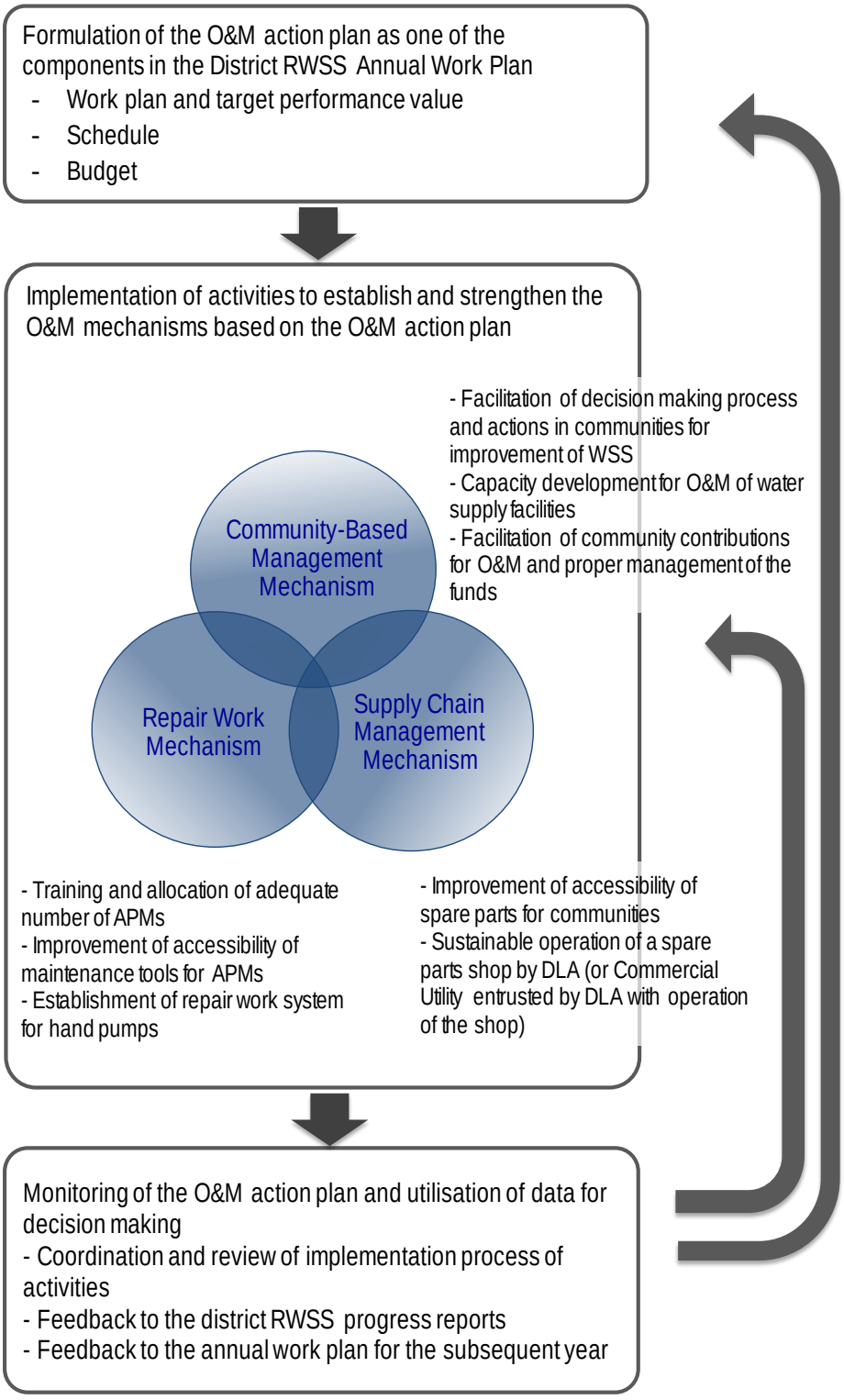


Figure 1-5 Conceptual Framework of the SOMAP O&M Model

Table 1-5 Concept and Activities of the Community-Based Management Mechanism

Concept	The CBM mechanism aims to realise O&M for protected water points with hand pumps with community-based management, which includes the active and collective participation of water users and the recovery of O&M facility costs from financial contributions made by water users. CBM entails the ownership of communities in the process of planning, mobilising, implementing and monitoring all integrated parts of the O&M system.
Main Activities	☐ Sensitise communities and stakeholders on principles of community contributions for O&M. ☐ Conduct training of Ward Development Committees (WDCs) on facilitation of CBM of RWSS and monitor their activities. ☐ Form and train V-WASHEs on CBM of RWSS. ☐ Facilitate O&M activities to be conducted by V-WASHEs including setting and collecting water user fees for raising O&M funds, and management and utilisation of the funds. ☐ Open a communal bank account to keep the O&M funds raised by communities and properly maintain the account on behalf of the communities that have agreed to use this management option. ☐ Communities/V-WASHEs to purchase spare parts and organise repair works. ☐ Monitor conditions of water points as well as the progress of O&M activities conducted by V-WASHEs.

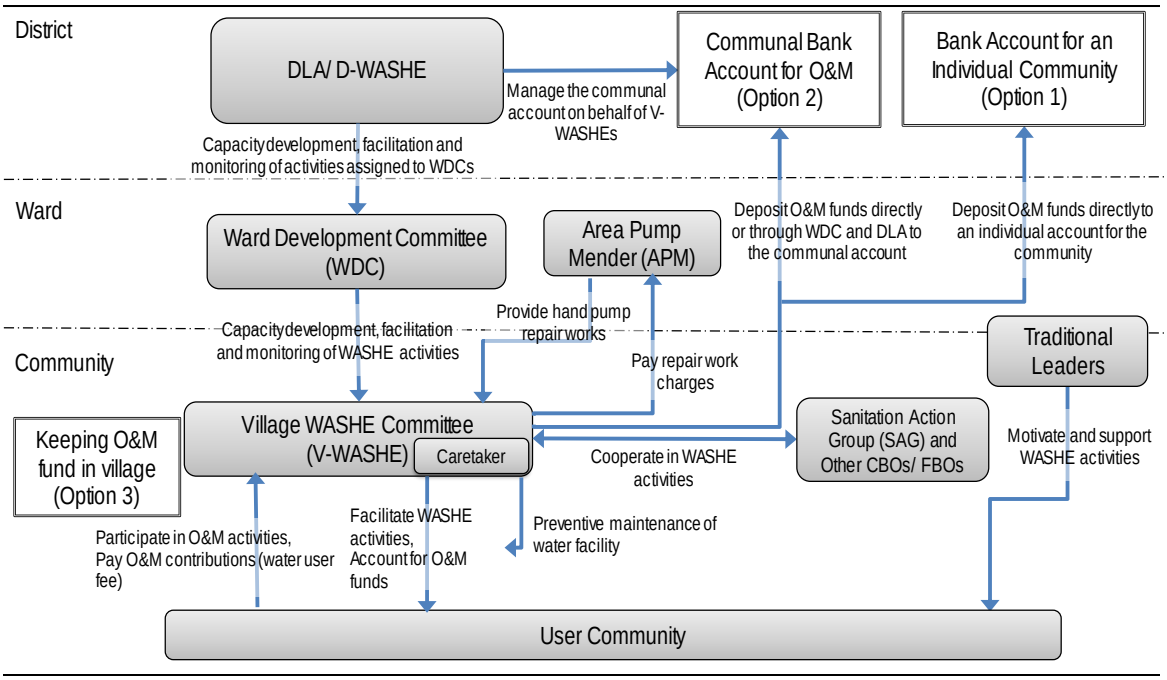


Figure 1-6 Structure of the Community-Based Management Mechanism

Table 1-6 Concept and Activities of the Repair Work Mechanism

Concept	RWM is designed to realise the smooth implementation of hand pump repairs by establishing an appropriate level of repair services and tool kit management. The aim is to reduce downtime, which is the time between breakdown of a facility and completion of repair, through the swift provision of repair services charged to the community by APMs, who are selected by communities and trained by DLAs.
Main Activities	☐ Develop criteria for selecting APMs, a plan for allocation of APMs in the district, and standard repair work charges for APMs. ☐ Conduct training of APMs on their roles and responsibilities, district operational policies on O&M of rural water supply facilities, and procedures for installation and repair of hand pumps. ☐ Conclude Memorandum of Understanding (MoU) between DLA and APMs. ☐ Manage and update information on the allocation of APMs in the district. ☐ Raise awareness of community members on availability and conditions of repair services provided by APMs. ☐ Facilitate submission of repair work records from APMs and monitor their performance. ☐ Prepare a procurement plan for maintenance tool kits, decide the tool kit management system, and distribute the tools to the tool kit centres. ☐ Conclude MoUs between DLAs and tool kit centres and conduct orientation for the officers responsible for managing the tools at the centres. ☐ Provide guidance on procedures to record the tool kit inventories and tool kit movement forms, and monitor use of the tools. ☐ Conduct training of caretakers in V-WASHEs on preventive maintenance of water points.

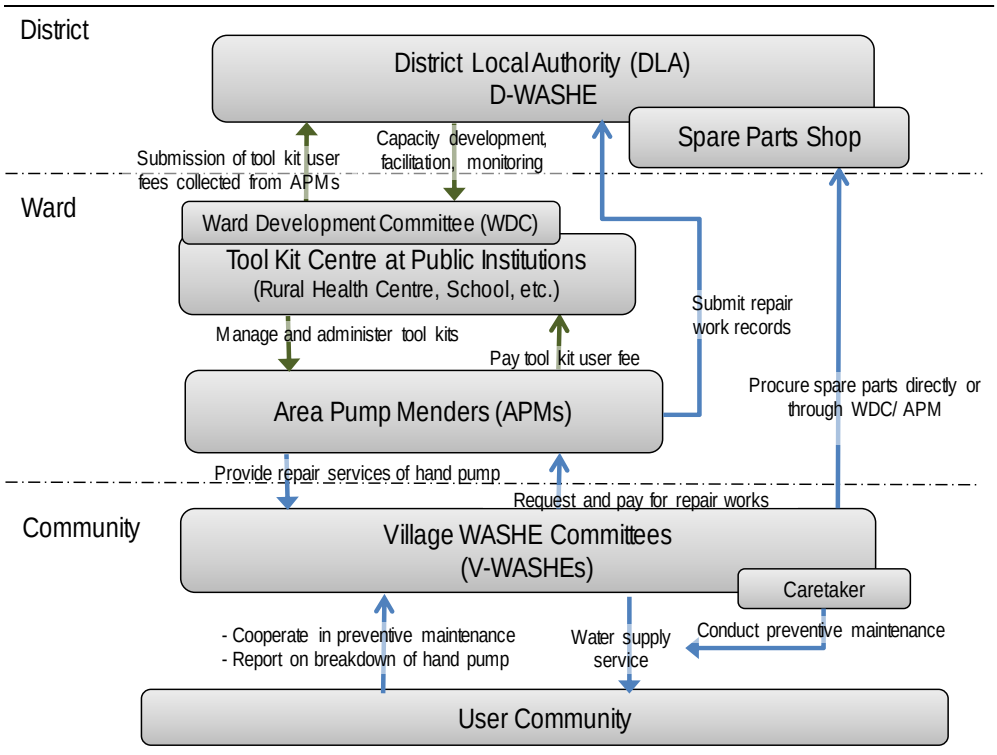


Figure 1-7 Structure of the Repair Work Mechanism

Table 1-7 Concept and Activities of the Supply Chain Management Mechanism

Concept	The SCM mechanism aims to make hand pump spare parts available in the district whenever they are required for maintenance and repair works by communities. The basic concept of SCM consists of the following: 1) Establishment of a spare parts shop at the district level which will be operated by DLA directly or in cooperation with a Commercial Utility (CU)*1 to which DLA entrusts daily operation of the shop 2) Procurement of seed stock of spare parts with financial support from GRZ or CPs and replenishment of stock with a revolving fund raised by DLA from sales of spare parts 3) Non-profitability, which means that selling prices of spare parts are kept at a level that ensures affordability for payment by communities while recovering costs for operation of the spare parts shop and replenishment of stock
Main Activities	☐ Draw up specifications of seed stock and calculate the required quantity of each item to be procured. ☐ Procure seed stock and set the selling price of the items. ☐ Construct a spare parts shop. ☐ Select and train officers to be involved in operation of the spare parts shop. ☐ Advertise availability of spare parts in the district. ☐ Conduct sales operation and stock management. ☐ Prepare sales and inventory management records, and various reports. ☐ Plan the replenishment of stock and procure necessary items. ☐ Revise the selling price of spare parts.

*1: The term "Commercial Utility (CU)" in this report refers to a regional commercial utility company which was set up to provide water supply and sewerage services in urban areas and is jointly owned by the local authorities, the jurisdiction of which is covered by the service network of the company. In SCM of hand pump spare parts in RWSS, DLA entrusts daily operation of the spare parts shop established by the district council to CU after holding discussions and obtaining the consent of stakeholders in the district.

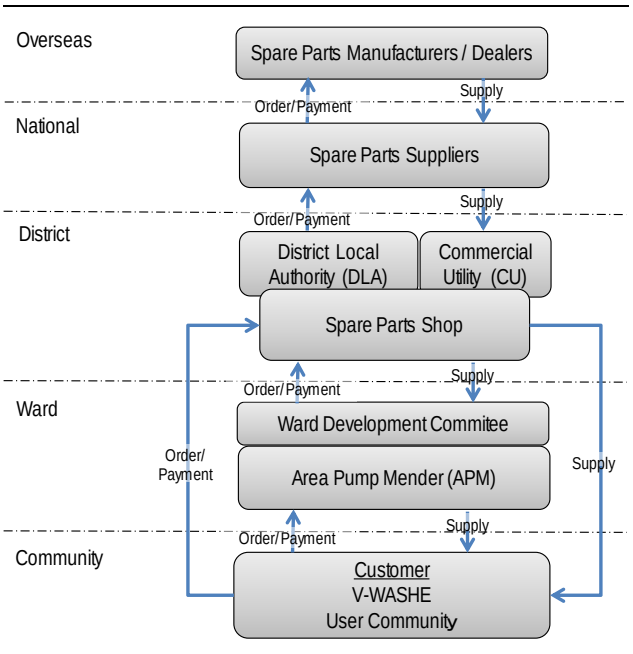


Figure 1-8 Structure of the Supply Chain Management Mechanism

1.5 Project Objectives

With the aim of improving the operational rate of rural water supply facilities, this project employs approaches of 1) capacity development of Department of Housing and Infrastructure Development (DHID)/MLGH for the implementation of the O&M component work plan, 2) nationwide roll-out of the SOMAP O&M model which has been developed and adopted as a model for O&M of rural water supply facilities in the country, and 3) provision of direct support for implementation of the O&M model to four districts where boreholes with hand pumps were constructed in the Projects for Groundwater Development in Luapula Province, the grant aid projects funded by the Government of Japan in three phases. ***Table 1-8*** summarises the overall goal, objective, outputs, and activities of SOMAP3.

Table 1-8 Project Outline of SOMAP3

Project Title: Project for Support in National Roll-out of Sustainable Operation and Maintenance Programme (SOMAP3)
Target Area: All NRWSSP target districts in the Republic of Zambia
Implementing Organisation: DHID/MLGH
Target Group: • DHID/MLGH • Provincial DHID (PDHID) offices and PSTs • DLAs and D-WASHEs • ADCs/WDCs, APMs, V-WASHEs (in the target districts for the project direct support in Luapula Province) * PSTs are formed in the Area-Based Programmes which are funded by CPs for development of RWSS in individual provinces or a cluster of districts selected from different provinces. A team consists of consultants assigned by the ABPs who are experts in different areas such as RWSS infrastructure, sanitation and hygiene, community development, and financial management. This project applies a strategy to introduce the SOMAP O&M model to all the target districts of NRWSSP through the provision of technical support and cooperation with the PDHIDs and PSTs which are responsible for the supervision of the formulation and implementation of district O&M action plans.
Duration of the Project: October 2011- March 2017
Overall Goal: The proportion of rural residents who have access to safe and accessible water supply is increased.
P**roject Purpose:** The operation rate of rural water supply facilities is improved.
Outputs: 1. The DHID's capacity to implement O&M Component is strengthened. 2. The SOMAP O&M model is implemented in NRWSSP target districts. 3. The SOMAP O&M model is implemented in Mansa, Milenge, Mwense and Nchelenge Districts in Luapula Province under the project's direct support.

Activities

【Activities for Output 1】

1-1 Consolidate lessons learnt for the improvement of the SOMAP O&M model through the monitoring of the six target districts of SOMAP 1 and SOMAP 2.
1-2 Analyse the sales record of spare parts of the areas where the SOMAP O&M model has been implemented and revise the RWSS O&M Component Supply Chain Management Manual.
1-3 Design the National O&M Work Plan.
1-4 Define indicators and procedures to measure the progress of establishing the SOMAP O&M model.
1-5 Stipulate the implementation framework of the O&M component among MLGH, provincial DHID offices/PSTs, DLA and implement the O&M component as decided.
1-6 Instruct provincial DHID offices/PSTs on implementing process of the O&M component and the SOMAP O&M model.
1-7 Conduct the water quality survey (on iron contents), analyse water quality conditions in Luapula Province, and provide suggestions for rural water facility specification standards.
1-8 Determine baseline and target values for monitoring of the O&M component.
1-9 Develop the Procurement Guidelines to ensure the access to quality spare parts.
1-10 Revise the National Guidelines for Sustainable Operation and Maintenance of Hand Pump in Rural Areas.
1-11 Revise the RWSS O&M Implementation Manual & User Guide.
1-12 Conduct a post-survey of the implementation status and impacts of O&M activities.

【Activities for Output 2】

2-1 Support the designing of the O&M Component Plan.
2-2 Support the establishing of the O&M mechanisms of the SOMAP O&M model.
2-3 Support the monitoring of the spare parts supply chain management and the analysing of the sales record of spare parts.
2-4 Support the establishment of the O&M monitoring structure.
2-5 Support the implementation of training on the repair work and O&M of hand pumps for ADC through peer-learning amongst districts and communities.
2-6 Provide other necessary technical advices to Provincial DHID offices/PSTs and DLAs.

【Activities for Output 3】

3-1 Conduct orientation workshops to district stakeholders on NRWSSP and the SOMAP O&M model.
3-2 Design the district O&M action plan (including the log-frame, the Plan of Operation, and the budget plan).
3-3 Support the seed stock procurement for the establishing of the spare parts supply chain.
3-4 Sensitise district-level stakeholders on roles and responsibilities.
3-5 Conduct orientation workshops for community-level stakeholders on NRWSSP and SOMAP O&M model (V-WASHE members including traditional leaders).
3-6 Conduct training and orientation workshops on tool kit management for O&M.
3-7 Conduct training on sales, stock management, and accounting to staff members responsible for managing the spare parts supply chain.
3-8 Conduct training to Area Pump Menders.
3-9 Support the preparation of activity reports and financial reports.
3-10 Support training on O&M and repair work of the hand pumps for ADC/WDC through peer-learning amongst districts and communities.
3-11 Provide technical advice to districts on the baseline data collection through the establishment of MIS.
3-12 Monitor the progress of O&M by examining the reports submitted under Activity 3-9.

1.6 Target Area of the Project

At the time of the commencement of this project in October 2011, there was a total of 74 districts in Zambia of which 64 districts in nine provinces were covered by NRWSSP. The project planned to provide technical cooperation to DHID/MLDH to roll-out the SOMAP O&M model to 58 out of 64 districts, which excludes the six districts supported in SOMAP1 and SOMAP2. The number of target districts of NRWSSP has, however, increased to 93 districts in 10 provinces by November 2016 due to the new establishment of a province and districts since 2012. As the project had been designed to cover all of the NRWSS target districts for the roll-out of the O&M model, the target area of the project was changed to include these new districts. The revised target area of SOMAP3 included the districts of SOMAP1 and SOMAP 2 among the 93 districts, as follow-up activities and supplementary technical support were required by the districts covered in the preceding projects. The substantial rise in the number of the project's target districts has led to the extension of the implementation period as well as an increase of inputs and activities of the projects.

Chapter 2 Project Implementation Structure and Plan of Operation

Chapter 2 Project Implementation Structure and Plan of Operation

2.1 Work Schedule

The project was commenced in October 2011 and implemented in four stages, including a one-year extension period, until March 2017. The Plan of Operation (PO) in Annex 1 indicates detailed activities corresponding to each output and the planned and actual work schedules over the entire project period.

2.2 Implementation Structure

Rural water supply projects in Zambia are implemented in a multi-tiered system stretching over national, provincial, district, ward, and village levels. ***Figure 2-1*** shows the implementation structure of this project as well as the O&M component in NRWSSP.

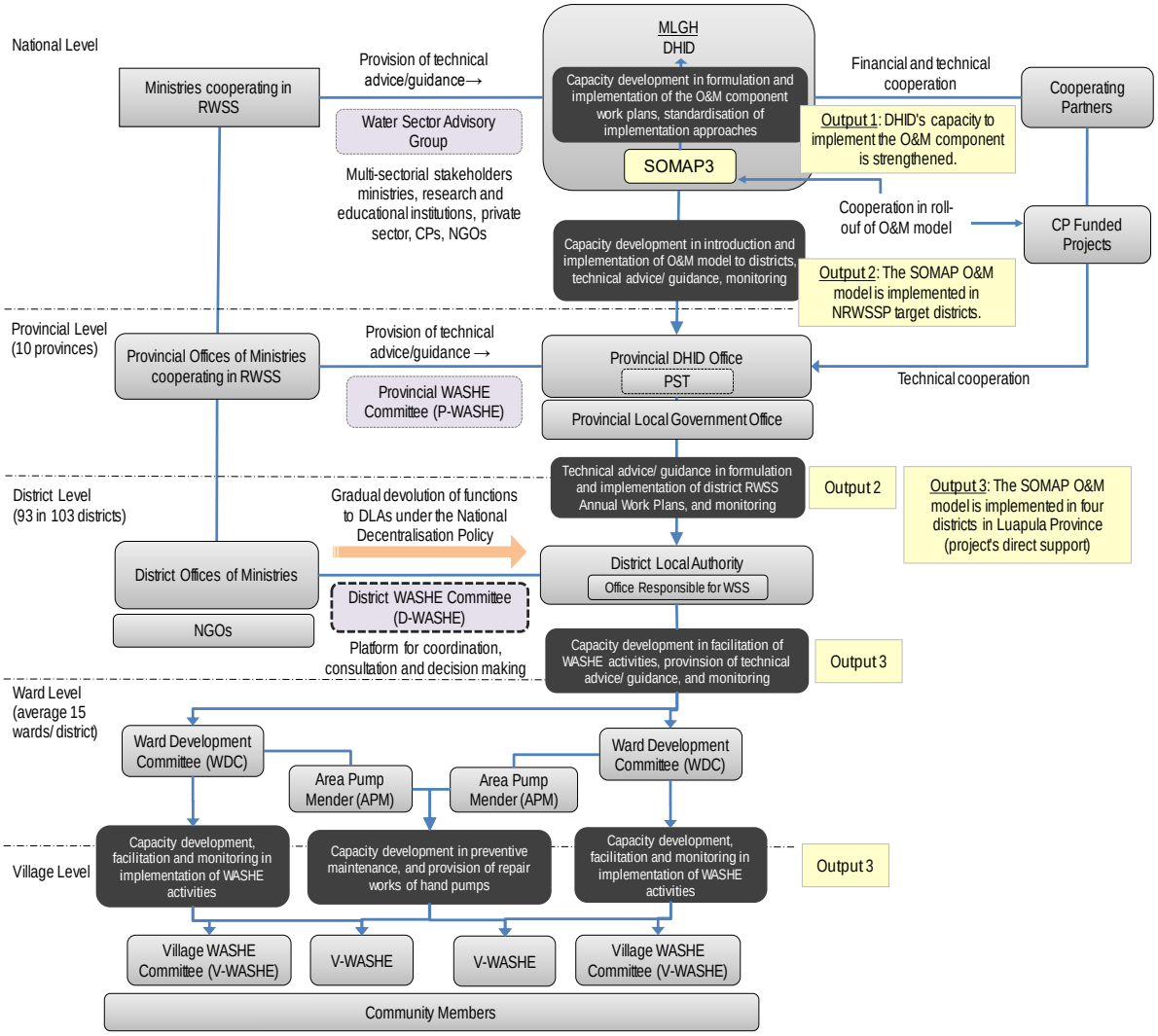
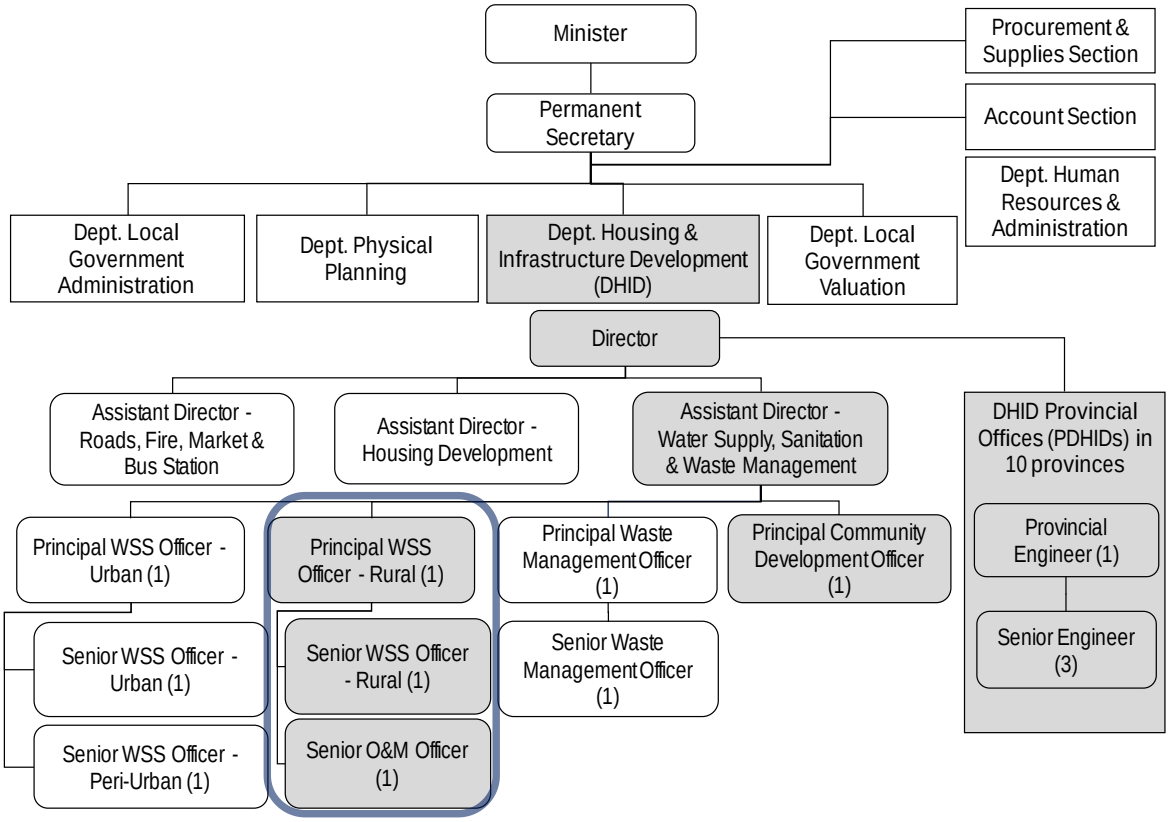


Figure 2-1 Implementation Structure of the O&M Component and SOMAP3

2.2.1 National Level (Ministry of Local Government and Housing)

The implementing agency of this project is DHID in MLGH, which is also the counterpart agency in the central government level. The organisation chart of DHID is shown in ***Figure 2-2***. Activities for Output 1 in this project, "The DHID's capacity to implement the O&M Component is strengthened," were carried out mainly for the RWSS (Rural Water Supply and Sanitation) subsector under the control of the Assistant Director in charge of Water Supply, Sanitation, and Waste Management in DHID.

In December 2012, after the commencement of this project, DHID was reorganised into the system as shown below in the organisation chart. The staffing system for programmes that relied on assistance from cooperating partners (donors, hereinafter as "CPs") was reviewed so as to assign new staff members through the recruitment of public officials. In the former system, the staff members of all sectors under the jurisdiction of DHID had been assigned under one Assistant Director of DHID, but after the reorganisation, the staff members of main sectors are assigned under the control of three assistant directors. As a result, the previous counterparts of this project have been replaced with one principle engineer and one senior engineer who are in charge of RWSS, and one senior engineer in charge of O&M. In particular, the assignment of the full-time official in charge of O&M was the factor that promoted the operation of the O&M Component and effective technical assistance in the activities in this project.



Note: The figures in brackets in the organogram show the number of posts, while the shaded sections are the offices assigned to RWSS programme management. The posts which are currently filled with programme-based employment are not included in this chart.

Figure 2-2 Organogram of DHID/MLGH

In October 2016 in Zambia, the Ministry of Water Development, Sanitation and Environmental Protection (MWDSEP) was newly established and approved by the Diet. As a result, the Ministry of Energy and Water Development (MEWD) that controlled so far water resource management, and MLGH, the implementing agency in this project that supervises the water supply and sanitation projects, as well as the Ministry of Lands, Natural Resources, and Environmental Protection were broken up and their services for water resource development, water supply and sanitation, and environmental protection were transferred to the newly established Ministry. In and after 2017, the apportionment of budgets in the water and sanitation sector will be made by the new Ministry.

On the other hand, MLGH was reorganised as the Ministry of Local Government (MLG) to control local administration and finance. It was expected that the staff members in charge of water supply and sanitation in the DHID of the former MLGH would be transferred to the Department of Water Supply and Sanitation in MWDSEP, but the transfer of services and the personnel to MWDSEP has not yet been completed as of the closing period (December 2016 to February 2017) of this project. As DHID/MLGH had been involved as the counterpart agency during the implementing period of this project, DHID/MLGH is noted as the counterpart agency in this Report.

2.2.2 Provincial Level (Provincial DHID Office)

(1) Provincial DHID Office

Provincial DHID offices (PDHIDs) are the local offices of DHID/MLGH in provinces that have been established gradually since 2011 when this project began. Three senior engineers in charge of water supply, sanitation, road and waste management are assigned under one principal engineer, but there are some provinces to which full members are not assigned. Each of the senior engineers has a field of responsibility, but they are working in a complementary way because they have to undertake a wide range of development programmes with a limited number of staff members.

Each PDHID in the RWSS subsector is responsible for providing guidance to District Local Authorities (DLAs) in accordance with the policy and implementation guidelines as enacted by MLGH, the formulation of the District RWSS Annual Work Plan (AWP) using NRWSSP funding, and promotion and supervision of implementing process of this plan. PDHID is also responsible for providing technical assistance for the AWP, the management of plans and budgets submitted by the districts and the reporting of the progress of those works to MLGH. For the O&M Component, PDHID is also one of the important counterparts in this project which is playing various roles such as Provincial level monitoring of the operation and maintenance conditions of water supply facilities in each district, providing O&M training to personnel in the district level, and guidance to each district on effective action plans to establish a sustainable O&M mechanism.

As the policy of establishing PDHIDs had not yet been announced by MLGH at the start point of this project, the PSTs (Provincial Support Team) as described below were considered to be the target of the activity to achieve the Project Output 2, “The SOMAP O&M model is implemented in NRWSSP target districts.” However, there was genuine progress in office establishment and staff assignment from 2012 to 2013, which made it necessary to improve the technical guidance capacity of each PDHID as the function to promote the introduction of the O&M model into DLAs. PDHIDs were new organisations in which most of the staff were transferred from ministries and agencies other than MLGH and from the private sector. Therefore, this project provided orientation for the O&M model to the staff members and training of trainers regarding the formulation and implementation of the district O&M action plans. After that, an approach was taken in which PDHIDs supported DLAs in an autonomous manner in the processes of promoting, monitoring and guiding the implementation of the O&M model.

(2) Provincial Support Team (PST)

Before the setup of PDHIDs, the Provincial Support Team (PST) had been assigned to each province as a tentative function to promote the NRWSSP in each province/district in cooperation with CPs since around 2009. In SOMAP 2, with cooperation from the PSTs assigned to Copperbelt, Northern and Luapula Provinces, support was provided to hold workshops to promote the O&M model and to formulate a district O&M action plan. Originally, the PST consisted of the consultants employed by CPs in their assistance programmes, but in 2011, the PST manager who supervised the entire PST became the MLGH employee, and other members supported the PST Manager as a consultancy team in their individual fields of specialty.

After the setup of PDHIDs, the post of PST Manager was abolished, and the responsibilities were transferred to the Principal Engineer of each of the Offices. PSTs were expert teams of consultants that mainly provided support to strengthen capacities with cooperation from the DHID Office with regard to a series of functions played by each province within the framework of the NRWSSP (including formulation/support of implementation of District RWSS AWP, procurement and contract procedures, construction work supervision and improvement of project implementation capacities of stakeholders at the district level). However, the activities of PSTs came to an end with the closure of the cooperative period in each of the programmes. During the period of this project, PSTs were active in Northern, Muchinga, Luapula, Lusaka, Southern, Western and Eastern Provinces as shown in ***Table 2-1.*** Therefore, in cooperation with PDHIDs, the Project Team provided orientation for the O&M model and training of trainers (ToT) to these PSTs in order to promote the activities contributing to O&M mechanism establishment in each province.

Table 2-1 Availability of PSTs in Provinces during the Project Period of SOMAP3

Province	Availability of PSTs*1		CP Funded Programmes Supporting PSTs [Duration]
	No. of Experts	Assignment	
Northern	2	Water Supply, Community Development	AfDB: NRWSSP Phase 1 [2008-2015]
Muchinga			
Luapula			
North Western	0		
Copperbelt	0		
Central	0		
Lusaka	3	Team Leader (oversees PSTs in Lusaka, Southern and Western Provinces), Community Development, Financial Management	DANIDA: Water Sector Programme Support Phase II (WSPSII) [2011-2014]
Southern	2	Community Development, Sanitation and Hygiene	
Western	2	Water Supply, Financial Management	
Eastern	5	Team Leader, Water Supply/O&M, Community Development, Sanitation and Hygiene, Financial Management	GIZ: Water Sector Reform Programme [2011-2015]

*1: The table indicates the total number of experts assigned in the long- or short-term by CP funded programmes during the implementation period of this project.

2.2.3 District Level (District Local Authority/D-WASHE)

The RWSS projects in Zambia are implemented by the District Local Authority (DLA)[7]. The Water Supply and Sanitation Coordinator (WSSC)[8] of each DLA is responsible for the planning, implementation and monitoring of the RWSS projects at the district level, and the capacity of the WSSC is very important to the promotion of the planned projects. In promoting RWSS projects as part of District development programmes, it is also indispensable that there is a complete understanding of the NRWSSP implementation policy and the O&M mechanism operation system and procedures among the staff members including the Director of Works (DoW) who supervises the WSSCs, the District Planning Officer (DPO) in charge of planning and coordination of District Development Programmes, the Council Treasurer in charge of project budget management, collection and management of project cost contributions borne by local residents, financial management of spare parts shops, and the Procurement Officer in charge of procurement management for property and services required in the projects.

In addition, under the leadership of DLAs, NRWSSP and O&M Component implementation policies and approaches must be shared with the district offices of the relevant ministries and agencies (including the Ministry of Community Development, Mother and Child Health, the Ministry of Health, the Ministry of General Education, Department of Water Affairs/Ministry of Energy and Water Development, the Ministry of Chiefs and Traditional Affairs, and the Ministry of Agriculture) and NGOs participating in D-WASHE that ensures overall coordination among the stakeholders involved in the district RWSS subsector.[9] DLAs ensure coordination among these stakeholders and obtain the advice and cooperation from professional fields for conducting activities based on the D-WASHE platform.

In this project, therefore, through activities for Output 2, the Project Team built up a system in which PDHIDs can provide orientation for the O&M model, and a support for improvement of the capacity of DLAs and D-WASHE committees for formulating, implementation and monitoring the O&M action plan. In the activities for Output 3, the Project Team provided direct support for the processes of capacity development training for DLAs and D-WASHE Committees in order to establish O&M mechanisms, and for the processes of formulation of plans and supervision and monitoring of activities in the ward and community level as described later.

2.2.4 Ward and Community Level

(1) Village Water, Sanitation and Health Education (V-WASHE) Committee

In the village level, the V-WASHE Committee, which consists of representatives of residents using the water supply facilities, carries out activities for the operation and maintenance of those facilities, and plays the main role in the CBM mechanism, which is one of the O&M mechanisms.

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[7] In this Report, the "District Local Authority" is synonymous with the "District Council."

[8] Since 2013, the WSSC has been adopted by the Local Government Service Commission that has jurisdiction over the management of public officials in local governments in Zambia. Some of the RWSS Focal Point Persons (RWSS FPPs) who had been in charge of RWSS projects in DLAs before assignment of WSSCs were engaged as WSSCs, but most of WSSCs were newly recruited s who had little experience in the services in the local administrative organisations.

[9] Under the revised National Decentralization Policy (2013), the transfer of some functions and authorities from 14 ministries and agencies of the Central Government to DLAs is making progress. Such transfer covers not only water supply and sanitation but also general education, primary health care, and the community development field having the close relation with the RWSS projects. It is expected that the District RWSS projects will be planned and implemented with more consistency by the DLA having the comprehensive jurisdiction over those services to appropriate necessary budgets and human resources to the Local Authority. During the implementing period of this Project, it was in the stage in which the relevant ministries and agencies were formulating the Sector Devolution Plan.

The main roles and responsibilities of this committee include detecting needs related to the improvement of water supply and sanitation in the community, formulating and promoting action plan implementation, arranging preventive maintenance and repairs of water supply facilities, collecting water charges and management of maintenance fund, educating local residents about the appropriate use of facilities and improvement of sanitation, and coordinating with administration. V-WASHE consists of about 10 members including the executive members such as a chairperson, vice chairperson, secretary and treasurer, and caretakers in charge of preventive maintenance of water supply facilities.

(2) Ward Development Committee (WDC)

Those who support and promote the O&M activities by V-WASHE Committees are the WDC and the APM, as described later. The setup of WDC was determined under the revised National Decentralization Policy (2013) for the purpose of promoting participation by local residents in the District Development Programmes through mediation by communities and DLAs, and activities to organise the WDC began in each district in 2014[10]. The main roles and responsibilities of the WDC are 1) the formulation of Ward Development Projects, and coordination and promotion of participation by local stakeholders in planning the Projects, 2) the mobilisation and management of resources for the implementation of Development Projects (including promoting the payment of project cost contributions borne by local residents and proxy tax collection) and 3) monitoring the Development Projects in the Ward and reporting to the District Council[11]. The WDC consists of representatives elected from among local residents and the following members who cannot make decisions via voting but plays the role of an advisory group:

- Representatives of officers from public institutions located in the ward (school, Rural Health Centre (RHC), Community Development, Agriculture)
- Representative from a local NGO in the area
- Representative of the Differently Abled
- Representative from Network of Zambia People Living with HIV & AIDS (NZP+)
- Representative from FBO
- Representative of the Village Council (Chiefdom Development Council) within the ward
- Ward Councillor

In the RWSS projects, in particular, the staff members from governmental/public agencies who participate in the WDC as an advisory group play an important facilitation role. The DLA provides these staff members with facilitation skills training for building CBM mechanisms in RWSS projects. The trained staff members are engaged in V-WASHE establishment and training, awareness-raising (sensitisation) activities for local residents, monitoring the status of V-WASHE activities, and promoting communications in the district and village (community) levels. With regard to repair mechanisms, the staff of the Hand Pump Maintenance Tool Kit Centre designated by the DLA at the RHC or a school in each ward take charge of tool kit management and the collection of rental charges. Those staff members are also the WDC members.

The budget for activities to organise the WDC should come from the revenue resources owned by each DLA, but most districts have not completed the organisation of their WDCs or have not yet provided WDC members with orientation even if the WDC does exist because the necessary budget cannot be acquired due to financial difficulties. However, the staff members from

[10] The Area Development Committee (ADC) that was the former organisation of the WDC had been set up since around 2006 in accordance with the Decentralization Policy (2003) and the Decentralization Implementation Plan (2006 – 2010) throughout the country, but its activity as a committee was stopped in the period 2012 to 2013 due to the transition to a new system (WDC). The ADC is actually abolished.

[11] Ministry of Local Government and Housing, Decentralization Secretariat (2013) Guidelines on the Establishment, Management and Operation of Ward Development Committees (WDCs)

governmental/public agencies as mentioned above provide their services to local residents regardless of whether WDCs are set up or not. In the SOMAP O&M model, therefore, the activity implementation methodology and the related training programs based on the effective use of these human resources are recommended.

(3) Area Pump Mender (APM)

APMs are trained by the DLA that selects personnel from the local community to be trained with hand-pump installation/repair techniques. For a fee, APMs repair hand pumps that the Community cannot repair. After completion the repair work, APMs have to submit repair reports that record the trouble with the facility and the details of repair works to the DLA. For the repair work fees to be paid by the community to APMs, the O&M model for each district encourages standard fees to be set. (For details, refer to **"**4-1-1 Consolidation of Lessons Learnt for Improvement of the SOMAP O&M model (Activity 1-1) in Chapter 4.)" APMs are used as trainers when the DLA provides training for caretakers who carry out preventive maintenance activities for hand pumps.

2.3 Cooperation with Other Cooperating Partners

The Government of Zambia actually depends on CP assistance programmes for about 60% of the financial resources needed to implement NRWSSP. In such a situation, it is essential for the Government of Zambia to conduct activities to introduce and implement the O&M model in districts in cooperation with NRWSSP support programmes from other CPs. The main CPs/NGOs that provided cooperation for the O&M Component during the implementing period of this project are shown in ***Table 2-2***. The details of the assistance programmes of the main CPs for the O&M Component and the details of cooperation provided by this project for their activities are described in Annex 2, and the contributions of other CPs' assistance programmes to this project in Annex 3.

In particular, AfDB, DANIDA, KfW and UNICEF have been providing financial cooperation for the implementation of the District RWSS AWP to some districts selected based on specific criteria or by province, and the introduction of the O&M model to the target districts was promoted by mutually complementary cooperative relations between their individual programmes and this project. This project provided technical assistance to PDHIDs/PSTs for the formulation of O&M action plans in the target districts, the training of DLAs/D-WASHE Committees and the promotion of the activities in accordance with the AWP, specifically, careful investigation of district O&M action plans, training of training facilitators, on-the-job guidance in training, provision of manuals/training materials, and joint monitoring of the implementation status of district O&M action plans were conducted. The details of those activities are described in Chapter 4, "4-2 Activities for Output 2". On the other hand, for this project, assistance programmes from other CPs/NGOs were important in terms of obtaining feedback regarding the approach to implementing the O&M Component because they provided opportunities for funding in order to promote the introduction and implementation of the O&M models and activities by related operators.

Table 2-2 Cooperating Partners Contributing to the O&M Component (2011-2016)

Organisation/ Programme	Duration	Number of Districts with CP Support by Provinces										
		Central	Copperbelt	Eastern	Luapula	Lusaka	Muchinga	Northern	North Western	Southern	Western	Total
	Total	10	3	9	11	7	7	9	9	12	16	93
AfDB (Phase 1)	2007-2015				3		4	8				15
AfDB (Phase 2)	2015-2020										16	16
ADRA	-2014			2				1		1		4
DANIDA (WSPSII)	2006-2013	1				3				6	7	17
GIZ	2011-2015			9								9
KfW (RWSS Basket Fund Phase 1)	2013-2014			3								3
KfW (RWSS Basket Fund Phase 2)	2015-2017	11*		9		7			9	13*		49
SNV	2009-2015	1				3	2	1	1			8
UNICEF	2006-2017		3	3	4	1		6	4	5		26
DAPP/ USAID	2009-2013						4	8				12
Village Water	on going									4		4
WaterAid	on going				3					1		4
World Vision	on going			2		1		3	1	8		15

***** The target districts of the Support for Establishment of Procedure in Management of NRWSSP Basket Fund (RWSS Basket Fund Phase 2) supported by KfW includes Kabwe in Central Province and Livingstone in Southern Province. These two urban districts have not been covered by NRWSSP as it was said that they were entirely served by the urban water supply and sewerage services by CUs. The RWSS basket fund provides support for the improvement of water supply and sanitation conditions in peri-urban areas that are not reached by CU water supply networks.

2.4 O&M Component Thematic Working Group

In the NRWSSP, Thematic Working Groups provide program management/coordination functions under the Steering Committee at which the Vice Minister of MLGH presides. The purpose of the Thematic Working Groups is to monitor the progress of the technical committee and each component as an advisory body, to deal with specific development issues and to coordinate among different stakeholders. Each Working Group carries out several activities such as the holding discussions on the Component Work Plan formulated by DHID, the coordination of assistance programmes by CPs/NGOs that support the individual components, the monitoring of the progress of the Work Plans, and the sharing of problems to be dealt with and the holding discussions on the measures to be taken by working-level staff members.

A Joint Coordination Committee (JCC) that is normally set up in JICA technical assistance projects was not set up in this project, but the Thematic Working Group for the O&M Component was used for decision making in the project. Sharing of information about work plans, progress of the project and project outputs, as well as holding discussions were carried out in this Working Group. ***Figure 2-3*** shows the NRWSSP program management system and the organisational structure of the Thematic Working Group for the O&M Component. The Steering Committee and the Technical Committee are the upper-level committees of the implementing agency, the relevant ministries and agencies and CPs, and they are not included in the implementing structure of this project.

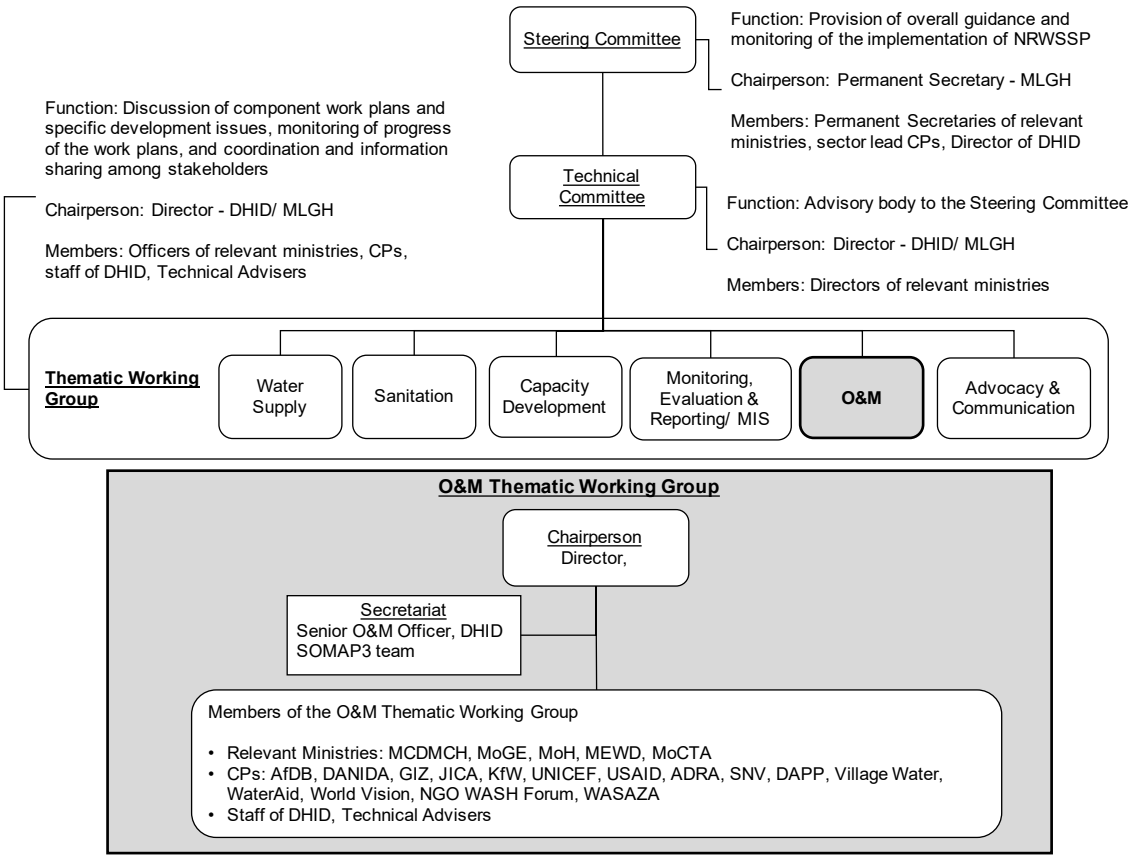


Figure 2-3 Managerial Structure of the O&M Thematic Working Group

Table 2-3 shows the main agenda items discussed in the O&M Thematic Working Group meetings held by MLGH during the project implementation period. Minutes of these meetings are attached hereto as Annex 4.

Table 2-3 Agenda of O&M Thematic Working Group Meetings Held in the Project Period of SOMAP3

Date	Main Agenda Items
17th Jan. 2012	• Terms of Reference and annual work plan of the O&M Thematic Working Group • SOMAP3 project brief • Work plan for the 1st stage of SOMAP3
17th May 2012	• Progress of the O&M component work plan, issues and actions • O&M work plan for roll-out of the O&M model • Final draft of the revised Supply Chain Management Manual • Research on appropriate hand pump specifications for boreholes with high iron content
5th Jul. 2013	• Progress of the O&M component work plan, issues and actions • Progress of SOMAP3, issues and actions • Proposal on standardisation of hand pump specifications in consideration of water quality
8th Nov. 2013	• Progress of the O&M component work plan, issues and actions • Progress of SOMAP3, issues and actions
14th Mar. 2014	• Review of the O&M component work plan • O&M component work plan for 2014

Date	Main Agenda Items
	• Results of the mid-term review of SOMAP3 • Revision of PDM version 1 of SOMAP3
1st Aug. 2014	• Progress of the O&M component work plan, issues and actions • Progress of SOMAP3, issues and actions • Revision of the O&M Manual
10th Apr. 2015	• Progress of the O&M component work plan, issues and actions • Progress in nationwide roll-out of the O&M model, issues and actions • Revision of PDM version 2 of SOMAP3
28th Jul. 2015	• Progress of the O&M component work plan, issues and actions • Results of the terminal evaluation of SOMAP3 • Extension of the project period of SOMAP3
20th Dec. 2016	• Progress of the O&M component work plan, issues and actions • Results of the joint end of term evaluation on SOMAP3

2.5 Assignment of Zambian Counterpart Personnel

For implementation of the project, the Zambian counterparts listed in ***Table 2-4*** were assigned by DHID/MLGH with consideration for the dispatch schedule and works of the Japanese Experts. A list of counterpart personnel who were involved in the project is attached hereto as Annex 5.

Table 2-4 Assignment of Zambian Counterpart Personnel

Assignment in SOMAP3	Position and Organisation	Assigned Period
Project Director	Director, DHID/MLGH	1st – 4th stages
Project Manager	Principal Engineer - RWSS	1st – 2nd stages
	Assistant Director - Water Supply & Sanitation & Waste Management, DHID/MLGH (new post created in the reorganisation of DHID)	2nd – 4th stages
Counterpart Team Leader	Principal WSS Officer – Rural, DHID/MLGH	2nd – 4th stages
Chief Counterpart	Senior RWSS Monitoring and Evaluation Officer, DHID/MLGH	1st stage
	Senior O&M Officer, DHID/MLGH (new post created in the reorganisation of DHID)	1st – 4th stages
Counterpart/Direct Support in Luapula Province	Principal Engineer, DHID – Luapula Province	1st – 3rd stages
Counterpart/Supply Chain Management	WSSC, Mumbwa District Council WSSC, Mkushi District Council	1st stage
Counterpart/Rural Water Supply Facility and Water Quality	Senior WSS Officer – Rural, DHID/MLGH	1st – 2nd stages
Counterpart/Procurement Guideline	Chief Procurement Officer, MLGH	1st stage
Counterpart/RWSS O&M Implementation Manual	Senior O&M Officer, DHID/MLGH	3rd stage
Counterpart/Public Relations	Communication and Advocacy Officer, DHID/MLGH	1st stage

2.6 Assignment of Japanese Experts

As shown in ***Table 2-5***, a total of 10 Japanese Experts were dispatched to the project. Detailed assignment schedules of the experts are attached hereto as Annex 6.

Table 2-5 Assignment of Japanese Experts

Assignment	Name	Person-Months by Project Stages				
		1st	2nd	3rd	4th	Total
Chief Adviser/RWSS O&M	Naoki MORI	8.00	5.50	9.00	13.00 (2.07)	35.50 (2.07)
O&M Capacity Development 1 (PST Support)	Mikiko AZUMA	6.50 (0.13)	5.00	8.50	16.00 (2.13)	36.00 (2.26)
O&M Capacity Development 2 (Support for Four Districts in Luapula/Technical Support)	Shoichi YOKOGI	1.00	2.00			3.00
O&M Capacity Development 2 (Support for Four Districts in Luapula/Community Development, Community Facilitation)	Fumika OKANE	6.00	8.00	5.00	4.50	23.5
Supply Chain Management 1	Kenichi MACHIDA	2.00				2.00
Supply Chain Management 2	Yukio IKEDA	2.00				2.00
Hand Pump Technology /Water Quality	Tetsuo YABE	2.00	4.00			6.00
RWSS O&M 2 (Procurement Guidelines)	Takafumi OHASHI	1.80				1.80
RWSS O&M 3 (National O&M Guidelines)	Toshifumi ANDO			4.00		4.00
Monitoring/Public Relations	Saori IWAMOTO	4.50	3.00	2.50		10.00
	Total	33.50 (0.13)	27.50	29.00	33.50 (4.20)	123.8 (4.33)

Note: The figures in brackets are additional assignment periods borne by the consultant.

2.7 Procurement of Equipment and Materials

Table 2-6 shows the equipment procured in the project. These items as well as the vehicles and equipment taken over from SOMAP1 and SOMAP2, as listed in Annex 7, were utilised in the project. All these vehicles and equipment have been handed over from the project to MLGH and are being used for activities related to the O&M component by the Ministry.

Table 2-6 Equipment Procured in the Project

	Item	Qty	Use	Place of Delivery
1	Project Vehicle (4x4 station wagon)	1	O&M component activities	MLGH in Lusaka
2	Project Vehicle (4x4 pickup truck)	1	ditto	ditto
3	Printer/Fax	2	Compilation of reports/documents	MLGH (Lusaka) x 1 PDHID (Luapula) x 1
4	Copier	2	As above	As above
5	Laptop Computer	2	Compilation of reports/documents and data management	MLGH in Lusaka

	Item	Qty	Use	Place of Delivery
6	GPS	12	Preparation of water point inventories and monitoring activities	District Councils of Mansa, Milenge, Mwense, and Nchelenge: 3 units each
7	GPS	1	Monitoring activities	MLGH in Lusaka
8	pH Meter	1	Water quality analysis and monitoring activities	As above

2.8 Outline of the Sub-Contracted Works

The Project Team conducted three surveys listed below by subcontracting the works to consulting firms based in Zambia:

- Baseline survey: 1st stage
- Endline survey: 4th stage
- Water quality analysis and monitoring through hand pump replacement: 1st – 2nd stages

2.8.1 Baseline Survey (1st Stage of the Project)

(1) Consultant: WRC Consultants Limited

(2) Outline of the Works

1) Objectives

The baseline survey was conducted to collect the following data and information that was required in order to determine the indicators of the project purpose and overall goal to measure the achievement and impact of the project:

- Operation rate of protected water points with hand pumps
- Average downtime of protected water points with hand pumps (time taken from the breakdown of the hand pump until the completion of the repair)
- Percentage of the rural population with access to safe water

2) Survey Area

Table 2-7 shows nine districts in 10 provinces where the target communities of the survey are located.

Table 2-7 Target Districts of the Baseline Survey

	Province	District
1	Southern	Kazungula
2	Lusaka	Chongwe
3	Central	Serenje
4	Eastern	Lundazi
5	Western	Sesheke
6	North Western	Mufumbwe
7	Northern	Luwingu
8	Luapula	Mansa, Nchelenge
9	Muchinga	Chinsali

3) Scope of Works

As shown in ***Table 2-8***, the baseline survey is composed of interviews with DLAs and on-site surveys at 30 water points with hand pumps in each district, which totals 300 sites in nine districts. The target group, methodologies, and survey items are explained below while the survey results are summarised hereafter in Section 4.4, Chapter 4. Details on

findings from the survey are compiled in Annex 8.

Table 2-8 Design of the Baseline Survey

1) Interview with DLAs	
Key Informant	- RWSS unit or RWSS Focal Point Person in the district council - Other D-WASHE members
Survey Method	Semi-structured interview
Survey Items	☐ Total number of water points with hand pumps (both shallow wells and boreholes) in the district ☐ Number of functioning/non-functioning water points with hand pumps ☐ List of water points with hand pumps ☐ Access rate to the protected water points and distribution by type of the facility ☐ Reasons and causes of non-functioning of the facilities ☐ Average down time of water points with hand pumps in the district ☐ Perceptions of the key informants on requirements to realise sustainable management of water points with hand pumps
2) On-Site Survey	
Target Site	30 water points with hand pumps selected in each district A total of 300 water points in 300 communities, 30 per district, where the facilities randomly selected from existing water points with hand pumps in the district are surveyed. Out of 30 water points in each district, 15 will be those constructed between 1990 and 2000 while other 15 should be the ones constructed after 2001. Abandoned water points will not be included in the target sites.
Informant	V-WASHE, village head (if V-WASHE has not been established)
Survey Method	i) Structured interview (questionnaire survey) ii) Direct observation and measurement of conditions of the water points In case that the consultant finds difficulty to determine the cause of malfunctioning of the facility only by observing the upper part of the hand pump and by obtaining information from the users, the consultant should dismantle the hand pump for detailed and accurate verification subject to consent of V-WASHE and village head of the user community.
Survey Items	i) Structured interview with V-WASHEs/village heads ☐ Demographic information and number of water points with hand pump in the community ☐ Year of construction of the water point ☐ Conditions of the facility ☐ Record of breakdown and repair of the facility ☐ Reasons and causes for non-operational facility ☐ Collection of community contributions for O&M and management of O&M funds ☐ Availability of repair service of hand pumps ☐ Establishment and training of V-WASHEs ii) Direct observation, examination of the condition and measurement of the facility ☐ GPS coordinates of the water point ☐ Specifications and type of hand pump installed ☐ Conditions of the facility

	☐ Installation depth of hand pump ☐ Information regarding malfunction of the hand pump and reasons for malfunction ☐ Pumping rate ☐ On-site water quality test (pH, Electric Conductivity (EC), taste, odour, colour) ☐ Conditions of appurtenant facilities ☐ Static water level (only for the water points of which upper component of the hand pump is dismantled) ☐ Depth of the borehole/well (only for the water points of which upper component of the hand pump is dismantled)

2.8.2 Endline Survey (4th Stage of the Project)

(1) Consultant: Kaizen Consulting International

(2) Outline of the Works

1) Objectives

The endline survey was conducted to collect the following data and information in the target districts of the baseline survey of 2011 in order to measure project effects by comparing the baseline and endline values of each indicator:

- ☐ To collect data and information that is required in order to analyse the achievement of the indicators of the project purpose listed below
  - Operation rate of protected water points with hand pumps
  - Average downtime of protected water points with hand pumps
  - Rehabilitation plan of water points with hand pumps by local authorities
- ☐ To collect data and information necessary to analyse the achievement of the project output related to community-based management of water points by V-WASHEs

2) Survey Area

Table 2-9 shows nine districts in 10 provinces where the target communities of the survey are located.

Table 2-9 Target Districts of the Baseline Survey

	Province	District
1	Southern	Kazungula
2	Lusaka	Chongwe
3	Central	Serenje
4	Eastern	Lundazi
5	Western	Sesheke
6	North Western	Mufumbwe
7	Northern	Luwingu
8	Luapula	Mansa, Nchelenge
9	Muchinga	Chinsali

3) Scope of Works

As shown in ***Table 2-10***, the endline survey is composed of interviews with DLAs and on-site surveys. The target group, methodologies, and survey items are explained below while the survey results are summarised hereafter in Section 4.4, Chapter 4. Details on findings from the survey are compiled in Annex 8.

Table 2-10 Design of the Endline Survey

1) Interview with DLAs	
Key Informant	- RWSS unit or WSSC in the district council - Other D-WASHE members
Survey Method	Semi-structured interview
Survey Items	☐ Total number of water points with hand pumps (both shallow wells and boreholes) in the district ☐ Number of functioning/non-functioning water points with hand pumps ☐ Reasons and causes of non-functioning of the facilities ☐ Average down time of water points with hand pumps in the district ☐ Rehabilitation plan of water points with hand pumps by the district ☐ Perceptions of the key informants on requirements to realise sustainable management of water points with hand pumps
2) On-Site Survey	
Target Site	30 water points with hand pumps selected in each district A total of 300 water points in 300 communities, 30 per district, where the facilities randomly selected from existing water points with hand pumps in the district are surveyed. Out of 30 water points in each district, 15 will be those constructed from 1990's to 2004, while other 15 should be the ones constructed in the past 10 years, i.e. after 2005. Abandoned water points will not be included in the target sites.
Informant	V-WASHE, village head (if V-WASHE has not been established)
Survey Method	i) Structured interview (questionnaire survey) ii) Direct observation and measurement of conditions of the water points The below ground component of hand pumps will not be dismantled to identify causes of breakdown in this survey even in case that the pumps are not functioning.
Survey Items	i) Structured interview with V-WASHEs/village heads ☐ Demographic information and number of water points with hand pump in the community ☐ Year of construction of the water point ☐ Conditions of the facility ☐ Record of breakdown and repair of the facility ☐ Reasons and causes for non-operational facility ☐ Collection of community contributions for O&M and management of O&M funds ☐ Availability of repair service of hand pumps ☐ Establishment and training of V-WASHEs ii) Direct observation, examination of the condition and measurement of the facility ☐ GPS coordinates of the water point ☐ Specifications and type of hand pump installed ☐ Conditions of the facility, defects observed on the facility ☐ Pumping rate ☐ On-site water quality test (pH, EC, Fe, taste, odour, colour) ☐ Conditions of appurtenant facilities

2.8.3 Water Quality Analysis and Monitoring (1st and 2nd Stages of the Project)

(1) Consultant: Joint Venture between WRC Consultants Limited and China Gansu Engineering Corporation (Zambia) Limited

(2) Outline of the Works

1) Objectives

- To identify reasons and/or causes that increase the iron content in the groundwater in boreholes equipped with hand pumps.
- To recognise the effect of groundwater with low pH (acidic) on steel parts such as riser pipes, connecting rods and cylinders of hand pump.
- To examine the performance of Afridev hand pumps in a corrosive groundwater environment.

2) Works Contracted to the Consultant

a) Procurement of Afridev hand pumps
b) Borehole cleaning by air-lift and replacement of existing India Mark II hand pumps by Afridev at a total of 20 boreholes
c) Water quality analysis and monitoring at the water points mentioned above before and after replacement of the hand pump

3) Survey Area

The survey was conducted in 11 districts in four provinces as shown in ***Table 2-11***. The target sites for the survey were selected with consideration for hydrogeological and geological conditions, accessibility to the sites, consent to the implementation of the survey from the communities where the water points are located, and in consultation with PDHIDs, DLAs, and communities.

Table 2-11 Target Districts and Number of Water Points for Water Quality Analysis

Province	District	No. of Target Water Points
Luapula	Chiengi	1
	Nchelenge	1
	Kawambwa	2
	Mwense	1
	Mansa	2
	Samfya	1
	Milenge	2
Central	Kapiri Mposhi	2
	Serenje	2
Copperbelt	Lufwanyama	3
North Western	Kabompo	3
	Total	20

4) Scope of Works

The works listed below were performed by the consultant on the same boreholes throughout the 1st and 2nd stages of the project. The survey results are summarised in Section 4-1-6, Chapter 4 while details on findings from the survey are compiled in Annex 9.

[1st Stage]

1. Procurement of equipment and materials
2. Preliminary site visit and 1st water quality analysis
3. Removal of India Mark II hand pumps installed on the boreholes

4. Borehole cleaning
5. 2nd water quality analysis
6. Installation of Afridev with Galvanized Iron (GI) connecting rods

[2nd Stage]

7. (After four months) 3rd water quality analysis
8. Replacement of GI connecting rods with stainless steel rods (in case iron content is detected from the boreholes)
9. (After four months) 4th water quality analysis

2.9 Products of the Project

This section explains the objectives and provides an overview of the products produced in the project.

2.9.1 Supply Chain Management Manual (2nd Edition)

The SCM Manual describes the basic concept of the SCM mechanism and procedures to set up and operate spare parts shops for the establishment of a supply chain for hand pump spare parts in districts by DLAs. The project surveyed the situation of the operation of the spare parts shops and sales of spare parts in the districts which had been conducting the activities for supply chain management based on the first edition of the Manual (June 2008) developed in SOMAP2. Findings from the survey were elaborated as refined procedures and methodologies of the activities to establish and maintain the SCM mechanism, and were reflected in the second edition of the Manual (April 2012). ***Table 2-12*** shows the contents of the SCM Manual (2nd edition). Revisions to the 1st edition of the Manual are further explained in Section 4.1.2, Chapter 4.

Table 2-12 Contents of the Supply Chain Management Manual (2nd Edition)

[Stage 1] Organisational St-up
1-1 Understand Concept of NRWSSP and SCM
1-2 Recognise Actors Involved in Supply Chain
1-3 Hold District Stakeholders Meeting
1-4 Conclude an Official Document on Operation and Management of a Spare Parts Shop
1-5 Develop Organisational Regulation for Spare parts Shop and Job Description for Shop Staff
[Stage 2] Preparation of Spare Parts Shop
2-1 Estimate the Volume and Costs of Seed Stock
2-2 Plan Store Room for Spare Parts Shop
2-3 Plan Advertising Tools
2-4 Prepare Budget Proposal
2-5 Prepare Pricing Proposal
2-6 Obtain Approval on Budget and Pricing Proposal by Local Authority
2-7 Request Budget for Establishment of Spare Parts Shop to GRZ/MLGH
2-8 Open an Independent Bank Account for Spare Parts Shop
2-9 Budget Allocation
2-10 Preparation of Store Facility for Spare Parts Shop
2-11 Order Seed Stock of Spare Parts
2-12 Prepare Receipts and Bin Cards
2-13 Prepare and Start Advertising
2-14 Receive Seed Stock
[Stage 3] Daily Shop Operation and Management
3-1 Stock Management

3-2 Daily Sales Operation
3-3 Occasional Expenditure
3-4 Monthly Reports and Meeting
3-5 Quarterly Stocktaking
3-6 Annual Audit
3-7 Annual Reports and Meeting

[Stage 4] Replenishment and Price Revision
4-1 Start Replenishment and Price Revision
4-2 Prepare Replenishment Proposal
4-3 Conduct Replenishment
4-4 Prepare Price Revision Proposal
4-5 Announce New Prices

2.9.2 Procurement Guideline for Supply Chain Management for Rural Water Supply

The Procurement Guideline of Spare Parts was developed in May 2012 to guide procedures for the procurement of hand pump spare parts in accordance with the public procurement regulations of GRZ, roles and responsibilities of officers responsible for procurement, and precautions on quality, specifications, and standards which should be considered in the procurement of spare parts. ***Table 2-13*** shows the contents of the Guideline, while activities conducted in order to compile the document are explained in Section 4.1.8, Chapter 4.

Table 2-13 Contents of the Procurement Guideline

General Guidance
1. Introduction
2. Purpose of the Guideline
3. Outline of and Usage of the Guideline

Chapter 1 Organisational Structure on Procurement Process
1-1 Actors Involved in Supply Chain for Spare Parts
1-2 Organisational Structure of spare Parts Shop
1-3 Structure and System of Approval in Local Authority

Chapter 2 Job Description for Stakeholders on Procurement Process
2-1 DHID Provincial Office
2-2 Local Authority
2-3 District WSS Officer
2-4 Spare Parts Shop

Chapter 3 Procurement Process in Supply Chain Management
3-1 Standard Specification of Hand Pump Spare Parts in Zambia
3-2 Standard Steps on Procurement Process in SCM
3-3 Ordering Procedures
3-4 Lead Time for the Stock Procurement
3-5 Receive Spare Parts with Documents
3-6 Make Payment to Supplier

Chapter 4 Challenges for Successful Supply Chain Management
4-1 Ways of Sales of Hand Pump Spare Parts
4-2 Reporting and Monitoring

4-3 Measures against Sales of Hand Pump Spare Parts in Bulk 4-4 Measures against Package Sales of Hand Pump Spare Parts from Supplier

2.9.3 National Guidelines for Sustainable Operation and Maintenance of Hand Pumps in Rural Areas (2nd Edition)

The first edition of the O&M Guidelines (November 2011) formulated in SOMAP1 were used as the operational guidelines for the O&M component in NRWSSP, which describes the O&M model comprising the basic principles and implementation structure of O&M as well as the approaches necessary to realise sustainable O&M in the RWSS sub-sector. With consideration for changes in policy and the institutional environment of the sector since the development of the document in SOMAP1, the Project Team reviewed the first edition of the O&M Guidelines and compiled a second edition (December 2016) as shown in ***Table 2-14***. Revisions to the first edition of the O&M Guidelines are described in Section 4.1.9, Chapter 4.

Table 2-14 Contents of the National O&M Guidelines (2nd Edition)

1. Introduction 1-1 Background 1-2 Concepts and Trends 1-3 Purpose of the Guidelines 1-4 Intended Users 2. Requirements for Sustainable O&M 3. Institutional Options for O&M in Rural Water Supply and Sanitation 4. Principles in O&M for Rural Water Supply Facilities 4-1 Cost Sharing by Communities 4-2 Sustainable Supply Chains 4-3 O&M Mechanisms 4-4 Choice of Appropriate Technology 4-5 Capacity Building is the Key to Sustainability 5. Sustainable Operation and Maintenance Approach (SOMAP model) 5-1 CBM Mechanism 5-2 RW Mechanism 5-3 SCM Mechanism

2.9.4 RWSS Operation and Maintenance Implementation Manual and User Guide (2nd Edition)

The first edition of the O&M Manual (June 2010) was developed in SOMAP2 to illustrate the concept of the O&M model, and structures and methodologies of the activities for the establishment of O&M mechanisms to be implemented by DLAs. The intended users of the O&M Manual are the officers in DLAs and members of D-WASHEs who are supposed to lead the implementation of district O&M action plans, and practitioners at national and provincial levels who provide technical support to districts for the implementation of NRWSSP. The Manual explains the activities to be conducted by DLAs as part of their work plans in accordance with the project cycle of planning, implementation, and monitoring.

In SOMAP3, as in the case of revising the O&M Guidelines, the Project Team reviewed the content of the first edition of the Manual and prepared a second edition (December 2016) taking

into account the practices and lessons accumulated through the implementation of the O&M model by DLAs, as well as changes in policies and the institutional environment in the sector. With the aim of presenting examples for facilitation of the O&M model by DLAs and promoting peer-learning among districts, the second edition of the Manual also includes a compilation of good practices and lessons learnt collected from different districts with regard to the implementation of activities to strengthen the O&M system. Revisions to the Manual and an outline of the good practices and lessons consolidated are described in Section 4.1.10, Chapter 4.

Table 2-15 Contents of the O&M Manual (2nd Edition)

Part 1: O&M National Framework
- 1-1 Introduction
- 1-2 O&M Principles in RWSS
- 1-3 SOMAP O&M Model in RWSS
- 1-4 O&M Organisational Structure and Stakeholders

Part 2: Operation and Maintenance Action Plan
- 2-1 Introduction
- 2-2 Support by Provincial Office and Task of D-WASHE
- 2-3 Stage 1: Preparation of Information/Data Required for Planning
- 2-4 Stage 2: Situation Analysis
- 2-5 Stage 3: Transform Result of Analysis into O&M Action Plan

[Training Module on O&M Action Planning]
- Orientation of District Stakeholders on Establishment of O&M Mechanisms and O&M Action Planning

Part 3: Operation and Maintenance Implementation

Part 3-1: Community-Based Management Mechanism
- 3-1 Overview
- 3-2 Community-Based Management
  - 3.2.1 Overview of CBM
  - 3.2.2 O&M cost of a Hand Pump
  - 3.2.3 Process in Establishing the CBM Mechanism
  - 3.2.4 Standard Activity 1 a): Community Sensitisation – Orientation of Traditional/Community Leaders
  - 3.2.5 Standard Activity 1 b): Community Sensitisation – General Community Meetings
  - 3.2.6 Standard Activity 2: Participatory Community Assessment and Site Selection
  - 3.2.7 Standard Activity 3: Support to Form/Re-organise V-WASHE
  - 3.2.8 Standard Activity 4: Training of V-WASHEs on Their Roles and Responsibilities
  - 3.2.9 Standard Activity 5: Training of Caretakers on Preventive Maintenance and Participatory Hygiene Promotion

[Training Modules on the CBM Mechanism]
- Training of WDCs on Facilitation of Community-Based Management of Rural Water Supply Facilities
- Orientation of Traditional Leaders/Community Leaders on Community-Based Management of Rural Water Supply Facilities
- Sensitisation of Community Members on Community-Based Management of Water Supply and Sanitation
- Facilitation of Participatory Community Assessment and Site Selection
- Formation/Re-organisation of V-WASHEs
- Training of V-WASHE Members on Their Roles and Responsibilities
- Training of Caretakers on Preventive Maintenance of Water Points and Hygiene

Promotion

Part 3-2: Repair Work Mechanism
- 3-1 Overview
- 3-2 Repair Work Mechanism
  - 3.2.1 Structure of the RWM Mechanism and Roles and Responsibilities of Stakeholders
  - 3.2.2 Appropriate Allocation of APMs
  - 3.2.3 Tool Kit Management
  - 3.2.4 Flow of Diagnosis of Problems on Hand Pump toward Solution

[Training Modules on the RW Mechanism]
- Training of Trainers (ToT) for the Local Authority and District Stakeholders on Installation and Maintenance of Hand Pumps
- Training of APMs on Installation and Maintenance of Hand Pumps

Part 3-3: Supply Chain Management Mechanism
- 3-1 Overview
- 3-2 Supply Chain Management Mechanism
  - 3.2.1 Concept of SCM (SCM Manual 2012)
  - 3.2.2 Implementing Structure of SCM and Roles and Responsibilities of Stakeholders

[Training Modules on the SCM Mechanism]
- Training of District Staff in SCM of Hand Pump Spare Parts

Part 4: Monitoring of Operation and Maintenance Action Plan
- 4-1 Monitoring of the District O&M Action Plan
  - 4.1.1 Village Level Monitoring
  - 4.1.2 Sub-District Level Monitoring
  - 4.1.3 District Level Monitoring

Part 5: Hand Pump Technology – Operation and Maintenance
- 5-1 Selection of Hand Pump Specification
- 5-2 Type of Hand Pumps
- 5-3 Preparation of Hand Pump Installation
- 5-4 Maintenance of Pump surrounding

Section A: India Mark II Hand Pump
- 5-5 Components and Function
- 5-6 Tools for Installation, Maintenance and Repair
- 5-7 Installation and Maintenance of India Mark II Hand Pump
- 5-8 Spare Parts Catalogue for India Mark II

Section B: Afridev Hand Pump
- 5-5 Components and Function
- 5-6 Tools for Installation, Maintenance and Repair
- 5-7 Installation and Maintenance of Afridev Hand Pump
- 5-8 Spare Parts Catalogue for Afridev

- 5-9 Iron Removal Plant

Part 6: Good Practices and Lessons Learnt
- 6-1 Introduction
- 6-2 Mumbwa District, Central Province
- 6-3 Lufwanyama District, Copperbelt Province

6-4 Nyimba District, Eastern Province
6-5 Milenge District, Luapula Province
6-6 Mwense District, Luapula Province
6-7 Kaputa District, Northern Province
6-8 Mbala District, Northern Province
6-9 Siavonga District, Southern Province

2.9.5 Proposal on Standardisation of Hand Pump Specifications in Consideration of Water Quality

In Zambia, it has occasionally been observed that the water from boreholes with hand pumps has a high concentration of iron, and so people often avoid using such water sources for drinking and other domestic uses, and the facilities are abandoned. Iron eluted in the groundwater is attributed either to the geological formation of the area which naturally contains iron or to a reaction between steel parts used on underground components of hand pumps and corrosive groundwater. After replacing GI riser pipes and connecting rods with stainless steel parts, the Project Team studied the change in water quality at boreholes with hand pumps in the areas where a high concentration of iron had been observed. The team further analysed the relationship between hand pump materials and water quality, especially pH and iron content, at the boreholes.

Based on the survey results, the Project Team came up with the Proposal on Standardisation of Hand Pump Specifications in Consideration of Water Quality (July 2013) in order for implementing agencies of RWSS projects to be able to select appropriate hand pump types depending on the pH and iron content of boreholes. Table 2-16 shows the contents of the Proposal. Section 4.1.6 in Chapter 4 details the recommendations compiled by the project and the guidelines for the selection of hand pump specifications which was adapted by MLGH based on the recommendations.

Table 2-16 Contents of the Proposal on Standardisation of Hand Pump Specifications in Consideration of Water Quality

1. Background

2. Scope of the Study
   2-1 Objectives
   2-2 Scope of Works of the Study
   2-3 Entire Schedule
   2-4 Process of the Study

3. Location of the Study Area and Target Sites
   3-1 Number of Sites per District
   3-2 Target Sites of the Study
   3-3 Location Map of the Target Area and Sites

4. Procedures of the Study

5. Water Quality Results and Analysis

6. Conclusion and Proposal
   6-1 Conclusions
   6-2 Proposal on Standardisation of Hand Pump Specifications in Consideration of Water Quality

Chapter 3 Project Design Matrix (PDM)

Chapter 3 Project Design Matrix (PDM)

PDM of the project was revised twice during the implementation period. Revision of PDM version 1 to PDM version 2 was made based on the results of a mid-term review of the project conducted between January and February 2014. The revised PDM was agreed in the O&M thematic working group (TWG) held on 14th March 2014 and the minutes of meeting on revision of the PDM was signed between JICA Zambia Office and MLGH. PDM version 2 was further revised into PDM version 3 that mainly reconsidered the means of verification of the indicators. PDM3 was agreed in the O&M TWG held on 10th April 2015 with the minutes of meeting signed between JICA Zambia office and MLGH. ***Table 3-1*** and ***Table 3-2*** show the reasons for the revisions of PDMs.

Table 3-1 Revision of PDM Version 1 to PDM Version 2

PDM 1	PDM 2	Reasons for Amendment
Description in Target Area of Project Information		
All NRWSSP target districts in Zambia (Except SOMAP 1&2 Target Districts)	All NRWSSP target districts in Zambia	Since the project provided follow-up activities in the target district of SOMAP 1&2 as part of the nationwide roll-out of the SOMAP O&M model, these districts were included in the target districts of SOMAP 3.
Description in Target Group of Project Information		
NRWSSP implemented by DHID/PSTs/District Local Authority (DLA) RWSSU	DHID, Provincial DHID Offices/PSTs and DLAs	Provincial DHIDs newly established after the launch of the project were regarded as one of the target groups.
Indicators of Project Purpose		
Indicator 1 80% of rural water supply facilities in targeted 64 districts in the country is in operation	Indicator 1 At least 80% of rural water supply facilities in NRWSSP target districts is in operation.	Since the number of target districts under NRWSSP had been increasing due to the reorganisation of district administration and the final number was not known, a percentage of target districts was set rather than a specific number.
Indicator 2 Downtime of the rural water supply facility decreases to 14 days in case of breakdown of upper component	Indicator 2 The average downtime of a rural water supply facility is reduced below 14 days for repair works that can be handled by community members and APMs.	Bottom components of hand pumps are among the repair works that can be handled by communities and/or APMs (i.e. cylinders, rising pipes, connecting rods, etc.). As for Afridev, caretakers trained in O&M of the hand pump can lift up the plungers and connecting rods and replace the spare parts. In order to enhance communities and APMs to provide repair work in a swift and accurate manner, the types of breakdown are reconsidered and classified based on the expected capacity of communities and APMs for the provision of repair works. Types of breakdown that cannot be handled by communities and/or APMs (i.e. major breakdown that requires

PDM 1	PDM 2	Reasons for Amendment
		rehabilitation by a specialized contractor) are defined as follows: • Fishing of riser pipe and cylinder dropped into well using special tools • Malfunction of water points that could be caused by decreased water levels, siltation, or a defect of the water source itself. Other breakdowns are expected to be sorted out by trained APMs within 14 days due to the improved supply chain of spare parts and the availability of tool kits.
Indicator 3 Downtime of the rural water supply facility decreases to 30 days in case of breakdown of bottom component	Indicator 3 The DLAs incorporate rehabilitation of a rural water supply facility of which repair work cannot be handled by community members and APMs into District RWSS Plan.	Major breakdown that require rehabilitation work to be provided only by specialized contractors shall be dealt with by DLAs by incorporating rehabilitation plans into District RWSS Plans.
Output 2		
SOMAP O&M model is implemented in targeted 54 districts in the country	The SOMAP O&M model is implemented in NRWSSP target districts.	Since the number of target districts of the NRWSSP and the project had been increasing due to the reorganisation of district administration and the final number was not known, the description of target districts under the project was redefined as all "NRWSSP target districts" instead of describing a specific number.
Indicators of Output 1		
1-1 Whether O&M work plan is formulated abiding the national guideline or not	1-1 The National O&M Work Plan is prepared and annually reviewed by DHID.	1-1 Since the National O&M Work Plans to be prepared by DHID/MLGH shall be obviously consistent with national guidelines of NRWSSP, the term "national guideline" was deleted. On the other hand, an annual review of the Work Plan was added, emphasising the significance of planning through proper review.
1-2 Whether O&M work plan is monitored and implemented according to the plan or not	1-2 The National O&M Work Plan is monitored and implemented according to the	1-2 The indicator is clarified and elaborated.

PDM 1	PDM 2	Reasons for Amendment
	monitoring plan prepared by DHID.	
1-3 Whether benchmarks (indicators) of the SOMAP O&M model is defined or not 1-4 Whether suggestion and opinion regarding standardisation of hand pumps depending on the water quality is received or not 1-5 Whether project baseline and target value can be determined or not 1-6 Whether or not 2nd edition of SCM manual is completed 1-7 Whether Supply chain manual to guarantee the quality of spare parts is 1-8 compiled or not Whether 2nd edition of O&M guideline and manual is compiled or not	1-3 to 1-8 Indicators 1-3 to 1-8 are deleted.	1-3 to 1-8 Since Indicators 1-3 to 1-8 were already included in the activities of Output 1, these were deleted.
Indicators of Output 2		
2-5 Whether district O&M plan is designed in accordance with the National guideline	2-1 The District O&M Action Plan is prepared and annually reviewed at each district.	2-1 It became obvious that district O&M action plans shall be prepared in accordance with the national guidelines, so that its description was deleted from the indicator of Output 2 for simplification. In addition, the significance of reviewing the Plans to prepare new ones was emphasised.
2-4 Frequency and contents of monitoring	2-2 Necessary monitoring items for the O&M Component are incorporated in the NRWSSP's M&E framework and MIS.	2-2 Monitoring systems and indicators for NRWSSP including the O&M component and SOMAP 3 were to be defined by the MIS component in which RWSS MIS of MLGH had been reconstructed.

PDM 1		PDM 2		Reasons for Amendment
				Considering the relationship with the monitoring system of NRWSSP as a whole, it is not efficient that SOMAP develops an independent monitoring system. Therefore, through participating indirectly in the process to establish WASH MIS, the project was expected to reflect items necessary for the monitoring of the O&M component into M&E framework and MIS.
2-1	Number of communities collects and saves contribution for the hand pump O&M	2-3	Community contributions are collected for O&M at least 60% of wells fitted with hand pumps.	2-3 Specific and quantitative target values were set for the collection ratio of community contributions based on the results of the baseline survey conducted under the project and experiences of other projects/programmes.
2-2	Sales record of the spare parts	2-4	At least 80% of districts have a spare parts shop managed by DLAs or Commercial Utilities.	2-4 Since most of the target districts had just started to operate spare parts shops, or were planning to establish them, sales records for use in examining the indicator were not available. Thus, the indicator was redefined by introducing specific quantitative target values given to assess the establishment of supply chain management in the country by the end of 2015.
2-3	Number of facilities repaired by APMs	2-5	Sufficient numbers of APMs are trained and appointed in target districts in accordance with the APM allocation plan.	2-5 The indicator was modified in a realistic manner, considering available means of verification at the time.
Indicators of Output 3				
3-5	Whether district O&M plan is designed in accordance with the National guideline	3-1	The District O&M Action Plan is prepared and annually reviewed at each district.	3-1 It became obvious that district O&M action plans shall be prepared in accordance with the national guidelines, so that its description was deleted from the indicator of Output 2 for simplification. In addition, the significance of reviewing the Plans to prepare new ones was emphasised.

PDM 1	PDM 2	Reasons for Amendment
3-4 Frequency and contents of monitoring	3-2 The district database (smart spreadsheet) is updated at least on a quarterly basis based on reports from V-WASHEs and APMs at each district.	3-2 The indicator was clarified and elaborated with consideration for the introduction of the monitoring system in the target districts in Luapula Province under the project.
3-1 Number of communities collects and saves contribution for the hand pump O&M	3-3 Community contributions are collected for O&M of at least 80% of wells fitted with hand pumps.	3-3 Specific and quantitative target values were set for the collection ratio of community contributions based on the targets set in the district O&M action plan in the target districts in Luapula Province.
3-2 Sales record of the spare parts	3-4 Sales records are kept at a spare parts shop in each district.	3-4 The indicator is clarified and elaborated.
3-3 Number of facilities repaired by APMs	3-5 The proportion of water supply facility repairs by APMs in a year among the total number of breakdowns in a year is increased.	3-5 The indicator was modified in a realistic manner with consideration for the introduction of the monitoring system in the target districts in Luapula Province.
Activity		
Descriptions in each activity for output 1 to 3 are not changed, except adding the terms of "Provincial DHID Office" where it is relevant.		

Table 3-2 Revision of PDM Version 2 to PDM Version 3

PDM 2	PDM 3	Reason for Amendment
Means of Verification for Indicators Set for Overall Goal		
Information Management System（IMS）	Deleted	RWSS MIS was still under development by MLGH and completion of the system was not expected during the project period of SOMAP 3. It was considered that the statistics gathered by the GRZ, as listed below, could provide the necessary information to verify the indicators for the overall goal even if RWSS MIS was not in place. Thus, MIS is deleted from the means of verification.
Sample survey conducted by the Government of Zambia	Statistics conducted by the Government of Zambia	Mean of verification was clarified and rephrased.
Means of Verification for Indicators Set for Project Purpose		
1. MIS: Means of verification to obtain	1. NRWSSP reports prepared by	As completion of MIS was not expected during the project period,

PDM 2	PDM 3	Reason for Amendment
Indicator 1, "At least 80% of rural water supply facilities in NRWSSP target districts are in operation".	Provincial DHID offices and District Local Authorities (DLAs)	the term "MIS" was deleted as a means of verification and was substituted with NRWSSP reports prepared by PDHIDs and District Local Authorities (DLAs).
2. NRWSSP's M&E framework, MIS, and project report: Means of verification to obtain Indicator 2, "The average downtime of rural water supply facility is reduced below 14 days for repair works that cannot handled by community members and APMs"	2. Questionnaire survey to DLAs	A post-sample survey was not planned under the project. Thus it was deleted as a means of verification and was substituted with "questionnaire survey to DLAs" to obtain the necessary information to examine achievement.
3. (No Description) Means of verification to obtain indicator 3, "The DLAs incorporate rehabilitation of a rural water supply facility of which repair work cannot be handled by community members and APMs into District RWSS Plan.	3. Ditto	The means of verification for Indicator 3 was clarified.
Indicators for Output 2		
2-4 At least 80% of districts have a spare parts shop managed by DLAs or Commercial Utilities (CUs)	2-4 At least 60% of districts have a spare parts shop managed by DLAs or Commercial Utilities (CUs)	Although the number of NRWSSP target districts at the commencement of the project was 64, the number of target districts increased to 93 as of September 2014 due to reorganisation of district administration. With consideration for the progress of the establishment of supply chains in the districts and the available means of verification, the target values were revised to a level which could be achieved by the end of the project.
Means of Verification for Indicators Set for Output 2		
2-2 NRWSSP's M&E framework, IMS, and project report	2-2 NRWSSP's M&E framework, MIS and project report	The system had been redefined and the wording was changed from IMS to MIS.
2-3 Post-sample survey conducted by the Project Means of verification to	2-3 Questionnaire survey to DLAs	As a post-sample survey was not planned under the project, the means of verification was substituted with a "questionnaire survey to DLAs."

PDM 2		PDM 3		Reason for Amendment
	obtain indicator 2-3, "Community contributions are collected for O&M at least 60% of wells fitted with hand pumps.			
2-4	NRWSSP annual report Means of verification to obtain indicator 2-4, "At least 60% of districts have a spare parts shop managed by DLAs or Commercial Utilities (CUs)".	2-4	NRWSSP annual report, questionnaire survey to DLAs	"Questionnaire survey to DLA" was also included as the means of verification for Indicator 2-4 in order to supplement data to be collected to assess the status of the establishment of a supply chain for hand pump spare parts.
2-5	NRWSSP annual report Means of verification to obtain indicator 2-5, "Sufficient number of APMs are trained and appointed in target districts in accordance with the APM allocation plan."	2-5	NRWSSP annual report, questionnaire survey to DLA	"Questionnaire survey to DLAs" was also included as the means of verification for Indicator 2-4 in order to supplement data to be collected to examine the allocation of APMs in the districts.

Table 3-3 Project Design Matrix (PDM) Version 3

Project Name: Project for Support in National Roll–out of Sustainable Operation and Maintenance Programme (SOMAP 3)
Duration: September 2011– February 2017
Version 3
Target Area: All NRWSSP target districts in Zambia
Date: 10th April 2015
Target Groups: DHID, Provincial DHID offices/PSTs, and DLAs

Summary of the Project	Indicators	Means of Verification	Important Assumptions
Overall Goal The proportion of rural residents who have access to safe and accessible water supply is increased.	1. At least 75% of rural residents use safe water.	• Statistics conducted by the Government of Zambia	
Project Purpose The operation rate of rural water supply facilities is improved.	1. At least 80% of rural water supply facilities in NRWSSP target districts are in operation. 2. The average downtime of a rural water supply facility is reduced below 14 days for repair works that can be handled by community members and APMs. 3. The DLAs incorporate rehabilitation of a rural water supply facility of which repair work cannot be handled by community members and APMs into District RWSS Plan.	1. NRWSSP reports prepared by Provincial DHID offices, District Local Authorities (DLAs) 2. Questionnaire survey to DLAs 3. Ditto	Community sensitisation on the use of safe water is sufficiently conducted in NRWSSP.
Outputs 1. The DHID's capacity to implement the O&M Component is strengthened 2. The SOMAP O&M model is implemented in NRWSSP target districts.	1-1 The National O&M Work Plan is prepared and annually reviewed by DHID. 1-2 The National O&M Work Plan is monitored and implemented according to the monitoring plan prepared by DHID. 2-1 The District O&M Action Plan is prepared and annually reviewed at each district. 2-2 Necessary monitoring items for the O&M Component are incorporated in the NRWSSP's M&E framework and MIS. 2-3 Community contributions are collected for O&M of at least 60% of wells fitted with hand pumps. 2-4 At least 60% of districts have a spare parts shop managed by DLAs or Commercial Utilities.	1-1 National O&M Work Plan 1-2 NRWSSP Annual Report 2-1 District O&M Action Plans 2-2 NRWSSP's M&E framework, MIS, and project report 2-3 Questionnaire survey to DLAs 2-4 NRWSSP Annual report, questionnaire survey to DLAs	Construction of new rural water supply facilities are completed based on the Component 1 of NRWSSP.

	2-5 Sufficient numbers of APMs are trained and appointed in target districts in accordance with the APM allocation plan.	2-5 NRWSSP Annual report, questionnaire survey to DLAs (Comparison between the necessary number of APMs estimated based of the number of boreholes and number of APMs trained)	
3. The SOMAP O&M model is implemented in Mansa, Milenge, Mwense and Nchelenge Districts in Luapula Province under the Project's direct support	3-1 The District O&M Action Plan is prepared and annually reviewed at each district. 3-2 The district database (smart spreadsheet) is updated at least on a quarterly basis based on reports from V-WASHEs and APMs at each district. 3-3 Community contributions are collected for O&M of at least 80% of wells fitted with hand pumps. 3-4 Sales records are kept at a spare parts shop in each district. 3-5 The proportion of water supply facility repaired by APMs in a year among the total number of breakdowns in a year is increased.	3-1 District O&M Action Plans 3-2 District database 3-3 Quarterly reports prepared by district RWSS officers 3-4 Quarterly reports prepared by district RWSS officers 3-5 Quarterly reports prepared by district RWSS officers	

Activities	Inputs	Pre-Assumption
【Activities for Output 1】 1-1 Consolidate lessons learnt for the improvement of the SOMAP O&M model through the monitoring of the six target districts of SOMAP 1 and SOMAP 2. 1-2 Analyse the sales record of spare parts of the areas where the SOMAP O&M model has been implemented and revise the RWSS O&M Component Supply Chain Management Manual. 1-3 Design the National O&M Work Plan. 1-4 Define indicators and procedures to measure the progress of establishing the SOMAP O&M model. 1-5 Stipulate the implementation framework of the O&M component among MLGH, provincial DHID offices/PSTs, DLA and implement the O&M component as decided. 1-6 Instruct provincial DHID offices/PSTs on implementing process of the O&M component and the SOMAP O&M model. 1-7 Conduct the water quality survey (on iron contents), analyse water quality conditions in Luapula Province, and provide suggestions for rural water facility specification standards. 1-8 Determine baseline and target values for monitoring of the O&M component.	**【Japanese side】** • Experts: - Long-term experts: Chief adviser, PST support, work coordinator, O&M model establishment - Short-term experts: Spare parts supply chain/quality control, Hand pump technique/water quality, compilation of O&M manual - Local experts, long-term staff • Equipment: - Seed stock for the four districts in Luapula province • Training	Cooperating partners continue their RWSS projects.

1-1 Develop the Procurement Guidelines to ensure the access to quality spare parts. 1-2 Revise the National Guidelines for Sustainable Operation and Maintenance of Hand Pump in Rural Areas. 1-3 Revise the RWSS O&M Implementation Manual & User Guide. 1-4 Conduct a post-survey of the implementation status and impacts of O&M activities. 【Activities for Output 2】 2-1 Support the designing of the O&M Component Plan. 2-2 Support the establishing of the O&M mechanisms of the SOMAP O&M model. 2-3 Support the monitoring of the spare parts supply chain management and the analysing of the sales record of spare parts. 2-4 Support the establishment of the O&M monitoring structure. 2-5 Support the implementation of training on the repair work and O&M of hand pumps for ADC through peer-learning amongst districts and communities. 2-6 Provide other necessary technical advices to Provincial DHID offices/PSTs and DLAs. 【Activities for Output 3】 3-1 Conduct orientation workshops to district stakeholders on NRWSSP and the SOMAP O&M model. 3-2 Design the district O&M action plan (including the log-frame, the Plan of Operation, and the budget plan). 3-3 Support the seed stock procurement for the establishing of the spare parts supply chain. 3-4 Sensitise district-level stakeholders on roles and responsibilities. 3-5 Conduct orientation workshops for community-level stakeholders on NRWSSP and SOMAP O&M model (V-WASHE members including traditional leaders). 3-6 Conduct training and orientation workshops on tool kit management for O&M. 3-7 Conduct training on sales, stock management, and accounting to staff members responsible for managing the spare parts supply chain. 3-8 Conduct training to Area Pump Menders. 3-9 Support the preparation of activity reports and financial reports. 3-10 Support training on O&M and repair work of the hand pumps for ADC/WDC through peer-learning amongst districts and communities. 3-11 Provide technical advice to districts on the baseline data collection through the establishment of MIS. 3-12 Monitor the progress of O&M by examining the reports submitted under Activity 3-9.	• Local costs: - Costs for the four districts in Luapula province (including training on designing the O&M action plan, activity costs for training and monitoring conducted based on the plan) - Experts field operation expenses **【Zambian side】** • Allocation of counterpart: - Project Director (Head of DHID) - Project Manager (top engineer of RWSS Unit) - Project Officer (O&M Officer) • Facilities: - Project offices - Storage for equipment - Any other facilities mutually agreed upon • Recurrent costs: - Local costs: especially costs for activities such as procurement of seed stocks, training and monitoring to target districts under Output 2	

Chapter 4 Results of Activities

Chapter 4 Results of Activities

This chapter explains the achievement of the outputs as well as activities implemented to achieve each output.

4.1 Activities for Output 1

Output 1: The DHID's capacity to implement O&M Component is strengthened.

Activities for Output 1 are aimed at capacity development of DHID/MLGH as the counterpart organisation of the project for the implementation of the O&M component in NRWSSP. The results and achievement of the activities for Output 1 are as described below. The activity numbers indicated in this chapter correspond to those written in PDM of the project.

4.1.1 Consolidation of Lessons Learnt for Improvement of the SOMAP O&M Model (Activity 1-1)

In the first year of this project, the Project Team conducted an interview survey with the stakeholders involved in SOMAPs 1 and 2[12], and carried out a field study, collected and analysed information and data, and consolidated the lessons learned from the implementation of SOMAPs 1 and 2 in order to further improve the SOMAP O&M model that had been used on a trial basis and refined in SOMAPs 1 and 2. The team also used a questionnaire when conducting interview surveys with APMs and V-WASHE members in the districts where SOMAPs 1 and 2 had been implemented in order to identify the points to be improved in the operation of the spare parts supply chain for the convenience of customers in local communities. These studies revealed major problems in the components mentioned in the following sections of the SOMAP O&M model. The team shared these problems with stakeholders on NRWSSP and prepared measures to alleviate them. The team implemented the measures on a trial basis, evaluated their effectiveness and presented practical countermeasures in the SCM Manual (second edition) and the O&M Manual (second edition). (See 4-1-2 and 4-1-10 for the revisions of the respective manuals.)

(1) Operation of the Supply Chain of Spare Parts of Hand Pumps

The spare parts supply chain was introduced and developed in the two districts where the pilot project was implemented in SOMAP 1 (Mumbwa District in Central Province and Monze District in Southern Province). Assistance was mainly provided for (1) decision-making regarding the quantity, specifications and procurement of the seed stock, (2) the establishment of spare parts shops (rehabilitation of existing facilities and manufacturing and installation of shipping container houses to be used as shops) and (3) the provision of guidance regarding shop operation to DLA and a CU that were expected to operate the shops. In SOMAP 1, two different systems of spare parts shop operation were tested, namely, direct operation by a DLA, and operation by a CU commissioned by a DLA to manage daily sales of spare parts (in Mumbwa District in Central Province and Monze District in Southern Province, respectively).

Based on experiences from the pilot project in SOMAP 1 and the results of analysing the outcomes from the pilot project, a SCM Manual (first edition) was prepared that systematically provided the people involved in spare parts shop establishment and operation with the procedures for the

[12] Officials of MLGH involved in the RWSS subsector, DLA officials involved in the projects, AMPs and members of V-WASHE in the six target districts for SOMAPs 1 and 2 (Monze, Mumbwa, Chibombo, Kapiri Mposhi, Mkushi and Serenje Districts) and Gwembe District in Southern Province in which indirect support was provided for the establishment of spare part shops in SOMAP 2

establishment and operation of the spare parts shops at the district level. It was used by the working-level staff involved in the operation of spare parts shops in DLAs and CUs as one of the manuals for the implementation of the O&M component of NRWSSP in SOMAP 2. The SCM Manual consists of the following content.

1) Organisational set-up for establishment of SCM
2) Confirmation of specifications and calculation of volume of seed stock to be procured
2) Calculation of procurement cost and selling price of spare parts
3) Procurement, sales and stock management, and financial management
4) Replenishment of stock and revision of selling prices

In the SCM, the sustainability of the operation of the spare parts shops at the district level is supposed to be maintained through continual stock replenishment using revenue from the sales of spare parts as revolving funds. The SCM Manual (1st Ed.) provided guidelines for the calculation of the quantities of parts required to replenish the stock (appropriate quantities of parts in stock) from the actual sales data and the timing of the replenishment. The first edition presented two options for the operation of the spare parts shops, namely, direct operation by a DLA and commissioning the operation to a CU, and it provided a detailed explanation of supply chain management in the latter case.

The studies conducted in the first year revealed that stock replenishment and sales price revisions, which were supposed to be conducted once every year, had not been conducted in many districts in which SOMAPs 1 and 2 were implemented. The existence of surplus seed stock was suggested as a reason for this problem. In cases where CUs operate the spare parts shops, stocks cannot be replenished and the prices cannot be revised without the approval of DLAs. The complexity of the process involved in acquiring this approval and the general insufficiency in coordination and cooperation between DLAs and CUs were also suggested as the causes of these problems in such cases. The Project Team considered the focal points for the revision of the manual in this project as being the adjustment of the quantity of seed stock, improvement of the management of the processes required for stock replenishment and price revision and strengthening the coordination and cooperation between CUs and DLAs. The above-mentioned points have been improved by the team in the manual as mentioned in "4-1-2. Revision of the Supply Chain Management Manual (Activity 1-2)," and the team has recommended and encouraged stakeholders on NRWSSP to utilise the revised manual.

(2) Purchase of Individual Spare Parts

The studies conducted by the Project Team revealed that many suppliers of hand pumps (sales agents and well construction/hand pump installation companies) sold them only as complete sets and it was difficult to purchase individual parts of the pump in small quantities as required for replenishing the stock in the spare parts shops in districts. A few local suppliers that supply individual parts do so by procuring completed hand pumps from abroad and disassembling them into individual parts to supply to customers when they have received a sufficient number of orders for spare parts. This situation is a factor impeding timely replenishment of the stock mentioned above.

The Project Team conducted a market study in the first year of this project to prepare a list of hand pump sales agents and well construction/hand pump installation companies that procure and supply spare parts in relatively large quantities and that could supply individual parts required by customers for stock management and other purposes (***Table 4-1***), and the list was included in the SCM Manual (2nd Ed.). This list has facilitated the replenishment of the stock in the spare parts shops as it has enabled DLAs to contact the suppliers of individual parts.

Table 4-1 Suppliers of Spare Parts for Hand Pumps

Name of Company	Address
African Brothers Corporation Ltd.	Plot 3971, Kafue Road, P.O Box 36865, Lusaka
AFE Limited	PO Box 31505, Freedomway, Lusaka
Ajay Industrial Corporation (Z) Ltd.	Plot #3040, Makishi Road, Lusaka
Baba Drilling & Exploration Company Ltd.	Plot #86A, Great East Road, North Mead, P.O. Box 34128, Lusaka
Marygold Investment Ltd.	Plot 397A-37C, Road to York Farm, off Kafue Road, Makeni, Lusaka, P.O. Box 37580, Lusaka
SARO Agro Industrial Ltd.	5284 Buyantanshi Road (Off Lumumba Road), P.O.Box 35168, Lusaka
Zambezi Drilling and Exploration	Plot #363/44, Kafue Road, Opposite to Southern Cross Motors, P.O. Box 50691, Lusaka

The Project Team organised a consultation meeting between suppliers of hand pumps and DHID in the fourth year. The staff of the relevant government offices, CP organisations and NGOs were also invited to the meeting. DHID presented the list of spare parts shops established in the country and provided the suppliers with an explanation of the estimated potential demand for spare parts based on the number of existing hand pumps in the country. In response, they showed great interest in the sale of individual parts, which suggested their positive attitude towards supplying individual parts, especially those that have high sales ratios. DHID intends to hold similar meetings with the suppliers after the completion of this project to provide them with information regarding the national policy in connection to the technical standards for water supply facilities equipped with hand pumps, the sale of spare parts of pumps in districts and parts that require frequent replenishment.

(3) Sustainability of the Activities of APMs

Many APMs were trained in the districts where direct support was provided for the introduction of the O&M model in SOMAPs 1 and 2. However, only a limited number of APMs continues to provide hand pump repair services in local communities. While some of them stopped providing the service after relocating, others ended their activities after losing interest in providing the service due to a lack of basic knowledge of the technology required to provide the repair service, or due to low or non-payment by local communities for the services provided. In order to solve this problem in this project, the Project Team recommended the measures shown in ***Table 4-2*** to establish standards for the selection of APMs in local communities, to establish standards for the number of APMs to be assigned by DLAs within a district, and to develop an environment to support continuous service provision by APMs.

The Project Team recommended the adoption of these alleviation measures and encouraged stakeholders on NRWSSP to take the measures at the orientation workshop for the formulation of an O&M action plan that was held for the provincial and district staff, and at provincial facilitator training courses regarding the formulation of an O&M action plan and management of its implementation (See “4-2-1. Support for Preparation of the O&M Component Plans at Provincial and District Level (Activity 2-1)” for reference). The team also adopted the APM assignment conditions mentioned above as part of the approach to the implementation of hand pump repair mechanisms in the preparation of the O&M Manual (2nd Ed.).

Table 4-2 Requirements on Allocation of APMs

Area of Consideration	Requirements
Selection Criteria of APM	APMs should preferably have the following characteristics: 1) Permanent resident in the ward 2) Familiar with the communities where s/he works 3) Able to read, write and keep records by him/herself 4) Self-motivated and energetic 5) Possessing a good reputation (be respected) 6) Possessing good communication skills with other stakeholders 7) Possessing knowledge and skills in basic mechanics such as bicycle repair, where possible
Standard for the Number of APMs to be Allocated in a District	1) At least one APM is to be located in each ward where protected water points with hand pumps are constructed. Service areas of APMs are usually demarcated by DLAs based on wards from a viewpoint of maintaining a connection to WDCs in their activities. Therefore, DLAs need to have at least one APM in each ward and to further adjust (increase) the required number of APMs in the ward according to distribution of hand pumps in each ward. 2) The ratio of the number of water points for which each APM is responsible should be one APM per 10-15 water points. This is from the viewpoint of securing an attractive scale of income from repair works for each APM. However, this proportion would vary with the geographical distribution and density of water points in the respective wards and the conditions of road access to water points. Where the water points are sparsely distributed, it would be difficult for one APM to cover even 10 hand pumps due to the long distance between villages where water points are located. Therefore, DLAs are expected to determine the required number of APMs in each ward with consideration for the distribution of water points with hand pumps rather than just using the ratio of 10-15 water points per APM.
Enabling an Environment to Support Continuous Service Provision by APMs	1) Introduction of standard charges for hand pump repair works DLAs set the standard charges for hand pump repair works which are to be paid by communities to APMs for repair works conducted on the hand pumps. The amount of the charge is to be determined by DLAs with consideration for the types of hand pumps, repair works, and clients (village community or public institution) and in consultation with WDCs and APMs. The standard charges should be explained by DLAs to both APMs and communities. 2) Improved access to maintenance tools for hand pumps In order for APMs to be able to access the tools required for repair works at any time, DLAs are to ensure that maintenance tools are kept at public institutions in the respective wards, such as RHCs and schools which are designated by DLAs as the tool kit centres. The number of tool kits to be allocated in each centre should meet the standard of one set per APM.

	3) Lending/provision of bicycles as a means of transport for APMs DLAs could procure bicycles and lend them to APMs as a means of transport to visit communities for repair works on the condition that APMs who perform their roles adequately for a certain period will be allowed to buy the bicycles from DLAs at a discount price. 4) Conclusion of MoU between DLAs and APMs MoU is to be signed between DLAs and APMs in order to clarify their roles and responsibilities for O&M.

These activities have resulted in a wide recognition of the above-mentioned APM selection and assignment standards by the staff of DHID/MLGH, PDHIDs, DLAs and CP programmes involved in NRWSSP and the use of these standards in the preparation of an action plan for the training of APMs. The measures to develop an environment to support continuous service provision by APMs have already been implemented as part of the O&M action plan in the districts where local authorities have raised the budget to implement the plan. By the completion of the project, the improvement measures had been implemented in the four districts in Luapula Province where direct support for the project was provided and the districts assigned with WSSCs trained as provincial facilitators for the preparation and management of the implementation of an O&M action plan. Improvements in the following points were reported by the districts that implemented the measures for the development of such an environment.

- Setting standard prices for repair services reduced disputes between communities and APMs regarding payment for services (including disagreements regarding the amount of payment, over-charging by APMs and underestimation of the price for the service by communities) and facilitated payments for repairs by communities to APMs.
- The clarification of APM work conditions by the signing of a MoU (Memorandum of Understanding) and improved access to repair tools and means of transport for work purposes led to greater work motivation among APMs and a reduction in the time required for repair.

(4) Necessity of the Systematic Development of CBM Mechanism

The O&M Manual (1st Ed.) provided little information on the method of capacity development, the details of activities, and the content of supplementary materials and visual materials used in training in local communities in order to develop a participatory operation and maintenance mechanism for water supply and sanitation facilities at the village level. DLAs had done little to develop such a mechanism. For these reasons, the Project Team decided to improve the content of the manual on this point. A series of activity modules to be promoted at the village level by DLAs through WDCs were standardised in this project for the development of a mechanism that would enable community residents to actively participate in and make decisions on the improvement of water supply and sanitation services including the maintenance of water supply facilities.

In practice, the activities for the promotion of community participation were structured by the Project Team according to the RWSS project cycle in the district level, and standard activities in each stage were divided into five categories as shown in ***Table 4-3***. Then, the Project Team prepared a Training Module Guide for the practical details of each standard activity and the details of methods to facilitate these activities, which was presented along with the structure of the standard activities in the O&M manual (2nd Ed.). Activities for the promotion of community participation in RWSS Projects have been standardised in order to be expanded nationwide through trials in districts in Luapula Province directly supported in this project and in the project areas of other CPs.

The standardised activity structure for the development of CBM in the O&M manual has not only become a reference material for DLAs when preparing district O&M action plans but it has also made it possible to use the manual as a standard in the evaluation of action plans made by PDHIDs and DHID/MLGH. Due to the inclusion of the training module guide that gives a detailed description of the facilitation process in each activity, the manual has standardised the activity implementation methods and contributed to the maintenance of a high level in the quality of activities and their outputs.

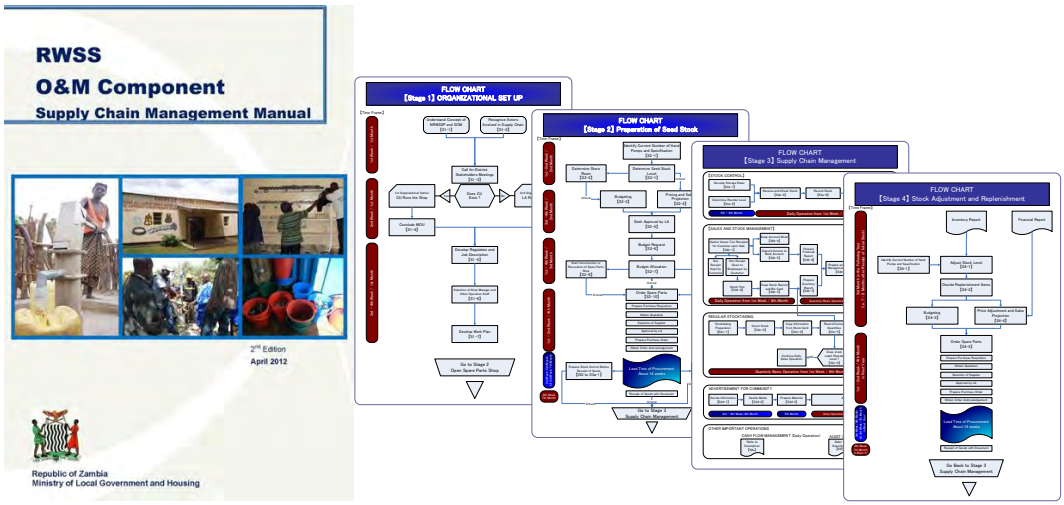
Table 4-3 Standard Activities to Establish the CBM Mechanism

Standard Activity		Target	Expected Output
1 Community sensitisation on CBM of water supply and sanitation	a) Orientation of Traditional /Community Leaders	Traditional/ Community Leaders	Traditional/community leaders understand district's policies to promote O&M principles as well as CBM in RWSS projects.
	b) General community meetings	Community members	Community members understand their roles and responsibilities under district O&M policies.
2 Participatory community assessment and site selection*1		Community members	Community members identify actions to be taken for improvement of water and sanitation in the community and agree on socially preferable location for water points as pre-siting.
3 Support to form/re-organise V-WASHEs		Community members	- V-WASHE committee is formed/re-organised. - V-WASHE constitution is agreed in the community. - Community members recognise purposes for community contributions for construction/rehabilitation of water points and for O&M (water user fee).
4 Training of V-WASHEs on their roles and responsibilities		V-WASHE	- V-WASHE recognise its management tasks, organisation, and relationship with other stakeholders. - V-WASHE can facilitate to set water user fee in the community and decide the collection method appropriately. - V-WASHE can keep account book in proper manners. - V-WASHE recognises the importance of participation in the monitoring of construction/rehabilitation.
5 Training of Caretakers on preventive maintenance of water points and participatory hygiene promotion		Caretakers	Trained caretakers can conduct preventive maintenance of water points and hygiene promotion for water users.

Source: MWDSEP (2016) RWSS O&M Implementation Manual and User Guide 2nd Edition
Note:
*1. This process is included in the activities for the establishment of CBM in the case that a community benefits from a project for the construction of a water facility with financial support of a DLA and/or other external funds.

4.1.2 Revision of the Supply Chain Management Manual (Activity 1-2)

Based on the results of the studies conducted in Activity 1-1, the Project Team identified major problems in the establishment and operation of the SCM mechanism and prepared a draft of the SCM Manual (2nd Ed.) in March 2012 that provided measures to alleviate the problems. The team held discussions with counterparts in the central government and DLAs on the content of the revised draft in order to refine its contents, and in April 2012, the team explained and discussed the content with the participants of the workshop organised mainly for the staff of PDHIDs and the district WSSCs. The main agenda of the workshop included (1) the necessity of training that aims to improve the capacity of DLAs in the operation of spare parts shops, (2) the assignment of personnel to spare parts shops, (3) the reliability of the specifications and the calculation of the quantities of seed stocks (understanding of the calculation formulas) (4) the reliability of the price setting method (understanding of the calculation formulas) and (5) the frequency of reporting. The team incorporated the comments and recommendations of the participants in the discussions in the revised edition of the manual (the final edition, shown in ***Figure 4-1***), which was distributed to stakeholders on NRWSSP.



Note: The diagrams shown at the right of the illustration above are the flow charts of a series of activities to be conducted at each stage of the establishment of a spare parts supply chain.

Figure 4-1 Supply Chain Management Manual (2nd Ed.)

The changes made in the SCM Manual (1st Ed.) are described below.

(1) Provision of the Specifications of Spare Parts

The Project Team reviewed the composition of spare parts for India Mark II and Afridev hand pumps that are recommended as stock in spare parts shops, identified the parts not described in the SCM Manual (1st Ed.) for which there was recognised demand in the field, and added such parts to the spare parts catalogue and the list of spare parts in the calculation of quantities in the seed stock in the Manual (2nd Ed.). The team also studied the specifications of the above-mentioned hand pumps that had been installed as standard pumps in Zambia and stated the specifications of each spare part clearly in order to procure parts that were appropriate for the existing pumps. The names and specification numbers of the parts listed in the manual were consistent with the international standard specifications of India Mark II and Afridev hand pumps as published by SKAT (Swiss Resources Centre and Consultancies for Development) - HTN (Hand pump Technology Network, currently Rural Water Supply Network). The purpose of using the names and specifications of the parts from these standard specifications was to prevent orders for incorrect parts.

(2) Optimisation of the Quantities of Spare Parts in the Seed Stock

The Project Team tried to optimise the seed stock by reviewing the annual sales ratio of each part. The SCM Manual (1st Ed.) stipulates that the formula shown below should be used for the calculation of the quantity of each spare part in the seed stock when a spare part shop is to be opened.

> Required Quantity of a Particular Item as Seed Stock in a District =
> Total Number of Particular Type of Hand Pump Installed in the District x Annual Sales Ratio of the Particular Item[13]

When the first edition of the manual was prepared, actual data was collected regarding the sale of spare parts in an approximately 1.5-year period at spare parts shops in Mumbwa District in Central Province and Monze District in Southern Province that had been in operation since 2006, and this data was used to calculate the ratio between the sales volume of each part and the total number of hand pumps in each district. The spare parts in the stock were classified by sales volume[14] into several categories and a sales ratio was set for each category. The analysis of annual sales data at spare parts shops established with support in SOMAPs 1 and 2 confirmed that the actual sales volumes of parts at these shops were generally smaller than those estimated in the calculation of sales ratios in the Manual (1st ed.) and, consequently, some parts were overstocked. In the manual, the sales ratio of a part was set on the assumption that the quantity of the part in stock would be reduced to 1/4 or less in a year after the procurement of the seed stock, and that the stock would be replenished by procuring new parts when the stock reached that level. However, the actual stock was much larger than estimated in the estimated sales ratios. The possible reasons for the overestimation of the sales ratios include the limited availability of actual sales data that could be used as reference in the estimations when preparing the manual in 2008, at which time only data from two districts from a period of approximately 1.5 years was available, and the high demand for parts in the initial stage of pump operation.

In the revised manual (SCM Manual (2nd Ed.)), the Project Team decided to continue using the method of estimating the quantities of spare parts in the seed stock using sales ratios provided in the first edition of the manual. However, the team reviewed the sales ratios according to the concepts mentioned below to optimise the quantities of spare parts in the seed stock.

- A sales ratio was set for each spare part based on the actual sales data
- The sale ratio was prevented from being set too high by excluding cases of large quantity parts sales for the construction and renovation work of water supply facilities from the sales data to be used for setting sales ratios and by considering only the demand for spare parts for the maintenance and repair of hand pumps used by local communities

The review revealed that the appropriate quantities of spare parts in stock could be reset by significantly reducing from the quantity stated in the first edition. A comparison between the sales ratios of spare parts of India Mark II hand pumps in the first and second editions of the SCM Manual is shown in ***Table 4-4.***

The buffer stock ratio, which was included in the sales ratio in the first edition of the manual, was shown as a separate factor in the calculation of the quantity of each spare part in the seed stock, which made the structure easier to understand. The revised formula is as follows.

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[13] The annual consumption rate per hand pump allied to the spare parts refers to the number of items to be sold annually per 100 hand pumps. The figure includes the buffer stock.

[14] Four (very low, low, intermediate and high) and five (very low, low, intermediate, high and very high) different sales ratios have been set for spare parts of India Mark II and Afridev pumps, respectively, depending on the sales volume of individual parts.

Required Quantity of a Particular Item as Seed Stock in a District =
Total Number of Particular Type of Hand Pump Installed in a District x Annual Sales Ratio of the Particular Item x Buffer Rate (=1.25)

The optimisation of the quantities of spare parts in the seed stock from the revised sales ratios also resulted in reduced costs for the procurement of parts, construction of spare parts shops and stock management. For MLGH, DLAs and CPs, this optimisation has reduced the cost of activities for the development of SCM mechanisms, which makes it easier to implement these activities.

Table 4-4 Comparison of Annual Sales Ratio of Spare Parts for India Mark II Set in the 1st and 2nd Editions of the SCM Manual

ID No.	Item	Annual Sales Ratio	
		SCM Manual (1st Ed.)	SCM Manual (2nd Ed.)
	Pump Head and Water Tank		
I-28	Head Assembly (Pump Head Box)	0.0100	⇩ 0.0010
I-20	Handle Assembly	-	0.0010
I-30	Third Plate Assembly (Rod Guide Plate)	-	0.0010
I-16	Front Cover	-	0.0010
I-04	Hex. Bolt (M12 x1.75 x 40)	0.0500	⇧ 0.1000
I-22	Nut (M12 x 1.75)	0.0500	⇧ 0.1000
I-21	Inspection Cover Bolt (Hex. Bolt M12x20)	0.0100	⇨ 0.0100
I-33	Washer (for inspection cover bolt M12, (Ø 24/13x2.5))	0.0100	⇩ 0.0020
I-06	Chain with Coupling (Chain Assembly)	0.0500	⇨ 0.0500
I-03	Bearing Spacer	0.0100	⇨ 0.0100
I-01	Handle Axle	0.0500	⇩ 0.0200
I-35	Axle Washer (Ø30x13x4)	0.0100	⇧ 0.0200
I-02	Ball Bearing	0.2000	⇨ 0.2000
I-05	Chain Bolt (H.T. Bolt M10 x40)	0.0100	⇨ 0.0100
I-23	Hex. Lock Nut (Nyloc Nut (M10))	-	0.0020
I-34	Water Tank Assembly	0.0100	⇩ 0.0010
	Stand Assembly		
I-24	Stand Assembly (Pedestal (Three Legs))	0.0100	⇩ 0.0010
	Cylinder Assembly		
I-09	Cylinder Assembly	0.0100	⇨ 0.0100
I-10	Cylinder Body and Reducer Caps	-	0.0030
I-36	Brass Liner	-	0.0030
I-11	Sealing Ring (Cylinder Seal)	0.0500	⇩ 0.0400
	Plunger Assembly		
I-27	Plunger Yoke Body	0.0100	⇩ 0.0050
I-37	Follower	-	0.0050
I-18	G.M. Spacer	0.0100	⇩ 0.0050
I-07	Upper Valve (Upper Valve Guide)	0.0100	⇧ 0.0200

ID No.	Item	Annual Sales Ratio	
		SCM Manual (1st Ed.)	SCM Manual (2nd Ed.)
I-32	Rubber Cup (Pump Bucket)	0.1000	⇨ 0.1000
I-08	Rubber Seating (Check Valve Seal) (Rubber Seal Small)	0.0500	⇩ 0.0200
	Foot Valve Assembly		
I-14	Check Valve Assembly (Foot Valve Assembly)	0.0500	⇩ 0.0003
I-13	Check Valve (Check Valve Guide)	0.0500	⇩ 0.0100
I-12	Cylinder Valve Seat	-	0.0050
I-38	Seat Retainer	-	0.0050
I-15	Rubber Seating (Foot Valve Seal) (Rubber Seal Large)	0.0100	⇧ 0.0200
I-26	Plunger Rod Assembly	-	0.0050
	Rising Main		
I-17	G.I. Riser Pipe (3m)	0.2000	⇩ 0.0300
I-25	Pipe Socket (G.I. Coupling)	0.0500	⇩ 0.0300
I-29	Pump Rod Assembly	0.1000	⇩ 0.0500
I-31	Rod Socket (Hex. Coupling: M12X50)	0.0500	⇧ 0.0700
I-39	Toprod Assembly	-	0.0050
	Others		
I-19	Grease (200g)	0.1000	⇩ 0.0600

Source: MLGH (2016) Supply Chain Management Manual for Rural Water Supply 1st Edition
MLGH (2012) RWSS O&M Component Supply Chain Management Manual 2nd Edition

Note: The ID numbers and descriptions of the items are based on the SCM Manual (2nd Ed.). The items for which the annual sales ratio is not indicated in the column of the SCM Manual (1st Ed.) above were newly added to the list of spare parts as seed stock in the SCM Manual (2nd Ed.)

(3) Review of the Formulas for the Calculation of the Selling Prices of Spare Parts

The two formulas shown below are provided in the first edition of the manual as those for the calculation of the selling prices of spare parts.

Unit Selling Price = (Unit Purchasing Price + Unit Management and Operation Cost[15]) x Risks for Price Increase and Exchange Rate (=1.2)[16]

Unit Management and Operation Cost = Unit Purchasing Price /Total Amount (Price) of Seed Stock x Annual Operation and Management Cost of Spare Parts Shop

The formulas for the calculation of the selling prices was revised in the preparation of the second edition of the manual due to (1) the inclusion of the contingency ratio in the formula for the calculation of the overheads and (2) the revision of the market price increase rate of spare parts, as shown below.

[15] Transport costs for spare parts, allowances for officer(s) who go to purchase spare parts from suppliers, costs for the preparation of various operation records of the spare parts shop, bank charges, and other costs

[16] 10% for both price escalation and exchange rate fluctuation

Unit Selling Price = (Unit Purchasing Price + Unit Management and Operation Cost) x Price Escalation Ratio (=1.1)[17]

Unit Management and Operation Cost = Unit Purchasing Price /Total Amount (Price) of Seed Stock x Annual Operation and Management Costs of Spare Parts Shop x Buffer Rate (=1.25)

In the revised manual, the Project Team has clearly stated that the revision of the selling prices following the first year of operation of a spare parts shop should be calculated based on the annual overhead costs in the actual expenditure from the previous year. The team obtained price lists for spare parts in recent years from the suppliers/distributors of hand pumps and used the lists to elucidate the changes in prices. Then, the team conducted a comparative analysis between the changing price of spare parts, the rates of price increases and inflation in Zambia, and, based on the analysis results, the team presented the suggested rates of increase in market prices for spare parts when revising prices.

(4) Measures against the Purchase of Large Quantities of Spare Parts by Individuals and Companies

The field study conducted in seven districts in Southern and Central Provinces revealed cases in which the stock of certain spare parts in spare parts shops had been exhausted after well construction companies had purchased the parts in large quantities. It was revealed that those companies purchased the parts at the spare parts shops because the prices at shops in rural districts were lower than market prices, so in most cases it was cheaper to purchase them at the shops than from distributors of the hand pumps or part suppliers in urban areas. Such cases occurred because these spare parts shops had not conducted a review and revision of selling prices, which was supposed to be conducted once every year. Most of the shops were still selling parts at the prices set when the seed stock had been procured. As the price of goods in Zambia has been increasing at an annual average rate of 12%, failing to change selling prices for three years, for example, not only causes a huge loss to the shops but it also destroys the very concept of SCM in that the revenue from the sales of parts is to be used as revolving funds for the sustainable operation of spare part shops.

The SCM Manual (2nd Ed.) restates the importance of reviewing and revising the selling prices of spare parts at least once every year in accordance with the change in market prices. The manual stipulates that spare parts shops of DLAs are primarily responsible for meeting the demand for parts for the daily maintenance of hand pumps by local communities, and that contractors of projects requiring large quantities of spare parts, such as those for the renovation of water supply facilities, should procure them directly from parts suppliers or order them from district spare parts shops.

(5) Simplification of the Management of the Process Concerning the Stock Replenishment and the Selling Price Revision

In the four districts in Central Province where the operation of spare parts shops has been contracted out to CUs, they have not replenished the stock or revised the prices since the shop opened. CUs cannot replenish the stock or revise the prices at their own discretion because the approval of district councils is required for stock replenishment and price revision. Acquiring this approval involved a complicated process, which was considered to be one of the reasons for the failure of the CUs to replenish stocks and revise prices at the shops. Insufficient coordination and cooperation between the CUs and DLAs on the operation of the shops in general was another reason for the failure.

[17] The price escalation ratio also considers exchange rate fluctuation risks.

As a result of discussions held with MLGH, the ministry supervising the local government administration, DLAs and the Project Team, an agreement was made to stipulate that DLAs are responsible for the procurement of the seed stock, stock replenishment and setting and revising selling prices at spare parts shops in the second edition of the manual. The three parties have also agreed that the replenishment of the stock (to make all spare parts available) at the shops is not a matter requiring approval of a district council but is a matter processed by a DLA within the scope of its ordinary duties. The processes for stock replenishment and price revision have been simplified through these agreements so that they are handled within DLAs.

(6) Re-establishment of the Structure for the Operation of Spare Parts Shops appropriate to the Organisational Structures, Systems and Capacities of DLAs and CUs

The SCM Manual (1st ed.) stipulated that the owners of spare parts shops and the parties responsible for final decision-making were DLAs, who were urged to consign the operation of the shops to CUs whenever possible because CUs were thought to be more capable than DLAs in terms of stock management, procurement, selling price setting and financial affairs/accounting. However, insufficient coordination and cooperation between CUs and DLAs in stock replenishment and price revision for spare parts had an adverse effect on their operation in the four districts in Central Province, as mentioned above. The field study in the four districts revealed that advanced technical knowledge was not required in the operation of the spare parts shops. The high effectiveness and efficiency was also confirmed with regard to the direct operation of spare parts shops by DLAs, and the comprehensive implementation of district RWSS Projects alongside activities for the construction/renovation of rural water supply facilities, the maintenance and repair of facilities at the community level and the development of a CBM mechanism.

Therefore, the second edition of the manual recommends the direct operation of the spare parts shops by DLAs and shows an organisational structure for direct operation (***Figure 4-2***). This diagram shows the person to whom each member of staff should report. Personnel involved in operation and management of the spare parts shop who are indicated in the diagram are all officers already employed by DLAs. No additional staff employment is considered for the positions of cashier and storekeeper of the spare parts shop since these roles are to be added to existing staff in DLAs. When DLAs entrust daily operation of the spare parts shop to CU, the cashier and storekeeper are to be assigned from the staff of CU. In the revision of the manual, the scope of responsibility of DLAs and CUs in the operation of spare parts shops when DLAs have consigned their operation to CUs has been revised as described in ***Table 4-5***.

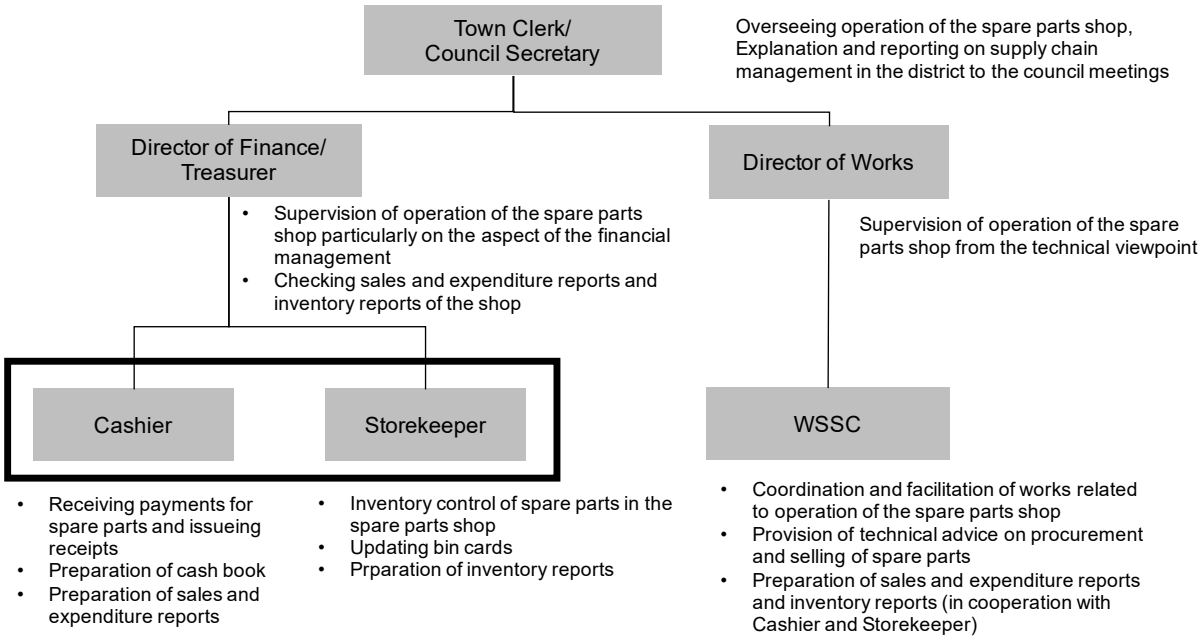


Figure 4-2 Management Structure of a Spare Parts Shop under Direct Operation of DLA

Table 4-5 Demarcation of Responsibilities between DLA and CU

	SCM Manual (1st Ed.)	SCM Manual (2nd Ed.)
DLA	• Examine and approve budget proposals prepared by CU for establishment and operation of a spare parts shop and pricing of spare parts. • Secure and provide necessary funds for construction of a spare parts shop facility and procurement of seed stock. • Monitor the process of financial and stock management, and provide necessary guidance to improve operation of the shop. • Advertise the spare parts shop to the general public. • Inspect quantities and quality of spare parts in stock. • Plan, monitor and regulate all operations with regard to supply chain management of spare parts in the district. • Mobilise/sensitise user communities for financial contributions for O&M, which include costs to purchase spare parts and pay APMs for repair of hand pumps.	• Secure necessary funds for construction of a spare parts shop facility, procurement of seed stock, and advertisement of the shop. • Construct a spare parts shop facility. • Set selling prices of spare parts. • Conduct quarterly stocktaking. • Prepare monthly sales and expenditure reports and inventory reports according to the demarcation of tasks for compiling reports between DLA and CU. • Prepare annual sales and expenditure reports and inventory reports. • Open and manage an independent bank account for the spare parts shop. • Monitor shop operation by CU and provide necessary guidance to CU. • Advertise the spare parts shop to the general public. • Mobilise/sensitise user communities for financial contributions for O&M, which include costs to purchase spare parts and pay APMs for repair of hand pumps. • Conduct an audit of the shop. • Assign appropriate staff to perform the responsibilities mentioned above.

	SCM Manual (1st Ed.)	SCM Manual (2nd Ed.)
CU	• Prepare and submit a budget proposal for establishment and operation of a spare parts shop to be approved by DLA. • Construct a spare parts shop facility. • Prepare and submit pricing proposals of spare parts to be approved by DLA. • Prepare and submit quarterly financial report and stock management report to DLA. • Procure seed stock of spare parts and replenish stock. • Sell spare parts at prices approved by DLA. • Store spare parts in a safe and secure manner in the shop. • Open an independent account for the spare parts shop and manage it jointly with DLA. • Provide DLA with information and documents regarding the spare parts shop account.	• Store spare parts in a safe and secure manner in the shop. • Sell spare parts at prices specified by DLA. • Update bin cards, issue sales receipts, and deposit sales in the spare parts shop account. • Prepare monthly sales and expenditure reports and inventory reports according to the demarcation of tasks for compiling reports between DLA and CU. • Assign appropriate staff to perform the responsibilities mentioned above.

(7) Review of the Forms of Various Reports on the Management of the Spare Part Supply Chain and the Frequency of Reporting

The first edition of the manual stipulated that an operator of the spare parts shop should maintain records and prepare various reports with regard to the financial and inventory-related affairs for the monitoring of the operating status of the shop. The Project Team has improved the forms of the records and reports to make it easy to prepare the reports and has reviewed the frequency of reporting. The list of records to be kept and reports to be prepared by DLAs on the management of the spare parts supply chain is shown in the changes made to the first edition of the manual in ***Table 4-6***. ***Figure 4-3*** depicts the workflow for the preparation of the reports on the operation of the spare parts shops presented in the second edition of the manual.

Table 4-6 Records and Reports to be Utilised for Supply Chain Management

Type of Records/Reports	Descriptions	Changes from SCM Manual (1st Ed.)
Records to be Referred to for Preparation of Reports on the Spare Parts Shop Operation		
i. Sales receipt books	Records of payments received for spare parts	Items to be recorded in receipt books are specified. Utilisation of the official receipt books of DLA is recommended.
ii. Expenditure records	Receipts, purchase order forms, delivery notes, and other documents issued for expenses for operation of the spare parts shop	None (These documents are supposed to be handled in accordance with the accounting procedures of DLA.)
iii. Cashbooks	Account books which record the details of cash received and disbursed by the shop	
iv. Bank statements	Detailed records of an account in which the proceeds of the shop are managed	

Type of Records/Reports	Descriptions	Changes from SCM Manual (1st Ed.)
v. Goods Received Note (GRN)	Receipt records of spare parts procured	Items to be recorded in GRN are specified. Utilisation of GRN forms prepared in DLA is recommended.
vi. Bin cards	Records of receipt and issuance dates for each item and its quantity Confirmation of the re-order level of each item for replenishment	A revised bin card form is introduced to indicate purchasing price, selling price, quantity procured, and re-order level each time an item is procured
vii. Quarterly stocktaking records	Records of stocktaking of spare parts	None
Reports on the Spare Parts Shop Operation		
1. Monthly sales and expenditure reports	Records of monthly sales and expenditures at the shop (Reference documents: i, ii, iii, iv)	• Changed from quarterly to monthly reports. • Revised report formats are introduced to meet requirements for monthly reporting.
2. Monthly inventory reports	Results of monthly count of stock received and issued (Reference documents: v, vi, vii)	
3. Monthly management reports	Records of enquiries received at the spare parts shop, and schedules for stock replenishment and price revision (Reference documents: 1, 2)	
4. Annual sales and expenditure reports	Results of annual count of sales and expenditure at the shop (Reference documents: 1, iv)	• New report formats are added to the revised manual to summarize monthly reports.
5. Annual inventory reports	Results of annual count of stock received and issued (Reference document: 2)	
6. Annual trend reports	Trends in sales figures for each item, sales and expenditure, and the number of customers in each month (Reference documents: 1, 2)	
7. Annual management reports	Records of observations and issues related to operation of the shop (Reference documents: 4, 5, 6)	

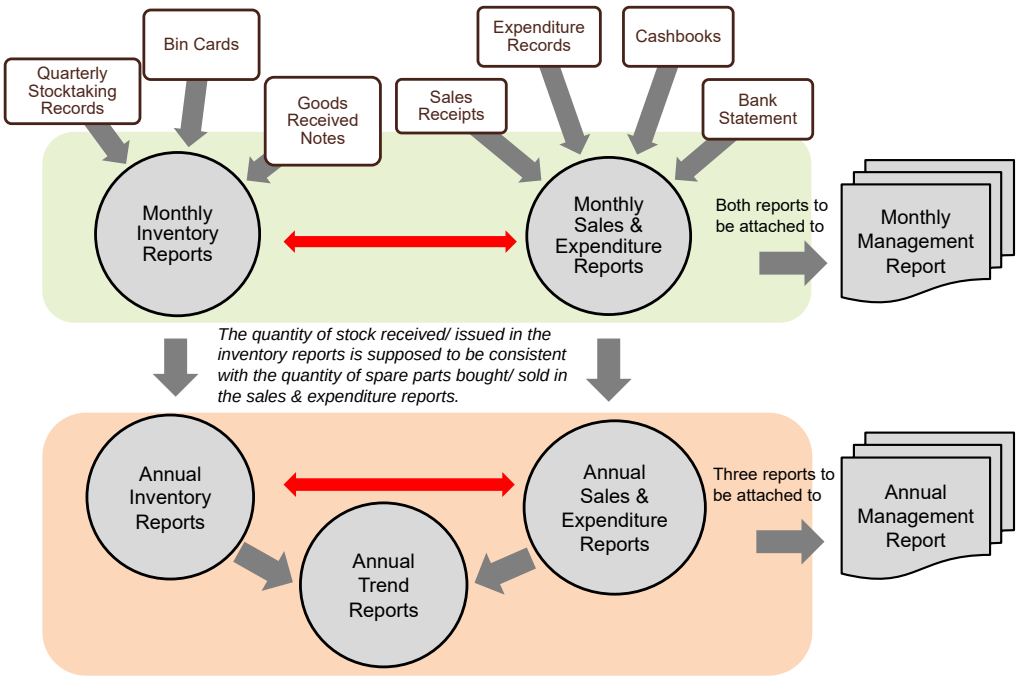


Figure 4-3 Work Flow for Preparation of Financial Management and Inventory Reports for the Spare Parts Shop

4.1.3 Preparation of the O&M Component Work Plan (Activity 1-3) and Determination of Indicators and Procedures to Measure the Progress of Establishment of the SOMAP O&M Model (Activity 1-4)

The promotion of the nationwide extension of an O&M model by the implementing agency of this project, DHID/MLGH, required the formulation of a detailed O&M component work plan, which served as a road map for the strategic presentation of the plan, the implementation of the plan and monitoring of the implementation. In the first project year, the Project Team reviewed the annual action plan that presented the contents of the activities in the O&M component and the budgetary allocation for the activities formulated by DHID, analysed the details of support for O&M components in ABP provided by CPs in specific target areas in the form of bilateral cooperation (including the cooperation between international organisations and the Government of Zambia) and prepared an O&M component work plan consisting of a logical framework, an action plan and a budgetary plan. The summary of the O&M component work plan for FY 2016 is presented as an example in ***Table 4-7***.

Table 4-7 Summary of the O&M Component Work Plan for FY2016

Programme		Programme/Activities	Description	Output Targets (#)	2016 Activity Budget (GRZ) Kr
325		Sustainable Operation and Maintenance (SOMAP)			
	325.1	Organise quarterly Thematic Working Group meetings.	Technical advice/input to MLGH are provided for implementation of O&M Component.	4 Working Group Meetings held	
	325.2	Update National O&M guidelines.	O&M Guidelines are updated refracting revisions made and disseminated.	600 copies of the revised National O&M guidelines produced and distributed	
	325.3	Update RWSS O&M Implementation Manual.	- O&M implementation manuals are updated reflecting revised mechanisms and disseminated. - Good practices on O&M in different provinces/districts are documented as a part of the manual.	600 copies of the revised RWSS O&M Implementation Manual produced and distributed	
	325.4	Provide orientation to district stakeholders on O&M model and action planning for establishment of O&M mechanisms	Organise orientation workshops for districts stakeholders on O&M mechanism	5 workshops for selected 19 districts held in Central, North-Western, Lusaka and Muchinga Provinces	240,000
	325.5	Procurement of initial seed stock of spare parts and tool kits for Districts	Procurement of initial seed stock for 1 year operation of the supply chain of spare parts	Initial seed stock for 38 selected districts procured in all Provinces except Western	3,600,000
	325.6	Train District Staff in supply chain management of hand pump spare parts	Organise training for the district staff to be involved in operation of spare parts shop	90 Council District staff trained (6 per district) in 15 districts in Central, Eastern, Luapula, Lusaka, North Western, and Northern	400,000
	325.7	Construct/renovate spare parts shops for hand pumps at District level	Construct new building or renovate existing facility to be used as spare parts shops	17 spare parts shops in selected constructed in 17 districts of all Provinces except Copperbelt, Central and Western	1,700,000
	325.8	Prepare for operation of the spare parts shops	District stakeholders meeting on establishment of spare parts shop, preparation of various formats for sales management, office furniture, advertisement, etc.	Operation of the spare parts shops started in 17 districts of all Provinces except Copperbelt, Central and Western	183,600
	325.9	Establish tool kit centres	Identify where to store the procured tools at ward level, deliver the procured tool kits to wards, orient officers in charge at the tool kit centres on tool kit management, prepare tool kit inventory	Tool kit inventory reflecting allocation of tools in wards prepared in 25 districts	270,000
	325.10	Train trainers in installation and repair of hand pumps (both India Mark II and Afridev)	Organise TOT workshops in hand pump installation and repair are made available at provincial level	40 trainers trained from 10 provinces (4 per Province)	500,000
	325.11	Train / re-train APMs in installation and repair of hand pumps	Inventory existing APMs in the districts, conduct training / re-training of APMs in maintenance and	540 APMs trained in 27 districts (20 per District)	1,350,000
	325.12	Train WDC members in facilitation of CBM of RWSS	Provide (refresher) training of WDC members in facilitation skills for training of V-WASHEs	360 WDC members trained (average 15 per district) in 24 districts	1,296,000
	325.13	Train V-WASHEs in roles and responsibilities, CBM of RWSS, maintenance skills, and monitoring of water facilities.	Conduct training of V-WASHEs for existing water points	1,250 V-WASHE members trained in 25 Districts (50 V-WASHEs per district)	1,963,148
	325.14	Quarterly M&E field visit (District Level)	Achievement of activities and output of the district O&M action plans is verified.	4 Quarterly M&E visits in 93 rural districts	1,000,000

Programme		Programme/Activities	Description	Output Targets (#)	2016 Activity Budget (GRZ) Kr
325		Sustainable Operation and Maintenance (SOMAP)			
	325.15	Consultation with hand pumps suppliers on supply chain management of hand pump spare parts	Organise a consultation meeting with hand pump suppliers to promote exchange of views between MLGH and suppliers towards improvement of accessibility to spare parts by hand pump users.	1 meeting organised at the national level	0
	325.16	Formalise the policy on standardisation of hand pumps specifications	Prepare a circular explaining the policy of MLGH on standardisation of hand pump specifications.	A circular on standardisation of hand pump specifications issued	0
	325.17	Facilitate exchange of experiences and lessons among the stakeholders in implementing/ supporting the O&M component activities	Organise seminars for the sector stakeholders to share project outputs of SOMAP3 and good practices on O&M in provinces/districts, and to discuss action items to enhance sustainable O&M.	2 seminars organised (one for national level and the other for provincial/ district level)	
	325.18	Develop the National O&M guidelines on Solar/Electric powered water schemes	O&M Guidelines are developed and disseminated.	Draft copies produced and circulated	0
	325.19	Conduct monitoring and report compilation on activities and budget expenditures. (National and Provincial Level)	Implementation and achievement of the district O&M action plans are tracked at all levels	National/Provincial DHID carry out M&E activities and reports produced (Quarterly basis)	100,000
Total					12,602,748

When planning for this project began, it was expected that IMS, which was developed by MLGH as a tool to measure the effect of the NRWSSP projects and to monitor and evaluate the projects, would be used for setting the indicators to measure the progress of the O&M work plan. However, the study on the development and operation of IMS conducted at the start of the first year revealed that, although the baseline data of IMS included the required information on the operation and maintenance of the existing water supply facilities, it could not be used for the intended purpose for the reasons mentioned below (***Table 4-8***).

- The software developed for the system did not work when it was installed on a computer because of a technical defect in the system[18].
- Although the information collected as the baseline data of IMS included information on the operation and maintenance of the water supply facilities, the baseline data consolidated by DHID only included those of major indicators (***Table 4-8***) and DHID had not analysed the rest of the collected data including data regarding the operation and maintenance of water supply facilities. Although the Project Team tried to analyse all the collected data extracted from a database on Microsoft Excel, the team failed to do so due to database design limitations.
- There was a large disparity in the quality and quantity of the data collected in different districts in the baseline survey as some districts had not entered the data obtained in the survey in the database and others were still using the information collected in 2008, which had not been updated. DHID did not provide the Project Team with survey sheets on which the data that had not been entered.
- The stakeholders involved in the water and sanitation sector suggested the need to review the method of analysing the data of major indicators. DHID was requested to reconsider the method taking into consideration consistency with the methods of defining the indicators and

[18] Incompatibility between the software and the version of the operating system of the computer is suggested as a possible cause of failure. Ministry of Local Government and Housing (Zambia) and Ministry of Foreign Affairs, DANIDA (Denmark) (2013) Assessment of the Information Management System (IMS) for the Rural Water Supply and Sanitation (RWSS) Sector: Final Report

the data analysis methods used by the Central Statistical Office of Zambia. For example, with regard to the indicator for the overall goal of this project, "the proportion of residents who have access to safe water," only data regarding the access to safe water of households located within 500m of protected water sources was analysed in IMS. However, some CPs suggested that the proportion of residents who had access to safe water in an entire village should be collected and analysed when monitoring the cost-effectiveness and the progress towards the achievement of the goal of a project for the construction of water supply facilities.

Table 4-8 Progress in Establishment and Operation of RWSS IMS (as of Oct. 2011)

	Status
Main Indicators Aggregated and Monitored in IMS	1. Water Supply 1) Percentage of rural population with access to safe and reliable water within 500m (all year round) 2) Percentage of rural population with partial access to safe water within 500m (for part of the year) 3) Percentage of protected water points in rural areas where households pay O&M costs 2. Latrines 1) Percentage of rural population with access to adequate latrines 3. Other Sanitation Facilities/Practices 1) Percentage of rural households who dispose of household rubbish in an adequate way 2) Percentage of rural households with hand washing facilities close to their latrines 3) Percentage of rural households with adequate bath shelters 4. Community and Local Authority Management Structure 1) Percentage of villages with trained and active V-WASHEs 2) Percentage of women in trained and active V-WASHEs 3) Percentage of districts with trained and active D-WASHE 4) Percentage of women in trained and active D-WASHEs 5) Percentage of districts with a RWSS Unit placed within the district council and with at least two staff 6) Percentage of districts with a full-time RWSS focal point person within the district council 7) Percentage of women among RWSS staff within district councils In addition to the main indicators listed above, other RWSS data is to be collected, such as specifications of water points, the total number of water points constructed in the year and O&M activities.
Unit of Data Collection	- Water point - Village - District
Data Collection Method	• Survey at water point and village levels: Questionnaire survey by ADC members, including government extension staff, who were trained by DLA on data collection • Survey at district level: Questionnaire survey by DLA/D-WASHE

	Status
	DLAs shall check, verify and enter the collected data into the system, and the data shall be aggregated and analysed in the system depending on the purpose of use.
System Components	The system is comprised of three components: • Database engine: Microsoft Access • Mapping programme: MapServer • User interface: Web browsers such as Microsoft Internet Explorer The system components mentioned above are scheduled for installation on computers in DHID/MLGH and DLAs so that the database is accumulated, updated, and managed on each computer terminal. The system design does not provide functions to accumulate, aggregate, and share the collected data online. DLAs need to share the data collected in districts at the provincial and national levels using other means such as electronic mail and external hard drives.
Period to Develop IMS	2007 – 2010
Number of Districts Where IMS is Installed	41 of 64 districts in 9 provinces (as of 2011)
Operation of IMS	• DHID organised training on operation of IMS for officers at national, provincial, and district levels, and on data collection for ADCs. • DHID conducted field surveys in 2008-2010 for collection of baseline data from water points, villages, and DLAs. (22,893 villages and 17,119 water points were surveyed.) • DHID compiled provincial and district aggregations of baseline data for the main indicators listed above into a report titled the Status of Rural Water Supply and Sanitation in Zambia (MLGH, September 2011) and shared it with sector stakeholders in October 2011. The report contains baseline data aggregated from 39 out of 41 districts. • There were frequent cases in which IMS could not be used in the districts because of problems such as virus infection of the computer on which the system was installed, data loss, or the inability to use the system itself on the computer. • DHID and CPs agreed to review and restructure IMS due to the need for re-examinations of technical defects on IMS, problems related to system operation in the districts, and the Monitoring, Evaluation, and Reporting (MER) framework of NRWSSP. This was followed in June 2012 by the commencement of a series of works such as planning and designing a new system renamed MIS, and formulating the MER framework. (Refer to 4.2.4 Support for the Establishment of a Monitoring Structure of O&M mechanisms (Activity 2-4) for details on MIS.)

Source:

- DHID/MLGH (2011) Rural Water Supply and Sanitation Sub Sector, National Rural Water Supply and Sanitation Programme, Status of Rural Water Supply and Sanitation in Zambia (Draft 01)
- MLGH/DISS-RWSS Unit (2008) Final Draft: Rural Water Supply and Sanitation Information Management and Monitoring and Evaluation System: Manual for District Staff
- Ministry of Local Government and Housing (Zambia) and Ministry of Foreign Affairs, DANIDA (Denmark) (2013) Assessment of the Information Management System (IMS) for the Rural Water Supply and Sanitation (RWSS) Sector: Final Report

As the policy for DHID/MLGH to monitor and evaluate NRWSSP, the aim was to use the MER framework of the programme and IMS designed on the basis of that framework in order to monitor the progress and achievement of the programme targets and each component. Therefore, DHID insisted on using IMS to define the purposes and outputs indicators of the O&M component. However, because of the aforementioned circumstances, the Project Team was unable to analyse the current state of the RWSS subsector and the operation and maintenance of water supply facilities, which should have formed the basis for setting the purposes and outputs of the O&M component and planning activities therein. Therefore, the team defined the following indicators of the purpose of the O&M component work plan, "The operation rate of rural water supply facilities is improved," based on the results of the baseline survey conducted at 300 sites in 10 districts in nine provinces in this project (see 4.1.7 for reference).[19] DHID is expected to monitor and evaluate the achievement of these indicators as part of the MER framework of NRWSSP using MIS.[20]

Indicator 1) Operation rate of rural water supply facilities is increased to 80% by 2015.
Indicator 2) The downtime of rural water supply facilities is reduced to less than 14 days by 2015 in case of breakdown of the upper component.
Indicator 3) The downtime of rural water supply facilities is reduced to less than one month by 2015 in case of breakdown of the bottom component.

In the second year, the Project Team tried to refine the contents, work schedule and expected outputs of the action plan and the benchmarks for the monitoring of the progress of the plan in the NRWSSP O&M component work plan formulated in the first year. The major improvements made in the second year include the reclassification of the activities in the work plan by subdividing them into large groups and small groups (groups of activities) by the intended purpose (expected output) in accordance with the Work Breakdown Structure (WBS), which shows a series of activities required for the introduction of the SOMAP O&M model at the district level and an execution schedule for the activities. The team refined the benchmarks as a tool for planning and process monitoring that would simplify the elucidation of the state of activities, the provision of input and budget expenditure and the management of outputs for PLGOs and DLAs. Appendix 11 shows examples of a logical framework of an O&M component work plan and a WBS created within it. After the Government of Zambia established its budget, the team prepared a budgetary plan for the O&M component of NRWSSP for FY 2013 for the allocation of the budget for each activity in the work plan.

From the third year on, the Project Team monitored and reviewed the execution of and the expenditure in the O&M component work plan in the previous year and prepared a work plan for the current year. In the final year of the project, the Senior O&M Officer of DHID independently prepared an O&M component work plan. Because the Ministry of Finance did not disburse the budget for the O&M component in FY 2015, the work plan executed in FY 2016 was basically identical to that of FY 2015. The Project Team identified the activities that were implemented in FY 2015 with assistance from CPs and the activities that were partly included in the assistance plans of CPs for FY 2016 alongside the O&M Officers of DHID. The Project Team also provided suggestions on the activities to be included in the plan for FY 2016, the selection of the districts in which these activities were to be implemented, the number of project sites in these districts and coordination with the assistance plans of CPs. These suggestions were incorporated as the output targets of the activities in the O&M component work plan for FY 2016 shown in

[19] These indicators were also adopted as those of the Project purpose of SOMAP 3. When the PDM of SOMAP 3 was revised, the indicators of the purpose of the O&M component were revised accordingly.
[20] DHID had not monitored or evaluated these indicators at the completion of this Project because it had not collected and accumulated data concerning water supply of a quality or quantity sufficient to operate MIS.

Table 4-7.

The counterparts of DHID have acquired the capacity to prepare relevant work plans through the experience of conducting studies for the preparation of action plans to alleviate problems in O&M in the RWSS subsector, ranking them by priority order, selecting districts in which the activities were to be implemented, setting the number of project sites and allocating budgets to each of the selected districts in this project. They have begun to make their own efforts to analyse the assistance plans of CPs for program management, to confirm the consistency between these plans and the approaches used for the introduction of the O&M model, to allocate available resources in the entire component and to adjust the targets to be achieved. They have also acquired the capacity to prepare an O&M component work plan as part of their routine work after the completion of this project.

4.1.4 Defining of the O&M Implementation Structure (Activity 1-5)

When the implementation of this project began, DHID did not have offices in provinces. Therefore, DLAs were implementing NRWSSP, including the O&M component, under the technical guidance of PSTs assigned to each province. However, as mentioned in "2-2. Implementation Structure," MLHG established PDHIDs gradually in one province after another from FY 2011/12 and announced the plan to terminate the services of PSTs in each province after completing the project to develop the capacity of the relevant PDHIDs. PDHIDs were therefore established as the leaders in the implementation structure of the O&M component in each province and DLAs were to formulate and implement district RWSS AWPs and monitor the implementation of the plans under the technical guidance of PDHID. (See Fig. 2-1 for the implementation structure.) When the preparation of the detailed design of this project began (in 2011), an important part of the project was the step-wise approach to the nationwide extension of the SOMAP O&M model consisting of the technology transfer required for the model introduction to PSTs at the district level, and the independent provision of technical guidance by PSTs at the district level in the actual model introduction. However, as MLHG had restructured itself at the provincial level, a decision was made to adopt a new approach using PDHIDs as the leaders in the nationwide extension of the SOMAP O&M model in the project.

4.1.5 Guidance to PDHIDs/PSTs on Implementation Process of the O&M Component and SOMAP O&M Model (Activity 1-6)

The Project Team carried out activities with the aim of developing leadership skills of PDHIDs and PSTs, which support the offices, in particular, skills for guidance to DLAs in the formulation and implementation of the O&M action plan and monitoring the implementation of the plan, and intended to facilitate the introduction of the O&M model into districts by PDHIDs.

The implementation of this project began immediately after the establishment of PDHIDs. Some of the principal and senior engineers assigned to the offices did not have experience of working in the RWSS subsector. Many of those engineers who had work experience in the subsector wanted to systematically acquire practical knowledge regarding the approach and technology used in the operation and maintenance of water supply facilities. In addition, PST members did not have a systematic understanding of the O&M component of NWSSP or the SOMAP O&M model. Therefore, it was necessary to provide them with orientation to make them fully understand the O&M component and the purpose of O&M model implementation, approaches and introductory processes.

In January 2013, during the second year of this project, the Project Team held orientation sessions for the staff members of PDHIDs and the members of PSTs with the aim of improving their understanding of the O&M component of NRWSSP, the SOMAP O&M model and the process of

introducing a model, and with the aim of preparing a provincial O&M work plan (zero draft) as a guideline for the activities of PDHIDs. In the orientation, in which Provincial case studies[21] were presented, the participants acquired an overview of the O&M mechanism and the development processes for each component, the procedure to prepare a district O&M action plan and monitoring activities.

Based on the implementation of the O&M component in the respective districts, the orientation participants also prepared provincial O&M work plans for PDHIDs in order to promote the formulation and implementation of action plans in individual districts. Provincial O&M work plans were prepared as follows: The O&M component work plan prepared by DHID/MLGH classifies the activities as to whether the budget for implementation is to be allocated to a PDHID or a DLA, and on this basis the activities in the O&M component are classified into those to be implemented by PDHIDs and those to be included in district O&M action plans. Then, provincial actions and budgetary plans are prepared based on this classification of activities. The facilitators of the orientation taught practical planning methods to the participants using an actual O&M component work plan and district O&M action plans. The summary of the orientation is described in ***Table 4-9***. An example of a provincial O&M work plan is attached to this report as Appendix 12.

Table 4-9 Orientation Workshop for PDHIDs/ PSTs in All Provinces for Roll-out of the O&M Model

1) Date and Venue:	15th -17th, January 2013 (3 days) in Siavonga, Southern Province
2) Participants:	• Principal and Senior Engineers, PDHIDs - Northern, Luapula, Copperbelt, North Western, Western, Eastern, Central, Lusaka, and Southern Provinces • Representatives from PSTs - Northern, Southern, Western, and Eastern Provinces • JICA Zambia Office, Plan International • RWSS FPPs from Nchelenge in Luapula Province, Mumbwa in Central Province, and Gwembe in Southern Province • DHID/MLGH, SOMAP3 team 【Total 33 participants】
3) Facilitators and Resource Persons:	● O&M Manager and Senior M&E Officer in DHID/MLGH ● RWSS FPPs in Nchelenge in Luapula Province, Mumbwa in Central Province, and Gwembe in Southern Province ● SOMAP3 team
4) Programme:	

Day	Session	Items
Day 1	Session 1	NRWSSP and O&M component
	Session 2	SOMAP approach
	Session 3	SOMAP O&M Model (five O&M mechanisms)
	Session 4	Implementation of SOMAP O&M model: experiences in Mumbwa district
	Session 5	Status in implementation of O&M model in each district local authority
Day 2		
	Session 6	National O&M component work plan
	Session 7	Guidelines and process for preparation of district O&M action plan

[21] The RWSS Officers of Mumbwa District, where SOMAPs 1 and 2 were implemented, Gwembe District, which was the project area of an assistance project of an NGO, ADRA, and where the support in the introduction of the O&M Model was provided in SOMAP 2, and Nchelenge District, which was a direct support area of JICA in SOMAP 3, presented their experiences in implementing measures to develop and strengthen the O&M mechanism.

	Session 8	Preparation of district O&M action plan: experiences in districts
Day 3	Session 9	Process for establishment of the SCM mechanism
	Session 10	Monitoring of the O&M component (outline)
	Session 11	Financing modalities for implementation of the O&M component (outline)
	Session 12	Preparation of provincial O&M action plan (zero draft)
	Special Session	Interim report on water quality analysis and monitoring through hand pump replacement

As it was difficult to prepare an elaborate work plan in a single planning process, and in order for provincial work plans for the next year to be consistent with the status and needs in provinces, it was decided to continue supporting the planning process as an activity for Output 2, "The SOMAP O&M model is implemented in NRWSSP target districts."[22] In addition to improving the format of the provincial O&M work plan to enable PDHIDs to formulate action plans in line with the benchmarks established in the O&M component work plan of MLGH, the Project Team calculated the standard expenses for the work plan implementation budgets. The team continued to provide guidance to the counterparts using these revised planning tools as an activity for Output 2. The details and outputs from the two continuous activities for Output 2 are described in "4-2 Activities for Output 2."

4.1.6 Water Quality Analysis and Monitoring through Hand Pump Replacement (Activity 1-7)

Many boreholes with hand pump have been constructed in Zambia. The water supplied from these boreholes has a high concentration of iron in certain areas. People avoid using water from such boreholes as potable water or as water for domestic use, and they have even stopped using such boreholes at all in some cases. People in certain villages are obliged to use water from boreholes that contains a high concentration of iron as domestic water because there are no alternative water points nearby. The hand pumps on such boreholes tend to be poorly maintained because the users of the boreholes are not satisfied with the quality of water in them.

The Project Team conducted a verification study to elucidate the relationship between types and materials of hand pumps and the quality of water in boreholes in Activity 1-7, prepared a recommendation on the standardisation of the technology for the installation and maintenance of hand pumps in Zambia and shared the recommendation with stakeholders to alleviate the problem of high concentrations of iron. The groundwater in a borehole will have high concentrations of iron when the iron contained in the earth and rock around the borehole has been eluted in the groundwater or when corrosive groundwater in the borehole has eluted iron in the water by reacting with steel parts of a pump. The Project Team conducted the study described below to examine the possibility of the latter case. The most likely cause of the elution of iron from pump parts is the low pH (high acidity) of the groundwater. Alkalinity of groundwater is also believed to cause corrosion of steel riser pipes and connecting rods. The number of disused boreholes is expected to be reduced significantly if an appropriate measure is taken against these causes.

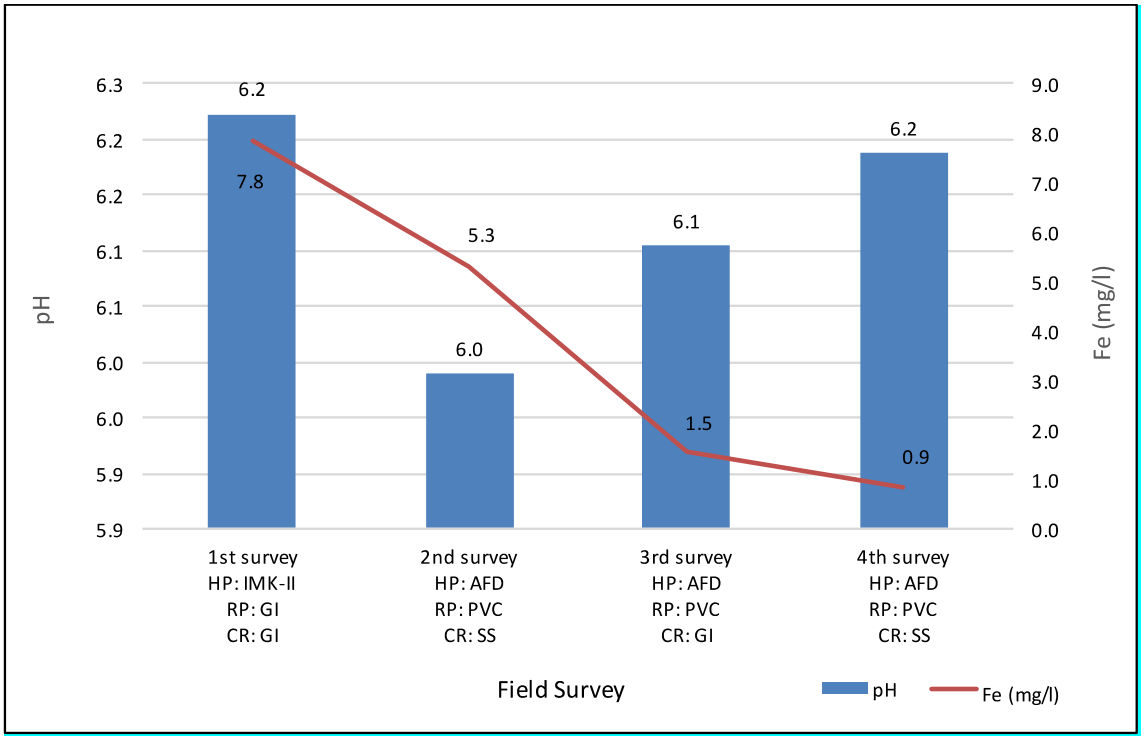
[22] This activity was continued as part of Activity 2-1, "Support the designing of the O&M Component Plan," and Activity 2-2, "Support the establishing of the O&M mechanisms of the SOMWP O&M model" in the activities for Output 2.

Corroded GI riser pipes
(India Mark II hand pump)

Replacement with PVC riser pipes
(Afridev hand pump)

The Project Team conducted the study continuously in the first and second years of the project. In the first year, the team conducted field reconnaissance at 34 potentially-valid study sites among the 60 candidate project sites in 11 districts in four provinces and identified 20 sites where the problem of a high concentration of iron (5.0 mg/L or more) in groundwater was observed (the first test). The team replaced the India Mark II hand pumps (with steel riser pipe and steel connecting rod) installed on the boreholes at the 20 sites with Afridev hand pumps (with PVC riser pipe and stainless steel connecting rod) and analysed the quality of the groundwater collected before and after the replacement (second test). A local subcontractor replaced the hand pumps, a simple water quality test of the water samples was conducted on site, and a detailed water quality analysis was conducted in a laboratory contracted by the team.

In the second year, the stainless steel connecting rods of the Afridev pumps installed in the previous year were replaced with steel rods and the quality of the groundwater was analysed before replacing the rods (third test). Then, the steel connecting rods installed on the Afridev pumps were replaced with stainless steel rods and the quality of the groundwater was analysed before replacing the rods. The Project Team analysed the change in water quality according to the material of the pump parts using the results of the tests (fourth test). The study was completed at the end of March 2013. ***Fig. 4-4*** shows the difference in the water quality parameters (pH and concentration of iron) caused by the difference in the design of the hand pumps detected in the study.



HP: Hand Pump RP: Riser Pipes CR: Connecting Rods IMK-II: India Mark II AFD: Afridev
GI: Galvanised Iron SS: Stainless Steel

Source: SOMAP3 (2013) Proposal on Standardisation of Hand Pump Specifications in Consideration of Water Quality

Figure 4-4 Correlation between pH and Iron Content Depending on Difference in Hand Pump Specifications

The Project Team prepared a recommendation on the standardisation of the specifications of the hand pumps to improve the water quality based on the study results. ***Table 4-10*** shows the summary of the recommendation.

Table 4-10 Proposal on Standardisation of Hand Pump Specifications in Consideration of Water Quality (Summary)

Findings from the Field Survey	Proposal
1. Specifications of Hand Pumps	
It was found that India Mark II pumps with GI riser pipes and GI connecting rods had been installed in 20 boreholes selected for the field survey. Of the 20 boreholes, 19 boreholes had a pH value of less than 7.0 (acidic), and 18 boreholes had iron content exceeding 5.0mg/l before replacement of the hand pump.	When there is an acidic condition with pH of less than 7.0, the pump to be installed in the borehole should have stainless steel and/or PVC components (riser pipes and connecting rods).
After replacing India Mark II pumps with Afridev pumps with PVC riser pipes and stainless steel connecting rods on all 20 boreholes, iron content decreased to almost 0.0mg/l in 16 boreholes.	Afridev hand pumps are recommended for use for groundwater with acidic water quality as they are designed to be resistant to corrosion.
Iron content did not decrease in some boreholes. This was attributed to the influence of local geology and the use of steel	If it is evident that the geological formation in the area contains iron, the installation of an Iron Removal Plant (IRP) is recommended.

Findings from the Field Survey	Proposal
casing and screens.	
GI riser pipes of hand pumps increased iron content to a level higher than Fe>10 mg/l, whereas limiting the use of GI materials only to the connecting rods causes iron content to slightly increase to 0.0 - 1.0 mg/l.	Since there is a noticeable effect in the increase of iron content in boreholes due to the installation of GI components, the installation of PVC and/or stainless steel components is recommended when pH is less than 7.0.
Afridev pump works perfectly in boreholes with a static water level of less than 35 mbgl.	In cases where the static water level is beyond 35 mbgl and pH is less than 7.0, India Mark II hand pumps fitted with stainless steel components are recommended. In cases where India Mark II hand pumps with GI riser pipes have been installed due to financial constraints, the further construction of an Iron Removal Plant is required.
2. Water Quality	
pH in boreholes is not always constant. It varies with seasons or is time-dependent.	Changes in pH values should be monitored at different times for a better understanding of the correlation between pH and iron content.
The Langelier Index (LI)[23] was observed to be an important parameter for water quality analysis involving iron content in boreholes.	It is recommended that the Langelier Index is included as one of the parameters to be measured during water quality analyses of boreholes and is used as a guide limit for selecting the pump to be installed.
3. Existing Boreholes	
There are many existing boreholes with high iron content. In most cases, it is considered that the problem of high iron content is attributable to corrosion of GI bottom components of hand pumps installed in these boreholes.	To solve this problem, two options can be considered as solutions: a) Replacement of the hand pump and construction of an Iron Removal Plant in case iron content is attributed to corrosive (acidic) water b) Construction of an Iron Removal Plant in case the iron content is attributed to the geological formation
Since DLAs do not keep drilling records, it was difficult to make an accurate evaluation of the problems related to water quality in boreholes during the field survey.	Borehole drilling records should be kept at the district councils in order to conduct the necessary follow-ups after construction. Submission of proper borehole logs recorded in the standardised format should be included in the terms and conditions of the contract with contractors.
4. Procurement of Hand Pumps with Appropriate Specifications	
Hand pumps are procured by contractors in accordance with the type and number of the pumps specified in the contract with the contractor. If there is no flexibility in the terms and conditions of the contracts in order	- To avoid using hand pump components that are not suitable to the groundwater quality condition at water points, it is recommended to conduct hydrogeological surveys in the target areas and to make an

[23] Refer to Annex 9 Findings of the Water Quality Survey for details.

Findings from the Field Survey	Proposal
to adjust the type of hand pump to be used, it is difficult to procure an appropriate type of hand pump with specifications that suit the water quality conditions of the respective water points.	estimation of what type of hand pump needs to be selected in that particular area. - Specifications in the contract with the contractors should indicate a proportion of hand pumps that can be used in consideration of the hydrogeological conditions in the target area. The type of hand pump to be installed at each water point should further be decided in consideration of the results of water quality tests during borehole drilling.

MLGH presented the recommendation to stakeholders in the sector at the meeting of the Q&M Component Thematic Working Group held in July 2013. After discussing other possible causes of the high concentration of iron in groundwater and the views of other CPs having similar problems, the participants of the meeting acknowledged the effectiveness of the recommendation. After studying various conditions including implementation systems and costs for the construction of boreholes with hand pumps ordered by MLGH and local authorities, MLGH has included the policy on the selection of the specifications of hand pumps to be installed in boreholes in NRWSSP in the O&M Manual (2nd Ed.) based on the recommendation. MLGH has adopted the above-mentioned recommendation as the policy for the implementation of NRWSSP under the following conditions related to the implementation capacity on the part of Zambia.

- The recommendation presents PVC and stainless steel as the materials of riser pipes where the groundwater is highly corrosive. MLGH prefers a PVC riser pipe due to the low cost of installation and maintenance and the ease of installation and removal if its use has no effect on the pumping capacity of a pump.
- In view of the ease performance for implementing agency and contractors of construction work, a simple assessment of only two parameters, concentrations of iron and pH, is to be used as the basic method for the selection of hand pump specifications by water quality. As the calculation of Langelier's index has been established as a valid means of accurately assessing corrosiveness, analyses using this evaluation method may be used in borehole construction projects wherever possible.

Figure 4-5 shows a flow chart depicting the recommendation on the standardisation of the hand pump specifications mentioned above as a process for the selection of hand pump specifications based on water quality (concentration of iron and pH). This chart is included in the O&M Manual (2nd Ed.). The understanding of stakeholders on NRWSSP at the provincial and district levels including staff of CPs and NGOs organised or facilitated in this project has been gained by providing an explanation of policy on the standardisation of hand pumps and the method of determining their specifications in various workshops regarding the problems in O&M.

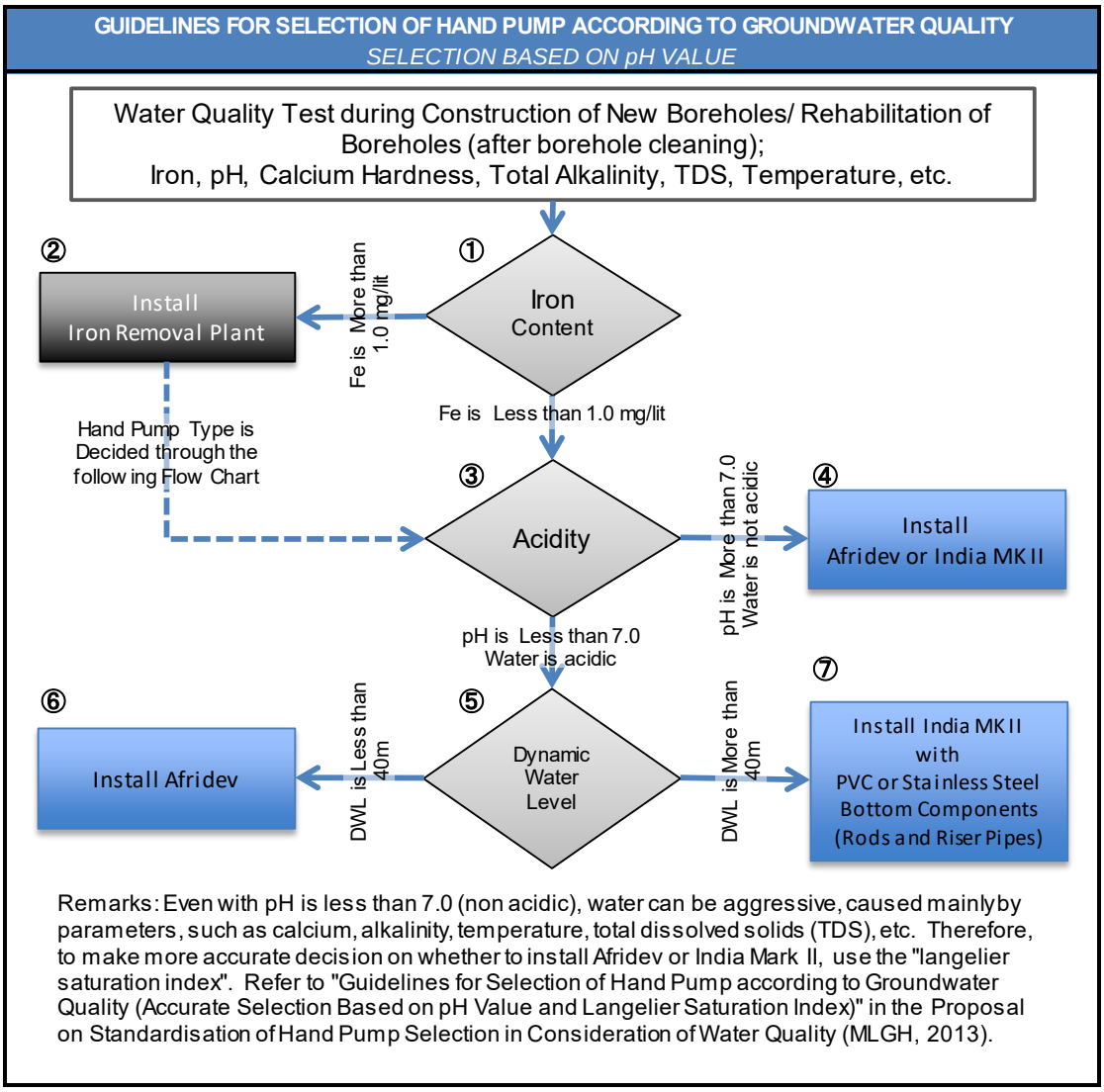


Figure 4-5 Flow Chart for Selection of Hand Pump Specifications based on Water Quality

4.1.7 Determination of Indicators of the Project Purpose and Overall Goal (Activity 1-8)

The Project Team planned to use IMS of MLGH in conjunction with the results of the baseline survey to be conducted in this project in order to set the baseline values of the project purpose, overall goal and indicators of some of the outputs. However, as technical defects had been found in IMS, the Project Team set the values of the indicators using the limited available IMS data and the results of the baseline survey conducted in the project.[24] (See "4-4. Results of the Baseline Survey and Endline Survey" for the results of the baseline survey.)

Table 4-11 shows the indicators of the project purpose, overall goal and outputs selected in the PDM Version 1. The indicators in PDM version 3 shown in "Chapter 3. Project Design Matrix

[24]The results of the baseline survey were used as the baseline values of all the indicators. The IMS data that could be used in the baseline value setting in this Project was only that which concerned the fund set up by communities in 2011 for hand pump maintenance, which was used as reference in the comparison with the PDM indicators of this Project.

(PDM)" are the final version of the indicators.

Table 4-11 Indicators Set in PDM Version 1 based on the Results of the Baseline Survey

Summary of the Project	Indicators
Overall Goal Proportion of the rural residents who has access to safe and accessible water supply is increased.	1. Percentage of the rural residents who use safe water becomes 75%.
Project Purpose Operation rate of the rural water supply facilities is improved.	1. 80% of rural water supply facilities in targeted 64 districts in the country is in operation. 2. Downtime of the rural water supply facility decreases to 14 days in case of breakdown of upper component. 3. Downtime of the rural water supply facility decreases to 30 days in case of breakdown of bottom component.
Outputs 1. Capacity of MLGH/DHID on O&M component is strengthened.	1-1 Whether O&M work plan is formulated abiding the national guideline or not 1-2 Whether O&M work plan is monitored and implemented according to the plan or not 1-3 Whether benchmarks (indicators) of the SOMAP O&M model is defined or not 1-4 Whether suggestion and opinion regarding standardisation of hand pumps depending on the water quality is received or not 1-5 Whether project baseline and target value can be determined or not 1-6 Whether or not 2nd edition of SCM manual is completed 1-7 Whether Supply chain manual to guarantee the quality of spare parts is compiled or not 1-8 Whether 2nd edition of O&M guideline and manual is compiled or not
2. SOMAP O&M model is implemented in targeted 54 districts in the country.	2-1 Number of communities collects and saves contribution for the hand pump O&M 2-2 Sales record of the spare parts 2-3 Number of facilities repaired by APMs 2-4 Frequency and contents of monitoring 2-5 Whether district O&M plan is designed in accordance with the National guideline
3 SOMAP O&M model is implemented in 4 districts (Mansa, Milenge, Mwense and Nchelenge) in Luapula province through coordination with PST and project direct support.	3-1 Number of communities collects and saves contribution for the hand pump O&M 3-2 Sales record of the spare parts 3-3 Number of facilities repaired by APMs 3-4 Frequency and contents of monitoring 3-5 Whether district O&M plan is designed in accordance with the National guideline

4.1.8 Formulation of the Procurement Guidelines of Hand Pump Spare Parts (Activity 1-9)

Spare parts supply chains were developed and many local communities purchased spare parts in the chain and repaired hand pump facilities in the six districts in which the pilot projects were implemented in SOMAPs 1 and 2. A major problem in terms of a discrepancy between the standards and specifications of parts of existing pumps and those of newly procured spare parts for the pump of the same model was observed occasionally.

The non-patented India Mark II and Afridev hand pumps installed as the standard models in Zambia are manufactured by many manufacturers in many countries. Therefore, spare parts that do not comply with the international standard specifications issued by SKAT-HTN are available in the market in large numbers. As some parts have multiple optional specifications in the said standard specifications, an order of a required spare part with incorrect optional specifications may be placed if the specifications are not studied carefully. In such a case, it will be impossible to install the purchased part. The Project Team prepared guidelines for the procurement of spare parts to enable DLAs to manage the quality, specifications and standards of spare parts in the procurement stage.

The Project Team conducted a study on the quality, specifications and standards of spare parts of the hand pumps in the districts where SOMAPs 1 and 2 were implemented and at agents of hand pumps and their spare parts. As the number of agents supplying individual spare parts was limited, as mentioned above, the team studied the products available from these agents. The team analysed the data and information obtained in the above-mentioned studies and prepared procurement guidelines describing the method of specifying the specifications and standards of spare parts in the procurement (ordering) stage, a list of agents supplying quality spare parts that correctly manage the specifications and standards of the parts they supply, and methods to inspect quality, specifications and standards of spare parts. The guidelines were included in the final version of the SCM Manual (2nd Ed.) mentioned above.

4.1.9 Revision of the National O&M Guidelines (Activity 1-10)

The O&M Guidelines provide policy and institutional guidelines on the operation and maintenance of facilities in the RWSS subsector. The Project Team revised the guidelines after analysing the changes from the preparation of the first edition in the policy and institutional environments, including the progress in devolution and the restructuring in the implementing agency at the level of the central government and the provincial level, in particular, as well as the lessons newly learned from the experience of activities related to the establishment of the O&M mechanism at the district level based on the implementation of the O&M component. The process of the revision of the guidelines is described below.

- The Project Team held discussions and reached an agreement with stakeholders involved in NRWSSP on the process and policy for the revision of the O&M Guidelines mentioned below at the first meeting in FY 2014 of the O&M Component Thematic Working Group (held on 14th March 2014).
- The Project Team analysed the following new developmental problems concerning compliance between the first edition of the guidelines with the relevant laws and regulations and the operation and maintenance of water supply facilities, and identified and sorted the issues to be included in the revised edition.
  - Selection of hand pumps specifications appropriate for the groundwater quality, particularly in connection to the hydrogeological conditions of low pH and high concentration of iron
  - Establishment of WDCs and the necessity to define their roles as the leading operator in

RWSS projects
  - A preference for the direct operation of the spare parts shops by DLAs
- The team interviewed the stakeholders to collect their suggestions and requests on the revisions and prepared a draft of the second edition of the guidelines. The major suggestions and requests collected from the stakeholders are shown below.
  - The relationship between the O&M action plan and overall district RWSS project plans should be defined systematically. As an O&M action plan is part of the RWSS project plan, it is not practical to formulate and implement action plans independently.
  - The number of opportunities for DLAs to procure materials and equipment for water supply facility construction projects and supervise the implementation of the projects is expected to increase as a process of devolution is in progress. Guidelines for the standardisation of the hand pump specifications are required for appropriate project implementation by DLAs.
  - Because the guidelines should only present an overall framework for the planning and implementation of the O&M component, they should be concise in volume. Implementation methods should be described in detail in the O&M Manual.

The major points of the revision made in the above-mentioned process of preparing the second edition of the guidelines are as follows.

- Reorganising the contents: The description of the operation and maintenance work and materials and formats required for the work that were included in the O&M Guidelines (1st Ed.) are included in the O&M Manual (2nd Ed.). The second edition of the guidelines mainly describes the guidelines derived from the basic policy and framework of the operation and maintenance work.
- Restructuring and re-definition of the SOMAP O&M model: The five O&M mechanisms used to compose the SOMAP O&M model (community-based management-CBM, mechanism for the repair of protected water points with hand pump, management of the tool kits, management of the spare parts supply chain and monitoring) were restructured into three mechanisms (CBM, mechanism for the repair of protected water points with hand pump and management of the spare parts supply chain). The mechanism for the management of the tool kit has been redefined as part of the mechanism for the repair of protected water points with hand pump and the monitoring has been redefined to be included in all the three mechanisms.
- The guidelines have been revised to be consistent with the relevant policies, guidelines and manuals mentioned below:
  - MLGH (2012), Agreed Guidelines and Procedures for Rural Water Supply and Sanitation Programme Funds
  - MLGH (2012), Guidelines on the Establishment, Management and Operation of Ward Development Committees (WDCs)
  - MLGH (2012), RWSS O&M Component Supply Chain Management Manual 2nd Edition, April 2012
  - MLGH (2013), Water Supply and Sanitation Policy, 2nd Draft, 17th June 2013
  - MWDSEP (2016), RWSS O&M Implementation Manual & User Guide, 2nd Edition

4.1.10 Revision of the RWSS O&M Implementation Manual (Activity 1-11)

As with the background and key points of the revision of the O&M guidelines, which are described in section 4-1-9, the Project Team produced a second edition of the O&M manual (1st Ed.) prepared in SOMAP 2 that reflected changes in the policy and institutional environments since the preparation of the 1st edition, and the experience accumulated and lessons learned in the implementation of the O&M component. The O&M Manual (2nd Ed.) (***Figure 4-6)*** is published by MWDSEP, which was given the responsibility for the implementation of water supply and

sanitation projects from MLGH.

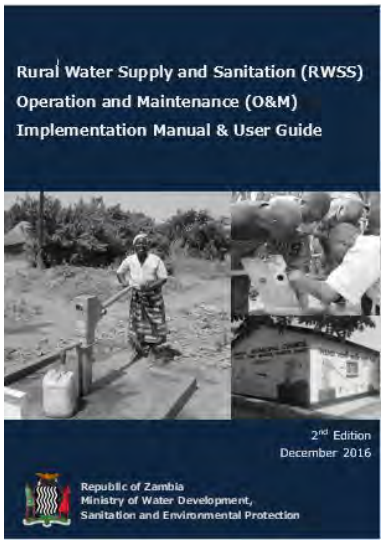


Figure 4-6 O&M Implementation Manual and User Guide (2nd Ed.)

This revised O&M manual comprehensively describes practical activities for the development of the SOMAP O&M model for the staff members responsible for the development of O&M structure in the RWSS subsector in central government and local authorities. The team prepared the manual in such a way that it was consistent with the "Agreed Guidelines and Procedure for Rural Water Supply and Sanitation Programme Funds (RWSSP Funds Guidelines)" formulated by MLGH with assistance from DANIDA in October 2012 on matters concerning planning, budgeting and procurement management and accounting for RWSS projects of DLAs. The said guidelines are considered to be part of the NRWSSP Implementation Guidelines. The process of the revision of the O&M manual is described below.

- The Project Team held discussions and reached an agreement with stakeholders involved in NRWSSP on the process and policy for the revision of the O&M Manual (1st Ed.) at the first meeting in FY 2014 of the O&M Component Thematic Working Group (held on 14th March 2014).
- The team collected and analysed various reference materials including relevant policies and laws, and the available relevant manuals. The team mainly analysed those documents prepared after the preparation of the O&M Manual (1st Ed.). The documents analysed by the team included those prepared in this project and assistance programmes of other CPs and technical references of hand pumps. The team used the collected manuals as reference materials on the following points.
  - The description of the procedures for the preparation of O&M action plans is consistent with the RWSSP Funds Guidelines (MLGH, 2012) mentioned above.
  - The implementation cycle and procedures of the participatory RWSS projects in NRWSSP are described in detail in the D-WASHE training manual prepared in an assistance programme by GIZ. When revising the O&M manual, the team paid attention to consistency between the description of the policy on activities for the development of the CBM mechanism and the description in the above-mentioned training manual.
  - The description of the method for the implementation of V-WASHE training at the community level in the O&M Manual is made consistent with the existing WASHE Manual and the V-WASHE Training Manual prepared in the Water Sector Programme Support II (WSPSII) supported by DANIDA.

- The team conducted an interview survey with the staff members directly involved in RWSS in the levels of central government and local authorities (April and May 2014). A survey on the use of the existing manuals and suggestions and requests for their implementation was conducted at MLGH, eight PDHIDs (in Eastern, Central, Western, Northern, Muchinga, Luapula, Copperbelt and North-western Provinces) and WSSCs in the 14 districts selected from the districts in which NRWSSP was implemented. The main suggestions and requests collected in the survey are as follows.
  - An explanation of the installation procedures of Afridev pumps in addition to those of India Mark II hand pumps shall be included in the manual.
  - Standard facilitation methods to be used in a variety of training shall be described in the manual so that the provincial and district stakeholders on NRWSSP can provide O&M-related training.
  - Consistency of the formulation processes of district RWSS AWPs and O&M action plans shall be established.
  - The methods of implementing activities for the development of the CBM mechanism and the major topics in the development of the mechanism shall be described in detail.
- The Project Team produced visual materials (showing spare parts and hand pump repair work) to be included in the O&M Manual.
- The team organised a national consultation meeting with stakeholders involved in RWSS projects (June 23rd and 24th 2014; a total of 47 people participated including the stakeholders involved in RWSS projects in 20 districts in 10 provinces and the members of the O&M Component Thematic Working Group). The team explained the content of the second edition of the O&M Manual (first draft) to the participants, held discussions on its content and collected their suggestions and requests on the content of the manual.
- The members of the O&M Component Thematic Working Group approved the Q&M Manual (2nd Ed. draft) in its meeting (on 1st August 2014).

The main points of the revision of the manual conducted through the process mentioned above are as follows:

- The Project Team reorganised and redefined each of the mechanisms composing the SOMAP O&M model as mentioned above in the section of Activity 1-10.
- The description on the development of the community-based management (CBM) structure in the first edition only presented the policy for raising the budget for O&M from user fees and the measures for the management of the collected fees. The second edition clearly describes the guidelines, practical activities and methods for the establishment of a voluntary association of community residents called V-WASHE that is required for the development of the CBM structure, training to strengthen the capacity for O&M among community residents, leadership training, estimation of annual O&M expenditure, setting of water user fees and accounting.
- In the second edition, the team used the "Proposal on Standardisation of Hand Pump Specifications in Consideration of Water Quality," which was approved by stakeholders in the sector in the O&M Component Thematic Working Group, as a reference material to describe the criteria and process for the selection of hand pump specifications based on hydrogeological conditions including water quality. The team also described the technology and maintenance methods used in iron removal plants.
- The team prepared the second edition of the manual to be consistent with the guidelines for the formulation of plans of RWSS projects (action plans and budgetary plans) by DLAs and, more specifically, RWSSP Funds Guidelines (MLGH, 2012) on matters concerning action plans, budget setting and financial affairs in the district O&M action plan.
- The team clearly defined the requirements for monitoring activities to clarify the state and output measurements for activities conducted in the introduction and implementation stages of the SOMAP O&M model by the individual mechanisms that comprise the model and by administrative level. The team also introduced record and report formats as monitoring tools.

- For user convenience, the team divided the manual into volumes that corresponded to an individual mechanism in the model. There was minimal use of photographs as visual materials when explaining spare parts and repair work in the manual. Instead, drawings were used for the ease of understanding of users.

In the fourth year, the Project Team used the revised manual in the training of provincial facilitators, orientations on O&M models for DLA staff, and APM training, and the operating procedures for various training programs to be attached to the manual were improved and finalised. The revisions made by the team included a revision to the time allocation for various training programs, more practical descriptions of facilitation methods and the clarification of the matters to be discussed and agreed upon in each session.

The Project Team also prepared a case study report for the purposes of creating a peer-learning effect among those engaged in strengthening the O&M structure at the district level, and facilitating their active participation in the introduction of the O&M model. The team collected the data for the preparation of the case study report in the districts mentioned in ***Table 4-12*** between July and October 2016. The team conducted a semi-structured interview survey and field inspection to collect examples of the measures taken and lessons learned in the three mechanisms composing the SOMAP O&M model (community-based management, repair mechanism and spare parts supply chain management) from the staff of DLAs, APMs, members of WDCs and members of V-WASHE. This report was printed as a component of the O&M Manual (2nd Ed.) and copies were distributed to stakeholders.

Table 4-12 Outline of the Case Study Document on Improved O&M

District/Province	Focused Thematic Areas	Cases Introduced as Good Practice
Mwense/Luapula	Comprehensive actions and their effects on establishment of O&M mechanisms	• Opening a communal bank account to keep O&M funds raised by V-WASHEs, management of the account by DLA on behalf of V-WASHEs, and development of procedures for V-WASHEs to settle payments for spare parts purchased at the spare parts shop and repair works provided by APMs utilising the communal account • Achieving synergistic effects by mutually linking activities to establish and strengthen the three O&M mechanisms
Milenge/ Luapula	Comprehensive actions and their effects on establishment of O&M mechanisms	• Allocation of APMs and tool kit centres corresponding to distribution of water points • Monitoring of performance of APMs and conditions of water points utilising APM repair work records • Selling of spare parts at RHC
Mumbwa/ Central	Comprehensive actions and their effects on establishment of O&M mechanisms	• Maintaining operation of the spare parts shop • Standardisation of the content and methodologies of APM training • Procedures for storage and use of maintenance tools
Siavonga/ Southern	Supply Chain Management	• Consideration of the need for spare parts by communities in neighbouring districts where spare parts shops are yet to be established • Procedures for stock replenishment and price revision • Facilitation of establishment of WDCs

District/Province	Focused Thematic Areas	Cases Introduced as Good Practice
Nyimba/ Eastern	Community-Based Management	• Community sensitisation, facilitation of establishment and training of V-WASHEs, and implementation of these works in collaboration with activities related to establishment of SCM • Facilitation of participation of women in APM training
Mbala/ Northern	Community-Based Management	• Coordination and promotion of collaboration among stakeholders in the RWSS sub-sector in the district using the D-WASHE meetings • Cooperation with traditional leaders in facilitation of O&M activities at the village level • Facilitation of community participation through sensitisation starting from the stage before construction of water supply facilities.
Kapula/ Northern	Repair Work Mechanism	• Allocation of APMs and tool kit centres corresponding to distribution of water points • Introduction of standard charges for repair works of hand pumps by APMs • Procedures for storage and use of maintenance tools
Lufwanyama/ Copperbelt	Repair Work Mechanism	• Coordination and promotion of collaboration among stakeholders in the RWSS sub-sector in the district

4.1.11 Dissemination of Project Output - Workshops on Review of National Roll-out of the SOMAP Model

The Project Team implemented the final seminars to disseminate the outputs of the project in Lusaka on 17th November 2016 and in Kabwe in Central Province on 30th November 2016. The first seminar was for the stakeholders from the central government and CPs involved in NRWSSP and the second one was for the staff of PDHIDs and DLAs. Both seminars had 50 participants. The project evaluation team presented the results of the brief terminal evaluation at the seminar in Lusaka. ***Table 4-13*** shows the summary of the two final seminars.

Table 4-13 Workshops on Review of National Roll-out of Sustainable O&M Model

(1) Workshop for Line Ministries, CPs, and Private Sector Related to RWSS		
Date	:	17th November 2016 (Thu.) 8:30-17:00
Venue	:	Lusaka
Participants	:	• Relevant ministries: MoCTA, MCDMCH, MoA, MoGE • CPs: JICA, UNICEF, GIZ (TAs), KfW (TAs for RWSS Basket Fund Mechanism), USAID, CARE, WaterAid, WASAZA • Consultants • Representatives from DLAs (5 districts), PDHIDs (10 provinces) • DHID/MLGH, SOMAP3
Objectives	:	1. Share findings from the endline survey of SOMAP3 on achievement in the national roll-out of the sustainable O&M model by MLGH and its partners. 2. Share good practices and lessons learnt from different districts and provinces in implementation of the O&M model. 3. Discuss approaches on how the O&M component should be implemented in

the Second Phase of NRWSSP with taking account of recommendations made in the End of Term Evaluation of NRWSSP as well as final evaluation of SOMAP3.
4. Make consensus among the participants on the points which should be reflected in the programme document of NRWSSP2 based on outcomes of discussion in the workshop.

Programme	:	1: Opening remarks, introduction of participants, workshop objectives	[DHID]
[presenter]		2: Achievement in National Roll-out of the O&M Model	[SOMAP3]
		3: Report on Results of the Final Joint Evaluation of SOAMP3	[JICA Evaluation Mission]
		4: Good Practices and Lessons Learnt in Implementation of the O&M Model	[WSSCs from Mumbwa, Mwense, Nyimba, Siavonga, and Kaputa]
		5: Utilisation of MIS and District Management Checklist in Implementation of O&M	[DHID-M&E/MIS, GIZ TA, SOMAP3]
		6: Implementation Approaches of the O&M Component in NRWSSP2 - Summary of recommendations from the End of Term Evaluation of NRWSSP and final evaluation of SOMAP3 - Plenary discussion on implementation approaches of the O&M component taking account of the recommendations	[DHID]

(2) Workshop for PDHIDs and Representatives from DLAs

Date : 30th November 2016 (Wed.) 8:30-17:00
Venue : Kabwe, Central Province
Participants :
- PDHIDs (10 provinces)
- WSSCs from DLAs (31 districts)
- DHID/MLGH, TAs (GIZ, SOMAP3)

Objectives :
1. Share findings from the endline survey of SOMAP3 on achievement in the national roll-out of the sustainable O&M model by MLGH and its partners.
2. Share good practices and lessons learnt from different districts and provinces in implementation of the O&M model.
3. Obtain feedback from participants from districts and provinces on the implementation approaches of the O&M component in NRWSSP2 which were discussed in the workshop at the national level.
4. Make consensus among the participants on the points which should be reflected in the programme document of NRWSSP2 based on outcomes of discussion in the workshop.

Programme	:	1: Opening remarks, introduction of participants, workshop objectives	[DHID]
		2: Achievement in National Roll-out of the O&M Model	[SOMAP3]
		3: Report on Results of the Final Joint Evaluation of SOAMP3	[DHID]

4: Good Practices and Lessons Learnt in Implementation of the O&M Model	[WSSCs from Milenge, Mbala, Kaoma, Lufwanyama, and Isoka]
5: Utilisation of MIS and District Management Checklist in Implementation of O&M	[DHID-M&E/MIS, GIZ TA, SOMAP3]
6: Implementation Approaches of the O&M Component in NRWSSP2 - Summary of recommendations from the End of Term Evaluation of NRWSSP and final evaluation of SOMAP3 - Summary of discussion in the workshop at national level - Plenary discussion on implementation approaches of the O&M component	[DHID]

The Project Team held discussions with the participants on the approaches to be used in the implementation of NRWSSP Phase 2 based on the recommendations derived from the results of the brief terminal evaluation of this project and the recommendation on the O&M component in the terminal evaluation of NRWSSP in the final seminar for stakeholders in the central government. The Project Team presented the content of the discussions in the final seminar in Lusaka to the participants and collected suggestions on the implementation of the O&M component in NRWSSP Phase 2 from provinces and districts in the final seminar in Kabwe for stakeholders on NRWSSP at the provincial and district levels. Then, the team classified these suggestions in four thematic groups, "O&M Mechanisms," "Project Cycle Management of District O&M Action Plan/District RWSS AWP," "Capacity Development of the Operators in O&M" and "Fundraising." The O&M Component Thematic Working Group discussed the measures to be taken in O&M on the Zambian side with consideration for the suggestions collected in the final seminar and reached an agreement on the measures in the meeting on 20th December 2016. The suggestions presented by the participants of the final seminar and the content of the agreement reached on the measures to be taken by DHID are described in the minutes from the meeting of the O&M Component Thematic Working Group meeting (held on 20th December 2016) attached hereto as Annex 4. The suggestions discussed in the final seminar are summarized below.

(1) O&M Mechanism

1) CBM

During the implementation of the first phase of NRWSSP, activities to establish SCM and RWM were mainly focused on the O&M component, which contributed to the facilitation of capacity development of actors at provincial and district levels on these thematic areas to a certain extent. On the other hand, further actions are required for budget allocation and the implementation of activities to establish CBM in districts in the second phase of NRWSSSP. Particularly, the following actions are expected to be approaches to the realisation of the establishment and sustainable operation of the CBM mechanism:

- Redefining roles and responsibilities of traditional leaders in NRWSSP, and cooperation with traditional leaders in planning, implementation, and monitoring RWSS projects
- Facilitating the full participation of communities to take the initiative in RWSS projects from the project preparation stage (identification of needs), and taking community applications for the improvement of water and sanitation as an important aspect of planning
- Utilisation of personnel who have adequate facilitation skills in community-based O&M activities and capacity development of actors involved in O&M at the community level
- Planning and implementation of the formation/re-organisation and training of V-WASHEs in a systematic manner

- Coordination among different Community-Based Organisations (CBOs) involved in the improvement of water supply and sanitation at the village level and promotion of an integrated approach in which communities take responsibility for all WASH activities

2) RWM

Firstly, it is necessary to create a mechanism in districts so that APMs are paid appropriately by communities for hand pump repair work.

Secondly, "rehabilitation" of water supply facilities in NRWSSP should be redefined and the criteria for selecting the facilities that fall under the definition reviewed so that they are based on the type and nature of the works required instead of the current system of applying a threshold to the costs incurred. According to the current policy of MLGH, in the case that the repair cost exceeds ZMW400, it can be categorised into rehabilitation work for implementation by DLA regardless of the cause of malfunction of the facility and the type of repair work required[25]. Because of this even cases that the community can handle by utilising O&M funds and placing a request for repair with APM would also be regarded as rehabilitation work based solely on the cost of repair. Such cases would lead to communities being dependent on financial support from DLA/GRZ and CPs, and would put pressure on the district's budget for rehabilitation work, which is a matter of concern.

3) SCM

DLAs should not separate management of spare parts shops from normal council business operations. All operation costs of the spare parts shops should be covered by the council's budget rather than relying on financial support from GRZ and CPs. In particular, DLAs should properly use the revolving funds managed from the sale of spare parts in order to continually replenish stock.

It is also recommended that DLAs keep stock of highly consumable spare parts at the ward level, such as tool kit centres and sub-offices of the district council, in order to make it more convenient for communities to purchase spare parts.

(2) Project Cycle Management of District O&M Action Plans/District RWSS AWPs

DLAs should prepare district RWSS AWPs including O&M action plans, set targets and prioritise financing based on baseline information. DHID/MLGH should incorporate the DLA plans into its work plan at national level, and not vice versa.

With regard to monitoring, operation of MIS under the comprehensive M&E system of NRWSSP and the establishment of an RWSS Unit in the new ministry MWDSEP are required. It is also recommended that required actions are incorporated into the O&M component work plan to respond to the need for including a water quality monitoring aspect in the component.

(3) Capacity Development of Actors in O&M

The content and methodologies of training to be provided for the establishment of O&M mechanisms should be harmonised among projects/programmes in support of capacity

[25] This policy is stipulated in the Guidelines on the Community Contribution towards Water Supply Infrastructure Development-National Rural Water Supply and Sanitation Programme (NRWSSP), a circular issued by MLGH in 2013. At the price level of Zambia as of 2016, the retail price of a riser pipe for India Mark II hand pump is about ZMW300-350 in Lusaka. In consideration of the cost of repair work, the replacement of even one riser pipe will exceed ZMW400, which satisfies the requirement for rehabilitation mentioned in the guidelines above.

development activities in districts. Furthermore, there should be a pool of facilitators/trainers who can train DLAs/D-WASHEs regarding O&M mechanisms based on the standard and harmonised approaches of each activity regardless of funding source or project type.

As to individual areas of capacity development related to the O&M component, the new phase of NRWSSP requires further efforts to be made towards refresher training of APMs, facilitating the establishment of WDCs and their capacity development as facilitators in RWSS projects including O&M activities, and training DLAs and PDHIDs to enhance their capacities to use and analyse WASH-related data.

(4) Financing

- The ministry responsible for RWSS should lobby decision makers in the country to increase GRZ funding towards the O&M component and to ensure implementation of the approved budget for the component. In addition to financial support from GRZ and CPs, the utilisation of local resources by DLAs for implementation of O&M action plans must also be promoted.
- All projects/programmes for construction/rehabilitation of water supply facilities should have accompanying funds intended for strengthening O&M mechanisms in the districts. In particular, emphasis should be placed on providing wards with more financing to enable WDCs and APMs to facilitate and monitor O&M activities conducted by V-WASHEs.
- Operation of the basket funding mechanism should be further promoted. Also, financial support for DLAs under NRWSSP should be tied to the preparation and availability of district RWSS AWPs.

4.2 Activities for Output 2

Output 2: The SOMAP O&M model is implemented in NRWSSP target districts.

The activities for Output 2 are aimed at facilitating nationwide roll-out of the SOMAP O&M model. Results and achievement of the activities for Output 2 are explained below.

4.2.1 Support for Preparation of the O&M Component Plans at Provincial and District Level (Activity 2-1)

Prior to adopting the RWSS Funds Guideline (MLGH, 2012) as guidelines for the implementation of NRWSSP, DLAs used to formulate project plans by programme component, *e.g.* water supply, sanitation and O&M, and by CP programme. Under such circumstances, there was likely to be a duplication of activities between different assistance programmes, and each component was likely to be large in terms of scale and budget. Therefore, the said guidelines require each DLA to prepare a single district RWSS AWP as a plan for the projects in the RWSS subsector in the district development plan. O&M action plans that provide measures to establish and strengthen O&M mechanisms for water supply facilities are considered to be part of the district RWSS AWP in this system, so DLAs are required to prepare an appropriate O&M action plan within the framework of the procedures for the preparation of AWPs. ***Figure 4-7*** shows the relationships between the district development plan, district RWSS AWP and O&M action plan and the implementation cycle of the plans.

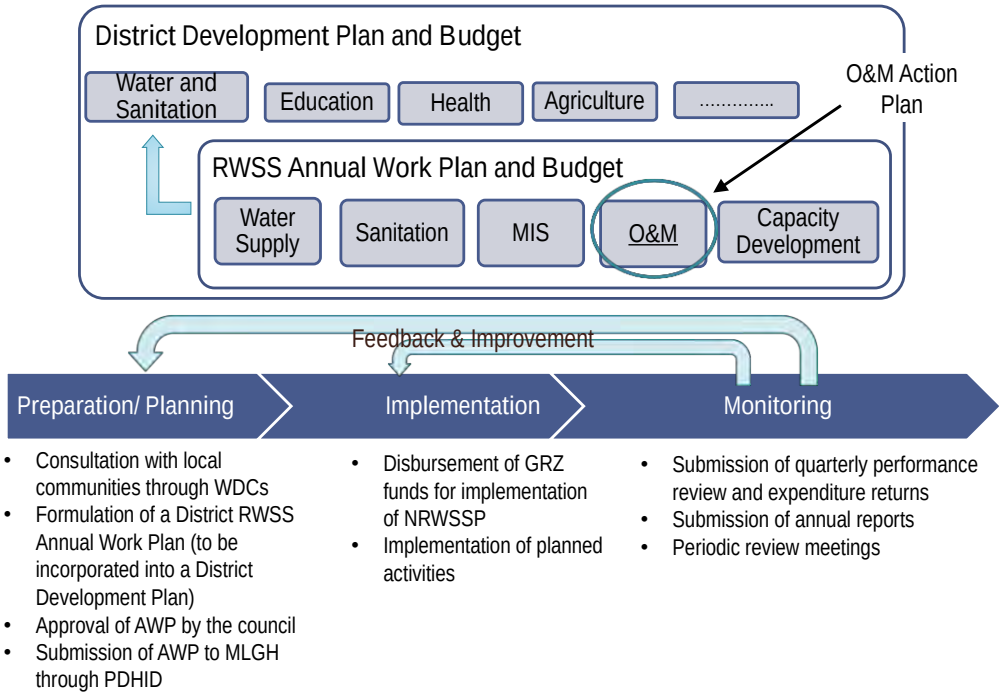


Figure 4-7 RWSS Annual Work Plan in the District Development Plan and Its Implementation Cycle

The Project Team carried out the following activities in this project to support the preparation of district O&M action plans aiming at the establishment and strengthening of the O&M mechanisms in the target districts of NRWSSP.

(1) Orientation Workshops on the Introduction of SOMAP O&M Model (for the staff of PDHIDs including the members of PSTs)

In January 2013 (in the second year), the Project Team provided orientation workshops on the O&M model and the formulation of a district O&M action plan to staff of PDHIDs including the members of PSTs, who were expected to facilitate the introduction of the SOMAP O&M model at the district level, as mentioned in "4-1-5. Guidance to PDHIDs/PSTs on Implementation Process of the O&M Component and SOMAP O&M model (Activity 1-6)." MLGH made the first disbursement of the NRWSSP Fund in FY 2013 to all PDHIDs in late April 2013 in accordance with the provincial O&M work plans prepared in the above-mentioned workshop. PDHIDs were expected to use the disbursed fund to provide orientation workshops to DLAs and carry out follow-up activities to facilitate the formulation of district O&M action plans for FY 2013.

(2) Training of Provincial Facilitators for the Preparation and Implementation Management of O&M Action Plan and Management of the Spare Parts Supply Chain

In the third year, the Project Team implemented a training course among facilitators for the formulation of district O&M action plans and individual tasks in O&M in order to improve the capacity of PDHIDs for technical assistance and supervision for the introduction and implementation of the O&M model at the district level.

Two staff members of PDHID and two DLA staff members recommended by PDHIDs from each province participated in the training.[26] The attitude towards the daily duties in RWSS projects and the capacity to put a plan into effect, as well as the ability to exert positive influence were the priority criteria for the selection of participants from DLAs.

The purpose of training staff of DLAs as provincial facilitators is to promote peer-learning among DLA staff and to create an environment that would enable such facilitators to report problems recognized in district level through the project implementation and the actual measures taken to solve the problems to PDHID. The training of DLA staff is also expected to produce a demonstrable effect of presenting good practice to nearby districts by implementing measures to establish O&M mechanisms led by the trained DLA staff.

The selected staff of PDHIDs and DLAs took two training courses, "Facilitation for the District O&M Action Plan Formulation" and "Spare Parts Supply Chain Management" to improve their knowledge and skills to the level required for the spreading and facilitation of the use of the O&M model. The focus of this training was the acquisition by the participants of the skills and attitudes that a facilitator is expected to have when facilitating and helping others to understand and practice the concept and methodology of the O&M model, so the training was designed so that participants could study how to manage sessions in a workshop and methods of guidance in the field while taking turns to practice the role of facilitator. The Project Team improved the training materials to be used in similar training at the provincial and district levels based on the level of understanding of the training content by the participants and their suggestions on the content.

The adoption of the format of joint training for stakeholders on NRWSSP in multiple provinces and districts facilitated the exchange of experiences views regarding the methods actually used for the realisation of the O&M model at the district level and an exchange of problems regarding the use of relevant guidelines and manuals among the participants. With regard to the methodology and tools used in the pilot project in the four districts in Luapula Province intended for inclusion in the O&M model, the points to be revised when spreading this model nationwide were identified based on evaluations and suggestions provided by stakeholders on NRWSSP from other districts and provinces. The participants of this training also participated in the workshop on the revision of the O&M Manual included in Activity 1-11 and discussed the matters to be reflected in the second edition of the manual. ***Table 4-14*** to ***Table 4-17*** show the summary of the training and breakdown of the participants. The list of the participants in the training is attached hereto as Annex 5 (2).

Table 4-14 Training of Provincial Facilitators on Facilitation for the District O&M Action Plan Formulation

Date and Venue	Target Province	Number of Participants	Facilitator
12th – 16th May 2014 Ndola	Copperbelt, Luapula, Northern, Muchinga, North Western	19	Senior Engineer and Senior O&M Officer of DHID/MLGH, SOMAP Team
14th – 18th July 2014 Kabwe	Central, Eastern, Lusaka, Southern, Western	17	SOMAP Team

[26] The participants from the PDHIDs were principally the Principal Engineer and a Senior Engineer in charge of the water and sanitation sector. If there was only one engineer assigned to PDHID, either a PST member or a DLA staff member was allowed to participate in the orientation workshop from the province concerned in place of an engineer of PDHID.

Programme		
Day 1	Session 1	Introduction of workshop objective
	Session 2	Consideration of O&M in RWSS project cycle
	Session 3	Roles and responsibilities of provincial facilitators in planning and implementation of the O&M action plans
Day 2	Session 4	Establishment of sustainable O&M mechanisms
Day 3-4	Session 5	Situation analysis on O&M status in the district
	Session 6	Preparation of the district O&M action plan
Day 5	Session 7	O&M monitoring

Note: A senior engineer of PDHID-Lusaka and WSSC for Chongwe District who were nominated as trainees were absent on other programmes.

Table 4-15 Breakdown of the Participants of Training (Facilitation for the District O&M Action Plan Formulation)

Province	Provincial Engineer/ DHID	RWSS Coordinator/ DLA
Copperbelt	2	2 (Masaiti, Mpongwe)
Luapula	2	2 (Mwense, Milenge)
Northern	2 (Including 1 PST member)	2 (Mbala, Kaputa)
Muchinga	2	2 (Isoka, Mpika)
North Western	2	2 (Chavuma, Ikelenge)
Central	2	2 (Serenje, Kapiri Mposhi)
Eastern	2 (including 1 PST member)	2 (Chadiza, Nyimba)
Lusaka	0	1 (Luangwa)
Southern	2	2 (Siavonga, Gwembe)
Western	1	3 (Kalabo, Sesheke, Shangombo)
Total	17	20

Table 4-16 Training of Provincial Facilitators on Spare Parts Supply Chain Management

Date and Venue	Target Province	Number of Participants	Facilitator
27th – 30th May 2014 Ndola	Copperbelt, Luapula, Northern, Muchinga, North Western	20	SOMAP Team
28th – 31st Jul. 2014 Kabwe	Central, Eastern, Lusaka, Southern, Western	15	SOMAP Team

Programme		
Day 1	Session 1	Introduction of workshop objective
	Session 2	Supply chain management of hand pump spare parts in the district
	Session 3	Organisational set-up
	Session 4	Product information
	Session 5	Procurement of seed stock
Day 2	Session 6	Pricing
	Session 7	Organising the store
	Session 8	Sales promotion
Day 3	Session 9	Stock control and records
Day 4	Session 10	Sales operation and financial accounting

Table 4-17 Breakdown of the Participants of Training (Spare Parts Supply Chain Management)

Province	Provincial Engineer/ DHID	RWSS Coordinator/ DLA
Copperbelt	2	2 (Masaiti, Mpongwe)
Luapula	1	3 (Mwense, Milenge, Mansa)
Northern	2 (including 1 PST member)	2 (Mbala, Kaputa)
Muchinga	2	2 (Isoka, Mpika)
North Western	2	2 (Chavuma, Ikelenge)
Central	1	2 (Serenje, Kapiri Mposhi)
Eastern	2 (including 1 PST member)	2 (Chadiza, Nyimba)
Lusaka	0	2 (Luangwa, Chongwe)
Southern	1	2 (Siavonga, Gwembe)
Western	0	3 (Kalabo, Sesheke, Shangombo)
Total	13	22

Note: Principal engineers of DHIDs - Luapula, Central, Southern, and Western provinces were absent on other programmes.

(3) Orientation Workshop on the Preparation of District O&M Action Plans

The orientation workshop on the O&M model and the preparation of O&M action plans was implemented in 65 districts among (70%) the 93 target districts of NRWSSP during the implementation period of this project. The purposes of the course were to improve the understanding of staff of DLAs/members of D-WASHE regarding the concept of O&M mechanisms and approaches to their establishment, the roles and responsibilities of the people involved in O&M at the district level in the development of the mechanisms and the procedures for the preparation of an O&M action plan as part of a district RWSS AWP, and to identify problems to be solved and outputs to be achieved in the action plan based on the results from analysing the current state of the O&M activities in each district. The participants held discussions and improved their understanding regarding the complementary relationships among the three O&M mechanisms and measures to be taken for the integrated establishment of these mechanisms during the preparation and implementation of an action plan. The approach used for the establishment of the SCM mechanism was new to all the districts. However, the participants agreed to use it for the creation of an environment that facilitates community-based management activities.

Most of these orientation workshops were conducted in 2013, the second year of the project period. The cost of their implementation was covered by the funds allocated from the FY 2013 budget from the Government of Zambia to the O&M component work plan. The cost of the orientation workshops in provinces receiving CP support at the time of the course was paid in whole or part by the CP. The Project Team provided PDHIDs with on-the-job training (OJT) on the preparation of the orientation workshops, including the preparation of a course program, a plan for facilitation in each session and training materials and facilitation in the orientation workshops for the implementation of the orientation workshops. ***Table 4-18***, ***Table 4-19*** and ***Table 4-20*** show assistance for the orientation workshops from this project including completed assistance from CPs, the standard program of the orientation workshop and the number of districts which participated in the orientation workshop in each province by the completion of this project, respectively.

Table 4-18 Orientation Workshops for Preparation of District O&M Action Plans to Which SOMAP3 Provided Technical Assistance for Facilitation

Province	Date and Venue	Targeted Districts (District Absent)	Participants		Source of Funds
			N	Position	
Northern and Muchinga	20-24 May 2013 (5 days) Kasama	Northern: Chilubi, Kaputa, Mbala, Mpulungu, Kasama, Mungwi, Mpolokoso, Luwingu, Nsama Muchinga: Mpika, Chinsali, Isoka, Nakonde, (Chama)	70	13 districts: 5 from each district (DLA staff (CS, DoW, WSSC, 2 from D-WASHE who does not belong to DLA) PLGO Office, DWA Provincial Office, DAPP, SNV	GRZ & DAPP[*1]
Western	4-5 Jun. 2013 (2 days) Senanga	Sesheke, Mlobezi, Kaoma, Senanga	12	4 districts: 3 from each district (DLA staff (DPO, WSSC, 1 from D-WASHE who does not belong to DLA)	GRZ & DANIDA
	20-21 Jun. 2013 (2 days) Senanga	Mongu, Kalabo, Shangombo, Lukulu	13	4 districts, same as first group above.	GRZ & DANIDA
Southern	27-28 Jun. 2013 (2 days) Monze	Mazabuka, Kalomo, Siavonga, Kazungula, Chikankata	13	5 districts: same as the target group in Western Province	GRZ & DANIDA
	18-19 Jun. (2 days) Choma	Southern: Choma, Gwembe, Monze, Namwala, Sinazongwe, Pemba, Zimba Central: Itezhitezhi[*2]	22	8 districts: same as the target group in Western Province	GRZ & DANIDA
Luapula	11-12 Jul. 2013 (2 days) Sanfya	Chiengi, Kawambwa, Sanfya, Chembe, Chipili, Mwansabombwe, (Lunga)	18	6 districts: 3 from each district (DPO, WSSC, 1 from D-WASHE who does not belong to DLA)	GRZ, UNICEF, WaterAid
Central	29-30 Jul. 2013 (3 days) Kabwe	Serenje, Mukushi, Kapiri Mposhi, Kabwe, Chibombo, Mumbwa, Lukanga WSC	22	6 districts: 4 from each district (DPO or DoW, 2 RWSS Officers, 1 from D-WASHE who does not belong to DLA), Engineer from Lukanga Water & Sewerage Co.	GRZ
Lusaka	12 Jul., 14 Aug. 2013 (2 days) Luangwa	Luangwa	8	WSSC, District Health Inspector, Treasurer, Store Manger, DoH, DoE, DWA	GRZ & DANIDA
Eastern	6-8 Aug. 2013 (2.5 days) Chipata	Lundazi, Chadiza, Mambwe, Buvuwi, Chipata	27	5 districts: 6 from each district (CS, DPO, WSSC, 2 from D-WASHE who does not belong to DLA)	GRZ
	8-10 Aug. 2013 (2.5 days) Petauke	Katete, Sinda, Nymba, Petauke	26	4 districts, same as first group above.	GRZ

Province	Date and Venue	Targeted Districts (District Absent)	Participants		Source of Funds
			N	Position	
Copperbelt	24-27 Aug. 2015 (4 days) Luanshya	Masaiti, Mpongwe, Lufwanyama	18	3 districts: 6 from each district (DPO, DoW, WSSC, 3 from D-WASHE who does not belong to DLA)	UNICEF

Note:

1. DAPP implemented a school WASH programme in 12 districts in Northern Province (including Muchinga Province) from 2009 to 2013 with funds from USAID.
2. Itezhitezhi District has been one of the target districts of WSPSII before incorporation of the district into Central Province in 2012. Since WSPSII had a plan to continue support of the target districts in implementation of the O&M component until the end of 2013, Itezhitezhi District was included in the participants of this planning workshop in consideration of efficiency of the programme management.

Table 4-19 Standard Programme of Orientation Workshop for Preparation of District O&M Action Plan

Session	Contents
Session 1	Introduction: Purpose of the workshop
Session 2	NRWSSP and O&M Component
Session 3	5 O&M mechanisms and process of establishment
Session 4	Situation analysis on introduction of O&M model at district level
Session 5	Process in preparation and implementation of district O&M action plan
Session 6	Way forward: undertakings after the workshop

Table 4-20 Progress in Implementation of Orientation Workshops for District Stakeholders on the O&M Model and O&M Action Planning by PDHIDs

Province	NRWSSP Target Districts		Implemented		Not Implemented		Year of Implementation of the Workshop	Source of Funds for Orientation
			N	%	N	%		
Central	10	(4)	6 (0)	60%	4 (4)	40%	2013	GRZ
Copperbelt	3	(0)	3 (0)	100%	0 (0)	0%	2013, 2015	UNICEF
Eastern	9	(2)	9 (2)	100%	0 (0)	0%	2013	GRZ
Luapula	11	(4)	11 (4)	100%	0 (0)	0%	2013	JICA, UNICEF, WaterAid
Lusaka	7	(4)	3 (0)	43%	4 (4)	57%	2013	GRZ & DANIDA
Muchinga	7	(2)	5 (0)	71%	2 (2)	29%	2013	GRZ & DAPP
North Western	9	(2)	0 (0)	0%	9 (2)	100%	-	-
Northern	9	(1)	9 (1)	100%	0 (0)	0%	2013	GRZ & DAPP
Southern	12	(3)	12 (3)	100%	0 (0)	0%	2013	GRZ & DANIDA
Western	16	(9)	7 (0)	44%	9 (9)	56%	2013	GRZ & DANIDA
Total	**93**	**(31)**	**65 (10)**	**70%**	**28 (21)**	**30%**		

Note: Figures in brackets show the number of new districts among the NRWSSP target districts.

Among the 93 NRWSSP target districts, 31 are new districts established in 2012 and thereafter and 62 are old ones established before 2012. While the orientation workshop on the preparation of the O&M action plan has been implemented in only 70% of the target districts, it has been implemented in 88.7% (55) of the old districts among the target districts. The assistance provided so far in the implementation of the O&M activities has enabled staff of DHID/MLGH and PDHIDs to begin to understand the procedures for providing guidance on the preparation of an O&M action plan to DLAs. Orientation workshops in the target districts where they have not yet been implemented are scheduled to take place in FY 2016/2017 with funding from the Government of Zambia in Muchinga Province, RWSS Basket Fund in Central, Lusaka and North-western Provinces and AfDB in Western Province. The scheduled courses had not been implemented because the budget for their implementation had not been disbursed from either the Government of Zambia or the assistance programmes of CPs by the time of the completion of this project. However, if the orientation workshops are to be implemented after the completion of this project, DHID will be able to implement the orientation workshops by utilizing the provincial facilitators trained in the third year.

(4) Monitoring of the Progress in the Preparation of Action Plans after the Implementation of the above-mentioned Orientation Workshops

The Project Team monitored the progress of the preparation of the action plans by DLAs and provided advice to WSSCs and PDHIDs after the completion of the work mentioned in 4-2-1 (3). The main points of the provided advice were as follows:

- When formulating an action plan, activities shall be prioritized in accordance with the establishment of the O&M mechanisms in the district and with consideration for the annual project budget and the capacity to implement AWP. The activities for the establishment of the spare parts supply chain (SCM) and the strengthening of the repair work mechanism (RWM) shall be prioritised to create an environment that supports community-based management mechanism (CBM).
- In the activities to strengthen CBM, priority is given to support for the establishment and training of V-WASHE and the training of WDCs, who are responsible for promoting activities. The function of WDCs as a facilitator in the RWSS project shall be strengthened.
- Activities for strengthening CBM of the existing water supply facilities shall be prioritised in districts that have completed the establishment of spare parts shops and have assigned the minimum required number of APMs. Clarification shall be provided regarding the total number and locations of water supply facilities that require formation or re-structuring of V-WASHE and training for O&M. A plan shall be prepared for the implementation of these activities at facilities (in communities) where the allocated annual budget can be used to implement activities.
- An O&M action plan shall be designed not only to establish a link between activities for the establishment of the three O&M mechanisms but also to create synergy with other components of a district RWSS AWP, including the activities for the construction and rehabilitation of water supply facilities, the improvement of sanitation and development of MIS.

The Project Team continuously confirmed the progress of the preparation of the action plans and the planned content of activities related to the O&M component in each province. A DLA is expected to prepare a district RWSS AWP including the O&M action plan as part of the annual project plan for the district regardless of the availability of support from CPs. In FY 2016, the year in which the implementation of this project was completed, districts that received support from CPs for the implementation of the district RWSS AWP prepared and revised the plan frequently due to the availability of a budget for implementation. Meanwhile, districts that did not have a reliable revenue source for the implementation of the plan continued using the same plans for years.

PDHIDs and DLAs (districts) have understood the above-mentioned advice and accepted most of it. Training for the improvement of water supply and sanitation for WDCs had been implemented in less than 20% of the 93 target districts of NRWSSP at the time of completing the project because of the delay in the establishment of WDCs by DLAs. When implementing the RWSS project in most of the districts, activities are conducted to educate residents and form and strengthen the capacity of V-WASHE by district extension officers from various ministries who had received training regarding the implementation policy of NRWSSP and the skills for the facilitation of the activities to improve water supply and sanitation provided by DLAs/D-WASHE.[27]

4.2.2 Support for the Establishment of the O&M Mechanisms of the SOMAP O&M Model (Activity 2-2)

(1) Activities for the Establishment of the O&M Mechanisms by DLAs and advice to DHID/MLGH and PDHIDs

The Project Team provided support for the establishment of the O&M mechanisms while following up on the progress in the preparation of action plans after the orientation workshops mentioned in "4-2-1. Support for Preparation of the O&M Component Plans at Provincial and District Levels (Activity 2-1)". The Project Team monitored the progress in the establishment of the O&M mechanisms in districts by conducting such activities as attending O&M-related training for DLA staff organised by PDHIDs, visiting districts to conduct monitoring and to carry out a questionnaire survey on the implementation of O&M action plans (in March 2015, see Annex 13) and advised DHID/MLGH and PDHID to provide DLAs with support they required. The team also answered questions of staff of DLAs/members of D-WASHE involved in RWSS on the implementation of activities for the establishment of the O&M mechanisms to supplement the guidance provided by PDHIDs to them when the team members had time to talk with them while attending the training for DLA staff and conducting monitoring visit in districts.

At least one activity in the district O&M action plan was being implemented or was scheduled for implementation in 89 (74 supported by CPs and 15 supported by GRZ) out of the 93 target districts of NRWSSP in FY 2016. In many districts, these activities included the establishment of a spare parts shop, training of APMs, community awareness-raising (sensitisation) activities at the target communities of construction/rehabilitation of water supply facilities and establishment and training of V-WASHE.

The Project Team identified the following problems in the implementation of O&M action plans while providing various O&M-related trainings to the staff of DLAs and conducting field inspections in districts.

- DLAs or PDHIDs have not sufficiently monitored or supervised the practice of works by the staff members of DLAs using the knowledge acquired through the O&M-related trainings, or the implementation status of the action plans for the establishment of the O&M mechanisms. District stakeholders on NRWSSP strongly believe that group training is the only means of capacity development. They almost completely overlook the possibility of changing their own behaviour to improve measures for the establishment of the O&M mechanisms by utilizing what they learned in the training in their work.
- The district officials do not make sufficient effort to establish efficient and effective relationship between activities when they implement multiple activities included in an O&M action plan. For example, while carrying out awareness-raising (sensitisation) activities in communities, it is effective to conduct publicity activities such as the dissemination of information about the spare parts available at the spare parts shops and their prices together

[27] Staff of RHC (mainly EHTs), school teachers, Community Development Officers, Agricultural Extension Officers, et. al.

with the explanation about the responsibility of facility users regarding maintenance. However, such information dissemination was not seen in some districts.

- The methodology for the activities to establish the O&M mechanisms in districts has not been standardised. Both DLAs and consultants contracted by CPs provide training for APMs and establish V-WASHE and train its members in some districts. In such districts, there is a difference in what the trainees have learned in the training and the quality of maintenance activities performed by them after the training because the duration of the training and methods used in the training differ between the two types of training.

The Project Team gave the following advice to PDHIDs and DLAs concerning these problems. PDHIDs have agreed to encourage DLAs to carry out the following items in order to facilitate the preparation and implementation of plans for O&M component-related activities at the provincial and district levels and have been providing guidance to DLAs in the preparation of district RWSS AWPs and at the review meetings.

- Plans and budgets for the group training and the follow-up guidance by PDHIDs to DLAs after the training shall be integrated and comprehensive advice shall be provided to facilitate the participants of the training to use what they had learned in the training and to solve problems at work place after the training. Even if a budget has not been allocated for monitoring visits in districts, the staff of PDHIDs shall confirm the situation of the work performed by the former trainees after training by conducting interviews with district stakeholders on NRWSPP even for a short period when they visit districts in other projects such as road projects. Progress in the implementation of the action plan a trainee prepared in the end of the training and the preparation of a report on the progress shall be the requirements for the participation in the training in the next phase.
- A schedule shall be made for activities, taking into account their maximum efficiency and effectiveness and the order of their implementation. The possibility of implementing an activity that has not been funded by combining it with the implementation of another funded activity shall be examined. An idea for implementing an unfunded activity without spending much on it shall be created.
- The information on the state of the activities for the establishment of the O&M mechanisms in a district shall be shared among the stakeholders in the sector in the D-WASHE meetings to standardise the level of outputs expected to be produced by each activity and implementing method of each activity. If an activity has failed to produce an expected level of output for a certain reason, an action plan shall be revised to include implementation of supplementary activities with other financial resources.

(2) Support for Establishment of the Mechanism for Spare Parts Supply Chain Management (SCM)

In the orientation workshop for the preparation of O&M action plans, NRWSSP district-level stakeholders gained an understanding of the importance of improving access to spare parts in districts, which had been ignored in the conventional O&M activities. This led to the planning and implementation of activities for the establishment of a spare parts supply chain as part of an O&M action plan. The progress of such activities was partially facilitated by the large interest and intention for cooperation expressed by CPs supporting the implementation of district RWSS AWPs towards the establishment of the spare parts supply chain.

The Project Team supported the establishment of the mechanism for SCM in districts in the following ways:

1) Technical assistance in the planning and management of the procurement of spare parts in the seed stock

2) Support for the facilitation of SCM training for the staff of DLAs (OJT by provincial facilitators)
3) Consultation on the construction of spare parts shops and setting of selling prices
4) Provision of information on suppliers of hand pump spare parts and their market prices
5) Monitoring of the progress in the establishment of spare parts shops after training (which is described in detail in 4-2-3).

1) Planning and Management of the Procurement of Spare Parts in the Seed Stock

The Project Team provided support for the procurement of the seed stock in the districts in which the implementation of activities for the establishing of spare parts supply chains was planned under assistance programmes of CPs. As described in ***Table 4-21***, the team provided technical assistance to PDHIDs with regard to the process of providing guidance for the confirmation of the specifications of the parts required in each district, calculation of the quantities of parts in the seed stock in the district and compilation of the composition of the seed stock, and the team also provided assistance to MLGH, which was to procure the parts for the districts, for the preparation of the tender specifications and the acceptance inspection of procured parts.

Table 4-21 Technical Assistance Provided by SOMAP3 for the Procurement of Seed Stock of Spare Parts

Target Provinces & Districts	Fund (Programme)	Purchaser	Year	Technical Assistance Provided by SOMAP3
Luapula Province Total 4 districts	JICA (SOMPA3)	MLGH/ SOMAP3	2012	• Confirmation of the specifications of the parts to be procured for each district • Guidance on calculation of the quantities of the seed stock and compilation of the composition of the seed stock • Support to DHID for preparation of the tender documents and tender evaluation • Inspection of procured parts • Guidance to DLAs on procedures for inspection and recording of the parts delivered to the districts (Refer to Activity 3-3.)
Southern, Lusaka, and Western Provinces Total 13 districts	DANIDA (WSPSII)	DANIDA	2013	• Provision of advice to PDHID/ PST about procedures for confirmation of the specifications of the parts required for each district and compilation of quantity of the seed stock
Northern (including Muchinga) and Luapula Provinces Total 15 districts	AfDB (NRWSSP1)	MLGH	2014	• Checking of the specifications and quantity of the spare parts compiled by PDHID/ PST • Support to DHID for preparation of the tender specifications and attendance at the inspection of

Target Provinces & Districts	Fund (Programme)	Purchaser	Year	Technical Assistance Provided by SOMAP3
				procured parts • Guidance to DLAs on procedures for inspection and recording of the parts delivered to the districts
Southern, Eastern, Copperbelt, North Western, Northern, and Luapula Provinces Total 24 districts	UNICEF (WASHE)	UNICEF	2016	• Support to PDHID in confirmation of the specifications of the parts required by each district and compilation of quantity of the seed stock
Southern, Lusaka, Eastern, Central, and North Western Provinces Total 49 districts	KfW (RWSS Basket2)	Each district	Procurement on-going	• Support to PDHID in confirmation of the specifications of the parts required by each district and compilation of quantity of the seed stock • Information sharing with TA responsible for management of this programme with regard to quantity and specifications of the spare parts required as seed stock, conditions of the spare parts shops in the districts, and a list of suppliers of hand pump spare parts
Western Province Total 16 districts	AfDB (NRWSSP2)	MWDSEP	Preparing for a procurement plan	• Support to PDHID in confirmation of the specifications of the parts required by each district and compilation of quantity of the seed stock • Support to DHID for preparation of the tender specifications

2) Planning and Implementation of SCM Training for Staff of DLAs

The Project Team provided technical assistance for planning and facilitating SCM training for staff of DLAs organised by PDHIDs mostly with funding from assistance programmes of CPs. The training was for the members of WSSCs, treasurers, warehouse managers and cashiers[28] of DLAs who were to be involved in the operation of the spare parts shops. The provincial facilitators mentioned in 4-2-1(2) facilitated the training. ***Table 4-22*** and ***Table 4-23*** show the training courses to which the Project Team provided technical assistance for facilitation and the standard program of the training, respectively.

In order for trainees to be able to manage the stock and perform accounting by themselves using the SCM Manual (2nd Ed.) after the training, the main method in the training was group practice

[28] Trainees from certain provinces included procurement officers responsible for the procurement of spare parts for stock replenishment and managerial staff of WSSCs (DoW and DPO).

composed of trainees from the same districts. The trainees practiced the procedures to calculate the quantities of spare parts in the seed stock and to replenish the stock, to set and revise the selling prices and manage the stock and accounts using various forms and tools described in the manual. Trainees from districts where the seed stock had been procured and preparations were underway for opening of the spare parts shops set provisional selling prices based on the quantity of procured spare parts in the seed stock, which would be discussed by the district councils after training.

Table 4-22 Supply Chain Management Training to Which SOMAP3 Provided Technical Assistance for Facilitation

Province	Date and Venue	Target Districts (District Absent)	Number of Participants	Source of Funds
Lusaka and Southern	18-19 Nov. 2013 (2 days) Siavonga	Kafue, Chongwe, Luangua, Siavonga [4 districts]	16	DANIDA
Southern and Western	21-22 Nov. 2013 (2 days) Livingstone	Namwala, Itezhitezhi, Mazabuka, Sinazongwe, Kalomo, Kazungula, Sesheke [7 districts]	28	DANIDA
Western	25-26 Nov. 2013 (2 days) Mongu	Kaoma, Kalabo, Shangombo, Senanga, Lukulu, Mongu [6 districts]	24	DANIDA
Northern and Muchinga	30 Mar. 2015 – 3 Apr. 2015 (5 days) Kasama	Mbala, Kaputa, Mporokoso, Luwingu, Nsama, Isoka [6 districts]	24	UNICEF
Southern	10-14 Aug. 2015 (5 days) Choma	Monze, Choma, Siavonga, Mazabuka, Chikankata, Pemba, Kazungula [7 districts]	35	UNICEF
Eastern	10-14 Aug. 2015 (5 days) Petauke	Petauke, Nyimba, Katete, Vubwi, Sinda [5 districts]	26	UNICEF
Northwestern	7-10 Sep. 2015 (4 days) Solwezi	Solwezi, Mwinilunga, Ikelenge, Zambezi, Chavuma [5 districts]	20	UNICEF
Muchinga	11-15 Jan. 2016 (5 days) Nakonde	Mpika, Chinsali, Isoka, Nakonde, Shiwan'gandu, Mafinga [7 districts]	29	UNICEF
Copperbelt	13-15 Jan. 2016 (3 days) Luanshaya	Masaiti, Lufwanyama, Mpongwe [3 district]	16	UNICEF
Northern	27 Jun. – 1 Jul. 2016 (5 days) Kasama	Kasama, (Luwingu), Chilubi, Kaputa, Mporokoso, Nsama, Mpulungu, (Mbala), Mungwi [9 districts]	25	DLAs (Local Government Equation Fund[29])

[29] The Local Government Equation Fund is the local grants stipulated in the Local Government (Amendment) Act, 2014, as the amendment of section 45 "Government Grants and Loans" of the Local Government Act (Cap. 281, 1991). The Fund was established to support DLAs to perform their functions indicated in the Local Government Act. The ministry responsible for local government is to disburse funds to DLAs using a formula based on the population size of the districts and adjusted by poverty levels. Within the rule set in the Act, each council can use the received funds according to its priority issues in development of the district. The Act requires that a council should use at least 20% of the funds received by the council from the Fund in any financial year, to finance capital expenditure.

Table 4-23 Standard Programme of the SCM Training for Staff of DLAs

Date	Session	Contents
Day 1	Session 1	Introduction of workshop objective
	Session 2	Supply chain management of hand pump spare parts in the district
	Session 3	Organisational set-up
	Session 4	Product information
	Session 5	Procurement of seed stock
Day 2	Session 6	Pricing
	Session 7	Organising the store
	Session 8	Sales promotion
Day 3	Session 9	Stock control and records
Day 4	Session 10	Sales operation and financial accounting

3) Consultation on the Construction of the Spare Parts Shops and Setting of Selling Prices

The districts that had received financial assistance for the construction of spare parts shops from the budget of the Government of Zambia or assistance programmes of CPs, conducted a tender for the selection of the contractors, concluded contracts with them and constructed the shops. The Project Team provided advice to PDHIDs on whether the layout of facilities and the volume of work had been planned appropriately in the preparation of standard tender documents for the districts based on the SCM Manual (2nd Ed.) and the experience in the construction of the shops in the four districts in Luapula Province that were directly supported by the project. When the districts preparing the establishment of the spare parts shops requested advice on the finalisation of the selling prices of spare parts, the team confirmed the validity of the calculation method, the prices of the procured spare parts and the breakdown of the operating cost used in the calculation.

4) Provision of the Information on Suppliers of Hand Pump Spare Parts and Market Prices of the Parts

The Project Team collected information on the spare parts suppliers that sell parts individually and market prices of the parts sold at the spare parts shops in districts. The team also collected information about spare parts suppliers that had supplied spare parts in the seed stock in assistance programmes of CPs and those that had supplied parts to districts to replenish the stock and procurement price data. The team visited the shops of individual parts suppliers to collect information about the availability and selling prices of the parts. The team shared the collected information with stakeholders on NRWSSP of DHID/MLGH, PDHIDs and DLAs by updating the list of the hand pump spare parts suppliers (See ***Table 4-1*** in 4-1-1 (2)) in the SCM Manual (2nd Ed.) The information on the market prices of spare parts was provided to those stakeholders as reference information when they practiced setting selling prices of spare parts in SCM training and when they actually set the selling price at the spare parts shops in districts (***Table 4-24***). In SCM training, the team was able to demonstrate in detail the process of setting prices by DLA when practicing setting selling prices based on the market prices.

Table 4-24 Information on the Market Prices of Hand Pump Spare Parts (Part of the Compiled List)

(Price including tax, ZMW)

			VAT= 16%	Unit Price (Bulk Purchasing)			Unit Price (Retail Price)					
ID No.	Serial	Item	SKAT No.	Supplier A	Supplier B	Supplier C	Supplier A	Supplier A	Supplier A	Supplier D	Dupplier E	Supplier F
				Quotation Issued in								
				Jul.2013	Aug.2013	Jul.2014	May2013	Apr.2015	Jul.2015	Jul.2015	Dec.2015	Apr.2016
India Mark II												
I-28	1	Head Assembly (Pump Head Box)	B2304	783.00	768.26	696.00		1,666.21	1,015.77	1,200.00	1,968.00	800.00
I-20	2	Handle Assembly	B2326	294.64	384.12	290.00			382.27	1,050.00	720.00	720.00
I-30	3	Third Plate Assembly (Rod Guide Plate)	B2335	49.88	49.22	46.40				209.00	144.00	105.00
I-16	4	Front Cover	B2320	61.48	48.01	58.00			79.74	165.00	144.00	90.00
I-04	5	Hex. Bolt (M12 x1.75 x 40)	C1017	3.48	1.82	3.48	4.31		4.56	15.00	12.00	18.60
I-22	6	Nut (M12 x 1.75)	C1016	1.28	1.40	1.16			1.68	8.00	12.00	7.00
I-21	7	Inspection Cover Bolt (Hex. Bolt M12x20)	C1030	1.74	14.41	1.16		2.09	2.24	10.00	18.00	10.50
I-33	8	Washer (for M12)	C1031 (SKAT Rev. 1-2004)	1.91	1.19	1.74	3.45	2.34	2.51	20.00	12.00	6.00
I-06	9	Chain with Coupling (Chain Assembly)	B2346	2.15	48.01	2.15	48.28	26.01	27.85	120.00	96.00	99.00
I-03	10	Bearing Spacer	C2332	3.48	5.60	3.48	25.86	4.26	4.56	22.00	14.40	7.00
I-01	11	Handle Axle	C2333	35.96	48.87	34.80	31.03	43.58	46.67	105.00	96.00	90.00
I-35	12	Axle Washer Ø 30/13x4	C2334			1.16		2.34	2.51	33.00	12.00	5.00
I-02	13	Ball Bearing	C1035	21.46	37.21	2.32	19.83	26.01	27.85	74.00	62.40	80.00
I-05	14	Chain Bolt (H.T. Bolt M10 x40)	C1033	3.02	1.44	1.39	3.45	3.65	3.91	26.00	16.80	10.00
I-23	15	Hex. Lock Nut (Nyloc Nut (M10))	C1034	1.60	21.61	1.16			2.05	22.00	16.80	4.60
I-34	16	Water Tank Assembly	B2340	258.68	216.07	174.00		313.44	335.60	850.00	780.00	557.00
I-24	17	Stand Assembly (Pedestal (Three Legs))	B2348	580.00	576.20	522.00		702.75	752.43	989.00	1,104.00	1,028.00
I-09-01	18-1	Cylinder Assembly (cast iron cylinder with brass liner)	A2350	642.64	504.17	580.00	587.07	896.68	960.07	1,300.00	1,272.00	1,045.00
I-09-02	18-2	Cylinder Assembly (Stainless Steel cyliner with SS plunger and check valves)						1,010.36		1,800.00	3,120.00	2,818.80

Source: The SKAT specification numbers (SKAT No.) in the list are based on the following document.
SKAT, RWSN (2007) India Mark Handpump Specifications, Revision 2-2007

4.2.3 Support in Monitoring of Spare Parts Supply Chain Management and Analysis of Sales Records of Spare Parts (Activity 2-3)

(1) Target Districts for SOMAPs 1 and 2

In the first year, the Project Team analysed the current state of the SCM structure and sales records by collecting information and data on the sales records of the spare parts shops in Mumbwa, Serenje, Mkushi, Kapiri Mposhi and Chibombo Districts in Central Province and Monze District in Southern Province where the spare parts shops had been established with support provided in SOMAPs 1 and 2 and continued to be operated by DLAs or CUs. During this process, the team provided the DLAs and CUs operating the spare parts shops with guidance for monitoring methods and sales record analysis methods. The team reviewed the operation of the shops in Monze District in Southern Province, and Serenje, Mkushi, Kapiri Mposhi and Chibombo Districts in Central Province where the respective DLAs had contracted out the operation of the shops to CUs and where the respective district councils approved the policy of transferring the management of the shops from CUs to DLAs as recommended by the team. The team also

provided advice and technical assistance to the DLAs in the transfer. The state of the operation of the spare parts shops in the above-mentioned districts including the transfer of the management is described below.

1) Serenje, Mkushi, Kapiri Mposhi and Chibombo Districts in Central Province

These four districts concluded MoUs with Lukanga Water and Sewerage Company Ltd. regarding the operation of the spare parts shops in the respective districts in May 2009 and the sales of spare parts were started in 2010. At the district O&M action plan review meeting held in Kabwe District, Central Province, on 22nd and 24th July, 2013, within the framework of Activities 2-1 and -2, the following problems in SCM were identified.

- There is a lack of information sharing and cooperation between the DLAs and the CU on the operation of the spare parts shops.
- The Head Office of the CU has not submitted an accounting report or inventory report to the DLAs. Some districts have changed to a reporting system whereby the branch offices of the CU in these districts submit reports directly to the DLAs under instruction from the head office. However, not all branch offices concerned have been informed of the details of the change in the reporting route. Meanwhile, the DLAs have not taken such measures as requesting the CU to submit the said reports or organising regular meetings with the CU.
- The DLAs have not provided information about the demand for spare parts in local communities to the CU.
- New spare parts have not been procured by the CU since procuring the seed stock, even though some parts are out of stock at the spare parts shops. CU staff in charge of the operation of the shops explain that the procurement of spare parts has been deferred because of the low prioritization of decision-making and procedures regarding the operation of the spare parts shops, which does not produce revenue for the CU.
- There is a significant difference between the selling prices of the parts in the shops and their market prices because the selling prices have not been revised since the seed stock was procured. The CU submitted a proposal for price revision to the DLAs in the past. However, the revision has not been made because mutual discussions have been left unfinished for the reason that the CU has not received an official response from the DLAs and some DLAs have no record of receiving the proposal.

Since the end of 2012, the DLAs had been expressing their intention to PDHIDs to improve shop operation by changing the system of spares parts shop management to direct management by DLAs. However, they had not taken any practical action to change the system. Interviews with the staff members of DLAs involved in NRWSSP revealed that many of them expected MLGH to provide the guidance for the revision of the MoU on the management of the shops between the DLAs and CUs and on the formation of a consensus among the stakeholders. This revealed a lack of intent for taking independent action as parties to the MoU and as persons in charge of SCM. Although the DLAs believed that the non-performance of the contractual liabilities of the CU was to blame for the problems in shop management, the Project Team considered that the problem was due to a lack of intent towards cooperating in the maintenance of the supply chain and a lack of the commitment towards performing the liabilities stipulated in the MoUs of both parties.

In the review meeting, the DLAs and CU shared the results of the self-evaluation of their performance of the liabilities stipulated in the MoUs and discussed the review of the operating structure. The CU reported that it had opened separate bank accounts for the spare shops, which had been a pending issue, presented its plan for the repair of the container shop (in Serenje) and expressed its intention to replenish the stock, submit the required reports exhaustively and hold regular meetings with the DLAs. Although the DLAs expressed positive views on the proposal

for the improvement of the CU, Serenje, Kapiri Mposhi and Chibombo DLAs decided to transfer the management of the shops in these districts to the respective DLAs to improve the efficiency of decision-making concerning shop operation and the required procedures. In the review meeting, the Mkushi DLA chose to maintain the existing MoU and improve the performance of the DLA and CU under the MoU, but following a further review it was later decided that the management of the shop would be transferred to the Mkushi DLA, like the other DLAs. The district councils of these districts passed the resolutions on the transfer of the management of the spare parts shops in 2014 and 2015.

PDHID of Central Province facilitated the transfer process as a coordinator between the four DLAs and the CU after the DLAs officially made the above-mentioned decisions. The Project Team provided support for the inspection of the inventories at the spare parts shops and the preparation of a list of items to be handed over from the CU to the DLAs upon request from the PDHID. The CU submitted the handover documents including the lists of parts in stock and the record of the proceeds from part sales at the shops in the four districts to PDHID in March 2016. In the handover document, the CU proposed the payment of sales proceeds from the shops in each district to the DLA concerned after deducting 30% of the proceeds as the overhead cost payable to the CU. However, as there was no provision for the deduction of a fixed overhead cost from the proceeds in the MoUs, the DLAs rejected the proposal.[30] PDHID requested the CU to submit a record of expenses justifying its claim for the payment of the overhead cost. As the CU has not responded to this request, it has been decided that MLGH headquarters should solve this problem through consultation with the CU and the DLAs after the completion of the project.

2) Mumbwa District in Central Province

The spare parts have been procured to maintain the standard quantities of the parts in stock and the prices have been revised almost every year in the spare parts shop in the Mumbwa District. According to DLA/WSSC, the shop has produced profit from the sale of spare parts every year. However, as the DLA has not prepared the statements of income and expenditure of the shop in recent years, the income and expenditure status of the shop has not been confirmed. WSSC used to prepare the statement and the inventory report. However, since the responsibility to prepare these documents was transferred to the Treasury Department of the DLA, the statement of income and expenditure of the shop operation has not been prepared or WSSC has not asked the Treasury Department about the statement.

In order to solve these problems, the DLA decided to appoint staff from the Treasury Department as the persons in charge of the preparation of the statement in the review meeting mentioned above, and these staff members were appointed after the meeting. As the DLA was using sales ratios for the procurement of seed stock described in the SCM Manual (1st Ed.) as a reference when replenishing the stock, the Project Team advised the DLA to use the method for calculating the quantity of spare parts to replenish the stock described in the second edition. When replenishing the stock, the quantity of a part required to be in stock for the following one-year period is estimated from the quantity of the part sold in the period between the start of the sale of the part (or the previous replenishment) and re-procurement, and the difference between the quantity required to be in stock and the actual quantity in stock is to be regarded as the quantity of the part to be replenished. The staff involved in the management of the shops understood the methods of calculating the quantities of parts in the seed stock and those for replenishment, as explained by the Project Team.

[30] In the SOMAP Model, an actual amount of the overhead cost of the spare parts shops (including the cost of the transport of the procured spare parts, a per diem allowance for the person in charge of the procurement, cost required for the preparation of various shop operation records and bank commissions) is to be paid from the proceed of the sales of spare parts.

The Project Team asked Mumbwa DLA to prepare a statement of income and expenditure, an inventory report and a sales trend report for FY2012 using the report forms attached to the SCM Manual (2nd Ed.) before the review meeting. The team found flaws in the process of report preparation including inconsistencies between the numbers of parts sold and the proceeds from the sales of parts and discrepancies between monthly and annual sales reports. The Project Team provided support to the DLA in the preparation and analysis of various reports on shop operation and the improvement of the decision-making process in the fourth year. This support has led to cooperation between WSSC and the Treasury Department of the DLA in the preparation of the income and expenditure statement and the inventory report by the former and the inspection of these records by the latter. This cooperation has led to the reduction in flaws in the reports.

3) Monze District in Southern Province

From 2006 onwards, operation of the spare parts shop in Monze District had been consigned by the DLA to Southern Water and Sewerage Company Ltd. However, the Monze DLA decided to operate the shop directly to improve the efficiency of shop operation like the four DLAs in Central Province mentioned above. Gwembe and Choma DLAs[31] in Southern Province also contracted out shop operation to the CU, as had Monze DLA. Both DLAs intended to transfer the management of the shops from the CU to themselves. Therefore, the Project Team provided PDHID of Southern Province with technical assistance in the training of its staff for the facilitation of the transfer process and preparation for the operation of the shops by the DLAs. The transfer of shop management in Monze District was completed in August 2016 with assistance from the Project Team and the proceeds from the sale of spare parts was handed over from the CU to the DLA after the CU had deducted the operating cost of the shipping container houses that had been used as the parts warehouse and spare parts shop from the proceeds.

(2) Establishment of the SCM Mechanism in Other Districts

The spare part shops were established and the shops began selling parts in 48 districts during the period between the commencement of SOMAP 1 and the conclusion of SOMAP 3 (***Table 4-25***). The Project Team collected the information on the establishment of the SCM mechanisms and provided guidance on shop operation to the DLAs during joint monitoring in the 48 districts with PDHID in each province in the second and subsequent years. ***Table 4-27*** shows the record of monitoring visits to those districts. The Project Team confirmed whether the DLAs in the districts where the spare parts shops were in operation were operating and managing the supply chain sustainably using such criteria as the preparation of reports on the operation of the spare part shops, replenishment of stock and revision of prices (***Table 4-26***).

[31] The spare parts shops were established in Gwembe District in 2012 with support from an NGO, ADRA, and in Choma District in 2013 in cooperation with UNICEF. They were originally operated by CUs contracted by the DLAs. However, the transfer to direct operation by the DLA in Gwembe and Choma Districts was completed in May 2015 and April 2016, respectively.

Table 4-25 Progress of the Establishment of Spare Parts Shops during the Period from SOMAP1 to SOMAP3

		SOMAP1 (Sep.2005-Aug.2007)			SOMAP2 (Sep.2007-Sep.2010)			SOMAP3 (Sep.2011-Dec.2016)						Spare Parts Shops Established	
Province	# District	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	N	%
Central	10	0	1	0	0	0	4	0	0	0	1	0	0	6	60%
Copperbelt	3	0	0	0	0	0	0	0	2	1	0	0	0	3	100%
Eastern	9	0	0	0	0	0	0	3	2	0	0	0	0	5	56%
Luapula	11	0	0	0	0	0	0	0	0	5	0	1	0	6	55%
Lusaka	7	0	0	0	0	0	0	0	0	1	2	0	0	3	43%
Muchinga	7	0	0	0	0	0	0	0	1	0	0	0	0	1	14%
North Western	9	0	0	0	0	3	0	0	1	1	1	1	0	7	78%
Northern	9	0	0	0	0	0	0	0	0	0	0	2	0	2	22%
Southern	12	0	1	0	0	0	0	0	2	3	2	0	1	9	75%
Western	16	0	0	0	0	0	0	0	0	1	4	1	0	6	38%
Total	**93**	**0**	**2**	**0**	**0**	**3**	**4**	**3**	**8**	**12**	**10**	**5**	**1**	**48**	**52%**

Table 4-26 Status on Operation of the Spare Parts Shops by DLAs

Province	Districts Where Spare Parts Shops are in Operation	Reports on operation of the shop are prepared regularly		Stock of spare parts has been replenished			Selling prices have been revised	
		Total N	District Name	Total N	Replenished solely with revenue of SP shop	District Name *1	Total N	District Name
Central	6	2	Itezhitezhi, Mumbwa	2	2	**Itezhi-tezhi, Mumbwa**	1	Mumbwa
Copperbelt	3	3	Lufwanyama, Masaiti, Mpongwe	3	0	Lufwanyama, Masaiti, Mpongwe	3	Lufwanyama, Masaiti, Mpongwe
Eastern	5	3	Chadiza, Katete, Nyimba	3	1	Chadiza, **Mambwe**, Nyimba	1	Chadiza
Luapula	6	4	Mansa, Milenge, Mwense, Nchelenge, Samfya	4	4	**Mansa, Milenge, Mwense, Nchelenge**	3	Chienge, Milenge, Nchelenge
Lusaka	3	2	Chongwe, Kafue	1	1	**Luangwa**	0	-
Muchinga	1	0	-	0	0	-	1	Isoka
North Western	7	1	Ikelenge	3	1	Ikelenge, Kasempa, **Solwezi**	3	Kabompo, Solwezi, Zambezi
Northern	2	1	Kaputa	0	0	-	0	-
Southern	9	7	Kalomo, Kazungula, Mazabuka, Monze, Namwala, Siavonga, Sinazongwe	5	5	**Gwembe, Kalomo, Monze, Siavonga, Sinazongwe**	3	Kalomo, Kazungula, Siavonga
Western	6	2	Senanga, Sesheke	1	1	**Kaoma**	2	Kalabo, Kaoma
Total	**48**	**25**		**22**	**15**		**17**	

Note:

1. The district names with the boldface and underline show the districts which covered replenishment costs with only the proceeds of the spare parts.

Table 4-27 Record of Monitoring Visits to Districts

Province	District	Schedule
Copperbelt	Masaiti, Mpongwe, Lufwanyama	15-17 Dec. 2013
Northwestern	Kasempa, Kabompo, Mwinilunga	18-24 Dec. 2013
Eastern	Nyimba, Petauke, Mambwe	5-9 Jan. 2014
Lusaka	Kafue, Chongwe, Luangwa	25 Feb.-5 Mar. 2014
Muchinga	Isoka	11 & 14, Apr. 2014
Northern	Mbala, Mpulungu, Luwingu	15-16 Apr. 2014
Southern	Mazabuka, Choma, Kalomo	19-24 Feb. 2014
	Monze, Sinazongwe, Namwala	11-13 Aug. 2014
Central	Itezhitezhi	14 Aug. 2014
Muchinga	Chinsali, Nakonde, Isoka, Mpika	23-27 Feb. 2015
Northern	Kasama, Mungwi, Mpulungu, Mbala, Luwingu, Mporokoso, Kaputa, Chilubi	28 Feb.-15 Mar. 2015
Copperbelt	Mpongwe, Lufwanyama	6-8 May 2015
Northwestern	Mufumbwe, Zambezi, Mwinilunga	9-16 May 2015
Northern	Mporokoso, Kasama	19-23 May 2015
Eastern	Lundazi, Vubwi, Sinda, Petauke, Nyimba	26 May-4 Jun. 2015
Western	Nkeyema, Luampa, Lukulu, Mitete, Limulunga, Mulobezi	19 May-2 Jun. 2015
Central	Chibombo, Kapiri Mposhi, Serenje, Mukushi	15-18 Dec. 2015
Southern	Choma, Monze, Mazabuka, Gwembe, Sinazongwe, Namwala, Kalomo, Kazungula, Siavonga	29 Mar.-12 Apr. 2016
Northwestern	Solwezi, Kabompo, Mfumbwe, Zambezi, Chavuma, Kasempa, Mwinilunga, Ikelenge	25-29 Apr. 2016
Copperbelt	Masaiti, Mpongwe, Lufwanyama	3, 5 & 6 May 2016
Lusaka	Kafue, Chongwe, Luangwa	9-13 May 2016
Eastern	Chadiza, Mambwe, Katete, Petauke, Nyimba, Sinda	16-19 May 2016
Western	Mongu, Kaoma, Lukulu, Kalabo, Senanga, Shangombo, Sesheke	30 May-6 Jun. 2016
Luapula	Chienge, Nchelenge, Kawambwa, Mwense, Mansa, Samfya, Milenge	25-30 Sep. 2016

The problems the Project Team identified in the monitoring and the contents of the guidance the team provided to the DLAs are described in ***Table 4-28***. The team explained these problems to the participants of the orientation workshops on the preparation of O&M action plans and SCM training, and advised them to include the approaches and contents of activities recommended in the SCM Manual in the action plans. The team and PDHIDs developed a common understanding of the issues to be improved in the provision of guidance on spare parts shop operation to DLAs and SCM during joint monitoring visits. PDHIDs continue to follow up the implementation of these activities by DLAs for which PDHIDs provided guidance in order to make improvements as part of the monitoring activities after completing visits to the districts mentioned above.

Table 4-28 Problems Observed and Guidance Provided on Establishment and Operation of the Spare Parts Supply Chain in Districts

Stages[32]	Activities/Actions	Problems Observed	Guidance Provided to DLAs
Stage 1: Decide Organisational Set-up	Stakeholders meeting at the district level to make consensus to establish spare parts supply chain Official appointment of staff to be involved in operation and management of the shop with written job descriptions Council resolution on establishment of spare parts shop	• Establishment of a spare parts supply chain is regarded as the activity of procuring seed stock and constructing a spare parts shop facility only, and the action items listed in Stage 1 are not undertaken by DLAs. • Officers involved in operation of the spare parts shop do not fully understand the scope of their responsibilities. • Due to inadequate information sharing with the district offices of the line ministries and NGOs that support rural water supply projects in the district, facility repair is conducted by these organisations without cost to the community contrary to the principle of community contributions for O&M.	• Incorporate activities in the O&M action plan to enhance the environment and capacities of personnel for supply chain establishment, as well as "hardware" activities such as procurement of seed stock and construction of a spare parts shop. • Conduct necessary activities in accordance with the stages indicated in this table.
Stage 2: Prepare Spare Parts Shop	Training of officers involved in operation of the spare parts shop	When the officers who were trained in SCM are transferred to other districts, their successors are not given orientation on their roles with regard to operation of the spare parts shop.	• Provide orientation to newly appointed staff regarding SCM and operation of the spare parts shop in cases where DLA has some officers who have been trained in the same. When necessary, request technical support from PDHID for implementation of orientation/re-training of the council staff in SCM. • PDHID shall conduct supplementary training of district officers in SCM.

[32] Stages and activities/action items for establishment of spare parts supply chain are listed based on the SCM Manual (2nd Ed.).

Stages[32]	Activities/Actions	Problems Observed	Guidance Provided to DLAs
			• Even in cases where officers who were trained in SCM have been transferred to other districts, DLAs shall utilise these officers in their newly stationed districts for direct or indirect operation of the spare parts shops.
Stage 2: Prepare Spare Parts Shop (continued from the previous page)	Construction of a spare parts shop facility	• There are some spare parts shops which are already in use that have not been properly completed due to an underestimation of the budget for construction of the facility, particularly for installation of shelves. • Where a container has been used as a spare parts shop, the foundation of the container has been poorly constructed and the windows for air ventilation have been poorly installed in some facilities, which impairs the durability of the structure.	• PDHIDs shall adequately check the specifications of spare parts shop facilities and budget estimates prepared by DLAs when preparing tender documents for the construction of the spare parts shop.
	Construction of a spare parts shop facility	Operation of the spare parts shop is inconvenient when the location is separated from the DLA office.	Establish the spare parts shop adjacent to the office of DLA to the extent possible. When the location of the shop is unavoidably separated from the DLA office due to a limitation on available land, ensure it is convenient for the customers and officers involved in daily operation of the shop by utilising a corner of a building in which council officers are stationed.
	Stocktaking of all the spare parts available at the district council before procurement of seed stock	In some cases, DLAs have been keeping spare parts provided in RWSS projects funded by CPs in the past in order to sell them to communities. However, this stock is not taken into	Check the quantity and specifications of the spare parts kept at DLA prior to procurement of seed stock and count them as a part of the seed stock if

Stages[32]	Activities/Actions	Problems Observed	Guidance Provided to DLAs
		consideration when DLAs calculate the required volume of seed stock for the spare parts shops and conduct procurement of seed stock. The responsible officers have an insufficient understanding of the concept of reasonable levels of stock, which could cause excess inventory.	the condition of the items is sufficient for sale in the spare parts shop.
Stage 2: Prepare Spare Parts Shop (continued from the previous page)	Procurement of seed stock of spare parts	• The volume of seed stock is not calculated based on the procedures indicated in the SCM Manual. • DLAs have difficulty calculating the required volume of seed stock due to deficiencies in data regarding the number of existing water points in the districts.	• Apply the annual sales ratio of spare parts indicated in the SCM Manual to calculate the required quantity of seed stock in order to avoid having excess inventory. • Expedite the collection and accumulation of data on existing water points in the districts under WASH MIS and utilise it for calculation of the required seed stock volume.
	Pricing of spare parts	There are some districts that calculate the selling price of spare parts with consideration for a fixed percentage of mark-up instead of estimating costs other than the purchase price of spare parts, such as operation and management costs and price escalation.	Calculate the selling price of spare parts by applying the price calculation formula explained in the SCM Manual, which considers the purchase price of spare parts, operation and management costs, and price escalation rates. Then, if DLA takes measures for part of the operation and management cost of the shop to be borne by the council's general budget, adjust the mark-up (i.e. selling price calculation coefficient) in view of the affordability of spare parts for communities.

Stages[32]	Activities/Actions	Problems Observed	Guidance Provided to DLAs
	Preparation of receipt books and bin cards	Although some districts use the bin cards prepared for management of the council's storeroom for stock control of the spare parts shop, the format does not cover all types of information required for stock control of spare parts.	Use the format of the bin card presented in the SCM Manual.
Stage 2: Prepare Spare Parts Shop (continued from the previous page)	Open a bank account for the spare parts shop	There are cases in which DLA does not open an independent bank account for the spare parts shop in order to minimise the cost of maintaining a bank account and to simplify administrative procedures. Instead, transactions from spare parts shops are kept in the RWSS general account or an account which was opened to keep community contributions for construction of water points. Among these cases, it was found that information on income and expenditure for each purpose is not separated and sales from the spare parts shop had been partly used for other RWSS activities in DLA.	Open an independent bank account for the spare parts shop as far as possible. Assign ledger codes to each purpose and record income and expenditure for the respective purposes when DLA needs to use one account for different activities due to constraints on the maintenance cost of accounts and administrative procedures. Also, avoid allocating sales of the spare parts shop for other DLA activities.
	Advertisement	Hand pumps users have not yet been fully informed of the establishment of the spare parts shops.	Disseminate information on establishment of the spare parts shop and responsibilities of users of hand pumps on O&M of the facilities through regular council meetings and D-WASHE meetings, community meetings, public institutions to which many people have access, such as RHC, and APMs even in cases that DLA cannot secure a budget for advertisement of the spare parts shop.

Stages[32]	Activities/Actions	Problems Observed	Guidance Provided to DLAs
Stage 3: Daily Shop Operation & Management	Receipting and recording sales	None	-
	Issuing spare parts and updating bin cards	• Bin cards are not updated in each case of stock receipt and issuance. Even in case the bin cards are updated, there are discrepancies between the actual number of items on the shelf and the record in the cards. • Stocktaking is not conducted regularly. Stock is controlled only by adding or subtracting the balance of stocks on bin cards.	• Place the bin cards close to shelves so that the cards are updated at every event of receiving and issuing spare parts. • Conduct stocktaking quarterly and check the results with information in the bin cards.
	Stock management and quarterly stocktaking		
	Preparation of monthly management reports (including inventory, sales and expenditure reports)	Preparation of reports is yet to be fully incorporated into operation of the spare parts shop. Reporting is irregularly done in most districts.	• WSSC shall facilitate regular reporting in coordination with other officers in the council. • PDHIDs shall check and provide advice regarding the preparation of reports by DLAs when visiting the districts for monitoring. • Incorporate check items on reporting and other areas of operation of the spare parts shop into the district RWSS progress reports.
	Preparation of annual management reports (including inventory, sales and expenditure, and trend reports)		
	Regular meeting within the shop staff/DLA	None	-
	Regular meeting with D-WASHE (reporting on the status of shop operation to the stakeholders)	None	-
Stage 4: Replenishment & Price Revision	Calculation and procurement of spare parts to be replenished	• Responsible officers are not well aware of the minimum stock (or re-order level) which informs them of the necessity to replenish items and procedures to calculate the required quantity of stocks to be replenished.	Prepare a replenishment plan for stock in accordance with the procedures to set the re-order level and to calculate the required volume of replenishment for each item, which are explained in the SCM Manual.

Stages[32]	Activities/Actions	Problems Observed	Guidance Provided to DLAs
		• The annual sales ratio of spare parts, which is supposed to be used to calculate the required volume of seed stock, has been used to determine the quantity of each item to be replenished.	
	Review of selling price of spare parts	• The selling prices of spare parts is kept the same for more than one year without being revised, which has made it cheaper than the market price. • In some districts, DLAs have difficulty obtaining the approval of the full council for revising selling prices.	Check the retail price of major items in the spare parts at least once a year and revise the selling prices of spare parts in the district.

4.2.4 Support for the Establishment of a Monitoring Structure of the O&M Mechanisms (Activity 2-4)

In this project, a structure for monitoring the progress of activities for the nationwide extension of the O&M component and managing the outputs of the activities was developed at the central and provincial levels and a structure for monitoring the O&M mechanisms was developed at the district level. As with the monitoring of other components, the monitoring of the O&M component was supposed to be implemented within the MER framework of NRWSSP using MIS, a monitoring and decision-making tool, in accordance with the implementation policy of NRWSSP prepared by MLGH. As MLGH had been restructuring the MER framework in NRWSSP and developing a new MIS since 2013 from the necessity of IMS to be reviewed as described in 4-1, the Project Team examined the monitoring plan of the O&M component while checking the progress of these activities by attending the meetings associated with the MER/MIS Thematic Working Group. The team has also made recommendations on the indicators and data items preferably included in the MER framework and MIS for the monitoring of the O&M component at these meetings. In this section, the outline of the MER framework and the water supply/sanitation MIS in NRWSSP and their relationship with the structure for monitoring the O&M mechanisms recommended by the project is described.

(1) MER Framework in NRWSSP

The logical framework of NRWSSP stipulates the MER framework. MLGH is supposed to monitor and evaluate the progress and achievement of the project purpose, the overall goal, the outputs (each component objective to be achieved) using the indicators and means of verification provided in the logical framework, and to report and disseminate the results of the monitoring and evaluation to stakeholders in the water and sanitation sector and make decisions on matters concerning the management of the programme. MLGH has reviewed the indicators and means of verification in the logical framework of MRWSSP through discussions in the MER/MIS Thematic Working Group and added, removed and given clearer definitions of indicators based on the necessity for decision-making, while developing a new MIS.

The Project Team explained the plan for the monitoring of the O&M component at the central and district levels to the short-term consultant employed by MLGH to prepare a recommendation on the MER framework and MIS, and discussed the relevance of the volume of activities and methodologies for the monitoring of O&M within the MER framework of the whole NRWSSP with the consultant. The Project Team also made recommendations regarding the definition and selection of indicators to maintain consistency between the programme indicators and the activities for the monitoring of the O&M mechanisms mentioned in (3) of this section in the review of the programme indicators. The indicators for the O&M component in the NRWSSP logical framework revised in the above-mentioned process are shown in ***Table 4-29***.

Table 4-29 Indicators for the O&M Component in the NRWSSP Logical Framework (Extracts)

Indicator (NRWSSP Programme Document)	Indicator (Revised by DHID)
Programme Objectives	
Water: To increase and improve the number of functioning water supply facilities in rural areas through systematic investments in new facilities and rehabilitation of existing facilities on basis of a single comprehensive national RWSS programme.	
• Number of new RWS facilities • Number of RWS facilities	• Number of new RWS facilities constructed in past year • Number of RWS facilities rehabilitated in past year • Number of RWS facilities at year end classified as fully

Indicator (NRWSSP Programme Document)	Indicator (Revised by DHID)
rehabilitated • Number of functioning RWS facilities	functioning/ functioning but requiring major attention/ functioning but requiring minor attention/ non functioning • Number of rural school and rural clinic water points constructed during year
Capacity Development: To improve the performance of the RWSS sub-sector in planning, implementation and operation and maintenance of RWSS facilities through policy and institutional reforms, capacity building, comprehensive and sustainable management information system and effective advocacy and communication.	
• O&M systems at all levels	• O&M system functional at all levels
Results/Outputs	
1. Water: Increased number of people with access to functioning rural water supply facilities	
• Water supply coverage increased from 37% (2005) to 60% (2010) and finally to 75% by 2015.	• Number of households/population within 500m (or 30 minutes return journey) of protected functioning water point • Number of households/population using a protected functioning water point as main source for drinking • Target: national water supply coverage increased from 37% (2005) to 60% (2010) and finally to 75% by 2015
6. O&M: Between 70% - 80% of rural water supply facilities operational all the time	
• O&M system operational in all districts • Number of functioning water points • Supply chains for spare parts developed	• O&M system operational in all districts • Number and percentage of functioning water points • Average time for water point repair (number of days between breakdown and restored functioning) • Provincial and district supply chains available to communities • Number of APMs in district and ward at year end • Number of tool kit centres in each ward and district at year end • Number of successful repairs made by APMs in each quarter • Percentage of successful repairs made by APMs • Number of V-WASHEs in district collecting sufficient revenues to pay for O&M costs • Number of person-days of APM training provided during past year

(2) MIS in the Water Supply/Sanitation Sector as a Tool for Monitoring the Achievement of NRWSSP Project Purpose

DHID, which started working on the establishment of a system to replace IMS in 2013, developed MIS in the current form through two stages. In the first stage, there were transitional measures for the comprehensive monitoring of the RWSS subsector and the establishment of a system for long-term use as a decision-making tool. DHID developed a database in the Microsoft Excel format, "SmartSpreadsheet," for the continuous collection, accumulation and analysis of data regarding the spreading of the water supply and sanitary facilities and the assignment of personnel involved in RWSS in each district in July 2013 and conducted a trial of its use in districts with

assistance from CPs. The following data on water supply and operation and maintenance work can be accumulated with this tool:

- ID
- Name/ location of water point
- Ward name
- Chiefdom name
- Constituency name
- GPS readings
- Water point type
- Construction date
- Depth of borehole/well
- Static Water level
- Dynamic Water Level
- Casing depth
- Screen depth
- Yield
- Seasonality of water point
- Lifting device type
- Pump name
- Cylinder depth
- Date of installation of the lifting device
- Sponsor name
- Whether V-WASHE is formed or not
- Whether APM is available or not
- Whether the pump is working or not
- Whether the water point is in use or not
- Enumerator's comments
- Name and position of the enumerator
- Report date

In this project, this tool was also used in the activities for the baseline data collection through the establishment of MIS (Activity 3-11) in the four districts in Luapula Province to collect data on the existing water supply facilities and to enter the data in a database (see 4-3-9 for the details of the activities). In the end, this tool was used to accumulate data on the coverage of the water supply and sanitary facilities in 34 districts including the four districts in Luapula Province for use as a reference.

SmartSpreadsheet has fulfilled its role as a register of existing water supply facilities at the district level and the purpose of accumulating and processing data regarding the coverage of the sanitary facilities in each village, but it does not have a function to process and integrate the data at the district level into those at the province and national levels or to analyse the integrated data. Thus, the integration/processing and analysis of the data had to be performed manually in the project. There were limits to the constant use of this tool by users at the district, provincial and national levels who had different levels of knowledge of computer operation, data analysis capacity and the purposes of data use.

In view of the above-mentioned limitations, DHID designed Water and Sanitation MIS (WASH MIS) in an effort to introduce a more user-friendly system that ensured the technical reliability of operation, including data acquisition and processing, and tried to introduce it gradually since 2014 in the second stage. The main platform in the WASH MIS system is DHIS2 (District Health Information System 2), and Akvo-Flow is a supplementary platform. DHIS2 was introduced mainly to monitor the progress of the achievement of the NRWSSP project purpose. It is used for processing data on access to water supply and sanitation services among rural residents at the village, ward, district, provincial and national levels and to share the data with the stakeholders in the sector. Akvo-Flow is used to create and update the inventory of the existing water supply facilities. Both are open-source applications that can be used on mobile phones, tablets and computers. They can be used for data collection and used as tools for data accumulation, management, processing, analysis and presentation on the Internet.[33]

[33] Data is uploaded to the Internet after inputting survey results into an input form pre-installed on a mobile phone or tablet. When in an area without Internet access, data can be saved to a portable terminal, and the saved data will be uploaded to the Internet once access to the network has been re-established.

Table 4-30 shows the data that MIS collects. The Project Team participated in the selection and review of the data items on water supply and O&M to be accumulated with DHIS2 and Akvo-Flow and made recommendations and adjustment of different opinions among stakeholders in order to enable the relevant settings of data items to the activities for monitoring the MER framework and O&M mechanisms.

Table 4-30 Data to be Collected with MIS

	DHIS2 (village-based data)	Akvo-Flow (water point-based data)
Basic Information	1. Province 2. District 3. Ward 4. Village 5. Village population 6. Number of households	1. Province 2. District 3. Constituency 4. Chiefdom 5. Ward 6. Village
Sanitation	1. Number of improved latrines built after CLTS triggering 2. Number of latrines in use with platform 3. Number of latrines with smooth cleanable floor 4. Number of latrines with lid on top of hole 5. Number of latrines with superstructure providing privacy 6. Number of latrines with hand washer with soap/ash 7. Number of latrines with a roof	
Water Supply	1. Total number of boreholes (whether working or not) 2. Number of boreholes giving good tasting water 3. Total number of protected hand dug wells (whether working or not) 4. Number of protected hand dug wells giving good tasting water 5. Total number of tap stands giving good tasting water 6. Whether the community has funds for O&M of water point(s) or not	1. Name of the water point 2. ID number of the water point 3. GPS location of the water point 4. Population and number of households using this water point 5. Time taken to and from the water point 6. Number of households within 500m of the water point 7. Year of construction 8. Installation year 9. Sponsor name 10. Payment of community contribution for construction/ rehabilitation of the water point 11. Amount of community contribution paid for construction/ rehabilitation of the water point 12. Water point type 13. Lifting device type 14. Pump type 15. Whether the water point is function or not 16. Reasons for non functioning

	DHIS2 (village-based data)	Akvo-Flow (water point-based data)
Water Supply		17. Period of breakdown of the facility 18. Seasonality of yield 19. Number of strokes to fill 20 litre bucket 20. Whether the water is used for drinking or not 21. Reasons for water not used for drinking 22. Whether V-WASHE is formed or not 23. Number of women in V-WASHE 24. Number of men in V-WASHE 25. Frequency of V-WASHE meeting 26. Number of V-WASHE members who were trained 27. Whether V-WASHE manages other water point or not 28. Name of the water point 29. ID number of the water point 30. Whether the community contributes to O&M or not 31. Amount of O&M contribution (water user fee) paid per household 32. Frequency to collect O&M contribution (water user fee) 33. Access to a trained APM 34. Access to a spare parts shop 35. Condition of the civil works of the water point 36. Depth of borehole/ well 37. Static Water Level 38. Dynamic Water Level 39. Casing depth 40. Screen depth 41. Yield 42. Cylinder depth 43. Picture of the water point

The Ministry of Health has experience in operating DHIS2. It was used as a tool to monitor the progress of activities in the Sanitation Component of NRWSSP including those in the Community-led Total Sanitation (CLTS)[34] at the beginning of the implementation of NRWSSP and relevant new data items were later added to the list of data to be collected to extend its use in the monitoring of the improvement of access to water supply services. The data collected with DHIS2 shows the total number of water supply and sanitary facilities in each village and their breakdown by design, as shown in ***Table 4-30***.

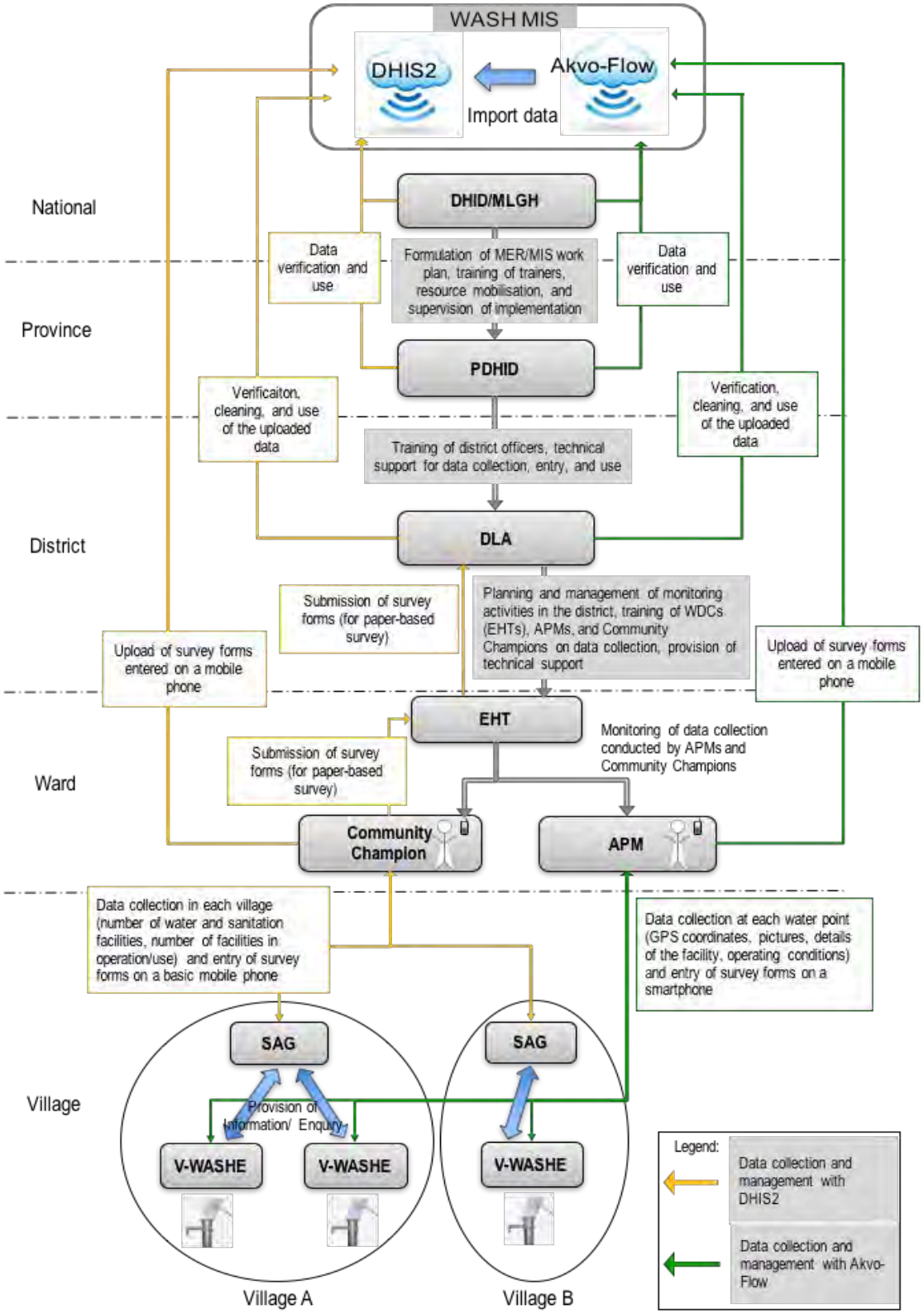
In the Sanitation Component of NRWSSP, in order to extend the use of sanitary facilities, improve hygienic behaviour and carry out awareness-raising (sensitisation) activities on hygienic behaviour using CLTS, a resident who can be a model for other people because of his/her voluntary activities in sanitation participates in the activities as a Community Champion to trigger the creation of an open-defecation-free environment in a community and to monitor such activities. A Community Champion visits villages to which he is assigned every month, collects monthly data from the Sanitation Action Group (SAG), an organisation of villagers formed to facilitate the improvement of the sanitary condition in a village, and enters and uploads the data using the automatic short message service (SMS) pre-installed on a mobile phone (future phone) terminal by DHID.[35]

Meanwhile, Akvo-Flow was initially introduced in a pilot project supported by SNV Zambia in 2014 and incorporated in WASH MIS. Akvo-Flow is used specifically for collecting information on specifications of water supply facilities and their operating conditions and usage (See Table ***4-30***). On average, an APM collects data in two wards under the supervision of the DLA. APMs visit existing facilities and enter data from each facility linked with its geographical coordinates in the survey form on a mobile phone (smartphone) terminal and the data entered in the form is uploaded to a server on the Internet. If a DLA keeps the water supply facility register including geographic coordinates as a spreadsheet, the data acquired with Akvo-Flow can be incorporated into the register.

The data accumulated with DHIS2 and Akvo-Flow can be processed separately on the respective applications. However, as the data processing function of Akvo-Flow allows only a simple processing of data by one parameter, this application is designed so that the data collected in Akvo-Flow can be exported to DHIS2, which has better data processing and analysis functions, thereby enabling comprehensive data processing and analysis. ***Figure 4-8*** shows the operating structure of MIS.

[34] Participatory activities in households for the improvement of sanitation and extension of the use of sanitation facilities for the elimination of open defecation

[35] In some districts, community champions collect data using questionnaire printed on paper. The champions are expected to submit completed questionnaire sheets to DLA through an EHT in RHC, in these districts.



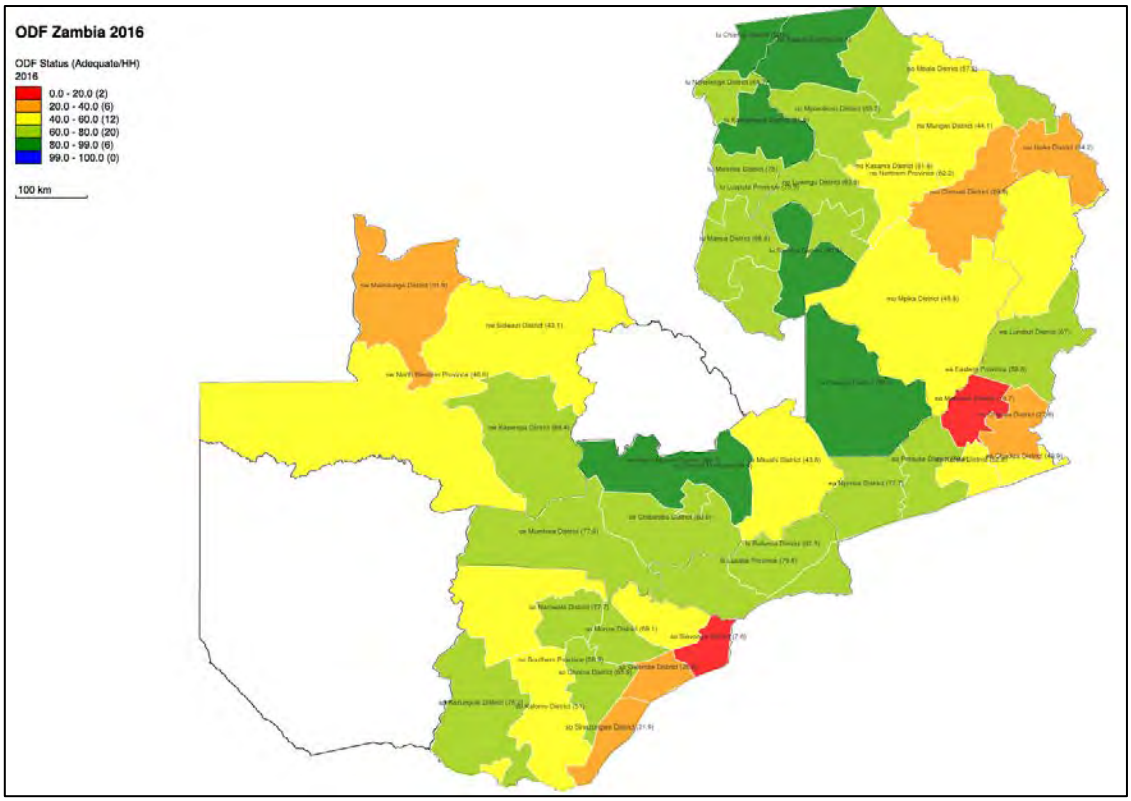
Source: Prepared based on the DHID's presentation materials for the project's final seminar "Workshop on Review of National Roll-out of Sustainable O&M Model" held in Kabwe on 30th November 2016.

Figure 4-8 Operating Structure of WASH MIS

The following facts were present in the background to the use of two systems of DHIS2 and Akvo-Flow.

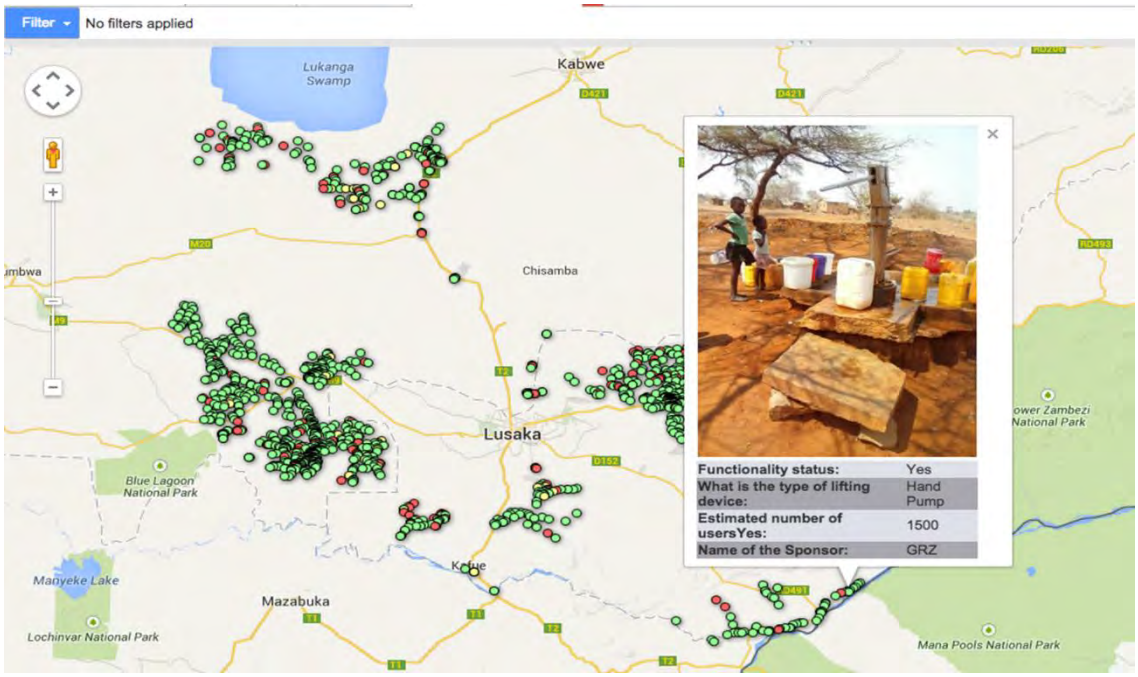
- DHIS2 was designed as a simple data collection system on the assumption that it should be used by volunteer residents (community champions) with little technical knowledge of water supply facilities and limited experience in using a smartphone. Therefore, the data that can be collected with DHIS2 is limited to content and volume that community champions are able to collect at the village level.
- In view of the above-mentioned limitation, sufficient data on operation and maintenance of each water supply facility cannot be collected with DHIS2.
- Akvo-Flow, which was tested in the pilot project implemented with assistance from SNV, was designed to enable the collection of data including the geographic coordinates of individual water supply facilities. This application has been used for data accumulation and its effectiveness has been demonstrated to the extent that justifies extended use in other districts.
- As the data accumulated in Akvo-Flow uses a spreadsheet format, the data can be imported in DHIS2 manually or automatically. Therefore, it was possible to operate MIS by linking the two systems without developing a new data collection system at the facility level on DHIS2.
- Due to the limitation of data collation functions using Akvo-Flow, as mentioned above, the integration of data in DHIS2 had an advantage in the effective use of the data accumulated in Akvo-Flow.

Figure 4-9 and ***Figure 4-10*** show examples of the presentation of the results of data analysis with DHIS2 and Akvo-Flow, respectively.



Source: Presentations made by DHID/MLGH in the project's final seminar "Workshop on Review of National Roll-out of Sustainable O&M Model" held in Kabwe on 30th November 2016

Figure 4-9 Example of the Presentation of the Results of Data Analysis on Achievement of ODF by Districts with DHIS2



Source: Presentations made by DHID/MLGH in NRWSSP MER/MIS thematic working group meeting held on 6th February 2015.

Note: The figure shows information on distribution and operating status of existing water points which was collected in districts in the suburbs of Lusaka. By selecting a water point location, a pop-up window appears to show a picture and attribute data of the water point.

Figure 4-10 Example of the Presentation on Distribution and Operating Status of Existing Water Points with Akvo-Flow

DHID introduced DHIS2 into 51 districts by the end of 2016, and the training for stakeholders on NRWSSP of target districts is currently being carried out with the aim of expanding to 73 districts during the first quarter of FY 2017. Meanwhile, Akvo-Flow was used in eight districts in the pilot project supported by SNV in FY 2014/15 for the collection of baseline data, and its introduction into 49 districts is underway since the end of 2016 with funding from RWSS Basket Fund. The introduction of Akvo-Flow is, therefore, expected to expand to a total of 52 districts during 2017 (*cf.* five districts are included in both projects).

MIS has been established and is being extended to all the NRWSSP target districts, but the quantity and quality of MIS data on water supply and O&M work are not sufficient for use in planning, monitoring and decision-making. For the effective operation of the entire MIS, it is necessary to verify the collected data in each DLA, to ensure the reliability of the data by means of cleaning, to enhance the skills of MIS users for data analysis and application, and to promote the active use of data and information in order to establish evidence-based decision-making. The issues to be solved in the operation of the two systems are as follows.

For DHIS2, although districts have begun collecting data after the training on data collection and system operation, the collected data on water supply has not yet been uploaded on the Internet. In addition, there are inconsistencies in the data available on the Internet. According to DHID, through verification of data collection activities conducted by community champions and the data collected by them, improvements are being made to water supply-related data items used in DHIS2 so that this data uses vocabulary and definitions that are easier for the community champions to understand and check. In the near future, a process shall be established not only for data collection using standardised data items, but also for data processing and utilization.

Meanwhile, the data and information on individual water supply facilities accumulated in Akvo-Flow is more important in the monitoring of O&M action plans in view of the fact that the community champions have limited capacity for information collection. DLAs will have to continue adding the information of newly constructed water supply facilities and updating the data in the system after they have completed the initial mapping and inventory creation for the existing water supply facilities in their districts. The Project Teams made the recommendations mentioned below at the meetings of the MER/MIS Thematic Working Group and workshops for the provincial and district stakeholders on NRWSSP (from PDHIDs and DLAs) and included these recommendations in the O&M Manual (2nd Ed.).

- Information on the construction sites and specifications of new water supply facilities shall be added to the inventory systematically using records of borehole construction work that are maintained appropriately with the entry of all the required data.
- It is preferable that DLAs should conduct a survey of all the existing water supply facilities every year using APMs to update dynamic data including the operating status of the facilities and state of the O&M activities of V-WASHE. Residents of communities in which water supply facilities are to be constructed shall make a contribution to the cost of facility construction to DLAs and DLAs shall save and manage it on behalf of the residents. Savings from the contributions made by the communities may be partly used as an incentive for APMs participating in this survey.[36] If budget limitations make it difficult to conduct such a survey, DLAs are required to update the operating conditions and use of the facilities concerned, at least, using the information collected in the monitoring activities in the district O&M action plans mentioned below in (4) of this section (the reports on hand pump repairs submitted by APMs and the records kept during monitoring visits to water supply facilities conducted by DLAs/WDCs).

(3) District Management Checklist as a Management Tool for District RWSS AWP Implementation

WASH MIS was designed primarily for monitoring the progress and achievement of the improvement in access to safe water and sanitation services. Achievement of the improvement of the services requires monitoring of the process whereby a district RWSS AWP has been appropriately prepared, and that it is being implemented to achieve the objectives in each district. Meanwhile, the District Management Checklist was developed as a tool to support management and decision-making in the RWSS AWP by DLAs in a GIZ-assisted programme implemented in Eastern Province between 2011 and 2015.

The checklist may be used to evaluate, record and confirm the progress and status of the work to be implemented by DLAs, allocations of resources and the capacity of the organisations involved in the implementation of RWSS projects in the following ten areas.[37] The data items for monitoring the implementation of the O&M action plans included in the checklist are described in Annex 14.

A WSSC of a DLA fills in the checklist to identify the issues that have not been addressed and

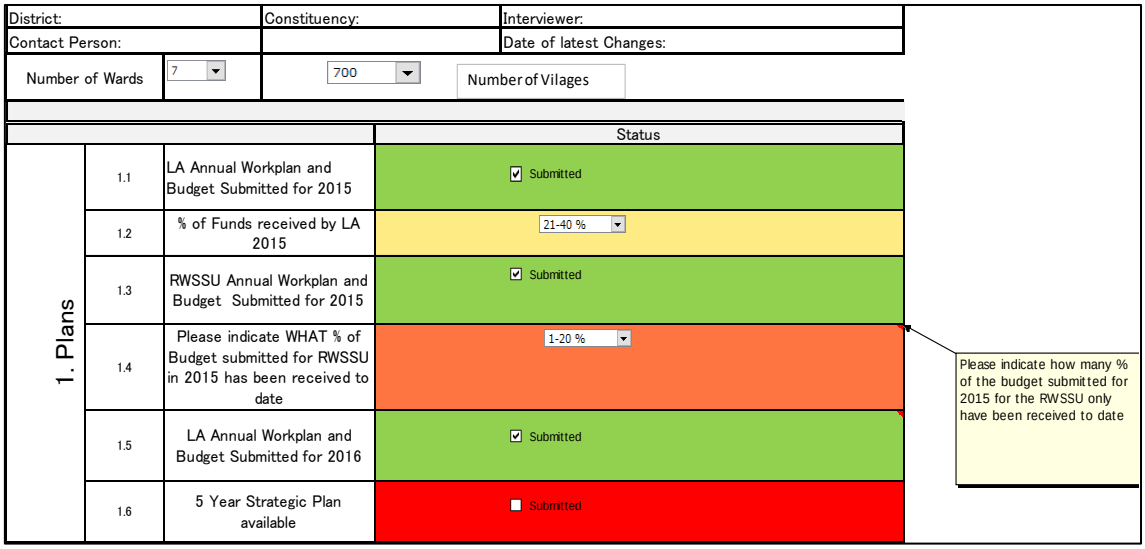
[36] A notice of MLGH, "Guidelines on the Community Contribution towards Water Supply Infrastructure Development-National Rural Water Supply and Sanitation Programme (NRWSSP) (2013) stipulates that the saving of the community's contribution to the cost of construction of water supply facilities should be included in the revenue in the budget of district RWSS AWP and should be used for the O&M-related activities of DLAs including the procurement of spare parts in the seed stock and the training of V-WASHE.

[37] MIS is defined in a narrow sense as an information management system based on specific computer applications in the RWSS subsector in Zambia. However, the District Management Checklist may be regarded as part of MIS in a sense that it may be used for collecting, managing and using the information required for decision-making in the operation of the sector development programme.

submits the completed list to PDHID on behalf of the DLA every quarter. The data on the lists submitted by WSSCs of DLAs are consolidated in a summary sheet that describes the state of NRWSSP implementation in the entire province at PDHIDs. ***Figure 4-11*** and ***Figure 4-12*** show a completed checklist of a district and examples of output of a summary sheet of a province, respectively.

A former member of the PST of Eastern Province who had participated in the development of the checklist in the programme supported by GIZ conducted a demonstration of this tool and presented the record of its use in Eastern Province to the staff of MLGH and PDHIDs in March 2015. The trial introduction of this checklist was extended to 44 districts in four provinces in 2016 with the addition of districts in Southern, Luapula and North-western Provinces. By monitoring how this checklist is used for data entry, submission at DLAs in these districts and data compilation at PDHIDs, MLGH intends to create the final version of this tool by making the necessary improvements. The use of the checklist is expected to be introduced in other provinces in 2017.

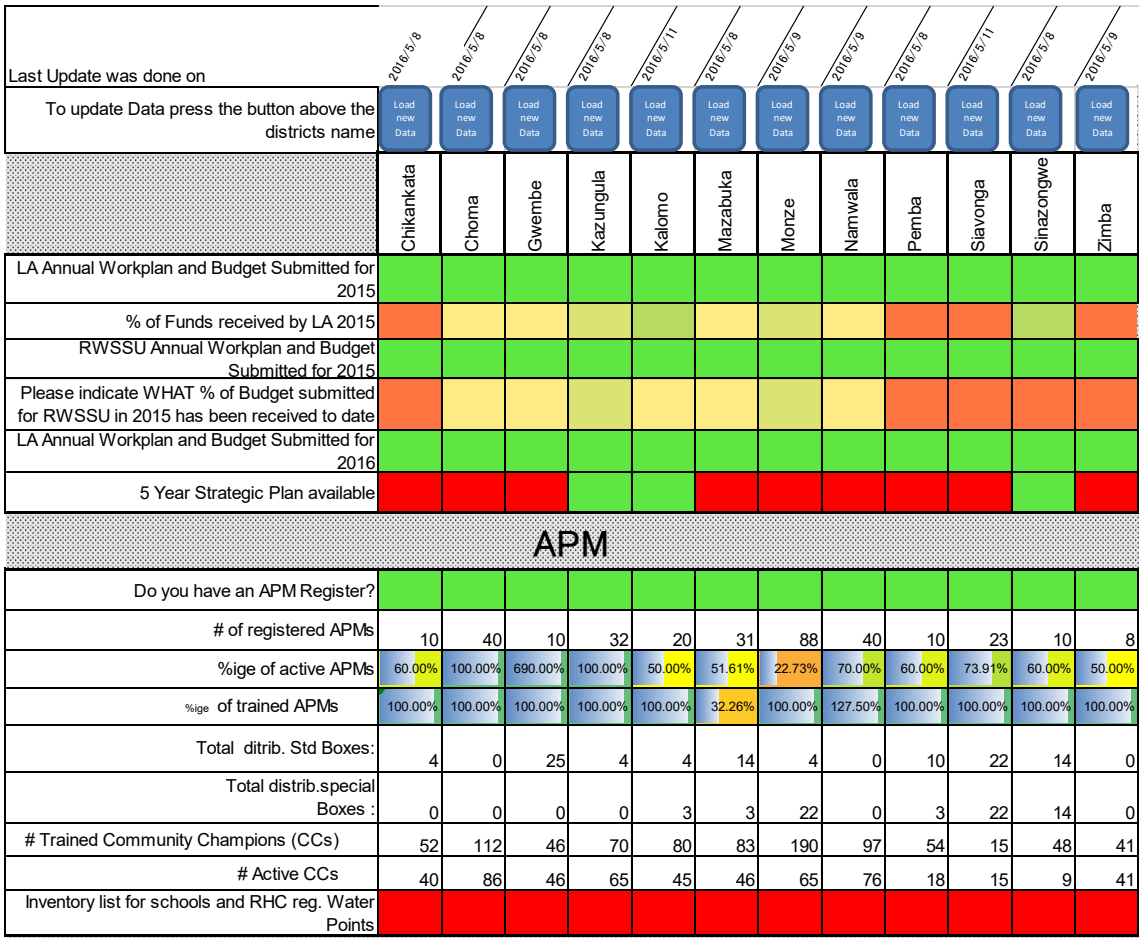
The team of experts from the GIZ assistance programme, "Water Sector Capacity Development Programme," has taken over the improvement and finalization of the tool from the PST of Eastern Province. The expert team is conducting a study to modify the tool to develop a system that will finally have online data sharing and processing and automatic reporting functions. The purpose of this modification is to facilitate the preparation of the quarterly RWSS progress reports by DLAs and PDHIDs based on the information on the checklist and sharing of the contents with other stakeholders. The Project Team examined the items for the monitoring of the district O&M action plans included in the checklist and made a recommendation on the information items to be added to the list to the GIZ expert team (See Annex 14). It was decided that these recommendations would be adopted in the finalization of the tool after the trial.



Source: Presentations made by DHID/MLGH-GIZ expert team for the Water Sector Capacity Development Programme in the project's final seminar "Workshop on Review of National Roll-out of Sustainable O&M Model" held in Lusaka on 17th November 2016

Note: By answering to each question in the checklist, cells in the "Status" column are highlighted depending on status of achievement of the task/activity. Cells in red means the tasks/activities which have the least progress and require actions by the district. The supplementary explanation for questions is provided in the text boxes in order to assist respondents to fill in the checklist.

Figure 4-11 Format of the District Management Checklist (Part of the Format for a District)



Last Update was done on	2016/5/8	2016/5/8	2016/5/8	2016/5/8	2016/5/11	2016/5/8	2016/5/9	2016/5/9	2016/5/8	2016/5/11	2016/5/8	2016/5/9
To update Data press the button above the districts name	Load new Data	Load new Data	Load new Data	Load new Data	Load new Data	Load new Data	Load new Data	Load new Data	Load new Data	Load new Data	Load new Data	Load new Data
	Chikankata	Choma	Gwembe	Kazungula	Kalomo	Mazabuka	Monze	Namwala	Pemba	Siavonga	Sinazongwe	Zimba
LA Annual Workplan and Budget Submitted for 2015												
% of Funds received by LA 2015												
RWSSU Annual Workplan and Budget Submitted for 2015												
Please indicate WHAT % of Budget submitted for RWSSU in 2015 has been received to date												
LA Annual Workplan and Budget Submitted for 2016												
5 Year Strategic Plan available												
APM												
Do you have an APM Register?												
# of registered APMs	10	40	10	32	20	31	88	40	10	23	10	8
%ige of active APMs	60.00%	100.00%	690.00%	100.00%	50.00%	51.61%	22.73%	70.00%	60.00%	73.91%	60.00%	50.00%
%ige of trained APMs	100.00%	100.00%	100.00%	100.00%	100.00%	32.26%	100.00%	127.50%	100.00%	100.00%	100.00%	100.00%
Total ditrib. Std Boxes:	4	0	25	4	4	14	4	0	10	22	14	0
Total distrib.special Boxes :	0	0	0	0	3	3	22	0	3	22	14	0
# Trained Community Champions (CCs)	52	112	46	70	80	83	190	97	54	15	48	41
# Active CCs	40	86	46	65	45	46	65	76	18	15	9	41
Inventory list for schools and RHC reg. Water Points												

Source: Presentations made by DHID/MLGH-GIZ expert team for the Water Sector Capacity Development Programme in the project's final seminar "Workshop on Review of National Roll-out of Sustainable O&M Model" held in Lusaka on 17th November 2016

Figure 4-12 Example of Output of a Summary Sheet of the District Management Checklist

(4) Monitoring the Establishment and Implementation of O&M Mechanisms

DLAs regularly conduct monitoring to assess the progress of each component in the district RWSS AWP and the achievement of expected outputs and objectives. The results of monitoring are to be used for providing necessary feedback for the activities related to each component under implementation and for planning for the following quarter/year. Monitoring of the district RWSS AWP is conducted at two levels in the MER framework of NRWSSP:

- Confirmation of the progress of activities by comparing the target performance values set for each activity (e.g. the number of facilities constructed, the number of activities, or the number of target of training) and their results
- Confirmation of the level of achievement of the immediate objective, development objective (overall goal), and output set in the logical framework of the district RWSS AWP

From this perspective, the methodologies and implementation structure for monitoring the O&M action plan that constitutes part of the district RWSS AWP were examined in this project, which was presented in the O&M Manual (2nd Ed.) as an O&M monitoring framework (***Table 4-31***).

Table 4-31 O&M Monitoring Framework based on the Standard O&M Component Target in a Logical Framework for District RWSS AWP

Narrative Summary	Process Indicators and Outcome Indicators		Means of Verification	Required Actions When the Target of the Indicator is not Achieved
Development Objective				
Proportion of the rural population using safe, reliable and convenient quality of water is improved.	[Outcome]	Increased % of rural population with access to safe and reliable water in the district	• WASH MIS (DHIS2)	Select necessary interventions depending on causes of the low coverage (e.g. construction of new water points, rehabilitation of existing facilities, strengthening of O&M mechanisms)
Immediate Objective				
Component 6: O&M Operation rate of the rural water supply facilities is improved in the district.	[Outcome]	Increased % of protected water points (with hand pumps, other lifting devices) that are functional at time of spot-check	• WASH MIS (DHIS2 & Water Point Mapping)	• Take necessary actions to repair/ rehabilitate the water points which were reported "not functional". • Prioritise activities to strengthen the O&M mechanism which requires further improvement.
	[Outcome]	Reduction of average number of days taken between breakdown of hand pump water supply facilities and completion of repairs for minor breakdowns and major breakdowns, respectively	• APM repair work record • On-site monitoring record by DLA/WDC	
Outputs				
Component 6: O&M				
1. Supply Chain Management Spare parts are readily available to communities at all times.	[Process]	A spare parts shop established in the district	• District RWSS progress report	Complete the planned activities to establish a spare parts shop.
	[Process]	Records on operation of the spare parts shop prepared as scheduled	• Monthly/ annual inventory and sales & expenditure reports of the spare parts shop	Agree upon the schedule and procedures to prepare various reports on operation of the spare parts shop among the responsible officers.
	[Outcome]	Spare parts replenished at appropriate timing every year	• Monthly inventory reports of the spare parts shop	Identify reasons why stocks are not replenished as required and take necessary actions.

Narrative Summary	Process Indicators and Outcome Indicators		Means of Verification	Required Actions When the Target of the Indicator is not Achieved
	[Outcome]	Reduced number of days taken for V-WASHEs to buy spare parts	• On-site monitoring record by DLA/WDC	Identify in which process it takes V-WASHEs a longer time than expected to buy spare parts.
2. Repair Work Mechanism Enough number of APMs with adequate capacities is allocated to all wards.	[Process]	At least one APM is available in each ward where hand pumps are installed.	• APM register	Train additional APMs in the wards where the number of APMs is in short.
	[Process]	The number of APMs trained in the district satisfies 10-15 hand pumps per APM.	• APM register	Train additional APMs in the wards where the number of APMs is in short.
	[Process]	At least one set of maintenance tools is allocated to each tool kit centre.	• Tool kit inventory	Procure tool kits for the centres which have not yet received any tools.
	[Outcome]	Increased % of APMs who submit repair work records to DLA monthly	• APM repair work record	Identify reasons why APMs do not submit the repair work records as required and consider the way to improve reporting.
	[Outcome]	Increased % of breakdown cases repaired by APMs successfully in a year	• APM repair work record	Analyse the breakdown cases which APMs failed to repair and take necessary actions to improve skills of APMs for repair works.
	[Outcome]	Increased number of tool kit centres keeping the tool kit movement forms properly	• Tool kit movement form at each centre	Identify the way to improve record keeping at the tool kit centres.
3. Community Based Management Community contributions for O&M is improved and properly managed by the V-WASHE committees.	[Process]	Increased % of water points (both newly constructed and existing ones) with trained V-WASHEs	• WASH MIS (Water Point Mapping)	Prioritise water points which need training/re-training of V-WASHEs and conduct training according to annual budget secured for the activity.
	[Outcome]	At least 50% women's participation in V-WASHEs	• WASH MIS (Water Point Mapping)	Sensitise communities about importance of participation of both men and women in management and decision making in V-WASHEs.
	[Outcome]	% of V-WASHEs collecting water user fees for O&M of water points	• WASH MIS (Water Point Mapping) • On-site monitoring record by DLA/WDC	• Visit V-WASHEs to find out problems on collection of water user fees and consider the ways to improve collection of user fees.

Narrative Summary	Process Indicators and Outcome Indicators	Means of Verification	Required Actions When the Target of the Indicator is not Achieved
	[Outcome] % of V-WASHEs collecting water user fees which can meet annual O&M requirements	• WASH MIS (Water Point Mapping) • On-site monitoring record by DLA/WDC	• Review the facilitation process and skills of DLA and WDCs to introduce the purpose and procedures to raise O&M funds to communities/ V-WASHEs.
	[Outcome] % of V-WASHEs keeping records on preventive maintenance and financial management	• Maintenance logbook • On-site monitoring record by DLA/WDC	Visit V-WASHEs and identify the way to improve record keeping.

Source: Ministry of Water Development, Sanitation and Environmental Protection (2016) Rural Water Supply and Sanitation Operation and Maintenance Implementation Manual & User Guide: Part 4: Monitoring of the Operation and Maintenance Action Plan

This process focused on the following points in order to optimise the O&M framework:

- Indicate standard monitoring indicators in order to measure the progress of the establishment and implementation of O&M mechanisms and their effects, and propose monitoring items and tools alongside a structure for monitoring the measurement of these indicators.
- Derive practical measures for DLAs from a study of the outcomes from pilot activities for monitoring in the four districts in Luapula Province under direct support from the project (see Section 4.3.9), and a study of the progress of monitoring O&M activities in other provinces and districts.
- Propose a monitoring system for O&M within the MER framework of NRWSSP instead of suggesting a monitoring system that is parallel to the programme or other components.
- Fully utilise MIS and the District Management Checklist, which are the monitoring tools common to all components and the entire programme of NRWSSP.
- Ensure that data and information to be collected through O&M monitoring can be integrated into data collection using DHIS2, Akvo-Flow, and the District Management Checklist.

1) Monitoring the Progress of Activities in O&M Action Plans

The Component Activity and Performance Schedule (***Table 4-32***), one of the formats for the district RWSS AWP, shows the activities to be implemented in the financial year, indicators to measure their progress, and target performance values for each quarter. In monitoring the progress of activities set in O&M action plans, DLAs compare the target values and their results every quarter and check for delays in implementation of the planned activities.

Table 4-32 Example of the Component Activity and Performance Schedule in the District RWSS AWP

Code	Activity	Performance Indicator	Target Performance Value (2016)					Ref.
			Q1	Q2	Q3	Q4	計	
01	**Component 1: Water Supply**							
010101	Construction of new boreholes with hand pump	Number of facilities constructed		10	10		20	
010201	Rehabilitation of existing boreholes with hand pump	Number of facilities rehabilitated			7		7	
02	**Component 2: Sanitation**							
020101	Training of EHTs in CLTS	Number of EHTs trained		15	15		30	
06	**Component 6: O&M**							
060101	Construction of a spare parts shop	Number of shop constructed	1				1	
060201	Training of APMs on installation and maintenance of India Mark II and Afridev	Number of APMs trained	30				30	
060301	Training of V-WASHEs in O&M of water points	Number of V-WASHEs trained		20	50		70	
060302	Monitoring visit to water points by D-WASHE	Number of water points visited				35	35	

Note: Activities planned in the O&M action plan are shown in "Component 6: O&M" in the table above.

2) Monitoring the Outputs and Objectives of O&M Action Plans

District O&M action plans aim to improve the operation rate of rural water supply facilities in the districts. Improvement of the operation status of the facilities can be regarded as the effect that is realised by the establishment and sustainable implementation of O&M mechanisms, which are

outputs expected to be achieved in O&M action plans. As shown in ***Table 4-31***, the O&M Manual (2nd Ed.) introduced the standard indicators for O&M action plans in the logical framework of the district RWSS AWP, particularly to monitor the progress of the establishment and implementation of O&M mechanisms and their effects. As to the immediate objective of O&M action plans, the improved O&M of water supply facilities (effect of the establishment and implementation of O&M mechanisms) is monitored from the aspects of increased operation rates and reduced downtime at the facilities. Outputs of O&M action plans describe the desired situation to be achieved for each O&M mechanism. While progress in the establishment of O&M mechanisms is monitored as process indicators, functionality of O&M mechanisms established in the district is to be assessed by monitoring outcome indicators.

The immediate objective and development objective and their indicators in district O&M action plans are to be common to all districts in accordance with the logical framework of NRWSSP and the O&M component work plan, while each district is to set present values and targets for the indicators of the immediate objective and development objective. DLAs can decide an output and its indicators for each O&M mechanism depending on the situation of the district, and the O&M Manual includes examples on the method of setting outputs and indicators. The O&M monitoring framework in the Manual also indicates actions required of DLAs when the targets for the indicators are not achieved so that monitoring activities connect to certain actions, such as follow-ups for implementation of O&M action plans, and preparation of a work plan for the following quarter/year.

The implementation structure of monitoring activities based on the O&M monitoring framework is shown in ***Figure 4-13*** and monitoring tools for recording O&M activities and collection of data and information are tabulated in ***Table 4-33***. The O&M Manual (2nd Ed.) and SCM Manual (2nd Ed.) contain formats for these activity records and reports for use as monitoring tools. The O&M Manual (2nd Ed.) defines the monitoring structure at village, ward, and district levels as follows:

As to village level monitoring, V-WASHEs keep records on water points and O&M activities conducted at the community level. Such information is utilised by V-WASHEs for daily O&M activities and reports made to water users, and can further be referred to as the data related to water supply facilities and O&M to be accumulated by DLAs in WASH MIS. For instance, when APMs collect information on water points to be uploaded to Akvo-Flow, they can refer to the Logbook for the Daily Maintenance of Hand Pumps recorded by caretakers for information on the timing and history of facility breakdown and repair. They can also find information on the number of user households per water point, the amount of water user fees collected and the frequency of collection, balance of the O&M fund, and other information in the Register of Households and Record of Contributions (Water User Fees) for O&M/Cashbook kept by the V-WASHE treasurers.

At ward level, the main aspects to be monitored are: 1) conditions and users of maintenance tools, 2) hand pump repair works conducted by APMs, and 3) state of water points and O&M activities conducted by APMs. The public institutions designated as the tool kit centres by DLAs prepare and update the Tool Kit Inventories and Tool Kit Movement Forms for periodic submission to DLAs. APMs prepare the APM Repair Work Records and submit them directly to DLAs or through WDCs (tool kit centres). In addition, when WDC members, especially government extension officers, monitor O&M activities in the communities in their catchment areas or visit the communities as part of other programmes, they are also expected to check and record the state of the water points and O&M activities by V-WASHEs in accordance with the O&M Monitoring Checklist for DLA and WDC to be submitted to DLAs.

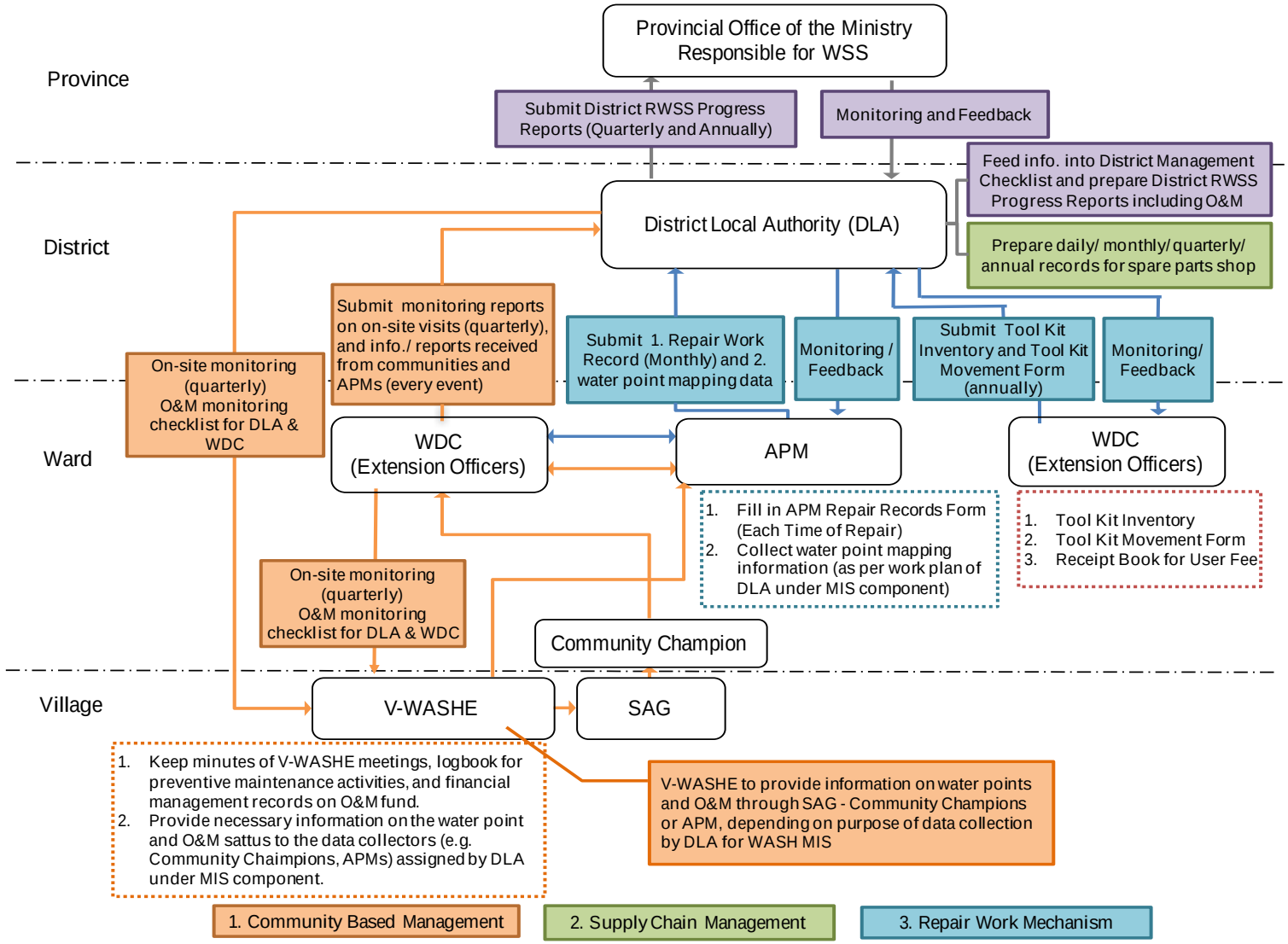


Figure 4-13 Implementation Structure of Monitoring Activities for O&M

Table 4-33 Monitoring Tools for Recording O&M Activities and Frequency of Data Collection

Community Based Management | Repair Work Mechanism | Supply Chain Management | Monitoring tools to be aggregated at district level | Activity records which information is to be summarised into the monitoring tools | Standard NRWSSP report forms are to be used

Frequency of Recording/ Preparation of Reports \ Responsible Person	Village (Water Point)		Sub-District (Ward)		District		
	Hand Pump Caretaker in V-WASHE	V-WASHE (1 per water point)	APM	WDC (Extension Officers)	WSSC	Spare Parts Shop Staff (Cashier & Storekeeper)	Council Treasurer
Daily	1. Logbook for Daily Maintenance of Hand Pump	2-3. Record of Contribution for O&M 2-4. Cash Book				11. Receipt Book 12. Bin Cards	
Monthly		2-2. Collection of Monthly Contribution for O&M			4-1. Spare Parts Shop Monthly Management Report 4-2. Monthly Sales and Expenditure Report 4-3. Monthly Inventory Report		10. Communal Banking Record
Quarterly				3. O&M Monitoring Checklist for DLA/ WDC [submit quarterly: WDC => DLA]	3. O&M Monitoring Checklist for DLA/ WDC Standard District RWSS Progress Report [submit quarterly: DLA => Province => Ministry]	4-4. Stocktaking Sheet	
Semi-Annually					6. APM Register		
Annually		2-1. Registration of Households		8. Tool Kit Inventory (annual & on delivery of tools) [submit on delivery & annually: Tool Kit Centre => DLA]	5-1. Spare Parts Shop Annual Management Report 5-2. Annual Sales and Expenditure Report 5-3. Annual Inventory Report 5-4. Annual Trend Report Standard District RWSS Progress Report [submit annually: DLA => Province => Ministry]		
Every Event			7. APM Repair Record [submit monthly: APM => DLA]	9. Took Kit Movement Form [submit annually: Tool Kit Centre => DLA]		13. Goods Received Note (on receipt of spare parts)	

At district level, all O&M activities to be carried out at village, ward and district levels are monitored holistically. In addition to the verification of reports and activity records submitted by WDCs and APMs, DLAs conduct monitoring by managing and updating the APM Register, compiling operation records of the spare parts shop, and recording the O&M Monitoring Checklists when visiting communities. Based on findings from the analysis of the accumulated data and information, DLAs enter information on the items related to O&M into the District Management Checklist and prepare quarterly district RWSS progress reports (***Table 4-34***). Then, the status of each province is ascertained when PDHIDs summarise the results of activities in the district RWSS progress reports submitted by DLAs.

Table 4-34 Quarterly District RWSS Progress Report (Example of Entries on Progress of the O&M Action Plan)

Progress of Activities

Council	
Department	
Programme	Rural Water Supply and Sanitation
Objective	Water Supply: Sanitation: O&M: Operation rate of the rural water supply facilities is improved in the district.
Strategy	(Component 1: Water Supply) (Component 2: Sanitation) (Component 6: O&M) Output 0601 Spare parts are readily available to communities at all times. Output 0602 Enough number of APMs with adequate capacities are assigned to all wards. Output 0603 Community contributions for O&M is improved and properly managed by V-WASHEs.

Planned Outputs		Annual Outputs			Variance Analysis per Quarter											
					1st Quarter			2nd Quarter			3rd Quarter			4th Quarter		
Code	Activity	Planned	Actual	Variance	Planned	Actual	Variance	Planned	Actual	Variance	Planned	Actual	Variance	Planned	Actual	Variance
060101	Construction of a spare parts shop	1	1	0	1	1	0									
060201	Training of APMs	30	26	4	30	26	-4									
060301	Training of V-WASHEs(O&M)	70	75	5				20	25	5	50	50	0			
060302	Monitoring of water points by D-WASHE	35	27	-8										35	27	-8

Achievement of Outputs

Objective	Output	Output Indicator	Output Indicator Target	Output Indicator Actual	Progress to Plan	Deviations from Plan	Reasons for Variance
Component 6: O&M							
Operation rate of the rural water supply facilities is improved in the district.	Spare parts are readily available to communities at all times.	A spare parts shop is established in the district.	A spare parts shop established in the 1st Quarter	Established in the 1st Quarter	Achieved	Nil	-
	Enough number of APMs with adequate capacities are assigned to all wards.	At least one APM is assigned to each ward in which hand pumps are installed.	13 wards	11 wards	Training of new APMs conducted	2 wards have no APMs.	4 APMs did not attend the training.

In the above mentioned structure, V-WASHEs are expected to have the role of properly and periodically taking and keeping records on the condition of water points and O&M activities, and of providing this data/information to DLAs depending on the requirements of DLAs for O&M monitoring activities. In the monitoring activities conducted in the four districts in Luapula Province, DLAs piloted the method by which V-WASHEs prepare monthly monitoring reports based on O&M activity records at the village level and submit the reports quarterly to DLAs through WDCs (see Section 4.3.9). The Project Team observed the following problems in the process of providing guidance to V-WASHEs on preparing monitoring reports and collecting the reports from the communities by DLAs (see Section 4.3.10 (4)).

- It was observed that many V-WASHEs have difficulty preparing V-WASHE monthly monitoring reports by themselves. WDCs need to continue to provide hands-on guidance to V-WASHEs for the preparation of the reports even after the completion of training of V-WASHEs in the monitoring activities.
- Realistically, it is difficult for many V-WASHEs to bring their reports to WDCs because of the distance and time involved in travelling from their communities to the locations where WDC members are stationed. In order to reliably collect the reports, it is necessary for WDCs to visit every V-WASHE as part of on-site monitoring and to support and collect the reports from them.
- DLAs need to budget the cost of preparing sufficient copies of the V-WASHE monitoring report in order to distribute the forms to all V-WASHEs in the districts.

Considering these points, the project suggests that officers of DLAs or data collectors designated by DLAs collect the necessary information from V-WASHEs at a predetermined frequency rather than using the method in which V-WASHEs regularly submit monitoring reports to DLAs. As the operation structure of WASH MIS, including the collection of indicators related to water supply and O&M, was formed after direct support for Luapula Province came to an end, the project decided to utilise the system of collecting data from Community Champions and APMs in MIS.

These monitoring activities on the establishment and implementation of O&M mechanisms have already been partly introduced in the districts, but the system is not yet complete, as suggested in the O&M Manual (2nd Ed.). Meanwhile, since data collection methods for indicators related to water supply and O&M have been gradually decided by DHID/MLGH and its partners in the RWSS sub-sector during the last stage of the project, the establishment of a connection between the O&M monitoring framework suggested by the project and WASH MIS remained at a stage where such a connection is indicated in the O&M Manual (2nd Ed.) and introduced to the stakeholders at national, provincial, and district levels in the Workshops on Review of National Roll-out of the Sustainable O&M Model. With the introduction of WASH MIS and the District Management Checklist in the districts, DLAs are expected to utilise the O&M monitoring records mentioned in this section as sources of data on water supply and O&M for entry in monitoring and decision-making tools.

4.2.5 Support for Hands-on Training of ADCs/WDCs for Hand Pump Repair and Maintenance through Peer-Learning among Districts and Communities (Activity 2-5)

The Project Team conducted this activity utilising opportunities to train provincial facilitators on the formulation and management of district O&M action plans and the orientation workshops for the district stakeholders on O&M action planning (Activity 2-1). Specifically, participants of these training/orientation workshops organised in the third and fourth stages of the project were introduced by the team to examples of human resource capacity development at the ward level and facilitation of their activities. Based on these cases, the team guided the participants on the

preparation of appropriate work plans on O&M. The technical guidance provided by the team mainly involves using the APM register when allocating and training APMs, and facilitating community activities, such as the establishment of V-WASHEs and their capacity development for O&M, by training government extension officers as facilitators of these O&M activities while waiting for the establishment of WDCs in the districts to be completed.

4.3 Activities for Output 3

For Output 3, the SOMAP O&M model shall be implemented under the direct support of the project in the four districts (Mansa, Milenge, Mwense and Nchelenge) in Luapula province.

The activities for Output 3 shall introduce the SOMAP O&M model in the four districts in Luapula province. Although the construction of water supply facilities with hand pumps and software component activities for O&M had been implemented in the "Project for Groundwater Development in Luapula Province" and the "Project for Groundwater Development in Luapula Province Phase 2" in four districts (Nchelenge, Mwense, Mansa and Milenge) in Luapula Province, comprehensive support for the O&M component of NRWSSP had never been provided in those four districts. Therefore, O&M mechanisms had not been established, and district stakeholders in the four districts had a limited capacity level for the preparation of RWSS O&M action plans. In view of the above situation, there was an urgent need for the establishment of O&M mechanisms in line with the NRWSSP O&M Implementation Manual and capacity building of district stakeholders in the four districts for O&M action plan preparation and implementation.

4.3.1 Orientation of the District Stakeholders on Their Roles and Responsibilities as well as NRWSSP and the SOMAP O&M Model (Activity 3-1 and Activity 3-4)

This Activity aims to hold an orientation for stakeholders in the four target districts in order to obtain an understanding regarding NRWSSP and the SOMAP O&M model as the first activity of direct support for Luapula Province. The orientation was held in Mansa in April 2012 for two days targeting stakeholders in the four districts (Council Secretary, WSSC, and D-WASHE members) with facilitation from DHID senior engineers and the Project Team. Through this orientation, the participants gained a deep understanding of NRWSSP and the SOMAP O&M model, and agreed to implement activities to establish the O&M model in their respective districts.

In the orientation, explanations were provided regarding the outline of NRWSSP, basic principles and approach of the O&M component, roles and responsibilities of sector stakeholders, and the concept and establishment procedure for the spare parts supply chain. Experiences of establishing spare parts shops and the SOMAP model of the Mumbwa district, presented by the district WSSC supported under SOMAP1, were also shared. The Project Team also explained and gained consent for the procedures and establishment schedule for spare parts shops and the SOMAP model in the four districts. Detailed information regarding the orientation is shown in ***Table 4-35***.

Table 4-35 Orientation for District Stakeholders about NRWSSP and O&M Model

Date and Venue	12–13 April 2012 (2 days), Mansa District	
Participants	Council Secretary, WSSC, and D-WASHE members of each District	
Facilitator	Provincial DHID senior engineer and SOMAP3 team	
Programme	Session 1	Introduction and purpose of the orientation
	Session 2	Overview of the NRWSSP
	Session 3	The O&M component, principles and approaches
	Session 4	Stakeholder analysis
	Session 5	Situation analysis

	Session 6	O&M mechanisms
	Session 7	Establishment of Supply Chain of Spare Parts and Management
	Session 8	O&M action plan of the district
	Session 9	Discussion of new issues for 5 components
	Session 10	Allocation of Roles and responsibilities for implementation

4.3.2 Formulation of the District O&M Action Plans and Signing of the Tripartite Agreement for Implementation of the Action Plans (Activity 3-2)

(1) Workshop for Development of O&M Action Plan

Workshops regarding the development of O&M action plans were held in each district targeting WSSC, Council Treasurers and D-WASHE members. In the workshop, O&M problem and solution finding activities using the PCM method, and guidance for development of the action plan was provided with facilitation from PDHID officials and experts. Details of the workshops are shown in ***Table 4-36*** and ***Table 4-37***.

Table 4-36 Worksop for Development of O&M Action Plan

District	Date	Number of Participants	Participants	Facilitator
Milenge	4–5 June 2012	10	WSSC, Council Treasurers, other D-WASHE members (District officers related to RWSS and NGOs)	PDHID senior engineer and SOMAP3 team
Nchelenge	28–29 May 2012	10		
Mwense	1–2 June 2012	12		
Mansa	23–24 May 2012	12		

Table 4-37 Programme for Worksop for Development of O&M Action Plans

Session	Contents
Session 1	Introduction
Session 2	Overview of the NRWSSP and O&M component
Session 3	Process of development of O&M Action Plan
Session 4	Situation analysis of district RWSS
Session 5	Establishment of O&M mechanism
Session 6	Preparation of logical framework
Session 7	Preparation of work plan
Session 8	Preparation of narrative proposal
Session 9	Preparation of budget plan

(2) Support for Signing the Agreement regarding District O&M Action Plans for FY 2012 by JICA Zambia Office, MLGH, and DLAs

After the workshop for development of O&M action plans in the first year, each district developed a logical framework under the support of DHID senior engineers and SOMAP 3 team. In the second year, the districts continued to develop work plans, budget plans and narrative proposals, and then the agreement on district O&M action plans for FY 2012 was signed by JICA Zambia Office, MLGH, and DLAs on December 2012. A district O&M action plan, which consists of a logical framework, work plan, budget plan and narrative proposal, is attached in Annex 15.

Under SOMAP 2 in 2010, action plans were developed after workshops on the preparation of district O&M action plans were held for the Luapula PST and district officials in seven districts including four target districts of this project, but due to the transfer of those officials, new officials

had been assigned to each district at the beginning of the project. As it was the first time for those officials to prepare a district O&M action plan, there was a need for close support and instruction from the Project Team throughout this process. The main problems found through the preparation process were as follows.

- When preparing a budget plan, some districts had not determined the details of the implementation plan such as number of days required, number of staff required, and methodologies of implementation for each activity, which prevented them from determining "quantity" in the budget. Therefore, the Project Team provided advice on methodologies of activity implementation and prepared the budget plan together with the districts.
- The districts had no prior experience of preparing a narrative proposal. The Project Team prepared a sample and provided it to the districts for reference.

(3) Support for Signing the Agreement regarding District O&M Action Plans for FY 2013 by JICA Zambia Office, MLGH, and DLAs

In April 2013, district O&M action plans for FY2012 were reviewed and O&M action plans for FY 2013 were prepared. The tripartite agreement for FY 2013 was signed in June 2013. As to the review of O&M action plans for FY2012, the content of the logical framework was reviewed and revised. In the logical framework, it was observed that the description of the indicators was vague and that target numbers had not been set for each indicator. Therefore, the indicators for "Overall Goal" and "Purpose" were revised in accordance with those of the logical framework of the NRWSSP O&M component of MLGH, and indicators for "Outputs" were rewritten with sufficient clarity to objectively measure the achievement of each activity. The "Means of Verification" was also revised accordingly.

Support for preparation of district O&M action plans for FY 2013 was provided to the district WSSCs with the presence of PDHID. The difficulties found during the activity are as follows.

- When preparing a budget for certain activities such as training, workshops, and community sensitisation, it is necessary to include detailed information of target numbers of communities and/or number of participants. Since the districts did not have a database of water points and O&M activities at the community level, the target numbers for which a budget was made were based on a rough estimation, which made detailed checking difficult for the Project Team. Therefore, the Project Team prepared a format of a summary table for districts to fill in the data regarding the present situation, the desirable number of target communities/participants and the number of days required for each activity. The summary table enabled the districts to prepare their budgets and for the Project Team to scrutinize them.
- A strong request was made by all districts for JICA to support the procurement of equipment required for O&M activities, such as vehicles, motorbikes, computers, printers, copy machines, and GPS. The Project Team summarised the information regarding the equipment that was both required and available in each district and discussed it with JICA Zambia office. As a result, GPS will be procured under the direct support of JICA while MLGH will examine the possibility of utilising counterpart funds to purchase the other equipment.

(4) Support for Signing the Agreement regarding District O&M action Plans for FY 2014 by JICA Zambia Office, MLGH, and DLAs

From April to May 2014, district O&M action plans for FY2013 were reviewed and O&M action plans for FY 2014 were prepared. The tripartite agreement for FY 2014 was signed in June 2014.

(5) Preparation of District O&M Action Plans for 2016

Four districts prepared annual O&M action plans for 2016 after direct support for the four districts

by JICA was completed in March 2015. The prepared O&M action plans were integrated in the district RWSS AWP for 2016 for submission to MLGH through PDHID. As the continuation of monitoring activities by DLAs is critical from the viewpoint of project sustainability, the districts also prepared action plans and budgets for monitoring activities for the remaining part of 2015 after the completion of JICA direct support in March and submitted them to MLGH.

Workshop for Development of O&M Action Plans (12 July 2012: Milenge District)

Preparation of District O&M Action Plans (23 April 2015: Mansa District)

4.3.3 Facilitation of Procurement of Seed Stock for the Establishment of the Spare Parts Supply Chain (Activity 3-3)

(1) Calculation of Quantity of Seed Stock

The quantity of seed stock in each district was compiled after verifying the existing number of spare parts. In Mansa, Milenge, and Nchelenge, spare parts were procured by UNICEF and the quantity of seed stock was calculated and adjusted in coordination with the number and types of parts procured by UNICEF. An agreement was reached amongst stakeholders regarding the establishment of spare parts shops, the locations of storage and shops was selected, and BoQ (Bill of Quantity) and construction budget was developed. The final decision for each item is shown in ***Table 4-38***.

Table 4-38 Final Decision regarding the Establishment of Spare Parts Shop

District	Consensus formation for establishment of spare parts shops	Selection of facilities as spare parts shops	Budget for construction (ZMW)
Mansa	Agreed	New construction at district capital	111,919,265
Mwense	Agreed	New construction at district capital	105,461,807
Milenge	Agreed	New construction at district capital	123,371,455
Nchelenge	Agreed	New construction at district capital	100,438,180

(2) Procurement of Seed Stock of Spare Parts

The Project Team provided support for procurement of seed stock of spare parts. Detailed information regarding the procurement/bid process is as follows.

1) Bidding method: National competitive bidding
2) Schedule:

Activity	Date
Announcement of the tender	22–23 November 2012
Distribution of TOR	22 November – 11 December 2012
Deadline of submission of proposals	11 December 2012
Bid opening	11 December 2012

Bid evaluation	13 December 2012
Signing of the construct	19 December 2012

3) Bidders:

1 AFE Limited
2 African Brothers Corporation Ltd
3 KNR Advancement and Sustainable Business Consultants Ltd. (KNR)

4) Successful bidder: KNR Advancement and Sustainable Business Consultants Ltd. (KNR)

The tender for the procurement and delivery of spare parts and repair tool kits was conducted on 11 December 2012, in which three companies participated. On 13 December 2012, bid evaluation was carried out with staff from MLGH, PDHID-Luapula, WSSCs in the target districts, and the Project Team. PDHID-Luapula and WSSCs in the target districts were invited for the purpose of capacity development for managing the procurement of hand pump spare parts. The contract for the procurement and delivery of spare parts was signed on 19 December 2012 with the successful bidder.

PDHID and the Project Team inspected and delivered the procured initial seed stock of spare parts and tool kits to Mansa on 31 July 2013, and they were later delivered to each district.

(3) Construction of Spare Parts Shop

The four DLAs completed the tender for construction of the spare parts shops and selection of the contractor by January 2013 under the supervision of PDHID, and construction began. The result of the selection of the contractor is shown in ***Table 4-39***.

Table 4-39 Selected Contractors for Spare Parts Shop Construction and Contract Price

District	Selected Contractor	Contract Price (ZMW)
Mansa	Astrim Communications Ltd.	109,860.12
Mwense	Julsam Construction, Transporters and Suppliers	99,367.00
Milenge	Davis and London Ltd.	109,289.81
Nchelenge	Gerkas Hard Ware and General Dealers	96,907.70

The following problems were found through monitoring by PDHID and the Project Team regarding the capacities of DLAs for contract management and the supervision of construction work:

- DLAs did not have enough capacity to provide close supervision for construction, which resulted in some defects in the quality of construction being overlooked, such as a lack of strength of concrete slabs in Mansa and Mwense. The Project Team together with PDHID discussed countermeasures with DLAs and contractors, and concluded that the defective concrete slabs should be demolished and cast again by contractors with the presence of WSSCs. The Project Team helped DLAs to supervise construction work and ensure quality control.
- There were some deficiencies in the bidding and contract documents between DLAs and contractors. Although DLAs had followed the procurement procedures that were usually applied in the respective districts, the requirements stipulated in the tender document were not fulfilled. The Project Team summarised the missing and insufficient documents of all districts and provided technical support to DLAs in organising the contract documents properly.

All construction work was completed by August 2013 and the shops are now in operation.

Inspection of Spare Parts
(31 July 2013: Mansa District)

Spare Parts Shop in Mansa District
(3 September 2013: Mansa District)

Spare Parts Shop in Nchelenge District
(24 October 2013: Nchelenge District)

Inside the Shop
(24 October 2013: Nchelenge District)

4.3.4 Orientation of Community Stakeholders on NRWSSP and the SOMAP O&M Model (Activity 3-5)

(1) Orientation for Traditional Leaders and Civic Leaders

DLAs organised orientation workshops targeting traditional leaders and civic leaders in each District with the aim of promoting an understanding regarding NRWSSP and the SOMAP O&M model and of agreeing on the implementing structure. Detailed information of the orientation is shown in ***Table 4-40*** and ***Table 4-41***.

Table 4-40 Orientation for Traditional and Civic Leaders

District	Date	Number of Participants	Detail of Participants	Facilitator
Milenge	21 January 2013	15	Civic leader: 13 Traditional leader: 2	DPO, D-WASHE members
Nchelenge	2–4 January 2013 (3 days)	15	Civic leader: 15	DoW, D-WASHE members
Mwense	2–3 August 2013	24	Civic Leader 24	DoW, D-WASHE members
Mansa	22–23 October 2013	20	Civic Leader 20	D-WASHE members

Table 4-41 Standard Programme of the Orientation for Traditional and Civic Leaders

Session	Issue
Session 1	Introduction
Session 2	Overview of NRWSSP and O&M component
Session 3	SOMAP O&M model
Session 4	Establishment of Supply Chain of Spare Parts
Session 5	Implementation plan of the district
Session 6	Roles and responsibilities of civic/traditional leaders

Under the community based O&M system, the community must contribute user fees for O&M and manage water supply facilities. However, some cases have been observed in which civic leaders and/or traditional leaders, who have strong political influence on communities, oppose the principle of financial contribution for O&M by the users, which impedes the realisation of community based management. Therefore, during orientation, the roles and responsibilities of civic/traditional leaders in the O&M implementation structure and the importance of community participation were emphasised. The participants agreed that they will fulfil their roles and responsibilities towards O&M activities.

(2) ADC Training

DLAs took the initiative in conducting training ADC members who are responsible for community sensitisation and capacity development of V-WASHEs in O&M at the ward level (EHT, school teachers and government extension officers such as community development officers). Although ADC members from each ward in the target districts had been trained in the software component activities of the rural water supply projects funded by the Japanese government, supplementary training was conducted in this project to introduce them to the implementation structure and methodologies which were reviewed in line with five O&M mechanisms. New members were also trained as some staff had been transferred to other districts. Details of the training are shown in ***Table 4-42*** and ***Table 4-43***.

Table 4-42 Training for ADC Members

District	Date	Number of Participants	Facilitator
Mansa	26–28 June 2013 (3 days)	16	WSSC, D-WASHE members, SOMAP team
Mwense	Group 1: 22–24 July 2013 (3 days) Group 2: 23–26 July 2013 (3 days)	Group 1: 36 Group 2: 12	DoW, D-WASHE members, SOMAP team
Milenge	24–26 June 2013 (3 days)	28	DoW, D-WASHE members, SOMAP team
Nchelenge	20–21 June 2013 (2 days)	26	DPO, D-WASHE members, SOMAP team

Table 4-43 Training Programme for ADC Members

Session	Issue
Session 1	Introduction
Session 2	Overview of NRWSSP
Session 3	The O&M component and principles
Session 4	Situation analysis of hand pumps
Session 5	O&M mechanisms
Session 6	Ideal O&M mechanisms to be established
Session 7	O&M Action Plan of the district

Session	Issue
Session 8	Roles and responsibilities of stakeholders
Session 9	Methodology for community level activity
Session 10	Role play
Session 11	Development of activity schedule for each Ward

During the training, the outline of NRWSSP and the SOMAP O&M model, roles and responsibilities of the stakeholders, and the process and implementing structure of the O&M model were explained by D-WASHE members and agreed by participants. The most important purpose of the training was to establish a consensus with ADC members, who are the core actors to facilitate O&M activities in the community, on emerging issues, such as launch of the spare parts shop and selling price of items, the process of estimating the O&M cost of hand pumps and setting the amount of water user fees, the standardisation of prices for repair works by APMs in the district, and tool kit management systems at the sub-district level. The Project Team supported facilitation of the respective sessions to promote the understanding of participants on the issues above.

Also, since it is very important for ADC members to take a uniform approach to community level activities, such as community sensitisation and training of V-WASHEs including caretakers, the Project Team developed guidelines on the methodologies for implementation of community level activities, which show the steps and methodologies that ADC members can follow during ground-level implementation of activities. The existing manuals for training V-WASHEs for planning O&M activities, financial management, and preventive maintenance by caretakers were also revised and distributed to the participants. The outline of the facilitation plan for ADC to implement community level activities is shown in ***Table 4-44***, and the outline of the training manual for V-WASHEs and caretakers is shown in ***Table 4-45*** and ***Table 4-46***. The actual facilitation plan and manuals are attached in Annex 16 and 17.

Table 4-44 Outline of Facilitation Plan for Implementation of Community Level Activities

Session	Contents
1. Orientation of Traditional/Community Leaders	
1	Introduction
2	NRWSSP and O&M principles
3	Situation analysis of O&M of hand pumps
4	District O&M mechanisms for 5 components
5	Roles and responsibilities of stakeholders
6	Activity implementation schedule
7	Way Forward
2. Community Sensitisation, Formation and Re-organisation of V-WASHE Committees	
1	Introduction
2	NRWSSP and O&M principles
3	Drama group performance and discussions/explanations
4	CBM and community contribution
5	Consensus on the amount of user fees and APM payments
6	V-WASHE formation/re-activation
7	Selection of APMs
8	Way Forward
3. V-WASHE Training	
1	Introduction
2	NRWSSP and O&M principles

Session	Contents
3	Community Based Management
4	Discussion and Agreement on MoU
5	Record Keeping and Management by V-WASHE
6	Cash Book/Financial Report Management
7	Action Plan of V-WASHE
8	Way forward
4. Caretaker Training	
1	Introduction
2	Roles and responsibilities of Caretakers
3	Maintenance of hand pumps
4	Record taking
5	Sanitation and hygiene promotion
6	Way forward

Table 4-45 Outline of Training of V-WASHE Treasurers in Financial Management for Operation & Maintenance of Hand Pumps

Session	Contents
1. V-WASHE Treasurer	Roles and responsibilities of treasurer of V-WASHE
2. Financial Management	Record keeping such as registration of households, record of contribution for O&M, cash books, etc.
3. Communication Flow	Communication flow among stakeholders
4. Setting the Amount of Community Contribution	How to set the amount of community contribution

Table 4-46 Outline of Caretaker Training Manual

Session	Contents
1. Community and Hand Pump	Roles and responsibilities and relationships of caretakers and communities
2. Usage of Hand Pump	Do's and Do Not's for using hand pumps
3. Communication Flow	Communication flow among stakeholders
4. Preventive Maintenance Activities	Daily, weekly and monthly preventive maintenance activities
5. Water Point Management	Water point structure, environmental sanitation, log book recording, duty roster and O&M contribution list
6. Management of Participatory Health and Hygiene Education	Hand washing methods, refuse and excreta disposal, home health and hygiene, environmental/sanitation health

(3) Orientation for Community Leaders

DLAs organised orientation workshops targeting community leaders in the four districts with the aim of improving the understanding of NRWSSP and the SOMAP O&M model and of agreeing on the implementing structure. Detailed information regarding the orientation is shown in ***Table 4-47***.

Table 4-47 Orientation for Community Leaders

	Mansa	Mwense	Milenge	Nchelenge
Target Group	Community leaders in the four districts			
Organiser	WDC/ADC, D-WASHE members, RWSS Unit			
Date	17 October–13 November 2013	11–19 October 2013	2 August 2013	2–8 August 2013
Number of Participants	382	120	80	260

Contents	・ Overview of NRWSSP and the SOMAP O&M model ・ Stakeholder analysis/roles and responsibilities of community leaders ・ Importance of community-based management of water supply facilities ・ Five ideal O&M mechanisms to be established

NRWSSP stipulates that community-based management of water points should be realised and communities must contribute user fees for O&M of water supply facilities. Since community leaders have a strong effect on community members, and their consensus and cooperation on the establishment of community-based management of water supply facilities is essential, the orientation emphasised the roles and responsibilities of the community leaders in the O&M implementation structure and the importance of community participation. The participants agreed that they would fulfil their roles and responsibilities in order to promote O&M activities in their own communities.

(4) Community Sensitisation

DLAs and WDC/ADC members took the initiative in conducting community sensitisation in order to improve understanding and to build a consensus on roles and responsibilities of community members, the importance of O&M of hand pumps and collection of user fee contributions. Details of the training are shown in ***Table 4-48***.

Table 4-48 Community Sensitisation Programme

	Mansa	Mwense	Milenge	Nchelenge
Target Group	Communities in the four districts			
Organiser	WDC/ADC members			
Date	16 December 2013 – 8 February 2014 13 October – 14 November 2014	12 December 2013 – 16 January 2014 16 September – 4 December 2014	8–24 October 2013 19 August – 19 September 2014	27 September – 26 October 2013 18 August – 18 September 2014
Number of Participants	354	203	156	172
Contents	・ Drama group performance ・ Roles and responsibilities of community members on CBM ・ Importance of community-based management of water supply facilities and collections of user fee contributions ・ How to calculate the amount of annual user fee contributions ・ Formation/Reformation of V-WASHE			

During sensitisation, the importance of community-based management of water supply facilities, the roles and responsibilities of community members for O&M, the availability of spare parts and the selling price of each item, and standardised prices for APM repair works were informed through drama group performances and facilitation by WDC/ADC members. Also, the cost of O&M for hand pumps was calculated with guidance from WDC/ADC members and agreed among community members. Community members expressed a willingness to pay their user fee contributions toward O&M of water supply facilities and to carry out their responsibilities.

Performance of the Drama Group during Community Sensitisation
（21 January 2014：Mansa District）

Facilitation by WSSC during Community Sensitisation
（21 January 2014: Mansa District）

(5) V-WASHE Training

DLAs and WDC/ADC members took the initiative for conducting training for V-WASHEs organised/reorganised through the above-mentioned community sensitisation with the intention of improving the understanding on roles and responsibilities, the constitution of V-WASHEs, and environmental hygiene and sanitation. Details of the training are shown in ***Table 4-49***.

Table 4-49 Training Programme for V-WASHE Members

	Mansa	Mwense	Milenge	Nchelenge
Target Group	V-WASHEs			
Organiser	WDC/ADC members			
Date	27 December 2013 – 26 March 2014 1 November 2014 – 31 January 2015	3 February–14 March 2014 25 September– 30 November 2014	13 December 2013 – 24 January 2014 23 September –30 November 2014	1 January– 16 February 2014 12 October– 19 December 2014
Number of Participants	280	218	156	179
Contents	・ Importance of community-based management of water supply facilities ・ Consensus on roles and responsibilities and regulation of V-WASHE ・ Training for treasurer on management of user fee contributions and record keeping ・ Gender consideration in CBM of water supply facilities ・ Improvement of Hygiene and sanitation			

In the training, the importance of community based management of water supply facility was reconfirmed, and the roles, responsibilities and regulations of V-WASHE were agreed by the participants. V-WASHE treasurers were also trained separately on proper management of collected user fee contributions and record keeping. V-WASHE members fully understood their roles and promised to fulfil their responsibilities for proper management of O&M of hand pumps.

(6) Caretaker Training

Training for caretakers selected during the formation/re-formation of V-WASHE was conducted with the aim of equipping them with the necessary knowledge and skills for daily and preventive maintenance of hand pumps. Details of the training are shown in ***Table 4-50***.

Table 4-50 Training Programme for Caretakers

	Mansa	Mwense	Milenge	Nchelenge
Target Group	Caretakers			
Organiser	APM and WDC/ADC members			
Date	9 December 2014 – 7 February 2015	3 December 2014 – 30 January 2015	3 – 12 February 2015	10-15 February 2015
Number of Participants	480	436	120	261
Contents	・ Roles and responsibilities of caretakers ・ Daily and preventive maintenance of hand pumps ・ Usage of tool kits ・ Coordination with APMs and V-WASHEs ・ Logbook keeping			

The training was conducted by WDC/ADC members and APMs in their respective wards and attended by two selected caretakers per water point. During the training, roles and responsibilities of caretakers, daily and preventive maintenance of hand pumps and logbook keeping were explained. The caretakers who participated in the training were equipped with the necessary knowledge and skills through lectures and practice.

Lecture session during Caretaker Training
(25 July 2013: Mwense District)

Practical Session during Caretaker Training
(19 July 2013: Mwense District)

4.3.5 Orientation on Tool Kit Management (Activity 3-6)

This orientation was conducted during ADC training (Activity 3-5) in each district. ADC members who attended the training will be the person responsible for tool kit management in the respective tool kit centres scheduled for establishment. The issues discussed in the training are as follows.

- Introduction of tool kit inventory and log book
- Setting prices for APM repair works
- Roles and responsibilities of tool kit managers
- Development of a tool kit management plan for the district

The participants understood their roles and responsibilities and agreed to promote the proper management of tool kits at their centres.

In each district, inventories of existing tool kits were developed. As shown in ***Figure 4-14***, the inventories contain information such as the name of the tool kit centre, GPS reading of the centre, the name of the person in charge, the name of APMs using the tool kit centres, the names of tool kits and the quantity kept at the centre. This information has been updated regularly by each district.

Tool Kit Inventory
Milenge District Council

Name of Ward:	Kapalala	
Name of Tool Kit Centre:	Kapalala RHC	
Name of Person in Charge:	Kamfwa Ian Chanda	
Contact of Person in Charge:	xxxxxxxxxx	
GPS Reading of the Center:	1) Latitude:	-12.40674
Decimal Degree: dd.ddddd (Datum: WGS 84)	2) Longitude:	29.39284
Name of APMs Using Tool Kits from the Centre:	Gershom Chilufya	
	Songwe Siya	

Afridev

No.	Name of Tool Kit	Remarks	Q'ty	Note
1	Spanner Assembly		1	
2	Resting Tool Assembly		1	
3	Connecting Tool Assembly		1	
4	Fishing Tool Assembly		1	
5	Fishing Tool Assembly		1	
6	Spanner	10 A/F, for hexagonal bolts and nuts of M6	2	
7	Spanner	13 A/F, for FRP-Rod connectors	2	
8	Spanner	16 A/F, for hexagonal bolts and nuts of M10	2	
9	Spanner	17 A/F, for hexagonal bolts and nuts of M10	2	

Date: _____

Name of Enumerator

Signature

Name of Person in Charge of the Centre

Signature

Figure 4-14 Tool Kit Inventory (Sample, Milenge District)

4.3.6 Training of Staff Working for Management of Spare Parts Supply Chain on Sales, Stock Management, and Accounting (Activity 3-7)

(1) Training on Sales, Stock Management, and Accounting to the District Staffs Working for Management of Spare Parts Supply Chain

Training was conducted for the management of spare parts supply chains targeting the shop operators appointed by DLAs. The details of the training are shown in ***Table 4-51*** and ***Table 4-52*** .

Table 4-51 Training on Management of Spare Parts Supply Chain

District	Date / Venue	Number of Participants	Facilitator
Mansa	14–15 February 2013 (2 days) / Mansa	5	PDHID, SOMAP team
Milenge		4	
Mwense	19–20 February 2013 (2days) / Mwense	5	PDHID, SOMAP team
Nchelenge		3	

Table 4-52 Training Programme for Shop Staff

Session	Issue
Session 1	Introduction
Session 2	Spare parts and tool kits
Session 3	Stock control and records
Session 4	Sales and stock management
Session 5	Accounting of spare parts shops
Session 6	Field visit to hardware shops

Spare parts shops will be managed by existing district officers who were given additional responsibilities as shop staff by the DLA. In all districts, WSSC will serve as the shop manager, the treasurer or accountant will serve as the accountant of the shop, and the clerical officers of the DLA serve as the casher and store officer.

The following issue was raised regarding the pricing of spare parts:
According to the SCM manual, the cost of operation and management of the shop must be estimated and added in the process of price calculation. Since the stock is supposed to be replenished by procuring additional spare parts in Lusaka, there is a high cost resulting from transport costs and DSA for staff who go to Lusaka for procurement, which raises the selling price to more than double that of the market price of the spare parts in Lusaka.

The Project Team reviewed the process of price calculation and provided the following advice to DLAs: 1) Utilise local transporters who can provide vehicles at a lower cost instead of using the service of a normal rental car company; 2) Utilise opportunities when district staff travel to Lusaka for other DLA tasks in order to save DSA; 3) Use district funds to support shop operation costs. As a result, the selling price fell within the range of the market price.

(2) Re-training on Sales, Stock Management, and Accounting to the District Staffs Working for Management of Spare Parts Supply Chain

Retraining was conducted for the management of the spare parts supply chain targeting the shop operators appointed by DLAs. The first training was conducted in four districts in February 2013, but since most of the trained staff members were transferred to other districts, DLAs have been facing difficulties in the smooth management of spare parts shops. Therefore, retraining was conducted to select and train new staff. The existing staff also participated in the training and refreshed their knowledge on their roles and responsibilities in shop management including the preparation of monthly reports. The details of the training are shown in ***Table 4-53***.

Table 4-53 Retraining for Management of Spare Parts Supply Chain

District	Date/Venue	Number of Participants	Facilitator
Mansa	28–29 July 2014 (2 days)/Mansa	4	Mwense District WSSC, DHID
Mwense		4	
Nchelenge	6 August 2014 (1 day)/Nchelenge	4	DHID, SOMAP Team
Milenge	Middle of August (1day)/Milenge	4	DHID, SOMAP Team

Retraining was designed to be more practical for daily management. Explanations and practice sessions on the preparation of reports using receipt books, sales receipts, GRN (Goods Received Notes) and Bin Cards, which have been in use the districts, were provided to cashers who are responsible for preparing monthly sales and inventory reports, store keepers who are responsible for monthly inventory reports and shop managers who are responsible for monthly management

reports. Prior to retraining, shop managers (District WSSCs) had been preparing all reports because of the transfer of trained staff. From now on, each staff member shall prepare the respective reports, and the smooth management of the shop is expected.

As to the facilitation of retraining, facilitation was provided by the senior engineer of PDHID and WSSC of Mwense district, who were trained as the provincial facilitator under activity 2-2 (provision of technical support for establishment of O&M mechanisms) of Output 2, which showed the effectiveness of the ToT training mentioned above.

For the management of the spare parts shop in the four districts, the Project Team supported DLAs on the preparation of monthly reports and promoted submission to PDHID. Also, the team promoted stocktaking and stock replenishment, as almost ten months had passed since the shop started sales of spare parts.

Lecture Session during the Training
(14 February 2013: Mansa District)

Practice for Preparation of Sales Report
(20 February 2013: Mwense District)

4.3.7 Training of APMs (Activity 3-8)

(1) Refresher Training for Existing APMs

DLAs took the initiative in conducting refresher training for existing APMs. Details of the training are shown in ***Table 4-54***.

Table 4-54 Refresher Training for Existing APMs

		Mansa	Mwense	Milenge	Nchelenge
Target Group		Existing APMs and WDC/ADC members			
Organiser		District RWSS Unit			
Date	Group 1	5–9 August 2013	13–17 August 2013	10–12 July 2013	29 July – 2 August 2013
	Group 2	23–27 August 2013	15–19 October 2013	15–17 July 2013	5–9 August 2013
Days/site		5	5	3	5
Number of Participants	APM	33	36	29	19
	ADC	18	23	13	20
	Total	51	59	42	39
Contents		• Review the structure of hand pumps, spare parts, and usage of tool kits • Share the experiences of activities as APMs • Reconfirm the roles and responsibilities of APMs, and communication with other stakeholders in the district • Spare parts supply chain/tool kit management/APM activity guidelines including payments for APM repair works/indicative O&M cost for hand pumps • Reconfirm particular repair work skills and field practice (India Mark II, Afridev, and Iron Removal Plant)			

It had been reported that, after a large amount of time had passed since receiving APM training, some APMs had lost the knowledge and skills for repairing hand pumps and had become incapable of providing a qualified performance as APMs. This training targeted those APMs to refresh and improve their knowledge and skills for repairing hand pumps. The training reviewed the usage of tool kits and spare parts, and the structure of hand pumps (India Mark II, Afridev, and Iron Removal Plant), and the skills of participants for repairing hand pumps were brushed up through field practice.

Also, discussions were held and an agreement was reached between DLAs and APMs regarding issues newly introduced under the SOMAP programme, such as the launch of spare parts shops and the selling price of items, the process of estimating the O&M cost of hand pumps, standardised prices for repair works by APMs in the district, the tool kit management system, and the bicycle management system. In order to share the guideline of APM activities, the training was also attended by WDC/ADC members, who supervise APM activities.

(2) Training for Newly Selected APMs

DLAs took the initiative in training newly-selected APMs. Detail of the training are shown in ***Table 4-55***.

Table 4-55 Training for Newly Selected APMs

	Mansa	Mwense	Milenge	Nchelenge
Target Group	Newly selected APMs			
Organiser	District RWSS Unit			
Date	11–16 December 2014	17–21 November 2014	4–9 February 2015	Completed in 2013
Number of Participants	16	24	19	-
Contents	・ Roles and responsibilities of APMs, communication with other stakeholders in the district ・ Hand pump structure and spare parts ・ Tool kits and their usage ・ Spare parts supply chain/tool kit management/APM activity guidelines including payments for APM repair works/indicative O&M cost for hand pumps ・ Field practice of hand pump installation and repair (India Mark II, Afridev, and Iron Removal Plant)			

New APMs were selected from the wards that required an additional number of APMs based on the district criteria (10-15 hand pumps per APM) and other conditions, such as the number of existing APMs, and the number and distribution condition of hand pumps in each ward. The training consisted of a lecture and practical parts. In the lecture, discussions were held and an agreement was reached between DLAs and APMs regarding issues newly introduced under the SOMAP programme, such as the availability of spare parts shops and the selling price of items, the process of estimating the O&M cost of hand pumps, standardised prices for repair works by APMs in the district, the tool kit management system, and the bicycle management system. During the practical part, APMs were equipped with skills for repairing India Mark II, Afridev and Iron Removal Plants by repairing some broken-down hand pumps in the field. On the last day, the participants took a written test, which all of them passed successfully.

(3) Authorization/Certification of Trained APMs

Assessment and certification of the trained APMs were conducted. The district councils assessed the performance and level of skills of each APM for repairing hand pumps three to six

months after the training based on criteria such as practical competence, responsiveness, adherence to MoU, consistence of reporting, and rapport with communities. The result of the assessment and certification of each district is shown in ***Table 4-56***.

Table 4-56 APMs Certified

	Mansa	Mwense	Milenge	Nchelenge
Number of APMs Trained	33	60	26	35
Certified	28	60	25	29
Not Certified	0	0	1	5
Others	5 (Relocated)	0	0	1 (Relocated)

DLAs issued APM ID cards to those who met the requirements and registered them as officially certified APMs. Those who had not been certified in Milenge and Nchelenge districts received follow-up training to improve their skills and were re-assessed and certified after a certain period by DLAs.

Lecture Session during APM Training
(5 February 2015: Milenge District)

Practical Training during APM Training
(6 February 2015: Milenge District)

4.3.8 Preparation of the Progress Reports (Activity 3-9)

(1) Support for Preparation of the Progress Report on the District O&M Action Plan for the FY2012

Based on the funding agreement, progress reports consisting of activity reports and financial reports regarding implementation of district O&M action plans are to be prepared and submitted by DLAs to MLGH and JICA Zambia Office through PDHID.

The procedures and formats for the financial report in SOMAP 2 were different from those used by DLAs in the implementation of NRWSSP using funding from the Government of Zambia, which caused them a lot of difficulties. In view of the above situation, the Project Team revised the format of the financial report based on discussions with MLGH and JICA Zambia Office and in conformity with "the Accounting and Finance Management Procedures Manual" of MLGH. After the revision above, a workshop for district stakeholders was held to promote understanding of report preparation. Details of the workshop are shown in ***Table 4-57***.

Table 4-57 Workshop for Preparation of Activity Reports and Financial Reports

Date	6 December 2012
Venue	Mansa District
Participant	Council Secretary, WSSC and Treasurer of 4 districts (12 persons)

Facilitator	SOMAP team, PDHID	
Programme	Session 1	Introduction
	Session 2	Overview of approved O&M action plans for 4 DLAs in Luapula
	Session 3	Types of reports to be prepared during O&M implementation
	Session 4	Activity report
	Session 5	Financial report - overview and how to prepare it
	Session 6	Management guidelines: roles and responsibilities of stakeholders

The preparation of the report required a great amount of support from the Project Team since it was the first report and the district officers were not accustomed to reporting procedures. For the financial report, in particular, most districts submitted a format that was almost blank together with receipts only. The Project Team, therefore, had to provide instructions for each step and to work together with WSSCs through all processes of preparation. The content of each report is as below.

＜Activity Report＞
1. Outcomes based on Logical Framework
2. Purpose of the activities
3. Target group
4. Activity period
5. Details of the activity
6. Outcomes of the activity
7. Difficulties and countermeasures
8. Photos

＜Financial Report＞
1. Cash book
2. Income and expenditure analysis
3. Expenditure analysis

(2) Support for Preparation of the Progress Report since FY2013

Considering the situation in FY2012, the Project Team prepared guidelines for report preparation, which was distributed to DLAs. Although the quality of report preparation improved to some extent for the first quarter of 2013 in comparison to before, close support was still provided for further improvement.

Regarding activity reports and financial reports after FY2013, continuous support was provided for preparation until the end of direct support by JICA at the end of FY2014 (March 2015).

4.3.9 Collection of Baseline Data for the Establishment of RWSS IMS (Activity 3-11)

(1) Provision of technical advice to DLAs on collection of baseline data through establishment of IMS of RWSS

In order to establish the O&M monitoring system in four districts in Luapula province, discussions were held with officers in charge of the MIS (Management Information System) component in DHID/MLGH regarding the MLGH implementation policy for re-establishing MIS and their plan for pilot activities on O&M monitoring system in the four districts. As a result of the discussion, the Project Team and DHID/MLGH agreed that SmartSpreadsheet would be introduced into the four districts on a trial basis, and that items necessary for monitoring and data collection methods in MIS would be suggested to MIS via pilot activities of the project. Images of data entry sheets and output sheets are shown in
Figure 4-15 and
Figure 4-16.

Water Points Database, Milenge

Showing 346 of Water Points in the Database

MarkID	Name/Location of Water Point	Ward Name	Chiefdom Name	Constituency Name	GPS Readings: Longitude (Decimal Degree, WGS84)	GPS Readings: Latitude (Decimal Degree, WGS84)	Water Point Type	Construction Date	Depth (m)	SWL (m)
MLGRZ 01	Butimbwe Primary scchool	Chipundu	Sokontwe	Chembe	29.4391037	-12.2358313	A	1 Jan 2007	35.00	5.00
MLGRZ 02	Kabange Pimary school	Chiswishi	Milambo	Chembe	29.4994227	-12.4027837	A	1 Jan 2007	37.00	6.00
MLGRZ 03	Moffat Primary school	Chiswishi	Milambo	Chembe	29.0800021	-11.5112815	A	1 Jan 2008	20.00	5.80
MLGRZ 04	Chibende Primary School	Milambo	Milambo	Chembe	29.0482598	-11.8721690	A	1 Jan 2007	38.00	14.00
MLGRZ 05	Mpinduka	Chiswishi	Milambo	Chembe	29.0148155	-11.4494748	A	1 Jan 2012	48.00	10.00
MLGRZ 06	Kafwanka Primary school	Fibalala	Milambo	Chembe	29.4820094	-11.6882323	A	1 Sep 2006	27.00	6.00
MLGRZ 07	Mumanse Primary School	Fibalala	Milambo	Chembe	29.3783167	-11.5974833	A	1 Jan 2007	32.00	ND
MLGRZ 08	Lwela Secondary school	Itemba	Milambo	Chembe	29.1195758	-11.7310049	A	1 Jan 2012	39.00	10.00
MLGRZ 09	Lwela RHC	Itemba	Milambo	Chembe	29.1179870	-11.7331316	A	1 Jan 2008	39.00	8.90
MLGRZ 10	Kampaki	Itemba	Milambo	Chembe	29.1190510	-11.7295356	A	1 Dec 2011	30.00	10.00
MLGRZ 11	Mwinsa Chifota	Itemba	Milambo	Chembe	29.1176964	-11.6853325	A	2 Jul 2012	48.00	8.00
MLGRZ 12	Nkolonga	Itemba	Milambo	Chembe	29.1172604	-11.6979435	A	3 Jul 2012	50.00	13.00
MLGRZ 13	Kapalala RHC	Kapalala	Sokontwe	Chembe	29.3929583	-12.4070359	A	1 Jan 2006	54.00	8.00
MLGRZ 14	Kapalala Primary School	Kapalala	Sokontwe	Chembe	29.3928833	-12.4081500	A	1 Jan 2007	38.00	4.00
MLGRZ 15	Milulu Primary school	Lusumbwe	Milambo	Chembe	29.4479211	-12.0041038	A	1 Jan 2007	46.00	5.50
MLGRZ 16	Kabongo RHC A	Lusumbwe	Milambo	Chembe	29.5131500	-11.7601500	A	1 Jan 2011	45.00	8.00
MLGRZ 17	Kabongo RHC B	Lusumbwe	Milambo	Chembe	29.5130500	-11.7603833	A	1 Jan 2003	35.00	7.60
MLGRZ 18	Mupita B	Lusumbwe	Milambo	Chembe	29.4699829	-11.9228864	A	1 Jan 2012	65.00	21.00
MLGRZ 19	Lunga B	Mikula	Sokontwe	Chembe	29.5125421	-12.3982349	A	1 Jan 2006	35.00	3.50
MLGRZ 20	Boma Bwale	Mikula	Sokontwe	Chembe	29.5024139	-12.4031717	A	1 Oct 2007	35.00	5.40
MLGRZ 21	Health stores	Mikula	Sokontwe	Chembe	29.5008610	-12.4041980	A	1 Jan 2007	29.00	6.00
MLGRZ 22	Milenge Market	Mikula	Sokontwe	Chembe	29.4974538	-12.4035519	A	1 Oct 2007	37.00	4.60
MLGRZ 23	7 houses	Mikula	Sokontwe	Chembe	29.4997759	-12.4060783	A	1 Oct 2007	38.00	7.80
MLGRZ 24	Milenge Primary school	Mikula	Sokontwe	Chembe	29.4931847	-12.4031395	A	1 Oct 2007	37.00	11.00
MLGRZ 25	Kasepa Primary school	Mikula	Sokontwe	Chembe	29.3928867	-12.4082564	A	1 Jan 2006	25.00	8.00
MLGRZ 26	East 7 RHC	Mikula	Sokontwe	Chembe	29.4851667	-12.4165000	E	1 Jan 2007	14.00	4.00

Figure 4-15 Sample of Smart Spreadsheet (Part of a Data Entry Sheet: Milenge District)

Type of Lifting Device in Use, by	Type of Lifting Device							
	A	B	C	D	E	F	G	
Type of Water Source	Hand pump	Windmill-driven pump	Solar-driven pump	Electrical pump	Treadle pump	Rope pump	Bucket, chain, & windlass	*Total*
A Borehole (drilled by a mechanical rig)	243	1	0	0	0	0	0	*244*
B Tube well (drilled by a hand-augured rig)	45	0	0	0	0	0	0	*45*
C Jetted well	0	0	0	0	0	0	0	*0*
D Protected hand-dug well	1	0	0	0	0	0	0	*1*
E Hand-dug well with drilled in borehole	51	0	0	0	0	0	4	*55*
F Piped water supply	0	0	0	0	0	0	0	*0*
G Protected spring	0	0	0	0	0	0	0	*0*
H Rainwater collection	0	0	0	0	0	0	0	*0*
I Improved traditional well	0	0	0	0	0	0	1	*1*
Total, all types of water sources	*340*	*1*	*0*	*0*	*0*	*0*	*5*	*346*

Functionality of Water Points (Sustainability) by	Total WPs	WPs Functional (in Use)			*Sustainability*
Type of Water Point	Constructed	Y	N	Unknown	*(% Total)*
A Borehole (drilled by a mechanical rig)	244	229	15	0	*94%*
B Tube well (drilled by a hand-augured rig)	45	29	16	0	*64%*
C Jetted well	0	0	0	0	
D Protected hand-dug well	1	1	0	0	*100%*
E Hand-dug well with drilled in borehole	55	40	15	0	*73%*
F Piped water supply	0	0	0	0	
G Protected spring	0	0	0	0	
H Rainwater collection	0	0	0	0	
I Improved traditional well	1	1	0	0	*100%*
Total, all types of water points	*346*	*300*	*46*	*0*	*87%*

Operational Status (Reliability) by	Total Devices	Pump Working			*Reliability*
Type of Lifting Device	Installed	Y	N	Unknown	*(% Total)*
A Hand pump	340	301	39	0	*89%*
B Windmill-driven pump	1	0	1	0	*0%*
C Solar-driven pump	0	0	0	0	
D Electrical pump	0	0	0	0	
E Treadle pump	0	0	0	0	
F Rope pump	0	0	0	0	
G Bucket, chain, & windlass	5	4	1	0	*80%*
Total, all types of lifting devices	*346*	*305*	*41*	*0*	*88%*

Figure 4-16 Sample of Smart Spreadsheet (Part of a Result of Data Analysis: Milenge District)

For the purpose of data collection, the Project Team designed monitoring plans along with the logical framework of district action plans (***Figure 4-17***) and prepared monitoring report formats for APM repair works and V-WASHE activities (***Figure 4-18*** and ***Figure 4-19***) as tools for data collection. Formats using excel files were also prepared in order to aggregate the collected data from the monitoring reports (***Figure 4-20***).

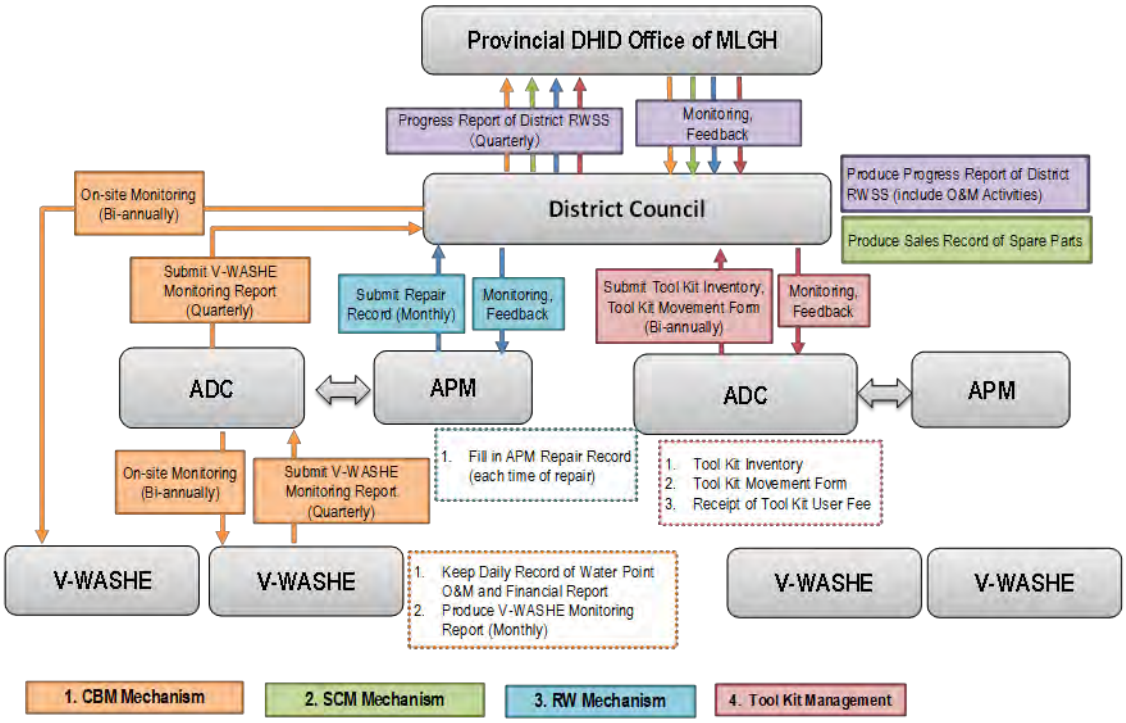
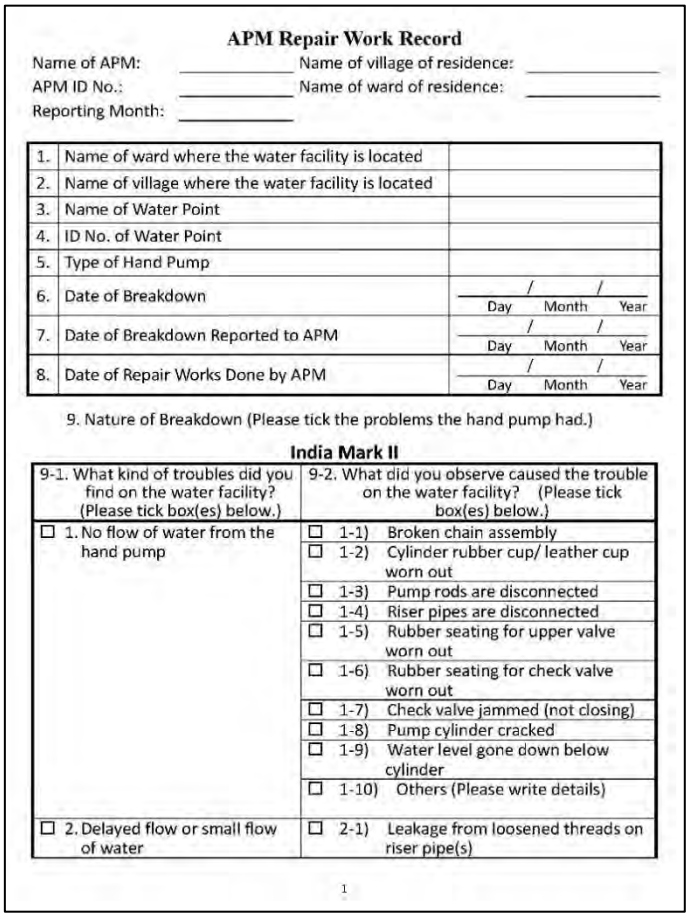


Figure 4-17 Monitoring Structure Developed as a Part of Monitoring Plan



APM Repair Work Record

Name of APM: _____ Name of village of residence: _____
APM ID No.: _____ Name of ward of residence: _____
Reporting Month: _____

1.	Name of ward where the water facility is located	
2.	Name of village where the water facility is located	
3.	Name of Water Point	
4.	ID No. of Water Point	
5.	Type of Hand Pump	
6.	Date of Breakdown	___/___/___ Day Month Year
7.	Date of Breakdown Reported to APM	___/___/___ Day Month Year
8.	Date of Repair Works Done by APM	___/___/___ Day Month Year

9. Nature of Breakdown (Please tick the problems the hand pump had.)

India Mark II

9-1. What kind of troubles did you find on the water facility? (Please tick box(es) below.)	9-2. What did you observe caused the trouble on the water facility? (Please tick box(es) below.)
☐ 1. No flow of water from the hand pump	☐ 1-1) Broken chain assembly
	☐ 1-2) Cylinder rubber cup/ leather cup worn out
	☐ 1-3) Pump rods are disconnected
	☐ 1-4) Riser pipes are disconnected
	☐ 1-5) Rubber seating for upper valve worn out
	☐ 1-6) Rubber seating for check valve worn out
	☐ 1-7) Check valve jammed (not closing)
	☐ 1-8) Pump cylinder cracked
	☐ 1-9) Water level gone down below cylinder
	☐ 1-10) Others (Please write details)
☐ 2. Delayed flow or small flow of water	☐ 2-1) Leakage from loosened threads on riser pipe(s)

1

Figure 4-18 Format of APM Repair Record (Part of the Format)

XX District Council

V-WASHE Monthly Monitoring Report

Reporting Month: _____ Name of Ward: _____
Name of Village: _____ Name of Water Point: _____
ID No. of Water Point: _____ Type of Hand Pump: _____
Total number of household using the water point: _____

1. Status of the Water Facility

1.1 Is the water facility functioning on the reporting day:

☐ 1) Functioning
i) Did the water facility get out of operation in this month?
☐1) Yes (When did the facility break down? Date:___/___/___)
Day Month Year
(When was the facility repaired? Date:____/____/____)
Day Month Year
☐2) No

☐ 2) Not functioning (Since when? Date:_____/_____/_____)
Day Month Year

1.2 Is the water point in use?

☐ 1) Yes ☐ 2) No. Temporary not in use
☐ 3) No. The facility has been abandoned.
(Reason _____)

1.3 Did the water facility have any problems during this reporting month?

☐ 1) Yes
What kind of problems was caused on the water facility? Please tick all problems observed.

☐1) No flow of water from the hand pump	☐ 2) Delayed flow of water
☐3) Low (small) flow of water	☐4) Folding of chain during return stroke (in case of India Mark II)
☐5) Handle operation gets stuck during water fetching	☐ 6) Abnormal noise during pump operation
☐7) Shaky handle	☐ 8) Pump head/water tank is shaking
☐9) Pump stand is shaking	☐ 10) Water from borehole got rusty
☐11) Iron Removal plant had a problem	☐ 12) Others (Reason:)

☐ 2) No (Please go to the Question 2.1)

Figure 4-19 Format of V-WASHE Monitoring Report (Part of the Format)

Data Entry Sheet: V-WASHE Monthly Monitoring Report

Reporting Month / Year: January / 2014

Date format has to be entered as below. XX October 2013

In case the date of break down is within the reporting month: Submission date minus the date in column I.
In case the date of breakdown is before the reporting month: Submission date minus 1st day of the reporting month.

The last day of the month (31 October 2013) minus the Date in column I

Basic Information			1. Status of the Water Facility									
	ID No. of WP and Name/Location of WP have to be in accordance with the Database of MIS.		1.1 Is the water facility functioning on the reporting day								1.2 Is the water point in use?	
ID No. of WT	Name/Location of Water Point	Total number of household using the water point	Choice	1) Functioning: i) Did the water facility get out of operation in this month?	1)-1When did the facility break down?	1)-2 When was the facility repaired?	Downtime (number of days: column G minus column F)	2) Not functioning: Sice When?	Downtime in this month (number of days)	Accumulated downtime (number of days)	Choice	3) Reason
1	MW-53	Mukanga	35	2			0				1	
2	MWII-59	Chilolo	23	2			0				1	
3	MWNS-54	Kaswika	17				0	23 September 2013	31	38	2	
4	MWNS-208	Mukonshi P. School	42	1	03 October 2013	18 October 2013	15				1	
5	MWNS-165	Shimukange	50				0	15 January 2013	31	289	3	No water coming out
6	MWNS-224	Kangomba	12	1	23 October 2013	30 October 2013	7				1	
7	MWNS-217	Mukanga p.school	14	1	08 October 2013	27 October 2013	19				1	
8	MWII-54	Mulunda P. School	35	2	05 October 2013	26 October 2013	21				1	
9	MW-52	Mulunda Village	28				0	09 October 2013	22	22	2	
10	MWNS-173	Shingwe Central	55	1			0				1	
11	MWNS-254	Malama	50	2			0				1	
12	MWNS-53	kasanda	41				0					

Figure 4-20 Excel Format for Data Aggregation (Part of the Format)

(2) Workshop for Establishment of O&M Monitoring System

Based on the above activities, orientation on the collection of baseline data on O&M activities and the establishment of monitoring systems was conducted with facilitation from PDHID and the Project Team targeting the four districts in Luapula province. Detail of the meeting are shown in ***Table 4-58***.

Table 4-58 Detail of Workshop for Establishment of O&M Monitoring System

Date	12–14 November (3 days)	
Venue	Samfya District	
Participants	12 people in total; 3 people per district among DPO, DoW, WSSC, and D-WASHE member from Mansa, Mwense, Milenge, Nchelenge district	
Facilitators	MIS coordinator of MLGH, PDHID engineer, and SOMAP team	
Programme	Session 1	Introduction and purpose of the meeting
	Session 2	Overview of MIS
	Session 3	Computer performance check
	Session 4	Introduction to Smart Spreadsheets
	Session 5	District situation analysis on monitoring activity
	Session 6	Establishment of district monitoring system
	Session 7	Introduction of monitoring tools and report formats
	Session 8	Aggregation of collected information
	Session 9	Any other issues

In the meeting, the person in charge of the MIS component in MLGH explained the outline and progress of the establishment of MIS and Smart Spreadsheet data entry methods, then PDHID and the Project Team explained the O&M monitoring framework of district O&M action plans, items to be monitored by stakeholders at each level, indicators to measure achievement and outputs, data collection methods and usage of monitoring forms, and data entry methods for collected information. The participants understood and agreed to all of the issues above.

After the orientation, the districts began work on data entry using Smart Spreadsheets based on the available information regarding the location, construction date, etc. of water supply facilities in the districts. DLAs also collected borehole data without this information by visiting the sites and filling in the Smart Spreadsheet.

Workshop for O&M Monitoring for District Members (14 November 2013: Samfya District)

Data Collection for MIS Database (22 August 201: Mwense District)

(3) Orientation on Establishment of O&M Monitoring System

Orientations on the collection of baseline data on O&M activities and the establishment of monitoring systems were conducted targeting D-WASHE members, WDC/ADC members, and

V-WASHE members.

1) Orientation for D-WASHE Members

In the orientation, the monitoring system to be established in the district, formats for reporting O&M activities, and excel tools for data aggregation and analysis including the Smart Spreadsheet were introduced and agreed among the participants. Details of the orientation are shown in ***Table 4-59***.

Table 4-59 Orientation for D-WASHE Members

	Mansa	Mwense	Milenge	Nchelenge
Target Group	D-WASHE members			
Organiser	District RWSS unit			
Date	14–15 Aug., 2014	28–29 Aug., 2014	10–11 Sept., 2014	Completed in 2013
Days	2	2	2	-
Number of Participants	15	11	7	-
Contents	・ Overview of Management Information System (MIS) and Smart Spreadsheet ・ District situation analysis on current practice on O&M monitoring ・ Establishment of district O&M monitoring system ・ Monitoring tools and reporting formats ・ Aggregation of collected data and analysis			

2) Orientation for WDC/ADC Members

In addition to the issues introduced in the abovementioned orientation for D-WASHE members, in the orientation for the WDC/ADC members the facilitation method and plan for V-WASHE training was explained and the establishment of the monitoring system in the district was agreed upon. Details of the orientation are shown in ***Table 4-60***.

Table 4-60 Orientation for WDC/ADC Members

	Mansa	Mwense	Milenge	Nchelenge
Target Group	WDC/ADC members			
Organiser	District RWSS unit			
Date	29–30 January 2015	16–17, 21–22 October 2014	2–3 October 2014	7–8 August 2014
Days	2	4	2	2
Number of Participants	32	44	26	9
Contents	・ Overview of Management Information System (MIS) and Smart Spreadsheet ・ District situation analysis on current practice on O&M monitoring ・ Establishment of district O&M monitoring system ・ Monitoring tools and reporting formats ・ Preparation of V-WASHE training for monitoring system ・ Role play practice ・ Action plan for V-WASHE training on monitoring system			

3) Orientation for V-WASHEs

Training was conducted by the ADC/WDC members oriented in the above activity. During V-WASHE training, V-WASHE members were introduced to the monitoring system to be established at the community level and the monthly monitoring report format, and the method of

completing this report was explained. V-WASHEs are required to prepare monthly monitoring reports every month for a quarterly one submitted to DLAs through ADC/WDC. Details of the orientation are shown in ***Table 4-61***.

Table 4-61 Orientation for V-WASHE Members

	Mansa	Mwense	Milenge	Nchelenge
Target Group	V-WASHE members			
Organiser	WDC/ADC members			
Date	9 February – 3 March 2015	13 November 2014 – 27 January 2015	7 November 2014 – 30 January 2015	12 October 2014 – 2 January 2015
Days	1day /V-WASHE	1day /V-WASHE	1day /V-WASHE	1day /V-WASHE
Number of Participants	441	269	342	257
Contents	・ Review of V-WASHE O&M activities and record keeping ・ Establishment of O&M monitoring system at the community level ・ O&M monitoring format and procedure for preparation			

(4) Preparation of MIS Smart Spreadsheet of Water Points and Database on O&M Activities

The districts completed the update of the Smart Spreadsheet regarding water points, APM registers, and tool kit inventories as of 2014 and submitted it to MLGH. The Smart Spreadsheet introduced on a trial basis in 2013 by MLGH contains the locations and other relevant information on all protected water points in the district. APM registers and tool kit inventories contain all the information about the allocation of APMs and tool kits in each ward in the format prepared by the Project Team. Examples of APM registers are shown in ***Figure 4-21*** and ***Figure 4-22***.

After being checked by the Project Team, typing errors and GPS coordinate format errors were observed, as well as inconsistencies in the information entered on each database. Also, the errors found in the submitted databases indicated that WSSCs and/or data entry clerks were not sufficiently familiar with basic GPS operation, such as how to read various position formats and how to obtain the coordinates and transfer them to computers. The Project Team provided the necessary advice on those issues for DLAs to make corrections. DLAs are required to update the database quarterly based on information obtained from the V-WASHE monthly monitoring reports, APM repair records and the results of on-site monitoring conducted by DLAs.

APM Register District Summary
Milenge District Council

	Name of Ward/Catchment in Charge	APM ID No.	Name of APM	No. of Water Points in Charge				Name of Ward/Catchment and Village of Residence	NRC No.	Contact	Year of Training
				IMK II	Afridev	Other Type	Total				
1	MIKULA	ML10-01	Machawa Saka	7	6	2	15	MIKULA - SAKA			2010
2	KAPALALA	ML10-02	Chilekwe Moses	11	2	1	14	KAPALALA - MUGAIWA			2010
3	MUMBOTUTA	ML10-03	Ravenda Chilambe	2	2	0	4	MUMBOTUTA - BEYARD			2010
4	MUMBOTUTA	ML10-04	Mwansa Stephen	3	1	0	4	MUMBOTUTA - MOSOLO 1			2010
5	SOKONTWE	ML10-05	Shadrick Lumono	0	0	0	0	SOKONTWE - KASANKA			2010
6	CHIPUNDU	ML10-06	Matanda Justine	3	0	2	5	CHPIPUNDU - SAKA			2010
7	LUSUMBWE	ML10-07	Chingalume Morgan	5	2	1	8	LUSUMBWE - MONDO			2010
8	LUSUMBWE	ML10-08	Mutakila Elias	5	0	2	7	LUSUMBWE - CHUUNGWE			2010
9	LUSUMBWE	ML10-09	Chafuba Filson	5	2	0	7	MUNWE UMO			2010
10	FIBALALA	ML10-10	Tambe Alfred	1	2	3	6	FIBALALA - KASANGASHI			2010
11	FIBALALA	ML10-11	Mwansa Lovely	5	0	1	6	FIBALALA - CHISHIMUTESHI			2010
12	MULUMBI	ML10-13	Mwewa Edward Lusaya	3	6	0	9	MULUMBI - MULUMBI			2010
13	MIKULA	ML10-14	Maybin Chisala	3	2	0	5	MIKULA - Talayi			2010
14	MIKULA	ML12-01	Lubono Sakeni	12	2	0	14	MIKULA - LUNGA			2012
15	MIKULA	ML12-02	Mwape Justine	9	2	1	12	MIKULA - MOLOTONI			2012
16	KAPALALA	ML12-03	Gershom Chilufya	8	4	1	13	KAPALALA - CHIPE			2012
17	KAPALALA	ML12-04	Siya Songwe	10	4	0	14	KAPALALA - KALOKO			2012
18	MUMBOTUTA	ML12-05	Musonda Julius	3	1	0	4	MUMBOTUTA - MOSOLO 1			2012
19	SOKONTWE	ML12-06	Jeremiah Mwewa	9	8	0	17	SOKONTWE - CHILUFYA YAMWELA			2012

Figure 4-21 APM Register (Part of Summary Sheet: Milenge District)

APM Register
Milenge District

Name of APM : MACHAWA SAKA **APM ID No.: ML10-01**

1.	**Name of Catchment Area in Charge**	Mikula		
2.	**Name of Ward of Residence**	Mikula		
3.	**Name of Village of Residence**	Saka		
4.	**GPS Reading of the Residence**	1) Latitude:	xxxxxxx	
	Decimal Degree: dd.ddddd (Datum: WGS 84)	2) Longitude:	xxxxxxx	
5.	**NRC No.**	xxxxx		
6.	**Contact CELL**	xxxxx		
7.	**Year of Starting Activities as APM**	2010		

8. Training

	Year of Training	Organizer	Type of Hand Pump for which APM was Trained
1)	**2010**	**JICA/ZULUBURROW**	**INDIA MARK II & AFRIDEV**
2)	**2011**	**WATERAID**	**INDIA MARK II & MALDA**

9. Water Points in Charge

	ID No. of W/P	Name of Water Point	Name of the Village where the Water Point is Located	Type of Hand Pump
1	MLGRZ 25	Kasepa Primary school	John Nkumba	India Mark-II
2	ML 09	Munushi Turnoff - ML 09	Munushi	India Mark II
3	MLRWSS02	Ndeni	Ndeni	Afridev
4	MLRWSS37	Olando	Orlando	Afridev
5	MLWAZ 70	Orlando	Orlando	Malda
6	MLWAZ 78	Mununshi	Munushi	India Mark-II
7	MLWAZ 79	Changwena Community sch	Nyeleti	India Mark II
8	MLII -02	Garden (B) MLII 02	Garden	Afridev
9	MLWAZ 68	Garden	Garden	India Mark II
10	ML-8	Garden	Garden	Afridev
11	MLWAZ 71	Forestry	Munushi Compound	Malda
12	MLII-01	Garden A	Garden	Afridev
13	MLII-01.2	Garden (A)2	Garden	India Mark II
14	MLWAZ 116	Chikula	Chikula	India Mark II
15	MLII 03	Munushi Compound MLII 03	Munushi	Afridev

Figure 4-22 APM Register (Individual Information per APM)

(5) Aggregation and Analysis of Collected Data from V-WASHE and APM Reports

Monitoring data regarding O&M activities is collected through V-WASHE monthly monitoring reports, which are to be submitted quarterly to DLAs through WDC/ADCs, and APM repair records. The WSSCs need to enter the collected information into an Excel spreadsheet that is used for aggregation and analysis (***Figure 4-20***), and then reflect the results in their annual work plans as well as quarterly progress reports. As many errors were observed in data entry, the Project Team instructed the DLAs on how to check the monitoring reports submitted from V-WASHEs and how to transfer the information from the reports to the Excel data entry sheet. The same instructions were also provided regarding APM repair records.

4.3.10 Monitoring of the Progress of O&M (Activity 3-12)

(1) First Joint Review Meeting

A joint review meeting was held to share the progress of implementation of district O&M action plans among officers from seven districts (except four newly established districts) in Luapula Province. In addition to the four target districts of this project, three districts supported by AfDB (Samfya, Kawambwa and Chienge) were invited to the meeting in order to promote a common approach to NRWSSP and O&M systems. Details of the meeting are shown in ***Table 4-62***.

Table 4-62 Detail of the First Joint Review Meeting

Date	16-17 July 2013 (2 days)	
Venue	Samfya District	
Participants	16 people consisting of DPO, DoW, WSSC and D-WASHE members of seven districts (Mansa, Mwense, Milenge, Nchelenge, Samfya, Kawambwa, Chienge)	
Facilitators	PDHID engineer, SOMAP team	
Programme	Session 1	Introduction
	Session 2	Progress of O&M activities in districts
	Session 3	Situation analysis of five mechanisms
	Session 4	Work share and demarcation with three new districts
	Session 5	Results of the water quality survey

Prior to the joint review meeting, it was found out that the districts of Samfya, Chienge and Kawambwa under the support of AfDB had not started the process of designing the district O&M action plan, and there were some newly assigned officers who had no experience of working on RWSS. Since the main purpose of the review meeting was to share the progress and experiences of implementing O&M activities in seven districts in the province, it seemed difficult for these three districts to participate in discussions in the meeting without O&M action plans. Due to the above situation, PDHID organised an orientation for the three districts on NRWSSP, O&M models and designing district O&M action plans before the review meeting, and the three districts obtained an understanding of an overview of the SOMAP model and the process of preparing an action plan. Detail of the orientation are shown in ***Table 4-63***.

Table 4-63 Workshop for Preparation of O&M Action Plans for Three Districts Supported by AfDB

Date	11–12 July 2013 (2 days)	
Venue	Samfya District	
Participants	DPO, DoW, WSSC and other D-WASHE members of Samfya, Kawambwa and Chienge districts	
Facilitators	PDHID engineer, SOMAP team	
Programme	Session 1	Introduction
	Session 2	Outline of NRWSSP and O&M component
	Session 3	Process of preparation of O&M action plan
	Session 4	Situation analysis of district RWSS
	Session 5	Establishment of O&M mechanism
	Session 6	Preparation of Logical Framework
	Session 7	Preparation of Plan of Operation
	Session 8	Preparation of Narrative Proposal
	Session 9	Preparation of Budget Proposal

In the review meeting, each district made a presentation regarding the progress of implementation of O&M action plans, and, based on the presentation, participants discussed the difficulties they had in action plan planning and implementation processes and countermeasures/solutions by

exchanging their own experiences in order for the implementation of future activities to be more efficient. PDHID also obtained a clear understanding of the progress of O&M activities in the Province, the particular and specific problems of each district, and the issues to be tackled at provincial level.

(2) Second Joint Review Meeting

The second joint review meeting on the O&M component of NRWSSP was held to share the progress of implementation of district O&M action plans with the participation of all 11 districts (including four newly established districts) in Luapula Province. Details of the meeting are shown in ***Table 4-64***.

Table 4-64 Details of the Second Joint Review Meeting

Date	15–16 January 2014 (2 days)	
Venue	Mansa	
Participants	22 people (2 people per district among DPO, DoW, WSSC) from Mansa, Mwense, Milenge, Nchelenge, Samfya, Kawambwa, Chienge, Chipili, Chembe, Mwansabombwe, and Lunga district	
Facilitators	PDHID engineer, SOMAP team	
Programme	Session 1	Introduction and purpose of the meeting
	Session 2	Progress of O&M activities in districts
	Session 3	Situation analysis of five mechanisms
	Session 4	Other issues (preparation for mid-term evaluation, submission of reports, etc.)

This review meeting was jointly held with participation from four districts under JICA direct support (Mansa, Mwense, Milenge, and Nchelenge), three districts under AfDB support (Samfya, Chienge, Kawambwa), and four newly established districts (Chipili, Chembe, Mwansabombwe, and Lunga). In the meeting, all districts made a presentation on the progress of implementation of O&M action plans/O&M activities, and based on the presentation, participants discussed the difficulties they had in action plan planning and/or implementation processes and countermeasures/solutions by exchanging their own experiences in order for the implementation of future activities to be more efficient. The other seven districts, in particular, were able to share and learn about the experiences presented by JICA-supported districts for their own planning process for O&M action plans. DHID were also able to obtain a clear understanding of the progress of O&M activities in the existing seven districts and the present situation of newly established districts as the starting point for designing their O&M action plans.

(3) Third Joint Review Meeting

The third review meeting was held six months after the second review meeting, and the progress of O&M activities in each district since the last meeting was reviewed and shared with all participants (***Table 4-65***). Each district WSSC made a presentation on the overall progress of O&M activities in their district, and discussions were held on detailed progress and the problems/difficulties of each of the five components. In this meeting, some districts shared not only the difficulties but also good practice, which motivated others towards the better implementation of O&M activities.

Table 4-65 Details of the Third Joint Review Meeting

Date	24-25 July 2014 (2 days)
Venue	Mansa
Participants	22 people (2 people per district among DPO, DoW, WSSC) from Mansa, Mwense, Milenge, Nchelenge, Samfya, Kawambwa, Chienge, Chipili, Chembe, Mwansabombwe, and Lunga district
Facilitator	SOMAP team

Programme	Session 1	Introduction and purpose of the meeting
	Session 2	Progress of O&M activities at district
	Session 3	Situation analysis of five mechanisms
	Session 4	Other issues (revision of O&M manual, notes about preparation of quarterly progress report, etc.)

Second Review Meeting
(15 January 2014: Mansa District)

Presentation on Progress of the Activities by WSSC
(15 January 2014: Mansa District)

(4) Stakeholder Review Meeting at District Level

Stakeholder review meetings at the district level were held in each district with the aim of sharing the progress and experiences of O&M activities with RWSS stakeholders and reflecting the outcomes in the planning and implementation processes in future activities. Details of the meetings are shown in ***Table 4-66***.

Table 4-66 Stakeholder Review Meeting Programme

		Mansa	Mwense	Milenge	Nchelenge
Target Group		D-WASHE, ADC/WDC and APM			
Organiser		District RWSS Unit			
Date		10–11 March 2015	9–10 March 2015	10 March 2015	7 March 2015
Days		2 days	2 days	1 day	1 day
Number of Participants	DLA	2	2	2	4
	ADC/WDC	8	22	12	13
	APM	8	22	12	13
	Total	18	46	26	30

In the meeting, WSSCs presented the outcomes and achievement of three mechanisms (i.e. Spare Parts Supply Chain Management (SCM), Community Based Management (CBM) and Repair Work Mechanism (RWM)) based on the activities implemented with direct support from this project. Then, WDC/ADC members presented the achievement of activities implemented in their respective wards. The problems and difficulties they faced during implementation were shared with all participants and possible solutions were also discussed. In this stakeholder review meeting, the focus of the discussions was on monitoring activities from a viewpoint of project sustainability. The following main issues were discussed.

- It was observed that many V-WASHEs have difficulties preparing the V-WASHE monthly monitoring reports by themselves. As solutions to this problem, the participants agreed that: 1) DLAs shall prepare the report format in the local language used in the districts, and 2) WDC/ADC shall visit every water point quarterly and help V-WASHEs to prepare the report and to collect the reports.
- V-WASHE monthly monitoring reports must be submitted to DLA every quarter through

WDC/ADC members. However, in reality it is difficult for many V-WASHEs to bring their reports to ADC/WDC because of the distance. In order to ensure collection of the reports, a budget is required for the cost of fuel for WDC/ADCs to visit every V-WASHE by motorbike as part of on-site monitoring and to support and collect the reports from them.

- Although the APM repair records have been submitted regularly, the importance of submission of the form was emphasised as one of the means of verification of indicators. Also, as some cases were found in which some APMs overcharged V-WASHEs for their repair work without following the standardised price set by the DLA, APMs were given instructions to abide by the standardised price for repair works.
- It is expensive to produce the formats of the V-WASHE monthly monitoring reports and the APM repair records as they have many pages. In order to produce the necessary volume of formats and to distribute to V-WASHEs, the cost for printing must be budgeted in the district O&M action plan.

The issues discussed and shared during the meeting were reflected in district O&M action plans for 2016. Those issues are expected to be reflected in O&M activities led by WSSCs during the later implementation stage as well.

Group Discussion during the Meeting
(10 March 2015: Milenge District)

Presentation on Progress and Outcomes
by an ADC Member
(9 March 2015: Mwense District)

4.4 Results of the Baseline Survey and Endline Survey

The Project Team conducted the baseline and endline surveys to analyse and discuss the matters considered to have a significant influence on the effectiveness of the project. This section describes the results of these analysis and discussions. The details of the results of the two surveys are described in Annex 8. The level of achievement of each indicator will be evaluated based on the survey results and described in Chapter 5.

The Project Team conducted the baseline survey between February and May 2012. The purpose of the survey was to collect the data and information required for setting the indicators of the project purpose and overall goal of the project for use in measuring the level of achievement of this project and its effect. This survey consisted of interviews at DLAs and D-WASHEs in 10 districts in nine provinces, interviews with representatives of villages (members of V-WASHEs and village chiefs) on 30 units of protected water point with hand pump in each district (a total of 300 units) and on-site observation and measurements of the said water points. The team completed the field survey of the facilities by conducting interviews in villages and inspecting the above-ground components of the hand pumps in April 2012. Among the non-operating water points found in the field survey, the team identified 71 pumps with lower-part components that urgently required inspection in order to identify the causes of breakdown. The team lifted the riser pipes of these pumps and inspected them in May 2012.

The Project Team conducted the endline survey using the same survey methods, survey items[38] and sample sizes in the same districts and provinces as the baseline survey from August to October 2016, the fourth year. The target villages of the survey were selected at random from the borehole catalogue of each DLA. The level of achievement of this project was measured by comparing the values of the indicators for the project purpose and project outputs obtained in the baseline and endline surveys.

4.4.1 Operation Rate and Downtime of Water Points with Hand Pump

Table 4-67 and ***Table 4-68*** show the operation rates of 300 protected water points (boreholes and protected shallow wells) with hand pumps as revealed in the baseline and endline surveys, respectively. The operation rate of the protected water points with hand pump in all the samples increased from 71.3% at the time of the baseline survey to 77.7% at the time of the endline survey in 2016. An improvement in the rate was observed in seven out of the ten surveyed districts.

Table 4-67 Operational Rate of Water Points with Hand Pump (Baseline)

District		Functional	Not Functional	Total
Kazungula	Count	26	4	30
	% within District	86.70%	13.30%	100.00%
Chongwe	Count	26	4	30
	% within District	86.70%	13.30%	100.00%
Serenje	Count	22	8	30
	% within District	73.30%	26.70%	100.00%
Lundazi	Count	19	11	30
	% within District	63.30%	36.70%	100.00%
Sesheke	Count	23	7	30
	% within District	76.70%	23.30%	100.00%
Mufumbwe	Count	22	8	30
	% within District	73.30%	26.70%	100.00%
Luwingu	Count	17	13	30
	% within District	56.70%	43.30%	100.00%
Mansa	Count	19	11	30
	% within District	63.30%	36.70%	100.00%
Nchelenge	Count	25	5	30
	% within District	83.30%	16.70%	100.00%
Chinsali	Count	15	15	30
	% within District	50.00%	50.00%	100.00%
Total	**Count**	**214**	**86**	**300**
	% within Total	**71.30%**	**28.70%**	**100.00%**

Source: Baseline Survey (JICA, 2012)

[38] The survey for identifying the causes of breakdown of pumps by lifting the components of their lower parts was not conducted in the endline survey.

Table 4-68 Operational Rate of Water Points with Hand Pump (Endline)

District		Functional	Not Functional	Total
Kazungula	Count	27	3	30
	% within District	90.00%	10.00%	100.00%
Chongwe	Count	25	5	30
	% within District	83.30%	16.70%	100.00%
Serenje	Count	22	8	30
	% within District	73.30%	26.70%	100.00%
Lundazi	Count	29	1	30
	% within District	96.70%	3.30%	100.00%
Sesheke	Count	24	6	30
	% within District	80.00%	20.00%	100.00%
Mufumbwe	Count	25	5	30
	% within District	83.30%	16.70%	100.00%
Luwingu	Count	14	16	30
	% within District	46.70%	53.30%	100.00%
Mansa	Count	18	12	30
	% within District	60.00%	40.00%	100.00%
Nchelenge	Count	25	5	30
	% within District	83.30%	16.70%	100.00%
Chinsali	Count	24	6	30
	% within District	80.00%	20.00%	100.00%
Total	**Count**	**233**	**67**	**300**
	% within Total	**77.70%**	**22.30%**	**100.00%**

Source: Endline Survey (JICA, 2016)

Table 4-69 and ***Table 4-70*** show the causes of the breakdown of the non-operating water points as revealed in the interviews with members of V-WASHEs and village representatives in the baseline and endline surveys, respectively. Among the causes of breakdown found in the surveys, the exhaustion of water resources and cylinders that have dropped into the borehole are the only problems that cannot be dealt with by APMs. The most common cause was wear to the upper components, which accounted for 27.4% and 48.5% of the causes revealed in the baseline and endline surveys, respectively.

Most of the non-operating water points had been out of order for "between one and six months" or for "more than six months" at the time of surveys. In addition to the points mentioned above, the surveys made the following revelations for the communities with non-operating water points.

- Most of the causes of the breakdown of water points can be solved through self-help by communities or by an APM.
- In connection to the response of the local community to the breakdown, many interviewees said, "The local community tried to repair the facility but failed to do so," "Although the community requested repair assistance from the DLA, the DLA has not responded to the request," and "The local community has not taken any action." This fact suggests a lack of understanding among local communities/V-WASHEs with regard to the action to be taken by local communities against breakdown, requests for repair from an APM, and the difference between preventive activities to be taken by V-WASHEs and repair services to be provided by APMs.
- Although most of the causes of breakdown can be solved by the trained APMs who have learned the appropriate technique for hand pump repair, their services have not been utilized in these communities. In most of cases, either an APM has not been assigned near the community or these communities do not know where to find an APM.
- Approximately 60% of the interviewees responded that they did not know where they can procure spare parts.

It is thought that the adoption of the SOMAP O&M model in rural communities will enable improvements to be made to the operation rate of the facilities, *i.e.* promotion of an integrated approach to strengthen a community-based management structure including the establishment of repair mechanisms and a spare parts supply chain and the O&M cost contributions borne by local residents with consideration for the causes of the breakdown or non-operation of water supply facilities and the attitude of communities towards their repair. It is also necessary to develop a system for the submission to a DLA of information about the facilities that have not been operational for long periods, and for decisions to be made quickly by a DLA on the necessity of promoting repair work by an APM or technical/financial assistance in the community.

Table 4-69 Reasons Why Water Points with Hand Pump Are Not Functioning (Baseline)

District		Borehole/ well has dried up	Worn out of consumable parts at upper part of HP	Cylinder has broken down	Cylinder has dropped into the borehole/ well	Riser pipe has leakage	Other	Total
Kazungula	Count	1	1	0	0	2	0	3
	% within District	33.30%	33.30%	0.00%	0.00%	66.70%	0.00%	
Chongwe	Count	0	0	0	0	2	4	4
	% within District	0.00%	0.00%	0.00%	0.00%	50.00%	100.00%	
Serenje	Count	0	2	2	4	1	3	7
	% within District	0.00%	28.60%	28.60%	57.10%	14.30%	42.90%	
Lundazi	Count	0	5	2	2	7	2	9
	% within District	0.00%	55.60%	22.20%	22.20%	77.80%	22.20%	
Sesheke	Count	0	2	0	2	2	3	4
	% within District	0.00%	50.00%	0.00%	50.00%	50.00%	75.00%	
Mufumbwe	Count	0	2	2	0	5	2	8
	% within District	0.00%	25.00%	25.00%	0.00%	62.50%	25.00%	
Luwingu	Count	1	2	3	3	1	7	11
	% within District	9.10%	18.20%	27.30%	27.30%	9.10%	63.60%	
Mansa	Count	1	2	0	1	0	7	10
	% within District	10.00%	20.00%	0.00%	10.00%	0.00%	70.00%	
Nchelenge	Count	0	0	2	0	0	3	4
	% within District	0.00%	0.00%	50.00%	0.00%	0.00%	75.00%	
Chinsali	Count	1	0	0	4	3	6	8
	% within District	12.50%	0.00%	0.00%	50.00%	37.50%	75.00%	
Total	**Count**	**4**	**16**	**11**	**16**	**23**	**37**	**68**
	% within Total	**5.90%**	**23.50%**	**16.20%**	**23.50%**	**33.80%**	**54.40%**	**100.00%**

Source: Baseline Survey (JICA, 2012)

Table 4-70 Reasons Why Water Points with Hand Pump Are Not Functioning (Endline)

District		Borehole/ well has dried up	Worn out of consumable parts at upper part of HP	Cylinder has broken down	Cylinder has dropped into the borehole/ well	Riser pipe has leakage	Other	Total
Kazungula	Count	1	1	1	0	0	2	3
	% within District	33.30%	33.30%	33.30%	0.00%	0.00%	66.70%	
Chongwe	Count	0	2	0	1	2	3	5
	% within District	0.00%	40.00%	0.00%	20.00%	40.00%	60.00%	
Serenje	Count	3	6	6	1	7	0	8
	% within District	37.50%	75.00%	75.00%	12.50%	87.50%	0.00%	
Lundazi	Count	0	1	0	0	0	0	1
	% within District	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	
Sesheke	Count	1	5	3	1	1	0	6
	% within District	16.70%	83.30%	50.00%	16.70%	16.70%	0.00%	
Mufumbwe	Count	0	0	0	0	0	5	5
	% within District	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	
Luwingu	Count	3	7	2	0	4	2	16
	% within District	18.80%	43.80%	12.50%	0.00%	25.00%	12.50%	
Mansa	Count	1	6	3	0	2	2	11
	% within District	9.10%	54.50%	27.30%	0.00%	18.20%	18.20%	
Nchelenge	Count	2	2	1	0	4	0	5
	% within District	40.00%	40.00%	20.00%	0.00%	80.00%	0.00%	
Chinsali	Count	2	2	2	0	2	2	6
	% within District	33.30%	33.30%	33.30%	0.00%	33.30%	33.30%	
Total	**Count**	**13**	**32**	**18**	**3**	**22**	**16**	**66**
	% within Total	**19.70%**	**48.50%**	**27.30%**	**4.50%**	**33.30%**	**24.20%**	**100.00%**

Source: Endline Survey (JICA, 2016)

Table 4-71 and ***Table 4-72*** show the time required for the restoration of protected water points with hand pump from breakdown (downtime) that had occurred just before the baseline and endline surveys, respectively. Breakdown was confirmed at 128 points (42.7% of all the points) and 146 points (48.7%) among the total of 300 sample points surveyed in the baseline and endline surveys, respectively. The percentage of facilities that had been repaired and restored within two weeks of breakdown[39] among those that had broken down were 38.28% and 43.15% in the baseline and endline surveys, respectively, which indicated an improvement in facility repair. However, the percentage of facilities that had been non-operational for "between one and six months" and "more than six months" were 39.8% and 41.8% in the baseline and endline surveys, respectively. This finding indicates that access to safe water is still impeded by long downtime in many cases. The factors causing a difference in the operation rates of facilities in the districts are discussed in the following paragraphs with consideration for the results of the study on other survey items.

Table 4-71 Downtime of Water Points with Hand Pump (Baseline)

District		Less than 6 days	1 week- less than 2 weeks	2 weeks- less than 1 month	1 month- less than 6 months	6 months or more	Don't remember	Total
Kazungula	Count	3	4	0	3	1	1	12
	% within District	25.00%	33.30%	0.00%	25.00%	8.30%	8.30%	100.00%
Chongwe	Count	3	2	1	4	2	0	12
	% within District	25.00%	16.70%	8.30%	33.30%	16.70%	0.00%	100.00%
Serenje	Count	4	3	0	0	3	0	10
	% within District	40.00%	30.00%	0.00%	0.00%	30.00%	0.00%	100.00%
Lundazi	Count	2	2	0	4	2	1	11
	% within District	18.20%	18.20%	0.00%	36.40%	18.20%	9.10%	100.00%
Sesheke	Count	3	1	11	4	1	2	22
	% within District	13.60%	4.50%	50.00%	18.20%	4.50%	9.10%	100.00%
Mufumbwe	Count	1	1	4	1	1	1	9
	% within District	11.10%	11.10%	44.40%	11.10%	11.10%	11.10%	100.00%
Luwingu	Count	0	3	0	3	5	0	11
	% within District	0.00%	27.30%	0.00%	27.30%	45.50%	0.00%	100.00%
Mansa	Count	1	4	0	2	1	0	8
	% within District	12.50%	50.00%	0.00%	25.00%	12.50%	0.00%	100.00%
Nchelenge	Count	6	2	7	8	0	0	23
	% within District	26.10%	8.70%	30.40%	34.80%	0.00%	0.00%	100.00%
Chinsali	Count	1	3	0	2	4	0	10
	% within District	10.00%	30.00%	0.00%	20.00%	40.00%	0.00%	100.00%
Total	**Count**	**24**	**25**	**23**	**31**	**20**	**5**	**128**
	% within Total	**18.80%**	**19.50%**	**18.00%**	**24.20%**	**15.60%**	**3.90%**	**100.00%**

Source: Baseline Survey (JICA, 2012)

[39] The O&M component work plan of DHID and this Project stipulate the downtime of less than two weeks in the case of breakdown that can be repaired by local residents or APMs as an indicator for measuring the improvement in the operation rate of protected water points with hand pump.

Table 4-72 Downtime of Water Points with Hand Pump (Endline)

District		Less than 6 days	1 week-less than 2 weeks	2 weeks-less than 1 month	1 month-less than 6 months	6 months or more	Don't remember	Total
Kazungula	Count	4	5	1	2	2	1	15
	% within District	26.70%	33.30%	6.70%	13.30%	13.30%	6.70%	100.00%
Chongwe	Count	3	3	1	5	3	0	15
	% within District	20.00%	20.00%	6.70%	33.30%	20.00%	0.00%	100.00%
Serenje	Count	1	1	1	3	1	0	7
	% within District	14.30%	14.30%	14.30%	42.90%	14.30%	0.00%	100.00%
Lundazi	Count	2	3	3	5	0	0	13
	% within District	15.40%	23.10%	23.10%	38.50%	0.00%	0.00%	100.00%
Sesheke	Count	7	4	4	3	2	1	21
	% within District	33.30%	19.00%	19.00%	14.30%	9.50%	4.80%	100.00%
Mufumbwe	Count	7	2	2	2	1	0	14
	% within District	50.00%	14.30%	14.30%	14.30%	7.10%	0.00%	100.00%
Luwingu	Count	2	2	1	2	11	0	18
	% within District	11.10%	11.10%	5.60%	11.10%	61.10%	0.00%	100.00%
Mansa	Count	3	1	2	0	0	0	6
	% within District	50.00%	16.70%	33.30%	0.00%	0.00%	0.00%	100.00%
Nchelenge	Count	5	5	0	3	4	0	17
	% within District	29.40%	29.40%	0.00%	17.60%	23.50%	0.00%	100.00%
Chinsali	Count	1	2	5	4	8	0	20
	% within District	5.00%	10.00%	25.00%	20.00%	40.00%	0.00%	100.00%
Total	**Count**	**35**	**28**	**20**	**29**	**32**	**2**	**146**
	% within Total	**24.00%**	**19.20%**	**13.70%**	**19.90%**	**21.90%**	**1.40%**	**100.00%**

Source: End-line Survey (JICA, 2016)

The baseline survey revealed that the downtime of more than 50% of the water points in Serenje, Mansa and Kazungula Districts that suffered a breakdown was less than two weeks. The endline survey revealed that the downtime of more than 50% of the water points in Kazungula, Sesheke, Mufumbwe, Mansa and Nchelenge Districts that suffered breakdown was less than two weeks. The downtime in more than 50% of the water points in Chongwe, Luwingu and Chinsali Districts that suffered breakdown was "between one and six months" or "more than six months" in both surveys. DLAs in these districts need to provide urgently technical assistance for the restoration of these facilities to the local communities.

4.4.2 Relation between Existence of V-WASHE, Operation Rate, and User Fee Collection

V-WASHE, which is to be formed at the village level, serves as the foundation of the operation of CBM mechanism. The percentage of villages that had established V-WASHE increased from 52.7% in the baseline survey to 71% in the endline survey. At the district level, the percentage increased in nine out of the ten districts. ***Table 4-73*** and ***Table 4-74*** show the relationship between the establishment of V-WASHE and the operation rate of water supply facilities at the district level revealed in the baseline and endline surveys, respectively. The baseline survey revealed that Lundazi, Kazungula and Mufumbwe Districts had the highest percentages of villages with V-WASHE (90.0%, 86.2% and 63.3%, respectively), while the endline survey revealed that Lundazi, Nchelenge and Kazungula Districts had the highest percentages (96.7%, 86.7% and 83.3%, respectively). At the time of the baseline survey, the facility operation rates in these districts except Lundazi District were higher than the average of the entire survey districts, and they were relatively high among the ten districts. Therefore, the existence/non-existence of V-WASHE in a village is considered to have a certain influence on the operating status of the facilities.

Table 4-73 Formation of V-WASHE (Baseline)

District		Formed	Not Formed	Total
Kazungula	Count	25	4	29
	% within District	86.20%	13.80%	100.00%
Chongwe	Count	10	20	30
	% within District	33.30%	66.70%	100.00%
Serenje	Count	20	10	30
	% within District	66.70%	33.30%	100.00%
Lundazi	Count	27	3	30
	% within District	90.00%	10.00%	100.00%
Sesheke	Count	3	26	29
	% within District	10.30%	89.70%	100.00%
Mufumbwe	Count	19	11	30
	% within District	63.30%	36.70%	100.00%
Luwingu	Count	15	15	30
	% within District	50.00%	50.00%	100.00%
Mansa	Count	8	22	30
	% within District	26.70%	73.30%	100.00%
Nchelenge	Count	18	12	30
	% within District	60.00%	40.00%	100.00%
Chinsali	Count	12	18	30
	% within District	40.00%	60.00%	100.00%
Total	**Count**	**157**	**141**	**298**
	% within Total	**52.70%**	**47.30%**	**100.00%**

Source: Baseline Survey (JICA, 2012)

Table 4-74 Formation of V-WASHE (Endline)

District		Formed	Not Formed	Total
Kazungula	Count	25	5	30
	% within District	83.30%	16.70%	100.00%
Chongwe	Count	19	11	30
	% within District	63.30%	36.70%	100.00%
Serenje	Count	21	9	30
	% within District	70.00%	30.00%	100.00%
Lundazi	Count	29	1	30
	% within District	96.70%	3.30%	100.00%
Sesheke	Count	21	9	30
	% within District	70.00%	30.00%	100.00%
Mufumbwe	Count	16	14	30
	% within District	53.30%	46.70%	100.00%
Luwingu	Count	11	19	30
	% within District	36.70%	63.30%	100.00%
Mansa	Count	23	7	30
	% within District	76.70%	23.30%	100.00%
Nchelenge	Count	26	4	30
	% within District	86.70%	13.30%	100.00%
Chinsali	Count	22	8	30
	% within District	73.30%	26.70%	100.00%
Total	**Count**	**213**	**87**	**300**
	% within Total	**71.00%**	**29.00%**	**100.00%**

Source: Endline Survey (JICA, 2016)

Table 4-75 and ***Table 4-76*** show the relationship between the percentage of villages with V-WASHE and the collection of user fees for the O&M cost revealed in the baseline and endline surveys, respectively. The percentage of villages collecting user fees in all the districts were 47.0% and 69.3% in the baseline and endline surveys, respectively. The percentage increased in eight out of ten target districts. In the baseline survey, districts that had a high percentage of villages with V-WASHE were found to have relatively low percentages of communities collecting user fees (*e.g.* Lundazi and Mufumbwe Districts). The percentage of communities collecting water user fees may be influenced not only by the existence/non-existence of V-WASHE but also

the reliability of facilities and existence/non-existence and quality of awareness-raising (sensitisation) activities on the responsibilities of facility users, including the payment of user fees for the O&M cost. In the endline survey, this trend is most obvious by revealing that the first three districts with higher percentage of villages with V-WASHE include the highly ranked communities in terms of collecting user fees.

It has been revealed that a certain group of residents or an organisation such as a village organisation, which serves as a water committee but not in the form of V-WASHE, a school or an RHC is taking responsibility for O&M activities in districts where the percentage of communities collecting user fees is high and the percentage of villages with V-WASHE is low, such as Sesheke District in the baseline survey and Luwingu District in the endline survey. This finding suggests that it is easy to collect user fees if the responsibilities for O&M of the facilities by an organisation such as V-WASHE are clearly defined.

Table 4-75 Formation of V-WASHE and Collection of User Fee for O&M (Baseline)

District		User fees for O&M Collected	Formed	Not Formed	Total
Kazungula	Count	20	25	4	29
	% within District	66.70%	86.20%	13.80%	100.00%
Chongwe	Count	13	10	20	30
	% within District	43.30%	33.30%	66.70%	100.00%
Serenje	Count	17	20	10	30
	% within District	56.70%	66.70%	33.30%	100.00%
Lundazi	Count	9	27	3	30
	% within District	30.00%	90.00%	10.00%	100.00%
Sesheke	Count	24	3	26	29
	% within District	80.00%	10.30%	89.70%	100.00%
Mufumbwe	Count	12	19	11	30
	% within District	40.00%	63.30%	36.70%	100.00%
Luwingu	Count	11	15	15	30
	% within District	36.70%	50.00%	50.00%	100.00%
Mansa	Count	7	8	22	30
	% within District	23.30%	26.70%	73.30%	100.00%
Nchelenge	Count	24	18	12	30
	% within District	80.00%	60.00%	40.00%	100.00%
Chinsali	Count	4	12	18	30
	% within District	13.30%	40.00%	60.00%	100.00%
Total	**Count**	**141**	**157**	**141**	**298**
	% within Total	**47.00%**	**52.70%**	**47.30%**	**100.00%**

Source: Baseline Survey (JICA, 2012)

Table 4-76 Formation of V-WASHE and Collection of User Fee for O&M (Endline)

District		User fees for O&M Collected	Formed	Not Formed	Total
Kazungula	Count	22	25	5	30
	% within District	73.30%	83.30%	16.70%	100.00%
Chongwe	Count	21	19	11	30
	% within District	70.00%	63.30%	36.70%	100.00%
Serenje	Count	10	21	9	30
	% within District	33.30%	70.00%	30.00%	100.00%
Lundazi	Count	27	29	1	30
	% within District	90.00%	96.70%	3.30%	100.00%
Sesheke	Count	22	21	9	30
	% within District	73.30%	70.00%	30.00%	100.00%
Mufumbwe	Count	17	16	14	30
	% within District	56.70%	53.30%	46.70%	100.00%
Luwingu	Count	29	11	19	30
	% within District	96.70%	36.70%	63.30%	100.00%
Mansa	Count	15	23	7	30
	% within District	50.00%	76.70%	23.30%	100.00%
Nchelenge	Count	23	26	4	30
	% within District	76.70%	86.70%	13.30%	100.00%
Chinsali	Count	22	22	8	30
	% within District	73.30%	73.30%	26.70%	100.00%
Total	**Count**	**208**	**213**	**87**	**300**
	% within Total	**69.30%**	**71.00%**	**29.00%**	**100.00%**

Source: Endline Survey (JICA, 2016)

4.4.3 Relation between User Fee Collection and Operation Rate

Table 4-77 and ***Table 4-78*** show the relationship between the percentage of facilities collecting user fees for the O&M cost and the operation rate of the facilities revealed in the baseline and endline surveys, respectively. The baseline survey revealed that Sesheke, Nchelenge and Kazungula Districts had the highest percentages of facilities where user fees were collected (80.0%, 80.0% and 66.7%, respectively), while Luwingu, Lundazi and Nchelenge Districts had the highest percentages in the endline survey (96.7%, 90.0% and 76.7%, respectively). At the time of the endline survey, the facility operation rates of all these districts except Luwingu District were higher than the average of the ten districts, and they were generally high among the ten districts. The records of hand pump repairs in these districts indicate the higher percentages of repair costs borne by communities. This leads to the conclusion that saving the O&M fund in the communities is contributing to the improvement of facility operation rates and the maintenance of the high operation rates.

Table 4-77 Collection of User Fees for O&M of Water Points (Baseline)

District		Collected	Not Collected	Total
Kazungula	Count	20	10	30
	% within District	66.70%	33.30%	100.00%
Chongwe	Count	13	17	30
	% within District	43.30%	56.70%	100.00%
Serenje	Count	17	13	30
	% within District	56.70%	43.30%	100.00%
Lundazi	Count	9	21	30
	% within District	30.00%	70.00%	100.00%
Sesheke	Count	24	6	30
	% within District	80.00%	20.00%	100.00%
Mufumbwe	Count	12	18	30
	% within District	40.00%	60.00%	100.00%
Luwingu	Count	11	19	30
	% within District	36.70%	63.30%	100.00%
Mansa	Count	7	23	30
	% within District	23.30%	76.70%	100.00%
Nchelenge	Count	24	6	30
	% within District	80.00%	20.00%	100.00%
Chinsali	Count	4	26	30
	% within District	13.30%	86.70%	100.00%
Total	**Count**	**141**	**159**	**300**
	% within Total	**47.00%**	**53.00%**	**100.00%**

Source: Baseline Survey (JICA, 2012)

Table 4-78 Collection of User Fees for O&M of Water Points (Endline)

District		Collected	Not Collected	Total
Kazungula	Count	22	8	30
	% within District	73.30%	26.70%	100.00%
Chongwe	Count	21	9	30
	% within District	70.00%	30.00%	100.00%
Serenje	Count	10	20	30
	% within District	33.30%	66.70%	100.00%
Lundazi	Count	27	3	30
	% within District	90.00%	10.00%	100.00%
Sesheke	Count	22	8	30
	% within District	73.30%	26.70%	100.00%
Mufumbwe	Count	17	13	30
	% within District	56.70%	43.30%	100.00%
Luwingu	Count	29	1	30
	% within District	96.70%	3.30%	100.00%
Mansa	Count	15	15	30
	% within District	50.00%	50.00%	100.00%
Nchelenge	Count	23	7	30
	% within District	76.70%	23.30%	100.00%
Chinsali	Count	22	8	30
	% within District	73.30%	26.70%	100.00%
Total	**Count**	**208**	**92**	**300**
	% within Total	**69.30%**	**30.70%**	**100.00%**

Source: Endline Survey (JICA, 2016)

4.4.4 Access to Hand Pump Repair Services from APMs

The development of a repair mechanism in the SOMAP O&M model requires an environment to be established in which a community requiring facility repair can quickly locate the services of an APM with a sufficient capacity for facility repair. ***Table 4-79*** and ***Table 4-80*** show APM accessibility in the sample villages by district as revealed in the baseline and endline surveys, respectively. Among the communities surveyed, the percentage of communities with access to repair services from APMs increased from 61.7% at the time of the baseline survey to 71.3% at the time of the endline survey. The percentage of communities with access to repair services from APMs in 7 out of 10 surveyed districts remained the same or increased in the period between the baseline and endline surveys. The endline survey revealed that the five districts with the highest percentage of facilities with an APM assigned nearby (Kazungula, Nchelenge, Chongwe, Lundazi and Mufumbwe Districts) also had higher facility operation rates than the average. This observation suggests that the method of assigning APMs may have a certain influence on the facility operation rate.

Table 4-79 Availability of APMs in the Vicinity of the Communities (Baseline)

District		Available	Not Available	Don't know	Total
Kazungula	Count	24	6	0	30
	% within D	80.00%	20.00%	0.00%	100.00%
Chongwe	Count	23	7	0	30
	% within D	76.70%	23.30%	0.00%	100.00%
Serenje	Count	11	15	4	30
	% within D	36.70%	50.00%	13.30%	100.00%
Lundazi	Count	16	14	0	30
	% within D	53.30%	46.70%	0.00%	100.00%
Sesheke	Count	14	15	1	30
	% within D	46.70%	50.00%	3.30%	100.00%
Mufumbwe	Count	26	3	1	30
	% within D	86.70%	10.00%	3.30%	100.00%
Luwingu	Count	17	13	0	30
	% within D	56.70%	43.30%	0.00%	100.00%
Mansa	Count	20	8	2	30
	% within D	66.70%	26.70%	6.70%	100.00%
Nchelenge	Count	9	20	1	30
	% within D	30.00%	66.70%	3.30%	100.00%
Chinsali	Count	25	3	2	30
	% within D	83.30%	10.00%	6.70%	100.00%
Total	**Count**	**185**	**104**	**11**	**300**
	% within T	**61.70%**	**34.70%**	**3.70%**	**100.00%**

Source: Baseline Survey (JICA, 2012)

Table 4-80 Availability of APMs in the Vicinity of the Communities (Endline)

District		Available	Not Available	Don't know	Total
Kazungula	Count	27	3	0	30
	% within D	90.00%	10.00%	0.00%	100.00%
Chongwe	Count	23	5	2	30
	% within D	76.70%	16.70%	6.70%	100.00%
Serenje	Count	19	10	1	30
	% within D	63.30%	33.30%	3.30%	100.00%
Lundazi	Count	23	7	0	30
	% within D	76.70%	23.30%	0.00%	100.00%
Sesheke	Count	17	6	7	30
	% within D	56.70%	20.00%	23.30%	100.00%
Mufumbwe	Count	23	6	1	30
	% within D	76.70%	20.00%	3.30%	100.00%
Luwingu	Count	18	9	3	30
	% within D	60.00%	30.00%	10.00%	100.00%
Mansa	Count	19	9	2	30
	% within D	63.30%	30.00%	6.70%	100.00%
Nchelenge	Count	26	4	0	30
	% within D	86.70%	13.30%	0.00%	100.00%
Chinsali	Count	19	11	0	30
	% within D	63.30%	36.70%	0.00%	100.00%
Total	**Count**	**214**	**70**	**16**	**300**
	% within T	**71.30%**	**23.30%**	**5.30%**	**100.00%**

Source: Endline Survey (JICA, 2016)

4.4.5 Achievement of Main Indicators on the Establishment of the O&M Mechanisms and Improvement of Operation Rate of Rural Water Supply Facilities

Table 4-81 shows the levels of achievement of the major indicators of this project concerning the implementation of the SOMAP O&M model in the NRWSSP target districts and the advantageous effects generated by its implementation, including the main results of the surveys described in (1) – (4) above. The Project Team analysed and organised the values of the indicators concerning the implementation of the O&M model for the preparation of district O&M action plans and the establishment of the three O&M mechanisms and added sub-indicators to supplement indicators in PDM deduced from the results of the baseline and endline surveys to the PDM. The values of all indicators have been improved from those revealed in the baseline survey except the two indicators (the indicator for the output of Activity 2-5 and Indicator 3 for the project purpose) for which the baseline values could not be established. This observation leads to the conclusion that the introduction and implementation of the O&M model in the NRWSSP target districts has made steady progress and has contributed to the improvement of the operation rate of the protected water points with hand pump.

Table 4-81 Achievements of the Project

Item		Major Indicator【The numbering in PDM】	Target Value	Baseline (May, 2012)	Endline (November, 2016)
Preparation of District O&M Action Plan		• Percentage of districts preparing and reviewing the District O&M Action Plan 【Output 2−1】	100%	45.30% (29/64 districts)	76.30% (71/93 districts)
Introduction of O&M Mechanisms	Community-based Management	• Percentage of communities collecting user fees for O&M of the water supply facilities 【Output 2-3】	60%	47.00%	69.30%
		• Percentage of communities that have formed V-WASHE (Sub-indicator)	–	52.70%	71.00%
	Supply Chain Management for hand pump spare parts	• Percentage of districts operating spare parts shops 【Output2-4】	60%	18.80% (12/64 districts)	51.60% (48/93 districts)
	Repair Work Mechanism	• Percentage of districts that have allocated a sufficient number of APMs 【Output 2-5】	–	-	55.90% (52/93 districts)
		• Percentage of water supply facilities for which APMs are allocated (Sub-indicator)	–	61.70%	71.30%
Improvement of Operation Rate of Water Points with Hand Pumps		• Operation rate of water supply facilities 【Project Objective 1】	80%	71.30%	77.70%

Item	Major Indicator 【The numbering in PDM】	Target Value	Baseline (May, 2012)	Endline (November, 2016)
	• Downtime of water supply facilities is decreased in average within 14 days 【Project Objective 2】	–	38.28%	43.15%
	• Percentage of DLAs that incorporate the rehabilitation plan for facilities with malfunctions that the communities/APMs cannot handle 【Project Objective 3】	–	–	76.30% (71/93 districts)