添付資料-5

DWST 中長期人材育成計画

Republic of Sudan

Ministry of Water Resources and Electricity

Drinking Water and Sanitation Unit

Drinking Water and Sanitation Unit
Training Centre (DWST)

Mid-Term and Long-term Plan for Human Resources Development for Water Supply in Sudan

1

１．Background

Before the application of decentralized governance in Sudan, official agency of the drinking water supply was National water corporation (NWC). After decentralization, Public Water Corporation (PWC) became the responsible organization of the water sector up to August 2012. Then the government of Sudan decided to change the name from (PWC) to Drinking water and Sanitation Unit (DWSU).

Japanese International Cooperation Agency (JICA) has technical projects, which provide practical assistance to developing countries. In June 2008 JICA in cooperation with public Water Corporation establish phase one of (Human Resources Development for Water Supply Project). The objective of this project is enhancing water supply situation in Sudan through implement advanced training system in public water corporation training centre. In March 2011, phase one of the project was completed.

In November 2011, phase two of the project was started; the aim of this phase is to establish training system in pilot states (Sennar and White Nile).

Table-1 shows the history of Human Resources Development for Water sector in Sudan.

Table‐1. Summary of the History of Human Resources Development in Sudan

Year	Month	Main Activity of Human Resources Development
2007	5	Establishment of the Training Center in PWC
2008	6	Commencement of Human Resources Development Project for Water Phase 1
2008	11	1st Water Treatment Plant Course
2009	12	Completion of the PWCT Workshop in Kiloten Area
2010	3	Completion of Water Quality Analysis laboratory
2011	3	Completion of the Human Resources Development Project for Water Phase 1
2011	5	Turkish Tour
2011	11	Commencement of the Human Resources Development Project for Water Phase 2
2012	12	The 1st Training in Morocco
2012	4	Establishment of Sennar State Water Corporation Training Center
2012	4	Establishment of White Nile State Water Corporation Training Center
2012	6	Provide state equipments
2012	6	evaluation of Kassala Project
2012	12	The 1st Invitation of Moroccan Experts

2

2013	12	Establishment of El Gezira State Water Corporation Training Center
2013	3	Establishment of Northern State Water Corporation Training Center
2013	4	The 2nd Training in Morocco
2013	9	Acceptance of the trainees from UNOPS Project
2013	10	Acceptance of the trainees from IOM Project
2013	12	The 2nd Invitation of Moroccan Experts
2014	1	Establishment of River Nile State Water Corporation Training Center
2014	3	Acceptance of the trainees from Africa Development Bank Project
2014	4	The 3rd Training in Morocco
2014	4	Establishment of North Kordofan State Water Corporation Training Center
2014	12	The 3rd Invitation of Moroccan Experts
2015	3	Appraisal of Human Resources Development Plan by the Government of Sudan
2015	3	The 4th Training in Morocco
2015	9	Completion of the Human Resources Development Project for Water Phase 2

２．**Purpose of the Mid-Term and Long-Term Human Resources Development Plan**

The most important factor to provide stable drinking water with sufficient quantity and high quality is qualified managers, engineers and technicians. The purpose of the mid-term and long-term human resources development plan is to create concrete and capable staff for water supply sector in Sudan.
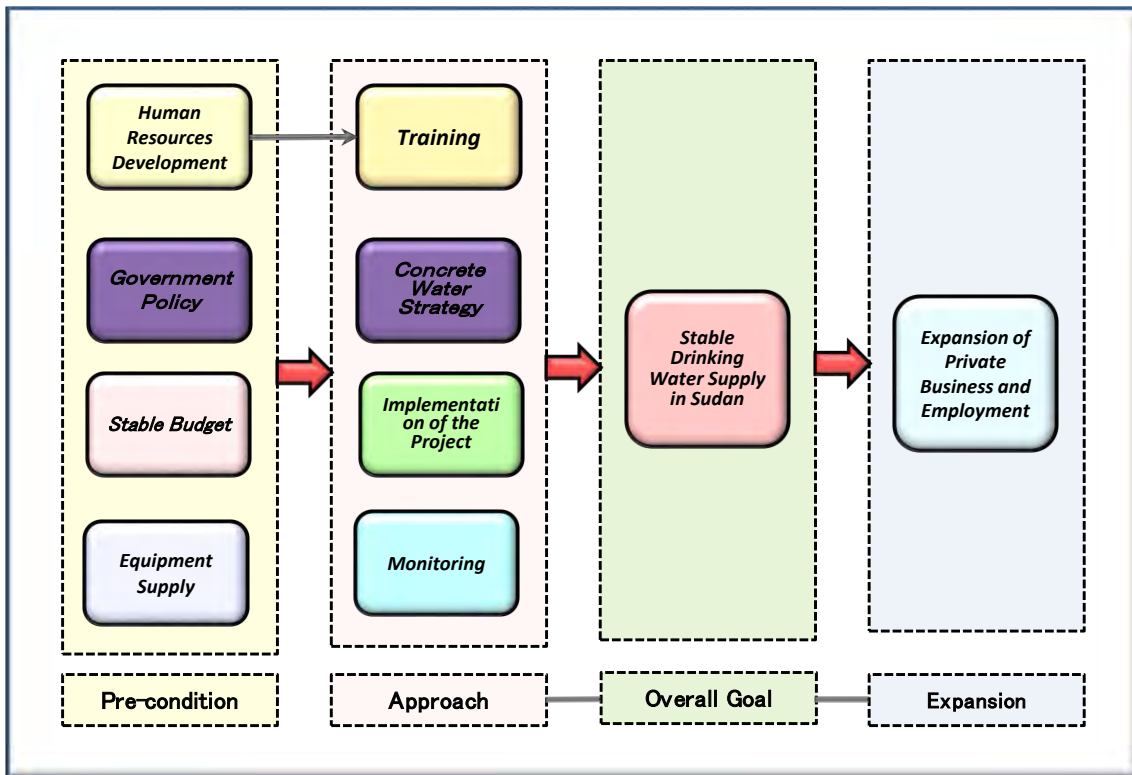
3

Figure (1) Final Target of the Water Supply Sector

3. Problem Analysis of the Water Sector in Sudan

3‐1. Sample Survey

The DWST carried out the sample survey for existing capacity of staff in DWSU, DWST, Sennar sate, White Nile state and Northern state (Table-2). The capacity evaluation format consists of 10 stages; ① Proposal, ② Survey and Design, ③ Contract, ④ Procurement, ⑤ Construction Management, ⑥ Operation and Maintenance, ⑦ Training, ⑧ Monitoring, ⑨ Follow up and ⑩ Administration. Based on this survey, DWST rank the human capacity of each organization from A (Excellent) to E (very weak). Followed table illustrate 50% of DWSU, Sennar SWC, White Nile SWC and Northern SWC, evaluation elements are weak (E and D).

4

Table (2) Analysis of the Capacity for each Organization

Stage	Indicator	DWSU A	B	C	D	E	DWST A	B	C	D	E	Sennar SWC A	B	C	D	E	White Nile SWC A	B	C	D	E	Northern SWC A	B	C	D	E	Necessary Skill
1.Proposal	1.Implementation of the Survey		O					O							O				O							O		Survey skill
	2.Analysis of the Project Needs			O				O							O				O							O		Computer skill
	3.Application Form Writing			O				O							O				O								O	Report writing skill
2.Survey/Design	4.Survey and Design Plan		O					O							O					O						O		Design skill
	5.Preparation of Relative Drawings			O				O								O					O					O		CAD and GIS Skill
	6.Cost Estimation			O			O									O			O							O		Computer skill
	7.Report Writing		O					O						O					O							O		Report writing skill
3.Contract	8.Preparation of Tender Document	O						O						O			O									O		Tender skill
	9.Tender and Evaluation	O						O						O			O									O		Tender skill
	10.Preparation of the Contract	O						O						O	O		O									O		Contract skill
	11.Signing of the Contract	O						O						O			O							O				Contract skill
4.Procurement	12.Quantity and Specification			O				O						O					O							O		Procurement skill
	13.Estimation			O				O							O				O					O				Computer skill
	14.Total Cost Estimation			O				O						O					O					O				Computer skill
5.Construction Management	15.Management of Schedule			O				O							O					O				O				Schedule management skill
	16.Management of Quality				O			O					O						O							O		Quality management skill
	17.Report Writing			O				O							O				O								O	Report writing skill
6.Operation & Maintenance	18.Maintenance of Equipment			O				O								O				O						O		Equipment skill
	19.Maintenance of Facility			O				O								O				O							O	Facility skill
	20.Collection of Water Tariff				O				O						O				O					O				Computer skill
	21.Report Writing		O					O							O				O								O	Report writing skill
7.Training	22.Training Facility		O					O							O		O							O				Facility skill
	23.Training Equipment		O					O					O				O								O			Equipment skill
	24.Training Budget		O					O					O				O										O	Accounting skill
	25.Training System			O				O					O				O										O	Training management skill
8.Monitoring	26.Management of the Project		O					O							O					O						O		Project monitoring skill
	27.Management of the Training			O				O					O				O		O								O	Training monitoring skill
	28.Monitoring Report Writing			O				O							O				O								O	Report writing skill
9.Follow Up	29.Preparation of Rehabilitation Plan		O					O							O				O						O			Survey and planning skill
	30.Estimation of the Rehabilitation				O			O							O					O				O				Computer skill
	31.Tender and Evaluation			O				O							O		O							O				Tender and contract skill
	32.Management of Rehabilitation			O				O							O					O				O				Construction management skill
	33.Report Writing			O				O							O				O								O	Report writing skill
10.Administration	34.Peronel Management			O				O							O				O					O				Management skill
	35.Finance Management			O				O							O				O				O					Management skill
	36.Management of Office				O				O					O				O								O		Management skill
	37.Management of Equipment			O				O							O				O							O		Management skill
	Total	0	9	9	16	3	0	21	16	0	0	0	5	5	21	6	0	10	5	14	8	0	9	5	15	8		
	Ratio(%)	0.0	24.3	24.3	43.2	8.1	0.0	56.8	43.2	0.0	0.0	0.0	13.5	13.5	56.8	16.2	0.0	27.0	13.5	37.8	21.6	0.0	24.3	13.5	40.5	21.6		

3‐2. Confirmation of the Problems

There are many problems in water supply sector in Sudan. The DWST has categorized into 5 items which are human resources development, organization, fund, equipment and politics (Table-3). Table 3 show that human resources development alone cannot develop high capacity staff, other factors such as: Organization, fund, equipment and politics must be taking into consideration.

Table (3) Problems of the Water Supply Sector in Sudan

No.	Problems	Details	HRD	Organization	Fund	Equipment	Politics
1	Shortage of Capable Staff	Small number of capable and rich experience staff	◎	○	○		
2	Lack of Capacity of the Management	Shortage of good management staff	◎	○			
3	Decrepit Facility	Without any treatment of old facilities	◎	◎	◎	◎	
4	Improvement of Water Quality	High turbidity bacteria, harmful matter, salinity water	◎	◎	◎	◎	
5	Lack of Capacity of Problems Solution	Confirmation of problems and quick solution of problems	◎	○			
6	Lack of Information Sharing System	Insufficient work for without information sharing	◎	◎		○	
7	Old Technology	Delay of new technology, equipment and soft wear	○	○	◎	◎	
8	Administrative Problems	Delay of Salary lack of social insurance staff evaluation	○	◎	◎		
9	Organizational Problems	Insufficient of regulation	○	◎	○	○	
10	Problems of the management System	Short assignment of the DG of SWC	○	◎			○
11	Problems of Well Rehabilitation	Shortage of monitoring data and rehabilitation works	○	○	○	◎	
12	Problems of Water Leakage	Old asbestos pipe and it damages	○	◎			
13	Equipment Shortage	Shortage of office, survey and analysis equipment	○	○	◎	◎	○
14	Problems of Water Tariff System	Insufficient tariff and pipe diameter base system	○	○	○	○	◎
15	Installation of Flow Meter	Difficulty of actual water consumption and leakage	○	◎	○	○	◎
16	Shortage of the Budget	Unformatted budget application based on each item	○	◎	○		◎
17	Insufficient of DG Meeting	There is no DG meeting for all SWC	○	◎	○		◎
18	Insufficient of Gender Balance	Low percentage of women manager	○	◎			◎
19	Problems of Hygiene and Sanitation	Sanitation and hygiene's does' include activity of the SWC	○	◎			◎
20	Protection of Water Sources	Insufficient of conservation and monitoring system of water resources	○	◎	◎		◎
21	Problems of Rural Water Supply	Water management committee is not functioning	○	◎	○	○	◎
22	Insufficient of Population Data	Difficulty of the project plan and evaluation for insufficient population	○	◎	○	○	◎
23	Distribution of Budget of State	Shortage of budget for operation and maintenance	○	○	◎		◎
24	High Cost of Electricity	Electricity tariff for water is more expensive than agriculture	○	○			◎
	Total	◎	6	15	7	5	11
		○	18	9	10	6	2

3-3. Arrangement of the Training Equipment

Japanese government provides each organization by many training equipments. However, SWC need additional necessary equipments.

Table-4 shows office equipment provided by Japan.

No.	Equipment	Total
1	Computer	175
2	Copy Machine(color)	21
3	Copy Machine(B/W)	44
4	Projector	22
5	Digital Camera	29

3-4. Construction of New Training Center

There are 18 states in Sudan, each state has established SWC. Now Northern, River Nile, El Gezira, Gedaref, Kassala, Sennar, White Nile, Red Sea and North Kordofan SWCs have training center. However, the training center of Darfur area and protocol areas are not sufficient to implement appropriate training. And also, the construction of new training center of the DWST is still under preparation.

Table (5)   Present Situation of the Training Center Construction

Organization Name	2008	2009	2010	2011	2012	2013	2014	2015	Equipment	Facility	Remarks
DWST New Training Center				◄──────────────────►					◎	○	Under Construction
1.Northern					■■■■	■■			△	○	Existing
2.River Nile					■■	■■■■			△	○	Existing
3. Khartoum									×	×	No Plan
4.El Gezira				■■■	■■■				△	○	Existing
5.Gedarif	■■■■	■■							△	△	Existing
6.Kassala			■■■	■■■					△	△	Existing
7.White Nile			■■■	■■■					○	○	Existing
8.Sennar			■■■	■■■	■■				○	○	Existing
9.North Kordofan						■■■	■■■		△	○	Existing
10.Red Sea							◄────►		×	×	Under Construction
11.Blue Nile							◄────►		×	×	Under Construction
12.South Kordofan	■■	■■■							×	△	Existing
13.West Kordofan									×	×	No Plan
14.North Darfur					■■■	■■			×	△	Existing
15.West Darfur				■■■	■■■				×	△	Existing
16.South Darfur				■■■■■					×	△	Existing
17.Central Darfur									×	×	No Plan
18.East Darfur									×	×	No Plan

6

3-5. Training in Morocco

Morocco is one of the most development countries in Africa. Figure-2 shows the progress of water supply covering ratio between urban and rural area. Especially, rural water supply was only 14% in 1995 but 91% villages cover safe drinking water in 2010. The key point of the rapid improvement of the rural water supply was that government of Morocco set up concrete national plan for drinking water supply.

On the other hand, water resource development and management in Morocco are quite advance. And also technology of the desalinization of sea water, drip irrigation and reutilization of sewage water are high level. Therefore, the DWST has decided to dispatch Sudanese to Morocco since 2012 and around 47 trainees participate in Morocco training.
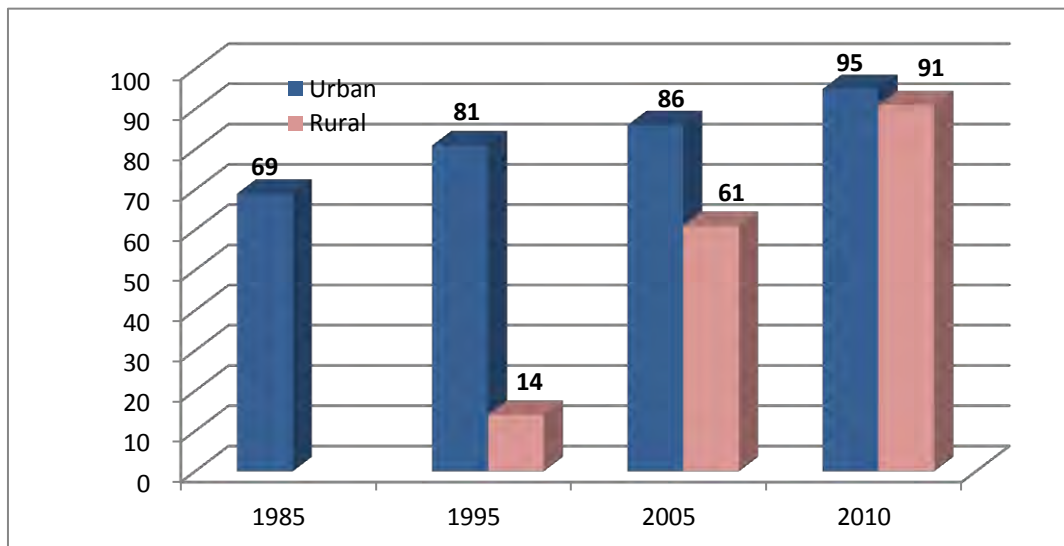
Figure (2) Water Supply Covering Ratio between Urban and Rural in Morocco (%)

Table (6) Comparison of Morocco and Sudan

Items	Morocco	Sudan
Area（10,000㎢）	45	189
Population	32,520,000	34,320,000
Population Density	73	16
Capital City	Rabat	Khartoum
Population of Capital City	180	518
GNI($/person）	2,950	2,020
Independent Year	1956	1956
Religion	Muslim	Muslim
Language	Arabia, Berber, French	Arabia, English
Government System	Constitutional Monarchy	Republic
Main Industry	Agriculture, Fisery,Mining, Tourism	Mining, Agricluture, Stockbreeding, Oil
Incident	West Sahara	Darfur, Protocol Area, Eastern
Annual Tourist	9,380,000	Not Clear
World Heritage	9	1

7

Table (7) Participations of Sudanese in Morocco Trainings

Organization	2012	2013	2014	2015	Total
DWST	1	1	1	2	5
DWSU	0	0	0	1	1
White Nile	2	1	1	2	6
Sennar	2	1	1	1	5
Kassala	3	0	2	1	6
River Nile	0	1	1	1	3
Blue Nile	1	1	0	0	2
North Kordofan	0	1	1	0	2
South Kordofan	1	1	0	0	2
North Darfur	1	1	0	0	2
West Darfur	1	1	0	0	2
South Darfur	1	1	0	0	2
Northern	0	1	0	1	2
Khartoum	0	1	0	0	1
El Gezira	0	1	1	1	3
Red Sea	0	0	1	0	1
Gedaref	0	0	0	1	1
Hawata Project	0	0	1	0	1
Total	**13**	**13**	**10**	**11**	**47**

3.6 Training system methods:

In addition to Lectures, laboratory experiments, practical training on workshop there are additional methods used in training system such as:

3.6.1 On the Job Training:

By Appling this method for mid-term and long-term plan water supply sector employee can obtain specific job training and can be shown what to do and as they practice under the supervision of more experienced staff, they will gain more confidence in their work as well as the trainer being able to guide them towards doing the job correctly and being on hand to point out any errors and to give feedback. In addition to the job training being tailored to specifically suit the needs of the water supply staff, this also allows a new trainee to be integrated far more easily and quickly into the company as opposed to them learning similar skills externally which might not be entirely suitable for the specific role they're being asked to do.

3.6.2 Case Studies

Case studies provide trainees with a chance to analyze and discuss real workplace issues. They

develop analytical and problem-solving skills, and provide practical illustrations of principle or theory. They can also build a strong sense of teamwork as teams struggle together to solve specific issue. When every state participates by a case study during specific training this will enhance the performance of staff and achieve sharing information.

4．Human Resources Development for High Capacity Staff

Table-8 shows necessary skills for each generation. The items of capacity and stature are all linking with Mid-Term and Long-Term Human Resources Development Plan.

Table (8) Necessary Capacity and Stature of each Generation

Plan	Capacity /Stature	20-25 Years	25-30 Years	30-40 Years	40-50 Years	Engineer	Non Engineer
Element	Compliance	◎	◎	◎	◎	◎	◎
	Motivation	◎	◎	◎	◎	◎	◎
	Ownership		◎	◎	◎	◎	◎
	Leadership			◎	◎	◎	◎
Mid Term Plan	Computer Skill	◎	◎	◎	◎	◎	◎
	Data Analysis	◎	◎	◎	◎	◎	◎
	Report Writing	◎	◎	◎	◎	◎	
	Presentation Skill	◎	◎	◎	◎	◎	
	Foreign Language	◎	◎	◎	◎	◎	
Long Term Plan	Technical Management		◎	◎	◎	◎	
	Document Management		◎	◎	◎	◎	◎
	Equipment Management		◎	◎	◎	◎	◎
	Facility management		◎	◎	◎	◎	
	Quality Management		◎	◎	◎	◎	◎
	Project Management		◎	◎	◎	◎	
	Monitoring and Evaluation			◎	◎	◎	◎
	Human Resources Management			◎	◎	◎	◎
	Financial Acquisition and Management				◎	◎	◎
	Organizational Management				◎	◎	◎
	General Management				◎	◎	◎

4‐1．Individual Specialty of the Staff

Almost all new comers of DWSU and SWCs graduated from university and college have studied basic expertise. The definition of expertise is not only for technical sector (hardware) but also socio economical filed; laws, accounting and community developments (software) etc. In water supply sector, new comers from technical firms will be assigned the department of survey and design, department of project management, department of maintenance or laboratory. On the contrary, new comer from software fields will be high possibility of assignment the administrative department.

Table-9 and 10 show necessary skills for administration staff and technical staff. To develop their capacity, appropriate training course shall be provided by the DWST and SWCs.

9

Table (9) Necessary Skill for Administration Staff

Skill	General	Personnel	Accounting	Procurement	Storage	Training Courses
1.Computer Skill	●	O	O	O	O	**1.Computer Skill**
1-1.Word	●	O	O	O	O	Basic Course
1-2.Excell	●	O	O	O	O	Advance Course
2.Coordination Skill	●	O	O	O	O	**2.Coordination Skill**
2-1.International Organization	●	O	O	O	O	Coordination Skill Course
2-2.Sudan government	●	O	O	O	O	Coordination Skill Course
2-3.State government	●	O	O	O	O	Coordination Skill Course
2-4.Private sector	●	O	O	O	O	Coordination Skill Course
3.Capacity Building Skill	●	O	O	O	O	**3.Capacity Building Skill**
3-1.for young generation	●	O	O	O	O	Organizational Management Course
3-2.for senior	●	O	O	O	O	Organizational Management Course
3-3.for women	●	O	O	O	O	Organizational Management Course
4.Report Writing Skill	●	O	O	O	O	**4.Report Writing Skill**
4-1.Arabic report	●	O	O	O	O	Arabic Reporting Course
4-2.English report	●	O	O	O	O	English Reporting Course
5.English Skill	●	O	O	O	O	**5.English Skill**
5-1.Speaking/Discussion	●	O	O	O	O	Basic English Course
5-2.Listening	●	O	O	O	O	Basic English Course
5-3.Writing	●	O	O	O	O	English Reporting Course
6.Presentation Skill	●	O	O	O	O	**6.Presentation Skill Course**
7.Management Skill	●	O	O	O	O	**7.Management Skill**
7-1.Organizational Management	●		O	O	O	Organizational Management Course
7-2.Equipment Management	●		O			Equipment Management Course
7-3.Financial Management	●		O			Accounting Management Course
7-4.Training Management	●	O	O			Training Management Course
8.Procurment Skill	●		O	O	O	**8.Procurment Skill**
8-1.Construction Equipment	●		O	O	O	Procurement Course
8-2.Office Equipment	●		O	O	O	Procurement Course
8-3.Survey and Laboratory Equipment	●		O	O	O	Procurement Course
8-4.Training equipment	●		O	O	O	Procurement Course
9.Tendering Skill	●			O		**9.Tendering Skill**
9-1.Survey Sector	●			O		Tender and Contract Course
9-2.Equipment Sector	●			O		Tender and Contract Course
9-3.Construction Sector	●			O		Tender and Contract Course
10.Monitoring Skill	●	O	O	O	O	**10.Monitoring Skill**
10-1.Organizational Monitoring	●	O				Organizational Management Course
10-2.Staff Monitoring	●	O				Organizational Management Course
10-3.Finance and Budget Monitoring	●		O			Accounting Management Course
10-4.Equipment Monitoring	●			O	O	Equipment Management Course

Table (10) Necessary Skills for Technical Staff

Skill	Engineer	Technician	Skilled Labor	Operator	Labor	Training Courses
1.Technical Skill	●	○	○	○	○	**1.Technical Skill**
1-1.Mechanical	●	○	○	○	○	Mechanical Course
1-2.Electolical	●	○	○	○	○	Electrical Course
1-3.Geological	●	○				Hydrogeological Course
1-4.Hydrogeological	●	○				Hydrogeological Course
1-5. Well Construction	●	○	○			Well Management Course
1-6.Water Quality	●	○	○			Water Quality Course
1-7.GIS/Remote Sensing	●	○				Data Management/GIS Course
1-8.Piping Work	●	○	○			Pipe Network Management Course
1-9.Water Treatment Plant	●	○	○	○		Water Treatment Plant Course
1-10.Sanitation	●	○	○	○		Sanitation Course
1-11.Hygine	●	○	○	○		Hygiene Course
1-12.Construction	●	○	○	○		Construction Management
1-13.Equipment and Storage	●	○	○	○		Equipment Management Course
2.Survey Skill	●	○	○			**2.Survey Skill**
2-1.Topographycal Survey	●	○				Topographical Survey Course
2-2.Geophysical Survey	●	○				Geophysical Survey Course
2-3.Hydrogeological Survey	●	○				Hydrogeological Survey Course
2-4.Hydraulical Survey	●	○				Hydraulically Survey Course
2-5.Electro-mechnaical Survey	●	○	○			Electro-mechanical Survey Course
2-6.Pipe Network and Leakage	●	○	○			Piping and Leakage Survey Course
2-7.Construction Survey	●	○				Construction Survey Course
2-8.Socio Economical Survey	●	○	○			Socio-economical Survey Course
2-9.Water Quality	●	○				Water Quality Survey Course
2-10.Data Analysis	●	○				Data Management Course
3.Design Skill	●	○	○			**3.Design Skill**
3-1.Well Design	●	○	○			Well Design Course
3-2.Water Yard Design	●	○	○			Water Supply Facility Course
3-3.Water Treatment Plant Design	●	○	○			Water Treatment Plant Course
3-4.Pipeline design	●	○	○			Pipe Network Management Course
4.Procurment skill	●	○	○			**4.Procurment skill**
4-1.Construction Equipment	●	○	○			Procurement Course
4-2.Office Equipment	●	○	○			Procurement Course
4-3.Survey and Laboratory Equipment	●	○	○			Procurement Course
4-4.Training Equipment	●	○	○			Procurement Course
5.Tendering Skill	●	○				**5.Tendering Skill**
5-1.Survey Sector	●	○				Tender and Contract Course
5-2.Equipment Sector	●	○				Tender and Contract Course
5-2.Construction Sector	●	○				Tender and Contract Course
6.Monitoring Skill	●	○				**6.Monitoring Skill**
6-1.Project Monitoring	●	○				Planning and Monitoring Course
6-2.Organization Monitoring	●	○				Organizational Management Course
6-3.Training Monitoring	●	○				Training Management Course
7.Computer Skill	●	○				**7.Computer Skill**
7-1.Word	●	○				Computer Course
7-2.Excell	●	○				Basic Course
7-3.Mapping	●	○				Advance Course
8.Coordination Skill	●	○				**8.Coordination Skill**
8-1.International Organization	●	○				Coordination Skill Course
8-2.Sudan Government	●	○				Coordination Skill Course
8-3.State Government	●	○				Coordination Skill Course
8-4.Private Sector	●	○				Coordination Skill Course
9.Management Skill	●					**9.Management Skill**
9-1.Organizational Management	●					Organizational Management Course
9-2.Project Management	●					Project Management Course
9-3.Equipment Management	●					Equipment Management Course
9-4.Financial Management	●					Accounting Management Course
9-5.Training Management	●					Training Management Course
10.Capacity Building Skill	●					**10.Capacity Building Skill**
10-1.for young generation	●					Organizational Management Course
10-2.for senior	●					Organizational Management Course
10-3.for women	●					Organizational Management Course
11.Report Writing Skill	●					**11.Report Writing Skill**
11-1.Arabic report	●					Arabic Reporting Course
11-2.English report	●					English Reporting Course
12.English Skill	●					**12.English Skill**
12-1.Speeking/Discussion	●					Basic English Course
12-2.Listening	●					Basic English Course
12-3.Writing	●					English Reporting Course
13.Presentation Skill	●					Presentation Skill Course

11

5．Mid-Term and Long-Term Human Resources Development Plan

Table-11 shows targets skill for the Mid-Term and Long-Term Human Resources Development Plan. The period of Mid-Term Plan is 7 years from 2012 to 2018 and Long-Term Plan is 15 years from 2012 to 2016.

Table (11) Mid-Term and Long-Term Human Resources Development Plan

Target Skill	1 2012	2 2013	3 2014	4 2015	5 2016	6 2017	7 2018	8 2019	9 2020	10 2021	11 2022	12 2023	13 2024	14 2025	15 2026
1．Fundamental Skill	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1-1.Compliance	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1-2.Motivation	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1-3.Ownership	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1-4.Leadership	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
2.Target Skill for Mid Term HRD Plan	■	■	■	■	■	■	■								
2-1.Computer Skill	■	■	■	■	■	■	■								
2-2.Data Analysis Skill	■	■	■	■	■	■	■								
2-3.Report Writing Skill	■	■	■	■	■	■	■								
2-4.Presentation Skill			■	■	■	■	■								
2-5.English Communication Skill			■	■	■	■	■								
3.Target Skill for Long Term HRD Plan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
3-1.Techinical Management Skill	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
3-2.Project Management Skill		■	■	■	■	■	■	■	■	■	■	■	■	■	■
3-3.Facility Management Skill		■	■	■	■	■	■	■	■	■	■	■	■	■	■
3-4.Equipment Management Skill		■	■	■	■	■	■	■	■	■	■	■	■	■	■
3-5.Quality Management Skill		■	■	■	■	■	■	■	■	■	■	■	■	■	■
3-6.Monitoring and Evaluation Skill		■	■	■	■	■	■	■	■	■	■	■	■	■	■
3-7.Documentation Management Skill		■	■	■	■	■	■	■	■	■	■	■	■	■	■
3-8.Human Resources Development and Management Skill		■	■	■	■	■	■	■	■	■	■	■	■	■	■
3-9.Fund Security and Budget Management Skill		■	■	■	■	■	■	■	■	■	■	■	■	■	■
3-10.Organizatiuonal Management Skill	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
3-11.General Management Skill	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

5‐1．General and Fundamental Skill

（1）　Compliance

All governmental staff shall uphold of relative national laws. Especially, the problems of bribe from private sector or international organization shall be pay attention to avoid big damage of organization and government.

Table-12. Training Items for Compliance

Items	Check
Understanding of Relative Law	
Consciousness of Public Servant	
Bribe,Entertainment,Donation	
Observance of Law and Penalty	
Case Study	

（2）　Motivation

To maintain the motivation for long period is essential matter of the government staff. However, due to low salary, rare promotion and lack of responsibility, the motivation of government staff is not so high and migration to oil countries is often happens. Although this issue is the political and governmental matters, each organization shall consider improving low motivation of staff.

12

（3）　Ownership

There are many international projects in Sudan and a lot of water supply facilities and equipment have been provided by those donors. However, the maintenance system of water supply facilities and equipment is not appropriate, water supply covering ratio in Sudan is still low.

（4）　Leadership

There are 18 SWCs in Sudan, but leadership of Director General of each organization is quite different. The leadership is one of the most important capacity of the Director General, this Mid-Term and Long-Term Human Resources Development Plan shows the training of the next capable management staff.

5‐2. Target Skill of the Mid-term Human Resources Development

(1)　Computer Skill

Computer skill is the most important for information sharing and effective work. However, total numbers of the computer in state and locality level are still small.   Almost all locality office in each SWC, the hand writing documentation works are majority. To improve the hand writing system, the DWST decided to enhance computer skill in the Mid-Term Human Resources Development Plan.

Table (13) Training Corse of the Computer Skill Improvement

Training Course	Check
Basic Computer	
Basic Word	
Advance Word	
Basic Excel	
Advance Excel	
Basic PowerPoint	
Advance Power Point	
Digital Camera	
Basic GIS	
Basic Cad	

13

(2) Data Analysis Skill

To analysis data is fundamental work of all activities. Based on the computer skill training, all data shall be analyzed by computer.

Table (14) Training Corse of the Data Analysis Skill

Items	Check
Survey Methodology	
Analysis of Problems	
Solution of Problems	
Reporting	

(3) Report Writing Skill

Report writing is essential skill of all staff. To share information of the survey results, all staff shall pay attention to write clear report. Appropriate figure, table and photo shall be utilized in the report.

Table (15) Training Corse of the Report Writing Skill

Items	Check
Methodology of Report Making	
Basic Computer	
Utilization of Table, Figure and Photo	
English Report Writing	
Presentation of Report	

(4) Presentation Skill

Presentation skill is important capacity for the seminar and international conference etc. The presentation shall prepare clear slide by figures, table and photos. Presentation by long sentences is sometimes reasons of time over and disturbing understand. Repeating and experience of presentation are most efficiency approach to improve this skill.

Table (16) Training Corse of the Presentation Skill

Items	Check
Basic Presentation	
Basic Computer	
Actual Presentation	

14

(5) English Communication Skill

English is the most important language in the world. Regarding overseas training for Sudanese, Arabic countries are limited, the training language of other countries are English. Therefore, the DWST selected the items of English Communication Skill for the Mid-Term Human Resources Development Plan.

Table (17) Training Corse of English Communication Skill

Items	Inspection		
	Self Study	Language School	University
Basic English			
Basic English Grammar			
Intermediate Grammar			
Basic Listening			
Intermediate Listening			
Basic Reading			
Intermediate Reading			
Basic Writing			
Intermediate Writing			
English e-mail			
Basic Conversation			
Intermediate Conversation			
English Presentation			

5‐3. Target Skill of the Long-Term Human Resources Development

(1) Technical Management Skill

Table-18 shows each item of technical management skill. These items are including both technical sector and administrative sector.

Table (18) List of the Technical Management Skill

15

Technical Sector	Administrative Sector
Water Sources Development	Population Survey
Geo-physical Survey	Inspection of Donors and NGOs
Geological Survey	Sociological Survey
Topographical Survey	Evaluation of Human Resources
Water Quality Analysis	Inspection of Budget and Payment
Pumping Test	Procurement Survey
Well Logging	Equipment Monitoring
Borehole Camera Inspection	Contract
Water Leakage Survey	Inspection of Document
Electrical Survey	
Mechanical Survey	
Water Supply Survey	

(2) Project Management Skill

Project management and schedule management are similar category. Based on the schedule of the project, management staff shall control any negative items. The comparison of original and actual schedule is the most important approach.

Table (19) Training Course of the Project Management Skill

Items	Check
Original Schedule	
Site Inspection	
Comparison of Schedule Actual and Plan)	
Follow up Schedule	

(3) Facility Management Skill

The target facilities of this skill are office, training center, workshop, water treatment plant and water yard etc. All management staff shall manage the facilities by individual manuals.

(4) Equipment Management Skill

All equipment of the training, office, workshop, survey and vehicles are target of this skill. Each- equipment shall be managed by individual manual.

(5) Quality Management Skill

To master this skill, it takes long period. The quality management is relative all activities. Each organization shall select an exclusive staff and manage to secure high quality.

(6) Monitoring and Evaluation Skill

Monitoring and evaluation are quite important to improve the problems. Especially,

16

monitoring of existing water supply facility and training system are quite important. The DWST prepared the monitoring manual in 2015, each organization shall monitor by the manual.

(7) Documentation Management Skill

There are many handwriting documents in each organization. However, without any management system, the documents are belonging in private cabinet. Important report and document shall stock in the library and soft data shall be managed by information center.

(8) Human Resources Development and Management Skill

Each organization is now under preparing the database of all staff. Model format of database has been provided by the DWST. The Director General and Human Resource Department shall inspect all staff data minimum 1 time per year and updating data.

(9) Fund Security and Budget Management Skill

This skill is a high level and the Director General is the target group. Annual budget of each government organization is depending on the leadership of the Director General in Sudan. On the other hand, budget management system in Sudan is still not clear, there is no comparison data between original budget and actual payment.

(10) Organizational Management Skill

The DWST has implemented an organizational management course since 2009 and the target group of this training is the manager class of each SWC. Some participating trainees promote now higher position like the Director General of SWC and the Director of the training center.   This training course consists of the budget management, human resources management and equipment management.

(11) General Management Skill

This skill is for the Director General or Deputy Director General level. The final target of the Long-Term Human Resources Development Plan is to establish concrete general management skill.

(12) Safety Management Skill

Safety management is commonly understood as applying a set of principles, framework,

17

processes and measures to prevent accidents, injuries and other adverse consequences that may be caused by specific activity or situation. It is that function which exists to assist managers in better discharging their responsibilities for operational system design and implementation through either the prediction of system's deficiencies before errors occur or the identification and correction of system's deficiencies by professional analysis of safety occurrences.

添付資料-6

DWST 人材育成マニュアル

Republic of Sudan
Ministry of Water Resources and Electricity (MWRE)
Drinking Water and Sanitation Unit (DWSU)
Drinking Water and Sanitation Unit Training Center (DWST)

Human Resources Development Manual

Photo in Kilo Ten Training Center, Khartoum in

Japan International Cooperation Agency (JICA)
Human Resources Development Project for Water Supply (Phase II)

March 2015

Table of Contents

1. Mission

2. Responsibility of DWST and SWC Training Center

3. Coordination system between Federal and State level

Attachment: Training Course Implementation Manual

1. Mission

The most important factor to provide stable drinking water with sufficient quantity and high quality is qualified managers, engineers and technicians.

The purpose of the Human Resources Development Manual is to provide an initial guiding support when SWCs establish training system through sharing experiences of DWST and Pilot States in *the Project for Human Resources Development for Water Supply phase-2* (2011-2015) (hereinafter the JICA Project) in the field of training implementation.

As described in the Water Supply and Sanitation Policy in 2010, Public Water Corporation (hereinafter DWSU, renamed in 2012) has established Public Water Corporation Training Center (hereinafter DWST, renamed in 2012) as a leading organization to develop human resources in water sector in Sudan. In the Quarter Century Strategy for Water Supply (2007-2031) emphasized the importance of capacity development in water supply sector.

2. Responsibility of DWST and SWCs

2-1 Role of the DWST

The role and responsibility of DWST is to enhance the capacity building in water sector. Initially, supported by JICA Project phase-1, the DWST launched the training program aiming at developing engineers and managers class of human resources in each State in Northern Sudan since 2008. The important mission of the DWST was recognized to raise the capacity of top managers, chief engineers and executive officers in State Water Corporations (SWCs). At the end of the JICA Project Phase-1 (March, 2011), the accumulated numbers of trained staff in SWCs and DWSU amounted to 443, and 30 training courses had been implemented.

This outcome triggered to start the Phase-2. After the Phase-1, the challenges in SWCs still remained on how they trained to local staff and technical staff as well as top managers and chief managers in each SWC.

In response to this, the JICA Project Phase-2 (2011-2015) started, focusing on expansion of human resources development in all SWCs.

In this regards, the DWST is expected to have a great role of leading other States to enhance capacity building in SWCs as well as training the key personnel in federal level.

To be summarized, the DWST is responsible for five major objectives.

- 1. To provide training opportunities for key personnel in SWCs.
- 2. To take initiatives to enhance capacity building in State level as a leading agency
- 3. To strive for external training and donor coordination
- 4. To make information system work to analyze human resources development in water sector in Sudan
- 5. To strive for introduction of new technologies to be capable in Sudan

2-2 Role of SWCs

Meanwhile, trained personnel in DWST are responsible to transfer what they have learned to the people in their State. Trainees in DWST have been always asked by DWST on how they transfer the skill that they have learned.

The way of transferring knowledge and skill can be varied. On-the-Job Training is one of the choices. However, without training budget and facility, it was difficult for ex-trainees to utilize their knowledge effectively in their States.
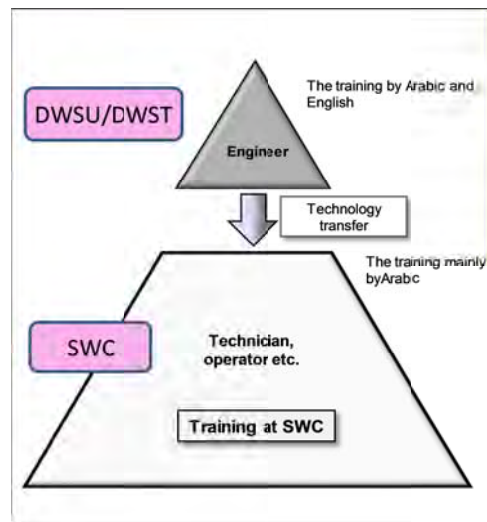
Consequently, series of movements for establishing training facility emerged in some SWCs by the ex-trainees and their colleagues. It was also triggered by providing training equipment such as computers, workshop tool kit, vehicles and diesel engines.

In 2014, most of SWCs have training centers or have plans to construct training facilities. In addition, not only the two Pilot States in the JICA Project Phase-2 (Sennar and White Nile) but also the other States such as El Gezira, Northern, North Kordofan, River Nile, and Gedarif SWC have prepared annual training plan and made best effort to secure budget.

3. Coordination system between Federal and State level

Joint Coordination Committee (JCC) of JICA Project and series of Joint Seminars functioned to connect the tie among SWCs and federal with SWCs since 2011. As of February 2015, the Joint seminars have been conducted six times to share good practices in SWCs.

It was good opportunities for SWCs and DWSU to be gathering again since 1994 when decentralization policy in water sector started as well.

In 2015, DWSU is proceeding to establish a new steering committee for human resources development in water sector. The steering committee for HRD in water supply sector is very important issue for the sustainability of training in the future to keep the system of training implementation to be properly managed and continued.

This will enable to keep the system of joint coordination committee and joint seminars as well.

For example, in this committee, many challenges must be discussed such as effective utilization of training equipment among federal and state actors. Sharing the training equipment is one form of expected cooperation. It is effective to share and utilize expensive equipment in other SWC or DWST when it is available. In this regards, the DWST is expected to establish database on training equipment utilization.

The steering committee shall act as a facilitator both at Federal and State levels.

4. Remaining challenges

Finance in the DWST still depends on the DWSU account although the DWST has annual standing budget for training implementation. This financial dependence prevents the DWST to manage administration independently. To be more autonomously managed, the DWST must have its own financial base by creating its own bank account.

Attachment
Training Course Implementation Manual

March 2015

Human Resources Development for Water Supply in
Sudan Phase-2

The purpose of this manual

(1) Objectives:

- **To implement training program for personnel of the State Water Corporations.**
- **To improve the management of the State Water Corporations training centers.**

(2) Training Program Management:

- **Training budget.**
- **Training plan.**
- **Training course guideline and application.**
- **Selection of lecturers and training on educational technology.**
- **Textbook and materials development.**
- **Training course implementation.**
- **Examination.**
- **Evaluation.**
- **Reporting.**
- **Impact assessment.**
- **Needs assessment.**

1. What to do before Training
-Training Course Preparation

Photo in Sennar SWC Training Center, in 2012

Photo in Sennar SWC Training Center, in 2012

3

1-1 Annual Planning

1) Planning for annual training program
 - Example in Drinking Water and Sanitation Unit Training Center (2014)
  The meeting for needs assessment and problem analysis must be done before planning
to set training target.

Drinking Water & Sanitation Unit Training Center (DWST) - Training Plan 2014

Training Schedule

No.	Training Course Name	January	February	March	April	May	June	July	August	September	October	November	December	Duration/ Day	Remark
1	Water Supply Facilities	19-29													
2	Operation&Maintenance of Water Treatment Plant				20-1					31-11			21-31		
3	Water Quality	5-16			6-17				24-4			9-20			
4	Well Management		2-13			4-15							7-18		
5	Data Management					4-15									
6	Supply Chain Procurement Management					18-22						23-27			
7	Organizational Management		16-20												
8	Management Skills & Projects Planning		23-27	16-20											
9	Evaluation & Monitoring									8-11					
10	Pipe Network			2-13			8-12			21-28					
11	Project Cycle Management												14-18		
12	Statistical Package for the Social Sciences (SPSS)					25-29									
13	Sanitation Management	12-16								14-18					
14	Integrated Management of Water			16- 20					10-21						

▬ UNOPS
▬ Africa Development Bank

2) Training Budget for personnel & materials
- Example budget application sheet in Sennar State Training Center

Budget Sheet Sample								
NO.	Item	Summary	Content	Unit Price	UnitPrice Unit	Quantity	Quantity Unit	Amount	Remarks
1	Personnel Expense	0	Trainee daily allowance		/person, day		Trainees		10prsx10daysx13 courses/year
			Lecturer remuneration		/person, lesson		Lectures		4 lessonsx9daysx13 courses/year
			D.G supervisor fee		training course		Persons		13 courses /year × 1 time
			D.T supervisor fee		training course		Persons		13 courses /year × 1 time
			Department TC Management fee		training course		Persons		13 courses /year × 1 time
			Counterparts' fee		/person, training course		Counterparts		1 Chief course coordinator (2) + 13 course coordinator, 1 times, 13 courses
			Assistants' fee		/person, training course		Assistants		1Chief assistant(2)+11 assistant 1 times 13 courses
			Skilled workshop labors		/person, month		Persons		2 person x 12 months
2	Transportation Expense	0	Invited Lecturer from other states		/person, time		person/course		2lecture/training course x 12 times/year
			transportation befor training course (preparation)				times/year		13 courses /year × 1 time
			transportation for Trainees befor training course		/person, training course		person/course		10 person ＊ 13courses
			Daily trainees transportation		/person, training course		person/course		10 person × 10 days × 13 courses
			transportation for Trainees after training course		/person, training course		person/course		10 person × 10 days × 13 courses
			Transportation for an exchange of techingues in year		person/time				10 person ＊ 8 times/year

3	Welfare Expense	0	Entertainment cost		/time		times/year		2 times/training course
			Lodging cost for Invited Lecturers		/person, day		times/year		2lecture/training course x 12 times/year
			Beavarage cost in the training		/month		month		
			Food(lunch & dinner) cost for Invited Lecturers		/person, day		person/year		2 lecturesx1time × 13type x(10days −1day)
			Food(lunch & dinner) cost for trainees		/person, day		times/year		10 trainees × 10days ×13 courses
4	Stationary & Office consumables	0	Text book (Paper and cover)		/pc		pcs/year		Trainee: 130, Coordinator: 13, Expert: 13 and Others: 4
			Note book		/pc		pcs/year		Trainee 130,13 counterpart,4 others= 147
			Pen		/pc		pcs/year		Trainee 130,13 counterpart,4 others= 147
			Others		/month		months		
5	Maintenance	0	Office Equipment(Copy machine etc.)		/month		months		
			Training center and work shop		/month		months		
			change the main signboard				time		
			Purchase for materials for training course		/month		months		
6	Communication Costs	0	Design web site for the traning center+ hosting		/time		times		for Training center
			Mobile cost		/training course		times/year		13counterpart × 13 cources
			Internet monthly fees		/month		months		12 times/year
			Anti−virus soft		/pc		sets		36 computers(21desktop+15 laptop)

7	Expenses for Lighting, Water and Fuel	0	Electricity		/month		months	for Training center, Workshop and Lodging
			Water		/month		months	for Training center, Workshop and Lodging
			Gas		/month		months	for Training center, Workshop and Lodging
8	Workshop, Seminar & Meeting Cost	0	Tea & Light meal		/time		Times/year	4 times in months
			Travel cost for JCC		/time		Times/year	4 person *2 times/year
			Travel cost for Workshop		/time		Times/year	4 person *2 times/year
			Join Seminar				Times/year	
			Counterparts' regular monthly meeting					13 counter part+12month
			Assistants counterpart meeting					13 Assistant +12 month
9	Field Survey	0	Fuel		/month		months	88 galoons/month
			Fuel for rehablitation 3 sites		/site			Well management course
			Allowance for 4 persons		person/month		months	4 person *6 month
			Lodging for 4 persons		person/month		months	4 person *6 month
10	Others	0	Emergency payment				months	
			Garden				months	
			supervision cost				months	5 person
			Cleaning & trash fees				months	
	Genral Total	0	SDG/YEAR					
	Abass Hamed							Mr.____
	D. Training center							Department Training Coures

1-2 Training Procedure

Procedure of Training Program implementation

الإدارة	الأنشطة الرئيسية	المناقشات والأنشطة الأخرى
قبل أسبوعين	تأكيدا لنظام التدريب والمنسقين -أقلاها 4 أشخاص .	
قبل 1-أسبوع		(1) الإجتماع الداخلي للمنسقين
	تجهيزات مسودة خطة التدريب.	تقويم السيرة الذاتية للمحاضرين
	إختيار المحاضرين.	إجتماع مع المحاضرين.
تجهيزات معدات التدريب . (الكمبيوتر،معدات تحليل المياة،معدات إدارة الابرو هكذا).	تجهيز مقرر التدريب.	توزيع (إذا غياب) — المدير التقني
	تجهيز برنامج إفتتاح التدريب.	
تأمين ونظافة مرافق المركز	تجهيز محتوى الكورس.	
قبل 1-2 يوم.	تجهيز الإمتحانات	
مراجعة حالة المولد وموارد المياة	تجهيز الأسئلة. • ورقة تقييم المتدربين • ورقة تقييم المحاضرة • ورقة تقييم المرافق والطعام وهكذا	طباعة محتويات الكورس . (كل المنسقين)
تأمين سكن ووجبات وماء الشرب للمتدربيت والمحاضرين.		(2) الإجتماع الداخلي للنسقين (تأكيدا لتجهيزات العمل)
أخذ صور للمتدربين والتدريب • تجهيز الوجبات •	تطبيقات وإنجازات التدريب	
	إنجازات الإمتحانات	
	معاينة مع المتدربين.	نقاط نتيجة الإمتحانات • تجهيز شهادات التدريب • جائزة الامتياز للمتدربين •
	الحفل الختامي .	
		دفع بدلات للمتدربين • دفع رسوم المحاضرات •
إرجاع المعدات إلى المخزن وتنظيف مرافق مركز التدريب.		تحليل الأسئلة • تحليل ورقة التقييم •
	تجهيز تسجلات التدريب	(3) الإجتماع الداخلي للمنسقين . مراجعة وملاحظات نتيجة التدريب و مناقشة البنود (لتطوير التدريب القادم)
	حفظ جميع البيانات في ذاكرة الكمبيوتر	

7

1-3 Scheduling

1) Scheduling for training program preparation

*Example of Water Quality Management

WORK SCHEDULE

Training Center		White Nile SWC Training Center
Training Program		Water Analysis Management

NAME OF ITEM		Person in Charge	24 Mon	25 Tue	26 Wed	27 Thu	28 Fri	29 Sat	30 Sun	31 Mon	1 Tue	2 Wed	3 Thu
	YEAR		14								4		
	MONTH		3										
Training Course													
Decide a content of training course		Trainirg Coordintor	▬										
Whole Course Coordinator Meeting		Mr. Mohammed Bilal							PM1				
Select Lecturers		Mr. Mohammed Bilal/Mr. Artif			▬								
Contact with Lecturers		Mr. Mohammed Bilal/Mr. Artif				▬							
Meeting with Lecturers (in charge, Text book & Examination)		Mr. Mohammed Bilal/Mr. Artif			▬								
Preparation of Text Book & Examination		Lecturers					▬ ▬ ▬ ▬ ▬						
Receiving Text Book & Exam. from Lecturers		Mr. Mohammed Bilal/Mr. Artif										▬	
Printing & Preparation of TEXT BOOK		Other course coordinator											▬
Procure the TEXT BOOK Cover, Note Book, Pen & Paper		Mr. Ahmed Eltyeb							▬▬▬				
Arrangement of Training Room		Mr. Mohammed Bilal/Mr. Artif							▬▬▬				
Check the analysis tool condition		Mr. Artif				▬							
Check the volume of reagent		Mr. Artif				▬							
Preparation of the Questionnaire		Mr. Mohammed Bilal											
Selection of Trainees		Mr. Mohammed Bilal/ Ahmed Eltayeb	▬										
Inform and Confirm the Trainees about the Training course		Mr. Artif							▬				
Preparation of Invitation Letter to Trainees		Mr. Ahmed Eltayeb							▬▬▬				
Arrangement of Trainees' and Lecturers' Lodging		Mr. Ahmed Eltayeb							▬▬▬				
Preparation of Attendance Record		Mr. Artif							▬				

8

1-4 Trainee nomination

Selection of trainees is important process in SWCs. In addition, the nomination procedure must be opened and clear for every staff in SWCs.

According to condition of the training courses, SWCs must consider the following points;

- SWCs must select person whose job is related to the training program.
- Basically, avoid duplication of trainees. However, some officers or engineers need to take several types of trainings. For instance, managers in Water Treatment Plant should know also about the system of pipe transmission network.
- Right man in the right place principle must be applied. D.G and managers of HR department must consider each staff's ability and potential needs.
- In order to multiply the effect of training, those who have skill to communicate other staff and transfer the knowledge should be prioritized to receive trainings.

Example of the Trainees list

No	Name of trainee	Speciality	Locality	Gender	Married	Age	E-mail address	Tel_N
	Water Quality Management (2nd) Trainees list							
1	Alnoman Abu Algasm Alamien Ahmed	Chemist	Rabak	Male	Single	28	n-gashim@hotmail.com	012-249-598
2	Jouahir Haj Ali Mohamed	Chemist	Rabak	Female	Married	39	-	011-725-592
3	Nagat Sabeel Abdalah Goma	Chemist	Rabak	Female	Single	39	-	011-725-592
4	Elham Musa Farah Gubara	Chemist	Rabak	Female	Married		-	091-260-435
5	Eltayeb Abdelkader Ali Abogdary	Chemist	Aklweim	Male	Married	33	eltayib.8008@hotmail.com	091-984-271
6	Nahed Mohammed Ahmed Ali Ejami	Chemist	Aklweim	Female	Single	32	nahedejami4@yahoo.com	091-121-041
7	Ahmed Sharaf Hasson Ahmed	Chemist	Kosti	Male	Single	28	ahmedshraf_99@yahoo.com	091-282-871
8	Omer Mohammed Abas Fadul	Chemist	Kosti	Male	Married			012-328-422
9	Afra Abbas Musa Mohammed	Chemist	Kosti	Female	Single	29	afraabbas2012@yahoo.com	091-555-508
10	Wala Mergani Hmad Mohammed	Chemist	Kosti	Female	Single			011-727-219
11	Salma Elfatih Elrayih Mohammed	Chemist	Kosti	Female	Single			091-416-146
12	Elham Abdallah Alfaki Kebashi	Chemist	Kosti	Female	Single			012-407-055
13	Eman Mostafa Abriahim Mostafa	Chemist	Kosti	Female	Married			012-658-796
14	Mohamed Ali Gindeel Mohamed	Chemist	Kosti	Male	Single			090-271-796
15	Noria Awadalla Omer Taha	Chemist	Kosti	Female	Married			091-546-644
16	Houzifa Mohammed Osman Sulimam	Chemist	Aklweim	Male	Single			091-738-360
17	Manal Habeeb Adam Mostafa	Chemist	Rabak	Female	Single			091-288-435
18	Maha Younis Elnoor Younis	Water resuorse	Headquarter	Female	Single	23		096-338-786
19	Ayaat Abdelwhab Blal Jawhaw	Internship	Kosti	Female	Single	25		092-013-50
20	Hoiam Hiameid Abdalbagi Frg	Internship	Kosti	Female	Single	26		096-201-323
21	Soad Albasheer Almamoun Mohamme	Internship	Rabak	Female	Single	23		091-289-332

9

1-5 Trainee ID Plate preparation

ID plate is a tool to get participants motivated.

ID sample in White Nile SWC Training Center, in 2014

1-6. Training Equipment preparation

The condition of training equipment must be checked in advance.
It is better to have enough time to purchase office supply.

Borehole test site in El Gezira SWC Training Center, in 2012

Training Center in North Kordofan SWC, in 2013

10

1-7 Final Check list one day before the training program start

☑ White Board, pens, eraser

☑ Projector, laser pointer, microphones and speaker

☑ Notebooks and pencils

☑ Budget for equipment, food and lecturer fees

☑ Printing and Binding textbooks, programs

☑ Tea & Coffee, Breakfast and food

☑ Check the facility, standby generator, toilet and water taps

☑ Cleaning environment and rooms

☑ etc…add as necessary

Photo in White Nile SWC Training Center, in 2013

11

12

2. What to do during training program

Photo in Masheshi Workshop, Khartoum in 2008

Photo in Sennar SWC Training Center, in 2013

During the Training Course:

The following issues must be prepared

    (1)   Orientation.

    (2)   Photography of the training.

    (3)   Holding an examination.

    (4)   Carrying out the course evaluation.

    (5)   Exam paper inspection (marking).

    (6)   Analysis of the exams.

    (7)   Training certificate making.

    (8)   Award of excellence making.

    (9)   Trainee interview.

    (10)   Closing ceremony.

    (11)   Payment of allowance to trainees.

    (12)   Payment of lecturer.

2-1. Orientation

Example of the Orientation Program

No.	بنود البرنامج	Time Schedule	Minute	Responsible Person
				WATER AQUALITY MANAGEMENT COURSE
	Orientation Program			
				ابريل 2014م 20
1	قران	8:30-8:32	2	Mr. Humam Abdeen
2	كلمة مدير مركز التدريب ـ مياه سنـــــــار	8:32-8:35	3	Mr. Elsary Kamal
3	كلمة المدير العام	8:35-8:40	5	Mr. EL Medani Elkhadir
4	توضيح مبسط عن الكورس	8:40-8:45	5	Mr. Ashraf Eltahir
5	شرح لمركز التدريب والتنظيم	8:45-8:48	3	Mr. Jalal Bashir
6	كلمة خبير منظمة جايكا	8:48-8:53	5	Mr. Shunsaku MASTUO
7	اخذ صورة جماعية	8:53-9:10	17	Ms. Eman Alnoor Fadl-Almoula
8	المياه الجوفية	9:10-10:30	80	Mr. Ali Hassan

Moderator of the orientation is Mr. Ashraf Eltahir

2-2. Training Program preparation

Example of Training Program

3rd Training Course of Water Quality Management in White Nile State
From: 8 February 2015 to: 19 February 2015

No.	Date	Lesson 1 9:00-10:30 (90min)	Lesson 2 11:00-12:30 (90min)	Lesson 3 12:45-14:00 (75min)	Lesson 4 14:30-15:30 (60min)
1	8 (Sun)	Orientation/ Japan itself	Water Contamination (1) *Lec. A*	Water Contamination (2) *Lec. A*	Basic water analysis (Bacteriological) (1) *Dr Noreldien*
2	9 (Mon)	Basic water analysis (Bacteriological) (2) *Dr Noreldien*	Microbiological contamination of water (1) *Dr Noreldien*	Microbiological contamination of water (2) *Dr Noreldien*	Procedure of Bacteriological Analysis (1) *Dr Noreldien*
3	10 (Tue)	Procedure of Bacteriological Analysis (2) *Dr Noreldien*	Sampling of Bacteriological Analysis *Dr Noreldien*	Theory of BOD and COD measurement *Lec. B*	Practical Training Preparation of BOD analysis *Lec. B*
4	11 (Wed)	Practical training (Bacteriological training) (1)			
8	16 (Mon)	Practical training (BOD & COD Measurement)			*Lec. B*
9	17 (Tue)	Waste water treatment *Lec. A*	Theory of Spectrophotometer *Mr. Mohammed Osman*	Parctical training Spectrophotometer (1) *Mr. Mohammed Osman*	Parctical training Spectrophotometer (2) *Mr. Mohammed Osman*
10	18 (Wed)	Site Visit (Kenana Treatment Plant)			
11	19 (Thu)	Examination امتحـــــان	Interview		Closing ceremony

The 1st Break: Breakfast, the 2nd and 3rd Break: Tea Time, after lessons: Cleaning Training Room

2-3. Attendance Sheet

Water Quality Management (2nd)
Attendance Record

No	Name of trainee	Locality	1 2014/4/6				2 2014/4/7				3 2014/4/8				4 2014/4/9				5 2014/4/10			
			L01	L02	L03	L04	L01	L02	L03	L04	L01	L02	L03	L04	L01	L02	L03	L04	L01	L02	L03	L04
1	Alnoman Abu Algasim Alamien Ahmed	Rabak	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
2	Alnoman Abu Algasim Alamien Ahmed	Rabak	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
3	Alnoman Abu Algasim Alamien Ahmed	Rabak	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
4	Alnoman Abu Algasim Alamien Ahmed	Rabak	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
5	Alnoman Abu Algasim Alamien Ahmed	Aldweim	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
6	Alnoman Abu Algasim Alamien Ahmed	Aldweim	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔
7	Alnoman Abu Algasim Alamien Ahmed	Kosti	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
8	Alnoman Abu Algasim Alamien Ahmed	Kosti	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
9	Alnoman Abu Algasim Alamien Ahmed	Kosti	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔
10	Alnoman Abu Algasim Alamien Ahmed	Kosti	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
11	Alnoman Abu Algasim Alamien Ahmed	Kosti	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
12	Alnoman Abu Algasim Alamien Ahmed	Kosti	✔		✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
13	Alnoman Abu Algasim Alamien Ahmed	Kosti	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔
14	Alnoman Abu Algasim Alamien Ahmed	Kosti	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔
15	Alnoman Abu Algasim Alamien Ahmed	Kosti	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
16	Alnoman Abu Algasim Alamien Ahmed	Aldweim	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
17	Alnoman Abu Algasim Alamien Ahmed	Rabak	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔								
18	Alnoman Abu Algasim Alamien Ahmed	Headquarter	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
19	Alnoman Abu Algasim Alamien Ahmed	Kosti	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
20	Alnoman Abu Algasim Alamien Ahmed	Kosti	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
21	Alnoman Abu Algasim Alamien Ahmed	Rabak	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

2-4. Examination result analysis

No	Name of trainee	Locality	Point	Rank
1	Alnoman Abu Algasim Alamien Ahmed	Rabak	68	9
2	Alnoman Abu Algasim Alamien Ahmed	Rabak	32	21
3	Alnoman Abu Algasim Alamien Ahmed	Rabak	68	9
4	Alnoman Abu Algasim Alamien Ahmed	Rabak	86	2
18	Alnoman Abu Algasim Alamien Ahmed	Headquarter	58	17
19	Alnoman Abu Algasim Alamien Ahmed	Kosti	76	5
20	Alnoman Abu Algasim Alamien Ahmed	Kosti	58	17
21	Alnoman Abu Algasim Alamien Ahmed	Rabak	94	1
	High Score		86	
	Low Score		32	
	Average		67	

16

2-5. Closing Ceremony Program

Example of Closing Program

No.	Program Item	Time Schedule	Minute	Responsible Person
				WATER AQUALITY MANAGEMENT COURSE
	Closing Ceremony Program			
				29 Nov, 2012
1	قران	14:30-14:32	2	Mr. Humam Abdeen
2	كلمة مدير مركز التدريب	14:32-14:43	3	Mr. Elsary Kamal
3	كلمة المدير العام	14:33-14:40	7	Mr. EL Medani Elkhadir
4	منح شهادات اكمال الدوره التدريبية	14:40-14:55	15	Mr. EL Medani Elkhadir
5	منح شهادات المتدربين المتميزين	14:55-15:00	5	Mr. EL Medani Elkhadir
6	كلمة خبير منظمة جايكا	15:00-15:05	5	Mr. Shunsaku MASTUO
7	دعوة الى الدورة التدريبية القادمة	15:05-15:10	5	Mr. Ashraf Eltahir

Moderator of the orientation is Mr. Ashraf Eltahir

2-6. Certification & Memorial Photo

Photo in White Nile SWC Training Center, in 2012

17

Photo in River Nile SWC Training Center, in 2014

3. What to do after the training course
- Feedback from trainee

(1) Analysis of questionnaire.

(2) Analysis of the evaluation sheet.

(3) After training meeting and evaluation.

(4) Training report making.

Example analysis of training course satisfaction
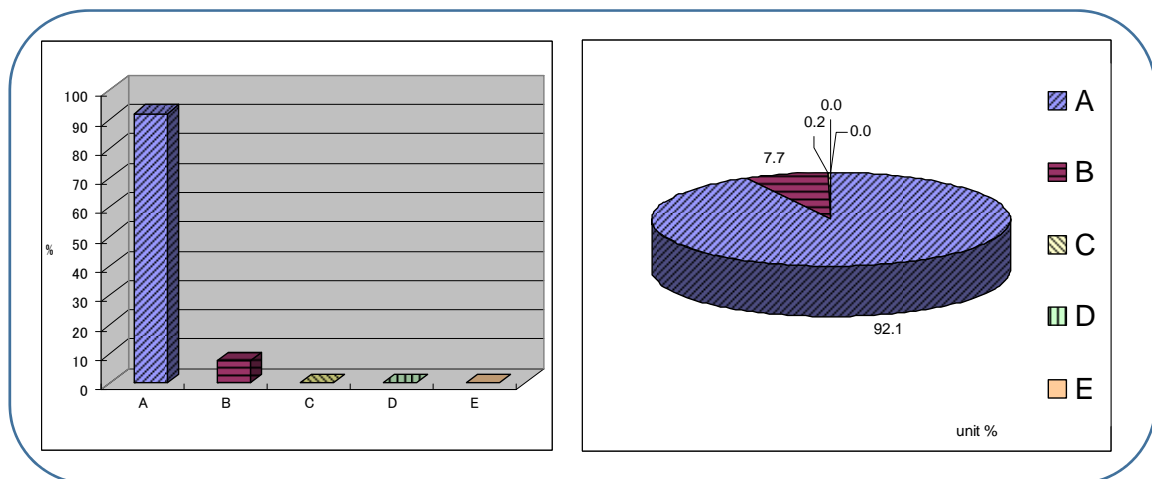
3-1 Training Evaluation

The evaluation forms are developed to gather information about:

1) Training course satisfaction

2) Quality of lecturer

3) Training environment

Training Record will be summarized for analysis, and are kept in the Training Center.

19

Sample Questionnaire for trainee (1)

			ورقة تقييم الكورس التدريبي The evaluation sheet of the training course				
اسم الكورس			رقم الكورس		التقييم		
تاريخ التقييم							

أ/الجزء النظري

الرقم	المادة	محتويات الاستبيان	أ	ب	س	د	ي
1		هل كانت المحاضرة جيدة؟					
2		هل مود التدريب ملائمة					
3		هل كان محتوى المادة مهمة؟					
4		هل تفكر ان هذه المحاضرة تساعدك في عملك؟					
5		هل كانت المحاضرة جيدة؟					
6		هل مود التدريب ملائمة					
7		هل كان محتوى المادة مهمة؟					
8		هل تفكر ان هذه المحاضرة تساعدك في عملك؟					
9		هل كانت المحاضرة جيدة؟					
10		هل مود التدريب ملائمة					
11		هل كان محتوى المادة مهمة؟					
12		هل تفكر ان هذه المحاضرة تساعدك في عملك؟					
13		هل كانت المحاضرة جيدة؟					
14		هل مود التدريب ملائمة					
15		هل كان محتوى المادة مهمة؟					
16		هل تفكر ان هذه المحاضرة تساعدك في عملك؟					
17		هل كانت المحاضرة جيدة؟					
18		هل مود التدريب ملائمة					
19		هل كان محتوى المادة مهمة؟					
20		هل تفكر ان هذه المحاضرة تساعدك في عملك؟					
21		هل كانت المحاضرة جيدة؟					
22		هل مود التدريب ملائمة					
23		هل كان محتوى المادة مهمة؟					
24		هل تفكر ان هذه المحاضرة تساعدك في عملك؟					
25		هل كانت المحاضرة جيدة؟					
26		هل مود التدريب ملائمة					
27		هل كان محتوى المادة مهمة؟					
28		هل تفكر ان هذه المحاضرة تساعدك في عملك؟					
29		هل كانت المحاضرة جيدة؟					
30		هل مود التدريب ملائمة					
31		هل كان محتوى المادة مهمة؟					
32		هل تفكر ان هذه المحاضرة تساعدك في عملك؟					
33	التعليق						

أ:ممتاز ب:جيد س:حسن د:ضعيف ي:ضعيف جدا

Sample Questionnaire for trainee (2)

		ورقة تقييم المحاضر The evaluation sheet of the lecturer		
اسم الكورس		رقم الكورس		التقييم
تاريخ التقييم		اسم المحاضر		

الرقم	المادة	محتويات الاستبيان	ا	ب	س	د	ي
1	التصرفات الأساسية	هل ادى المحاضرة المحاضرة بشكل هادئ ؟					
2		هل سيطر المحاضر على محاضرته جيدا؟					
3		هل المحاضر اظهر اليك شعور طيب؟					
4		صوت المحاضر وسرعة ايقاع صوته هل كانا ملائمين في التدريب؟					
5	المحاضرة	هل ركز المحاضر على المسائل المهمة؟					
6		هل استعمل المحاضر التعبير المبسط في المحاضرة؟					
7		هل ابنت المحاضرة في التدريب يسر؟					
8		هل تأكد المحاضر من فهمك للمسائل المهمة بالتكرار؟					
9		هل وضع لك المحاضر الهدف النهائي للمحاضرة؟					
10		هل محتويات المحاضرة مثبتة ؟					
11		هل وضح المحاضر للمتدربين المعدات الصحيحة للمحاضرة التي يتكلم عنها؟					
12		بالنسبة للمحاضر، هل ركز المحاضر على النقاط الرئيسية؟					
13		هل اجاب المحاضر على اسئلة وشكوك المتدربين بالضبط ؟					
14	الزمن	هل الحاضر راعي ضميرة خلال المحاضرة بالنسبة للزمن ؟					
15		هل استطاع المحاضر للتحكم في الزمن بشكل صحيح ؟					
16		هل بدا المحاضر المحاضرة في الزمن من غير تاخير المتدربين ؟					
17	ادوات التدريب	هل المحاضر استعمل برنامج power point ومواد اخرى في التدريب عمليا ؟					
18		هل كان من السهل فهم المقرر الذي وزع اليك من المحاضر ؟					
19		هل كان استخدام الاوراق التي وزعت اليك من المحاضر استخداما ملائما ؟					
20	التعليق						

امتاز ا: جيد س: جيد د: ضعيف ي: ضعيف جدا

21

Sample Questionnaire for trainee (3)

ورقة تقييم بيئة التدريب									
The evaluation sheet of the environment at training									

الرقم	المادة	محتويات الإستبيان	أ	ب	ج	د	ي
1	المعلومات	هل كانت الدعوة لمحطيناك في الوقت المناسب ؟					
2		هل تعرف محتويات الكورس التدريبي جيدا ؟					
3		هل كان من السهل معرفة مكان مركز التدريب ؟					
4	الإستقبال	هل كان الإستقبال سهلا ؟					
5		هل كان ذلك انسجام جيد في الإستقبال ؟					
6	مركز التدريب	هل كان مكان التدريب مريحا لك ؟					
7		هل دائما مكان التدريب كان نظيفا؟					
8		هل كان حجم الغرفة كفيا ؟					
9		هل الكرسي والمنضدة كانا مناسبين للدراسة؟					
10		هل دائما المرحاض كن نظيفا ؟					
11	الماء والطعام	هل كمية الوجبة كانت كفية ؟					
12		كيف كانت جودة الوجبة ؟					
13		هل كان هنلك اي تأخير في الطعام ؟					
14		عندما تشعر بالعطش هل تشرب ماء صحيحا ؟					
15	المرحاض	هل كان الحمام والمرحاض صحيان ؟					
16		هل دائما المرحاض كن نظيفا ؟					
17		هل كان عدد الحمام والمرحاض كفيين ؟					
18	التعليق						

أ:ممتاز ب:جيد جدا ج:حسن د:ضعيف ي:ضعيف جدا

Training record

Training Record

Basic Information	Training Course	Water Quaity Management		Course ID (WQM-(2)
	Training Period	6 / April / 2014	-	10 / April / 2014
	Number of Trainee	21		persons (See detail the attached file-1)

Evaluation	Evaluation of Training course	(A)	Evaluation of Environment	(A)
	Evaluation of Lecturer (1)	Mr. Yahia Elzeen		(A)
	Evaluation of Lecturer (2)	Mr. Zohaur Musa		(A)
	Evaluation of Lecturer (3)	Ms. Zeinab		(A)
	Evaluation of Lecturer (4)	Dr. Yasir		(A)
	Evaluation of Lecturer (5)			( )

Coordinator	Attendance of Course Coordinator	Mr. Mohammed Bilal, Mr. Atif Alhaboab, Mr. Ahmed Eltayeb, , Ms. Elrsala, Ms.Afra Abas (5) persons
	Contribution of coordinator	84 % Last 66 %

Examination	Examination	Average: 67 High Score: 94 Lowest: 32
	Award of Trainees	1. Ms.Elham Musa Farah Gubara (86) points
		2. Ms.Afra Abbas Musa Mohamned (80) points
		3. Mr.Ammer Mohammmed Abas Fadul (78) points
		Not Staff Ms. Soad Albasher Almamoun Mohamn (94) points

Improvement	Major improvement items for the next training course	1. Attention in time by students and lecturers is essential to develop the traing course.
		2. Each period of orientation items should be considered.
		3 Taking photoes and confirmation of name of trainees shoud be includes before the orientation.

Texbook (Arabic/English)+Lecture(Arabic)
The peiod of next training course shall be 2 weeks.

Attached document: 1-Trainee list, 2-Training Schedule, 3-Photo album   Nc   1

4. Data Management & Monitoring

2-8-2.Monitoring Format of the Training Course (Sample)

Course	Training Period			Training Record (Check List)							Trainee	Lecturer	Course	Lecturer
	Start	End	Duration	Record	Trainee List	Trainee's Photo	Photo	Program	Evaluation	Text				
Organizationa Management	2/Jun/2013	4/Jun/2013	3	O	O	O	O	O	O	O	11	4	87.0	96.0	89.
01 Well Management	10/Jun/2012	15/Jun/2012	6	O	O	O	O	O		O	10	3	65.4	66.0	76.2
QM-001 Water Quality	11/Nov/2012	15/Nov/2012	5	O	O	O	O	O	O	O	10	3	80.6	82.2	82.9	66
OM-002 Organizationa Management 2nd	18/Nov/2012	22/Nov/2012	5	O	O	O	O	O	O	O	8	4	89.7	92.6	89.7	40.0
EQM-001 Equipment Management	25/Nov/2012	30/Nov/2012	6	O	O	O	O	O	O	O	13	1	98.8	98.2	95.5	65.0	2
DM-001 Data Management	2/Dec/2012	6/Dec/2012	5	O	O	O	O	O	O	O	10	2	96.2	95.9	92.9	61.7	2
MM-001 Mechanical	16/Dec/2012	20/Dec/2012	5	O	O	O	O	O	O	O	11	4	93.8	92.0	88.7	67.0	2
EM-001 Electrical	23/Dec/2012	27/Dec/2012	5	O	O	O	O	O	O	O	7	1	89.1	91.7	92.2	73.2	2
WM-002 Well Management 2nd	13/Jan/2013	31/Jan/2013	19	O	O	O	O	O	O	O	12	2	76.4	52.0	60.1	63.0	2
PN-001 Pipe Network Management	10/Mar/2013	14/Mar/2013	5	O	O	O	O	O	O	O	9	5	91.1	88.3	89.0	86.0
WT-001 Water Treatment Plant	24/Mar/2013	28/Mar/2013	5	O	O	O	O	O	O	O	14	4	93.9	92.4	90.6	82.6
-001 Community Development	21/Apr/2013	25/Apr/2013	5	O	O	O	O	O	O	O	17	3	94.5	96.3	96.0	97
Pipe Network Management 2nd	17/Oct/2013	31/Oct/2013	5	O	O	O	O	O	O	O	8	5	90.1	87.2	89.8
ta Management 2nd	3/Nov/2013	14/Nov/2013	12	O	O	O	O	O	O	O	14	1	99.1	88.2	9
ff Management	24/Nov/2013	28/Nov/2013	5	O	O	O	O	O	O	O	25	5	97.2	96.4
agement 3rd	8/Dec/2013	12/Dec/2013	5	O	O	O	O	O	O	O	19	6	97.4
	1/Dec/2013	5/Dec/2013	5	O	O	O	O	O	O	O	13	1
Total											21			

Training Course Data Management

Desktop

Each Course Coordinator inputs data

Training Information

- Well Management → 01_WM
- Organization Management → 02_OM
- Water Treatment Plant Management → 03 _WTPM
- Pipe Network Management → 04_PNM
- Data Management → 05_DM
- Water Quality Management → 06_WQM
- Equipment Management → 07_EQM
- Mechanic Management → 08_MM
- Electric Management → 09_EM
- Community Development Management → 10_CDM
- Water Tariff Management → 11_WTM
- Sanitation Management → 12_SM

Training Course Name

Training courses ID

- Well Management: WM-00#
- Organization Management: OM-00#
- Water Treatment Plant Management: WTPM-00#
- Pipe Network Management: PNM-00#
- Data Management: DM-00#
- Water Quality Management: WQM-00#
- Equipment Management: EQM-00#
- Mechanic Management: MM-00#
- Electric Management: EM-00#
- Community Development Management: CDM-00#
- Water Tariff Manag: WTM-00#
- Sanitation Management: SM-00#

| 01.Schedule | 02. Training Program | 03. Trainee Info | 04. Lecture Info | 05.Questionarie | 06.Evaluation | 07. Text | 08. Examination | 09. Picture | 10. Certificate Excellence | 11. Training Record |

- Preparation Schedule

- Training Program
- Orientation
- Closing Ceremony

- Trainee's Information
- Trainee's ID

- Training Course
- Training Environment
- Lecture
- Items to be improved
- Work Demarcation

Trainee Photo

Training Photo

4-2. Monitoring system between DWST and SWCs
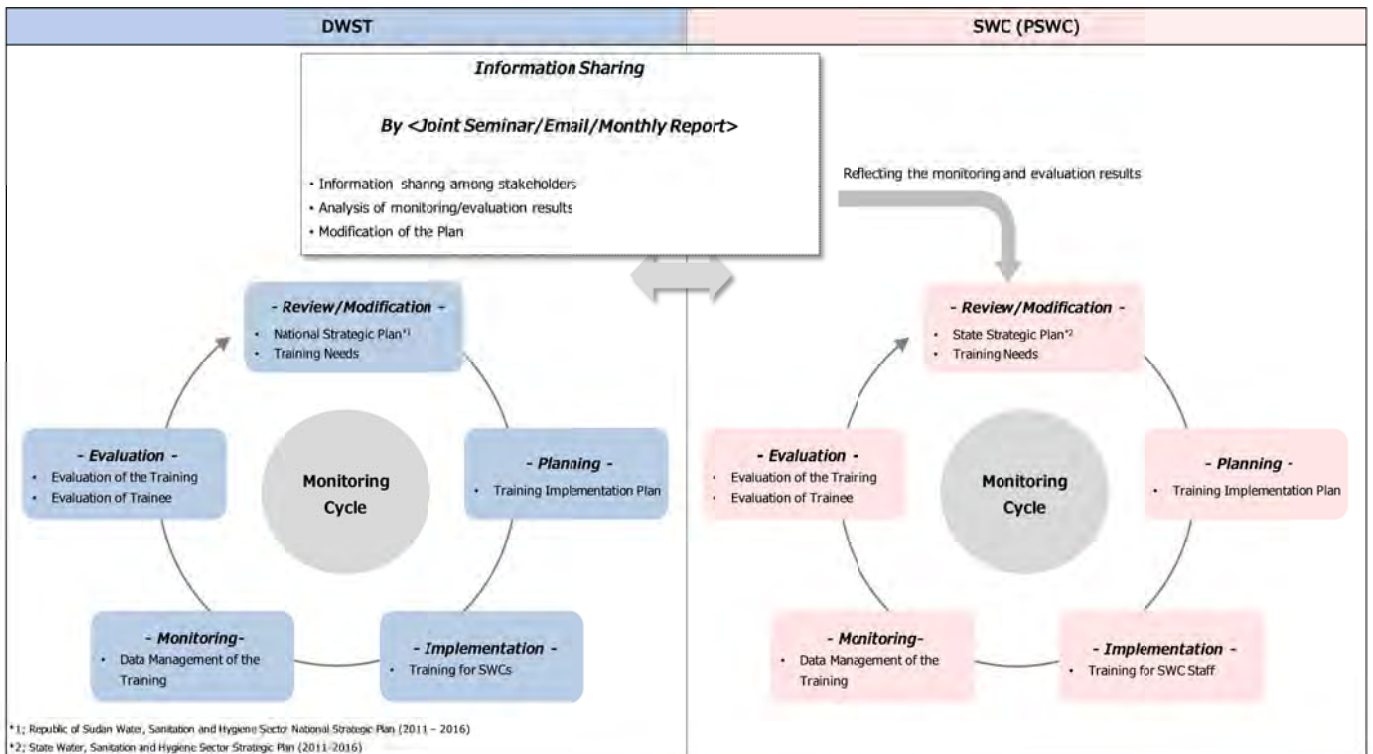
Photo in North Kordofan SWC Training Center, in 2013

Photo in Joint Seminar in Northern SWC in 2014

Photo in Joint Seminar in Northern SWC in 2014

Photo in Joint Seminar in Northern SWC in 2014

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Human Resources Development for Water Supply in Sudan Phase-2

March 2015

Human Resources Development for Water Supply in Sudan Phase-2

添付資料-7

DWSU モニタリングマニュアル
（給水施設/研修）

Republic of Sudan
Ministry of Water Resources and Electricity (MWRE)
Drinking Water and Sanitation Unit (DWSU)
Drinking Water and Sanitation Unit Training Center (DWST)

Training Monitoring Manual

- *Version .1*

Mar, 2015

Japan International Cooperation Agency (JICA)
Human Resources Development Project for Water Supply (Phase II)

Location Map of Sudan

1. Northern
2. River Nile
3. Red Sea
4. Khartoum
5. El Gezira
6. Gedaref
7. Kassala
8. Sennar
9. White Nile
10. Blue Nile
11. North Kordofan
12. South Kordofan
13. West Kordofan
14. North Darfur
15. West Darfur
16. Central Darfur
17. South Darfur
18. East Darfur

Table of Contents

1 Outline of the Human Resources Development and the Monitoring in Sudan

Since the Public Water Corporation Training Center (hereinafter "PWCT") has been established in 2008, the capacity building related to the drinking water supply have been conducted through the training at Khartoum. Although the PWCT was renamed "Drinking Water and Sanitation Unit Training Center" (hereinafter "DWST") in 2013 after incorporating the sanitation sector, DWST is currently well-functioning as the core organization of human resource development in Sudan. The training at DWST has focused on the capacity building of engineer class of each State Water Corporation (hereinafter "SWC"), and DWST has provided training for the around 1,629 SWC staff by the end of 2014. As for the data of training courses, DWST has established the system that administrative staff manages the related data such as training contents, trainees and the training evaluation.

Meanwhile at State Level, each SWC tries strengthening capacity of SWC staff through providing training courses at the SWC Training Center. The training at SWC has focused on the staff below engineer class. The training at SWCs started in 2012 at White Nile and Sennar SWC Training Centers, and now it has been spread to other SWCs in Sudan.

Although the training data of both White Nile and Sennar SWCs is managed by staff in charge of the information management, the nation-wide training data management system has not been established yet. The unified training data management and monitoring systems are urgently required.

In consideration of the above situation, this monitoring manual aims at providing a guideline for establishment of data management and monitoring systems both at federal and state levels. These systems encourage training information sharing among stakeholders, and improving the quality of training for water sector human resource development.

2 Purpose

The main purpose of monitoring is as follows;

2-1.Matching appropriate training for every staff

The DWST, SWC and other organizations such as UN agencies have provided many training for SWC staff so far. However, "training disbalance" exists as a problem. On one hand, many staff has not received necessary training; on the other hand, some of the staff has participated in many trainings. In some cases, SWC staffs participate in the trainings which are not relevant to their task work and responsibilities in the office. Given the limited human and financial resources for training, matching appropriate training courses for each staff is critical for effective reinforcement of the human resource capacity. Training opportunities should be equally available for all SWC staff that requires additional skills and knowledge for their daily tasks. At the same time, training organizers must avoid providing irrelevant trainings that take trainees' time and interrupt their daily activities.

In order to select trainees properly based on the training needs, each SWC Training Centre should manage and monitor the data of trainees and training courses.

2-2.Development and Revision of the Human Resources Development Plan

In some states such as White Nile and Sennar, training courses have been already conducted. Meanwhile, the State Human Resource Development Plans have not been developed yet. Thus each SWC should utilize the monitoring data of existing trainings in order to provide the State Human Resource Development Plan (Action Plan) for medium-term planning.

2-3.Collaboration among DWST, SWCs and Other Related Organization

The training data sharing system among the DWST, SWCs and other stakeholders has not been established. DWST is expected to function as **a facilitator** that encourages active cooperation and collaboration among the SWCs and other organizations. In order to accumulate the information of training courses at state level, DWST shall collect the information of implemented courses regularly from the SWCs (details in the chapter 5). DWST will also coordinate Joint Seminar, and monitor the progress of training implementation and its evaluation by the stakeholders.

2-4.Effective Capacity Development

As mentioned in the article "2-1.", "training disbalance" is reported as an urgent issue. Some trainees receive many training courses that are irrelevant to their work tasks and responsibilities. Moreover, similar trainings for SWC staff are repeatedly conducted by development partners.

In order to avoid duplication of the training and the disbalance of trainee's selection, the DWST and each SWC should establish the proper information sharing system.

The data accumulated at DWST and SWCs shall be open to other training providers such as the UN Agencies and NGOs as need arises.

2-5.Training Planning based on Training Needs

DWST and SWCs collect training needs from staff of each SWC to design the proper training plan. This "Training Needs" list shall be shared with DWST that oversees implementation of different training courses across the states. DWST may reflect the needs from the states on training programs at national level as well.

3 Roles of Implementation Agencies

<u><Federal Ministry of Water Resources and Electricity></u>

1. Allocation of the monitoring budget to DWST

<u><DWST (Drinking Water and Sanitation Unit Training Center)></u>

1. <u>**Management of training data at national level**</u>

   - Development of the Monitoring Format and the Database

   - Monitoring Data Management and Analysis

   - Feedback of the analyzed data to each SWC

   - Preparation of the Monitoring Plan

   - Preparation and follow-up of the Monitoring Budget

   DWST prepares the cost estimations based on the monitoring plan and submits it to the Ministry of Water Resources and Electricity.

2. <u>**Facilitate information sharing ("good practice") among stakeholders**</u>

   - Holding the Joint Seminar among stakeholders

   - Instruction of the Monitoring Methodology to SWC Training Centers

   Once a year, DWST visits each SWC Training Centre to instruct monitoring methodology

3. <u>**Develop future training courses that match with latest training needs**</u>

   - Plan and develop new training courses based on the monitored data

   DWST plans and develops new types of trainings that may require special equipment, tool or software which are difficult to be provided at state-level training.

<u><SWC Training Center></u>

- **Management of the monitoring data**

- **Training needs data collection from other sectors of SWC**

- **Analysis of the monitored data**

- **Holding the SWC monitoring workshop and preparation of the activity plan**

- **Feedback of the result of the monitoring to other SWC staff**

- **Instruction of the monitoring method to other sector of SWC**

- **Preparation and follow-up of the monitoring Budget**

- **Monitoring Scheduling**

- **Information sharing with stakeholders (SWC staff, DWST, NGOs, UNs and Other related organization)**
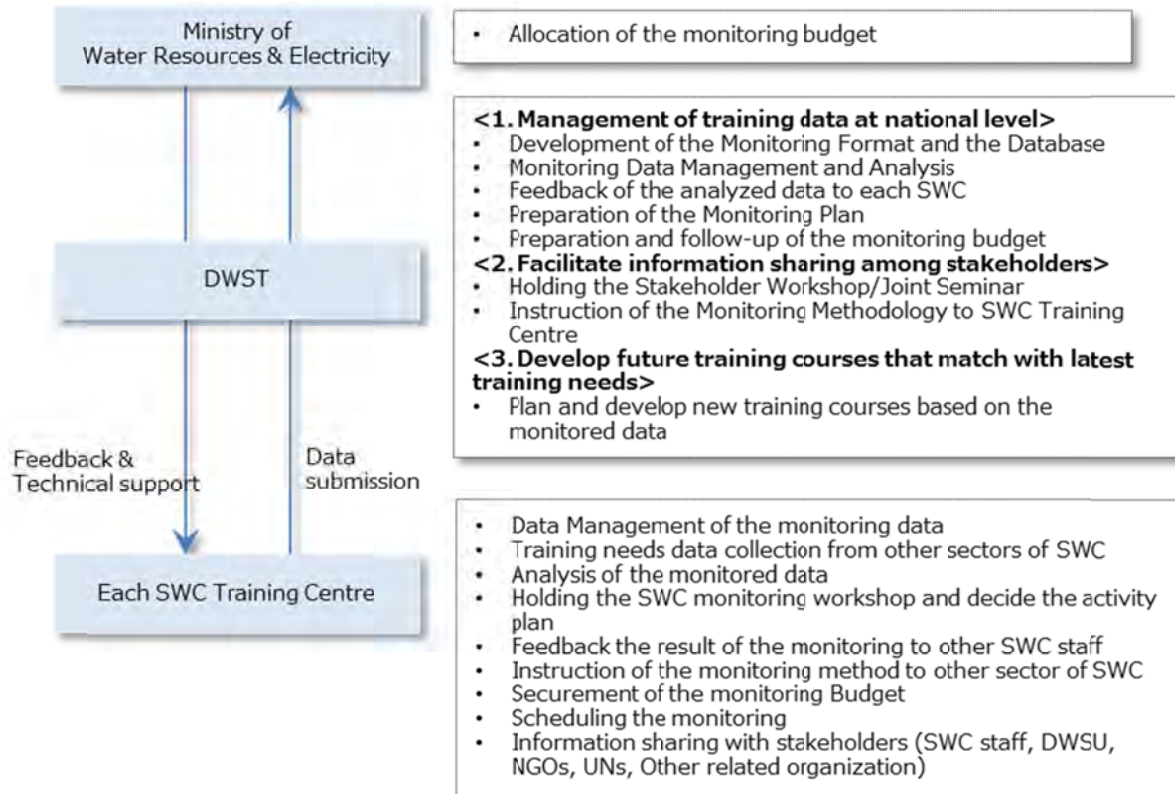
Figure 3-1 Main tasks of implementation agencies

4 Structure of implementation agency

The structures of DWSU and SWC that include the monitoring Unit are as follows;
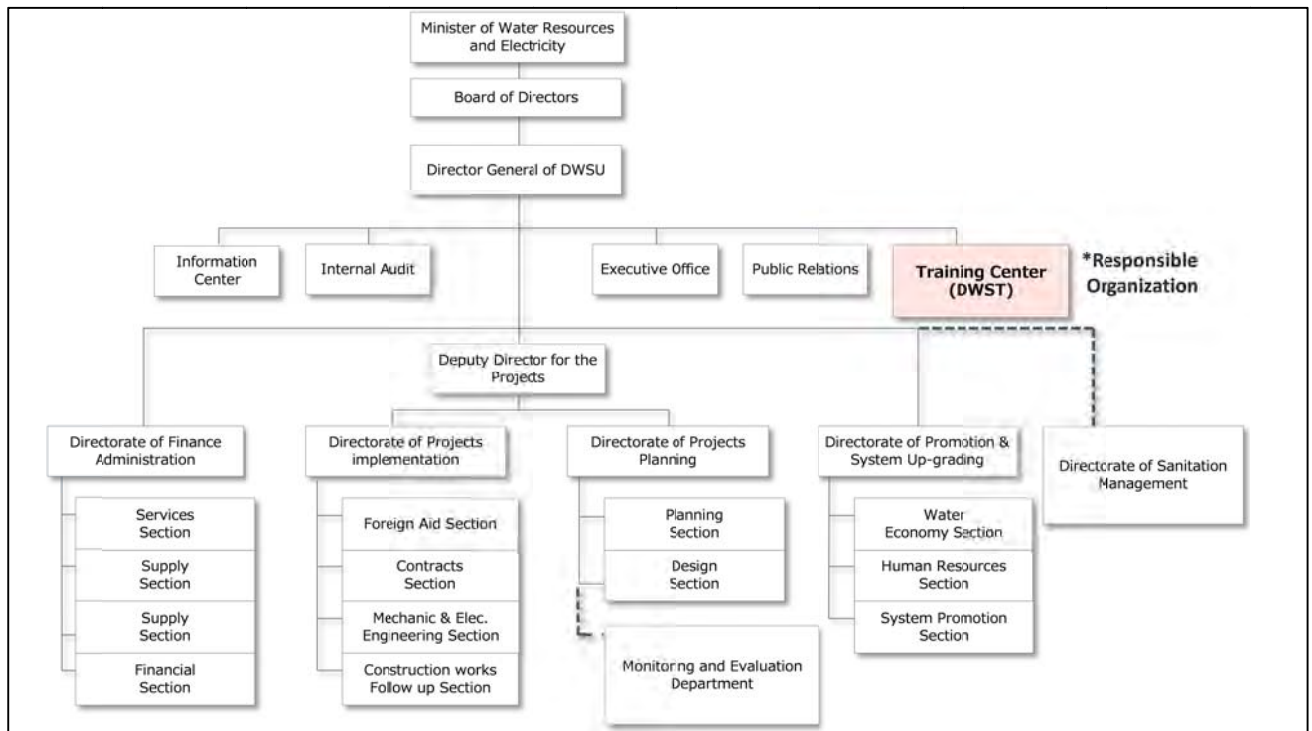
Figure 4-1 Structure of DWSU
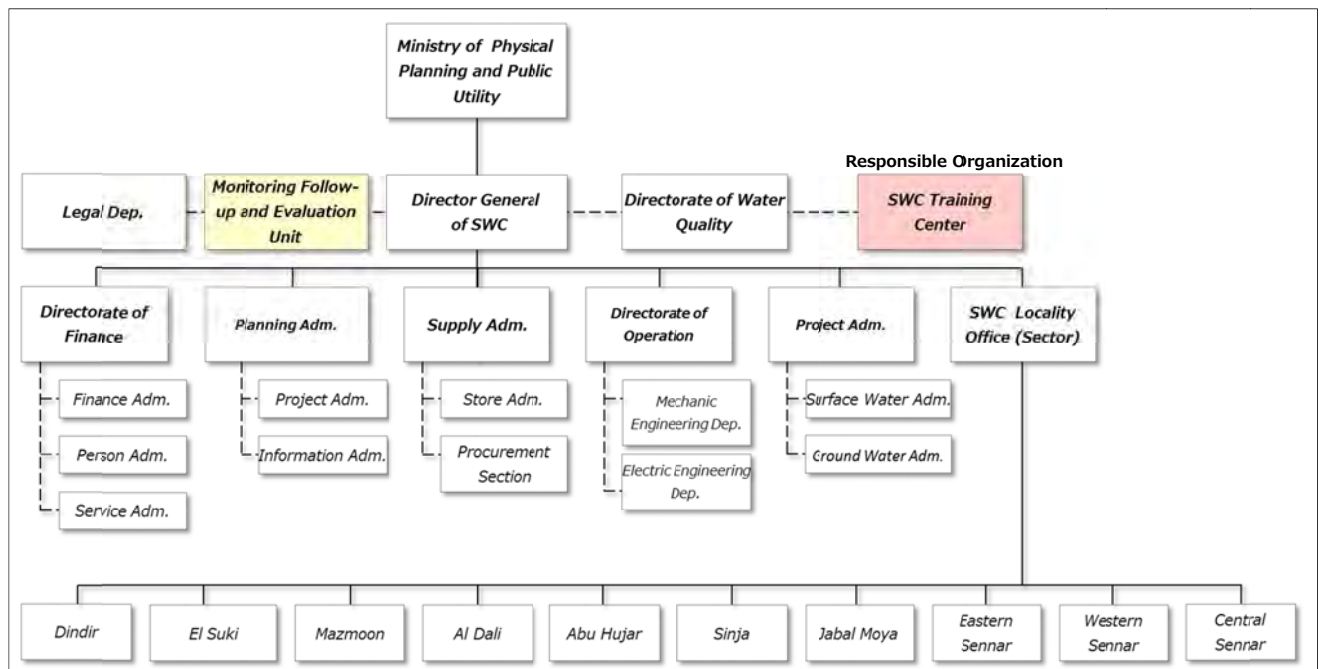
Figure 4-2 Structure of Sennar SWC and SWC Training Center

5 Methodology

The following seven (7) items are suggested to be monitored for the training (refer to Table 5-1).

However, items and contents of monitoring will be revised if necessary, based on the lessons learned from implementation.

Table 5-1 Monitoring Items

Implementation Agency	Monitoring Item	Responsibility	Information sharing interval (DWST ⇔ SWC)
DWST/SWC	1. Training Needs	DWST, SWC T/C[1]	Every 3 month (Feb, May, Aug, Nov)
	2. Training Budget	DWST, SWC T/C	
	3. Training Implementation Structure	DWST, SWC T/C	
	4. Training Courses	DWST, SWC T/C	
	5. Training Schedule	DWST, SWC T/C	
	6. Trainee's Information (only DWST)	DWST	
	7. Oversea Training	DWST, SWC T/C	

The methodology of gathering each monitoring data is as follows;

5-1.Training Needs

1) Data collection

①   Each SWC Training Centre distributes the questionnaire to representative of each SWC Sector (Locality Office) to confirm the training needs.

②   Representative of each SWC Sector calls their staff and discuss the request for the training, and fills in questionnaire.

③   The person in charge of information management of each SWC Training Centre compiles the collected data.

④   The person in charge of information management of each SWC Training Centre submits compiled data (Excel file) to DWST.

⑤   DWST collects the data from all states and summarizes national training needs.

2) Data Input

① SWC Training Centre inputs priority (1; Very High, 2; High, 3; Medium、4; Low) of each suggested training course based on the training needs.

---

[1] T/C; Training Centre

② If there is any request from SWC staff for additional training courses, SWC Training Centre adds the name of training courses for suggestion.

③ SWC Training Centre inputs "State Name" and "Date" of the update

④ SWC Training Centre submits the data to DWST M&E Dep.

⑤ DWST reviews the submission from each state and inputs newly suggested training courses to analyze additional training needs.

⑥ DWST summarizes the training priority of each state.

Methodology of the training needs data input-1

No	Survey		Development		Construction	
1	Topographycal Survey		Groundwater		Borehole	
2	Geological Survey		Rain water		Hand pump	
3	Geophysical Survey		River water		Hafir	
4	Hydrological Survey					
5	Sociological Survey					
6	Sanitation Survey					
7	Remote Sensing				Desalinization Plant	
8	GIS and Mapping				Pipe Line	
9	Water Quality					
10	Water Tariff					
11		①				
12						
13						

If each SWC has additional training needs, insert the new training course names

②

Based on training needs and priority, classify the training courses"1, 2, 3, 4".
1; Very High
2; High
3; Medium
4; Low

No	Monitoring		Management			
1	Water Quality		Procurement System			
2	Water Tariff		Contract			
3	Hand Pump		Equipment		English	
4	Hafir		Organization		Accounting	
5	Slow Sand Filter		Water Supply Facility		Office Management	
6	Water Treatment Plant		Electricity		Report Writing	
7	Desalinization Plant		Borehole		Capacity Development	
8	Pipe Network		Water Tariff			
9	Surface Water		Water Quality			
10	Groundwater		Information			
11	Sanitation		Project			
12	Water Supply Ratio		PDM			
13	Project					

③

State Name		Date	

④ Each SWC Training Centre sends data to DWST

Methodology of the training needs data input-2

Training Needs		DWST	Northern	R. Nile	Khartoum	Gezira	Red Sea	Kassala	Gedaref	Sennar	B. Nile	W. Nile	N. Kordofan	S. Kordofan	W. Kordofan	N. Darfur	S. Darfur	W. Darfur	C. Darfur	E. Darfur
1.Survey																				
1-1	Topographycal Survey																			
1-2	Geological Survey																			
1-3	Geophysical Survey																			
1-4	Hydrological Survey		⑥																	
1-5	Sociological Survey																			
1-6	Sanitation Survey																			
1-7	Remote Sensing																			
1-8	GIS and Mapping																			
1-9	Water Quality																			
1-10	Water Tariff																			
2.Development																				
2-1	Groundwater																			
2-2	Rain water																			
2-3	River water	⑤																		
2-4	Sea water																			
2-5	Community																			
3.Construction																				
3-1	Borehole																			
3-2	Hand pump																			
3-3	Hafir																			
3-4	Water Yard																			
3-5	Slow Sand Filter																			
3-6	Water Treatment Plant																			
3-7	Desalinization Plant																			
3-8	Pipe Line																			

Based on data which is submitted by each SWC, classify the training courses according to the priority levels "1, 2, 3, 4".

1; Very High

2; High

3; Medium

4; Low

If any SWC has additional training needs, insert new training course names

5-2. Training Budgets

DWST and SWC Training Centre monitor proper allocation of training budgets in each state as well as proper spending of the allocated budget.

1) Data collection

① Financial Officer and Director of SWC Training Centre prepare the budget plans based on the expense of a previous financial year, and submit it to the State Government (Oct-Dec).

② Financial Officer and Director of SWC Training Centre manage the expenses for each category of the training items.

2) Data input

① Responsible staffs of DWST and SWC Training Centre examine the proposed monitoring format for the next financial year. If there are additional item(s) that require new budget, they may add new column(s) in the Excel sheet.

② Input the unit price of the each item (DWST, SWC T/C).

③ Input the Unit of each item (DWST, SWC T/C).

④ Input the necessary quantity of each item (DWST, SWC T/C).

⑤ Input the basis for calculation (formula) of necessary quantity as reference (DWST, SWC T/C).

⑥ Input the expenses of the each item (DWST, SWC T/C).

⑦ Input the summarized data of each item year by year (DWST, SWC T/C).

⑧ Each SWC Training Centre sends the Excel Files with data of "①～⑦" to DWST.

⑨ DWST summarizes data of the budget and expense by the state based on submitted files from SWC Training Centers.

11

Methodology of the training budget and expense input-1(Breakdown)

No	Item	Contents	Unit price		Quantity		Budgets (SDG)	Expense (SDG)	Balance (SDG)	Remarks
			Price (SDG)	Unit	Quantity	Reference				
1	Personnel costs	Daily allowance for trainee	25	SDG/person/day	5600	400prs x 14days	140,000			
		Lecturer compensation	150	SDG/person/day	600	50prs x 12days	90,000			
		Monthly salary	750	SDG/person/month	360	30prs x12month	270,000			
		Payment for skilled workshop labors	250	SDG/person/month	180	15prs x12month	45,000			
		Sub total					545,000	-	-	
2	Transportation cost	Trainee use	50	SDG/person/time	800	400prs x 2times	40,000			
		Lecturer use								
		Investigation use								
		Technical exchange								
		Sub total							-	
3	Welfare	Food expenses of the lodgings								
		Equipment costs of the lodgings	50	SDG/person/day	360	30unit x12month	18,000			
		Entertainment costs	2,000	SDG/person/training	10	10 sets	20,000			
		Sub total					598,000	-	-	
4	Office work	Office supplies costs	10,000	SDG/month	12	12month	120,000			
		Office work machine costs	4,000	SDG/set	20	20 set	80,000			
		Maintenance cost of facilities	10,000	SDG/month	12	12month	120,000			
		Sub total					320,000	-	-	
5	Communication costs	Telephone / FAX	500	SDG/month	12	12month	6,000			
		Internet fee	500	SDG/month	12	12month	6,000			
		Anti-virus software	300	SDG/set	45	45 set	13,500			
		Sub total					25,500	-	-	
6	Lighting and fuel	Electricity	6,000	SDG/month	12	12month	72,000			
		Water	500	SDG/month	12	12month	6,000			
		Gas	100	SDG/month	12	12month	1,200			
		Sub total					79,200	-	-	
7	Training costs	Document purchase	200	SDG/text	1,000	1000 texts	200,000			
		Spare parts supply	2,000	SDG/set	24	24 sets	48,000			
		Documentation	250	SDG/person/time	500	500prs	125,000			
		Meeting place costs	150	SDG/time	600	50 times x 20	90,000			
		Sub total					463,000	-	-	
8	Workshop ,Seminar & Meeting costs	Tea & Light meals	80	SDG/time	250	50 x 5times	20,000			
		Daily allowance	250	SDG/person/time		50 x 3times	-			
		Sub total					20,000	-	-	
9	Cars & Field visits	Fuel	1,500	SDG/month	12	12month	18,000			
		Allowance	250	SDG/person/day	720	12prs x 60 days	180,000			
		Lodging	200	SDG/person/day	720	12prs x 60 days	144,000			
		Maintenance	2,000	SDG/month	12	12month	24,000			
		Sub total					366,000	-	-	
10	Workshop Maintenance cost	Maintenance	50	SDG/day	1,200	12 x 100	60,000			
		Spare parts supply	2,000	SDG/set	12	12 month	24,000			
		Building Maintenance	40,000	SDG/set/year	1	1 set	40,000			
		Sub total					124,000	-	-	
11	Lodging maintenance	Lodging utilities	2,000	SDG/month	12	12month	24,000			
12	Contingencies	Emergency expense	2,000	SDG/month	12	12month	24,000			
		Sub total					48,000	-	-	
		Grand Total(SDG)					2,808,700	-	2,808,700	

①

② ③ ④ ⑤ ⑥

If DWST and SWC T/Cs have additional items to be budgeted, insert it.

Methodology of the training budget and expense input-2(Annual)

No	Item		2013	2014	2015	2016	2017	2018	2019
1	Personnel expenses	Budget (SDG/year)	⑦						
		Expense (SDG/year)							
		Balance (SDG/year)							
2	Transportation expenses	Budget (SDG/year)							
		Expense (SDG/year)							
		Balance (SDG/year)							
3	Welfare expenses	Budget (SDG/year)							
		Expense (SDG/year)							
		Balance (SDG/year)							
4	Office work costs	Budget (SDG/year)							
		Expense (SDG/year)							
		Balance (SDG/year)							
5	Communication costs	Budget (SDG/year)							
		Expense (SDG/year)							
		Balance (SDG/year)							
6	Expenses for lighting and fuel	Budget (SDG/year)							
		Expense (SDG/year)							
		Balance (SDG/year)							
7	Training expense	Budget (SDG/year)							
		Expense (SDG/year)							
		Balance (SDG/year)							
8	Meeting costs	Budget (SDG/year)							
		Expense (SDG/year)							
		Balance (SDG/year)							
9	Field visits	Budget (SDG/year)							
		Expense (SDG/year)							
		Balance (SDG/year)							
10	Maintenance Cost of Facility	Budget (SDG/year)							
		Expense (SDG/year)							
		Balance (SDG/year)							
11	Contingencies	Budget (SDG/year)							
		Expense (SDG/year)							
		Balance (SDG/year)							
	Ground Total(SDG)	Budget (SDG/year)							
		Expense (SDG/year)							
		Balance (SDG/year)							

⑧Each SWC sends to DWST

Methodology of the training budget and expense input-3 (Summary)

No	Item		DWST	Northern	R. Nile	Khartoum	El Gezira	Red Sea	Kassala	El Gedaref	Sennar	B. Nile	W. Nile	N. Krdfn	S .Krdfn	W. Krdfn	N. Darfur	S. Darfur	W. Darfur	C. Darfur	E. Darfur
1	Personnel expenses	Budget (SDG/year)	⑨																		
		Expense (SDG/year)																			
		Balance (SDG/year)																			
2	Transportation expenses	Budget (SDG/year)																			
		Expense (SDG/year)																			
		Balance (SDG/year)																			
3	Welfare expenses	Budget (SDG/year)																			
		Expense (SDG/year)																			
		Balance (SDG/year)																			
4	Office work costs	Budget (SDG/year)																			
		Expense (SDG/year)																			
		Balance (SDG/year)																			
5	Communication costs	Budget (SDG/year)																			
		Expense (SDG/year)																			
		Balance (SDG/year)																			
6	Expenses for lighting and fuel	Budget (SDG/year)																			
		Expense (SDG/year)																			
		Balance (SDG/year)																			
7	Training expense	Budget (SDG/year)																			
		Expense (SDG/year)																			
		Balance (SDG/year)																			
8	Meeting costs	Budget (SDG/year)																			
		Expense (SDG/year)																			
		Balance (SDG/year)																			
9	Field visits	Budget (SDG/year)																			
		Expense (SDG/year)																			
		Balance (SDG/year)																			
10	Maintenance Cost of Facility	Budget (SDG/year)																			
		Expense (SDG/year)																			
		Balance (SDG/year)																			
11	Contingencies	Budget (SDG/year)																			
		Expense (SDG/year)																			
		Balance (SDG/year)																			
	Ground Total(SDG)	Budget (SDG/year)																			
		Expense (SDG/year)																			
		Balance (SDG/year)																			

5-3. Training Implementation Structure (Training Staff)

DWST and each SWC Training Centers develop the training implementation structure for efficient training implementation. DWST may utilize this data in order to facilitate collaboration among states and course coordinators that organize similar training courses.

1) Data Collection

① Director and a management representative of SWC Training Centers prepare the Organization Chart for staff.

2) Data Input

① Paste a picture of Director General of SWC, and input the necessary information (Name, Contact Address etc.).

② Paste a picture of director and manager of SWC Training Center, and input the necessary information (Name, Contact Address etc.).

③ Input the name of units which belong to SWC Training Center, and paste a picture of representative of each unit with the necessary information (Name, Contact Address etc.).

④ Paste a picture of each training course coordinator and the assistant, and input the necessary information (Name, Contact Address etc.).

⑤ SWC Training Center sends a data (Excel File) to DWST.

Methodology of data input for Organization chart [*1]

① DG of Sennar SWC
Mr. EL Madani Elkhadir
091-779-5757

②
Mr. Sari Kamal Aldeen
091-293-0126

Director of Training Center

Assistant Director
Training course supervisor

Mr. Jalal Bashir
091-461-7300

③

Department of Administration

Department of Training Course Management

Division of Accountant	Division of Administration	Key keeper	Computer management	Director Assistant	Director Assistant	Cleaning #1	Cleaning #2
Mr. Muahil	Ms. Ayoult	Mr. Ibrahim Eisa	Ms. Eman Alnoor Fadl-Almoula	Ms. Radwa	Ms. Egbal	Ms. Salwa Ahmed	Ms. Nada Ali

④

Well Management	Pipe Network Management	Management of Water Treatment Plant	Organization Management	Mechanic Management	Electric Management	Equipment Management	Data Management & Monitoring	Water Quality Management	Community Development	Sanitation Management	Water Tariff Management	Monitoring Management
Mr. Ali Hassan Saad	Ms. Marwa Osman Abd El Hafizz	Mr. Abdel Bagi	Mr. Ali Hassan Saad	Mr. Zakara Siddeg	Mr. Ayman Ali	Mr. Zakaria Siddeg	Mr. Amar Hassan Rahamtallah	Mr. Ashraf Eltahir Ismail Elnaeim	Mr. Jalal Bashir	Ms. Rehab Mustafa	Mr. Sari Kamal Aldeen	Ms. Sara Ali M.
Mr. Abbas Hamid	Ms. Sara Ali M.	Ms. Sana osman	Ms Omima Mohammed Elhaj	Mr. Mutwakil Mohammed Abdalla	Ms. Eman Alnoor Fadl-Almoula	Ms Omima Mohammed Elhaj	Ms. Ameera Mohamed Nur	Mr. Humam Abdeen	Ms. Rehab Mustafa	Mr. Ali Hassan Saad	Mr. Tawil Abd.	Ms. Sana osman

[*1] Sennar SWC training center organization chart is shown as sample.

⑤ Each SWC sends data to DWST.

5-4.Training Schedule

Although some SWCs including the White Nile and Sennar SWC have already started the training course based on the own schedule, the scheduling format is not unified. In order to simplify data management task, this section proposes a unified format for annual training schedule for SWC training centers.

1) Preparation of the annual training schedule

① DWST and SWC Training Centers prepare the training schedule for next fiscal year based on the training needs (Oct-Dec).

② In consideration of the approved budget for next physical year, DWST and SWC Training Centers revise the training schedule (Dec).

③ SWC Training Center distributes the training schedule to each SWC Sector for trainee's nomination (Dec).

2) Data Input

① Input the name of the State (DWST, SWC T/C).

② Input the fiscal year (DWST, SWC T/C).

③ Input the name of the planned training courses (DWST, SWC T/C).

④ Select the start and end dates of the training courses **as planned** (DWST, SWC T/C). Bar-charts are automatically displayed (DWST, SWC T/C).

⑤ Select the **actual** start and end date of the implemented training courses (DWST, SWC T/C).

⑥ SWC Training Centers send the data (Excel File) to DWST. (DWST, SWC T/C) in December.

**Internal Meeting for Training Scheduling
(White Nile SWC)**

17

Methodology of data input for the Training Schedule

State; ①
Year; 2015 ② ④ ⑤

No.	Training Course	Plan/Actual	Start	End	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Remarks
1	Well Management ③	Plan	1/Jun/2015	5/Jun/2015													
		Actual	1/Jun/2015	4/Sep/2015													
2	Organization Management	Plan	1/Jan/2015	5/Jan/2015													
		Actual	4/Jan/2015	7/Jan/2015													
3	Water Tariff Management	Plan	1/Jun/2015	13/Jun/2015													
		Actual	1/Jun/2015	5/Jun/2015													
4	Pipe Network Management	Plan	1/Jun/2015	5/Jun/2015													
		Actual	3/Jun/2015	12/Jun/2015													
5	Water Treatment Plant Management	Plan	1/Jun/2015	29/Jun/2015													
		Actual	1/Jun/2015	5/Jun/2015													
6	Electrical Management	Plan	1/Jun/2015	5/Jun/2015													
		Actual	1/Jun/2015	5/Jun/2015													
7	Mechanical Management	Plan	1/Jun/2015	5/Jun/2015													
		Actual	1/Jun/2015	5/Jun/2015													
8	Equipment Management	Plan	1/Jun/2015	5/Jun/2015													
		Actual	1/Jun/2015	5/Jun/2015													
9	Data Management	Plan	1/Jun/2015	5/Jun/2015													
		Actual	1/Jun/2015	5/Jun/2015													
10	Monitoring	Plan	1/Jun/2015	6/Jun/2015													
		Actual	1/Jun/2015	5/Jun/2015													
11	Water Quality Management	Plan	1/Jun/2015	5/Jun/2015													
		Actual	1/Jun/2015	5/Jun/2015													
12	Community Development	Plan	1/Jun/2015	5/Jun/2015													
		Actual	1/Jun/2015	5/Jun/2015													
13	Sanitation Management	Plan	1/Jun/2015	5/Jun/2015													
		Actual	1/Jun/2015	5/Jun/2015													
14		Plan															
		Actual															
15		Plan															
		Actual															
16		Plan															
		Actual															

Bar chart is automatically lined.

⑥SWC sends data to DWST (Dec)

7-21

18

5-5. Training Course（SWC）

SWC Training Centers collect data of the training courses for monitoring the capacity of SWCs. The record of implemented training courses can be used for preparation of future training plans. The proposed format can be used as check lists for related documents as well.

1) Data Input

① Input the name of the State.

② Input the Training Course Code Number (Example ; OM-001→1st Organization Management Courses).

③ Input the name of the each Training Course

④ Input the data of the training period.

⑤ Input the "○" to fields of check lists if related documents are available.

⑥ Input the number of trainees.

⑦ Input the number of lecturers for each training course.

⑧ Input the training evaluations.

⑨ Input the physical year of the each training course

⑩ Each SWC Training Center sends the data (Excel File) to DWST *by Email*.

Methodology of data input for Training Courses (Sample of White Nile SWC)

State; _____ ①

No.	Course ID	Training Course	Training Period			Training Record (Check List)							Trainee	Lecturer	Evaluation (%)				Year*
			Start	End	Duration	Record	Trainee List	Trainee's Photo	Photo	Program	Evaluation	Text			Course	Lecturer	Facility	Contribution	
1	OM-001	Organizationa Management	2/Jun/2013	4/Jun/2013	3	○	○	○	○	○	○	○	11	4	87.0	98.0	89.7	40.0	1
2	WM-001	Well Management	10/Jun/2012	15/Jun/2012	6	○	○	○	○	○		○	10	3	65.4	66.0	76.2	60.0	1
3	WQM-001	Water Quality	11/Nov/2012	15/Nov/2012	5	○	○	○	○	○	○	○	10	3	80.6	82.2	82.9	66.0	2
4	OM-002	Organizationa Management 2nd	18/Nov/2012	22/Nov/2012	5	○	○	○	○	○	○	○	8	4	89.7	92.6	89.7	40.0	2
5	EQM-001	Equipment Management	25/Nov/2012	30/Nov/2012	6	○	○	○	○	○	○	○	13	1	98.8	98.2	95.5	65.0	2
6	DM-001	Data Management	2/Dec/2012	6/Dec/2012	5	○	○	○	○	○	○	○	10	2	96.2	95.9	92.9	61.7	2
7	MM-001	Mechanical	16/Dec/2012	20/Dec/2012	5	○	○	○	○	○	○	○	11	4	93.8	92.0	88.7	67.0	2
8	EM-001	Electrical	23/Dec/2012	27/Dec/2012	5	○	○	○	○	○	○	○	7	1	89.1	91.7	92.2	73.2	2
9	WM-002	Well Management 2nd	13/Jan/2013	31/Jan/2013	19	○	○	○	○	○	○	○	12	2	76.4	52.0	60.1	63.0	2
10	PN-001	Pipe Network Management	10/Mar/2013	14/Mar/2013	5	○	○	○	○	○	○	○	9	5	91.1	88.3	89.0	86.0	2
11	WT-001	Water Treatment Plant	24/Mar/2013	28/Mar/2013	5	○	○	○	○	○	○	○	14	4	93.9	92.4	90.6	82.6	2
12	CM-001	Community Development	21/Apr/2013	25/Apr/2013	5	○	○	○	○	○	○	○	17	3	94.5	96.3	96.0	82.6	2
13	PN-002	Pipe Network Management 2nd	27/Oct/2013	31/Oct/2013	5	○	○	○	○	○	○	○	8	5	90.1	87.2	89.8	87.4	3
14	DM-002	Data Management 2nd	3/Nov/2013	14/Nov/2013	12	○	○	○	○	○	○	○	14	1	99.1	88.2	93.6	87.2	3
15	WTM-001	Water Tariff Management	24/Nov/2013	28/Nov/2013	5	○	○	○	○	○	○	○	25	5	97.2	96.4	88.5	92.4	3
16	OM-003	Organizationa Management 3rd	8/Dec/2013	12/Dec/2013	5	○	○	○	○	○	○	○	19	6	97.4	94.1	92.9	87.9	3
17	EQM-002	Equipment Management 2nd	1/Dec/2013	5/Dec/2013	5	○	○	○	○	○	○	○	13	1	92.5	95.1	89.2	86.1	3
18																			
19																			
20																			
21																			
22																			
23																			
24																			
25																			
Total													211	54					
Average													12.4	3.2	90.2	88.6	88.1	72.2	

Annotations: ① State; ② Course ID; ③ Training Course; ④ Training Period; ⑤ Training Record; ⑥ Trainee; ⑦ Lecturer; ⑧ Evaluation; ⑨ Year

*Project year

⑩Each SWC sends data to DWST .

7-23

20

5-6.Trainee's Information（DWST Only）

DWST has managed the data of trainee that have participated the training in DWST since 2009. DWST continues to manage the data for monitoring number of trainees from each state.

1) Data Input

① DWST input the name of the state and organization which dispatches the trainee to DWST.

② DWST input the implemented training courses and the number of trainees by the state.

③ DWST input the number of trainees of each training course by the states

21

22

Methodology of data input for Trainee's Information-1(Breakdown)

No	Training Course / SWC	Organizational Management 14th (5.2013)	Computer Excel (Basic) 15th (6.2013)	Water Quality Basic 16th (6.2013)	Water Supply Facility 17th (6.2013)	Water Well Design 18th (6.2013)	Pipe Network Management 19th (7.2013)	Water Supply Facility 20th (9.2013)	Pipe Network Management 21 th (9.2013)	W.A (Chromatography) 22th (10.2013)	Report Writing 23th (10.2013)	Water Well Design & Management 24th (10.2013)	Solar system 25th (11.2013)	Water Well Design & Management 26th (11.2013)	Pipe Network Design 27th (12.2013)	Total
1	Northern ①	0	0	1	1	1	1 ②	0	0	1	1	0	1	0	1	8
2	River Nile	0	0	0	1	0	1	0	0	0	0	0	0	0	1	3
3	Red Sea	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4	Kassala	0	0	0	1	1	1	0	0	1	0	0	0	0	1	5
5	Gedaref	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
6	Khartoum	0	0	1	0	0	0	0	0	1	0	0	0	0	1	3
7	El Gezira	0	0	1	1	1	1	0	0	0	1	0	1	0	1	7
8	Sennar	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
9	White Nile	0	0	1	1	0	0	0	0	0	0	1	1	0	0	4
10	Blue Nile	0	0	0	1	1	0	0	0	1	0	1	1	0	0	5
11	Northern Kordofan	0	0	1	1	1	0	0	0	0	1	1	1	0	1	7
12	Southern Kordofan	0	0	2	2	2	2	0	0	2	0	5	2	0	2	19
13	West Kordofan	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
14	Northern Darfur	0	0	1	1	1	1	4	4	0	1	0	0	4	1	18
15	Southern Darfur	0	0	1	1	1	1	4	4	1	1	0	0	4	1	19
16	Western Darfur	0	0	1	1	0	1	4	4	1	1	0	0	4	1	18
17	East Darfur	0	0	0	1	1	0	1	0	1	0	1	0	0	1	6
18	Central Darfur	0	0	0	1	1	0	4	4	0	1	0	0	4	0	15
19	N.W.E.Company	0	0	0	2	0	2	0	0	0	0	1	0	0	0	5
20	DWSU	13	12	0	0	0	0	0	0	0	3	0	0	0	1	29
21	El Hawata Project	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2
22	General Administration of Customs	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2
23	Maritime Ports Authority -Red Sea	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
24	Sudan Currency Printing Press	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	Total	13	12	15	19	11	12	16	16	10	11	9	9	16	13	182

Methodology of data input for Trainee's Information-2 (Summary)

No	SWC	2009	2010	2011	2012	2013	2014	Total
1	Northern	10	12	13	13	16	2	66
2	River Nile	10	11	12	19	15	1	68
3	Red Sea	8	7	3	5	8	1	32
4	Kassala	10	6	20	22	17	2	77
5	Gedaref	10	12	11	13	7	3	56
6	Khartoum	10	8	8	4	6	1	37
7	El Gezira	16	17	15	16	19	4	87
8	Sennar	7	10	11	17	8	1	54
9	White Nile	12	11	10	20	13	5	71
10	Blue Nile	12	19	11	7	13	3	65
11	Northern Kordofan	9	11	9	6	16	5	56
12	Southern Kordofan	15	39	18	23	45	4	144
13	Western Kordofan	0	0	0	0	1	4	5
14	Northern Darfur	10	17	8	17	30	12	94
15	Southern Darfur	11	18	8	25	33	15	110
16	Western Darfur	11	19	12	26	32	7	107
17	East Darfur	0	0	0	0	17	6	23
18	Central Darfur	0	0	0	0	24	14	38
19	DWSU	10	6	23	33	39	46	157
20	DWST	0	0	0	1	0	0	1
21	El Hawata Project	3	5	7	11	10	2	38
22	N.W.E.Company	8	3	7	7	7	4	36
23	Groundwater & Wadis	0	0	8	0	0	1	9
24	South Sudan	0	0	3	0	0	0	3
25	Sudan University	0	0	1	0	0	0	1
26	Gezira University	0	0	1	0	0	0	1
27	Africa City Technology	0	0	0	2	0	0	2
28	General Administration of Customs	0	0	0	0	2	0	2
29	Maritime Ports Authority -Red Sea	0	0	0	0	1	1	2
30	Sudan Currency Printing Press	0	0	0	0	1	0	1
	Total	182	231	219	287	380	144	1,443

③

Total Number of Trainee (2009-)

Bar graph is automatically updated.

23
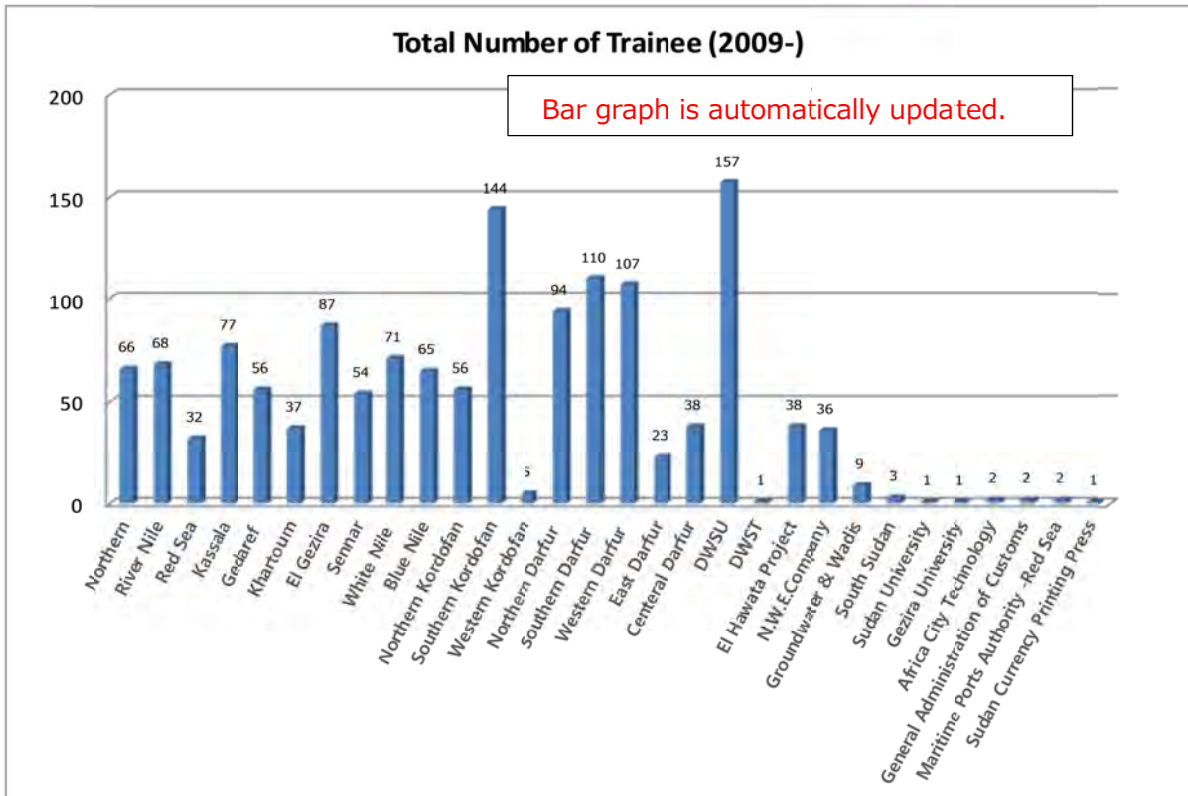
5-7.Overseas Training

Many overseas training related to water supply have been implemented for DWST and SWC in cooperation with Federal Government and other development partners. However, the contents of training and the information of trainees are not properly monitored. The lessons learned from overseas training should be widely shared among the colleagues in DWST and SWC. Furthermore, it is reported the "training disbalance" as a related issue. Which mean that ,while same staff participate many overseas training, many staff do not receive the opportunities.

Monitoring of overseas training aims to avoid the trainees' duplication and proper nomination of trainees.

1) Data Collection

Participants of overseas training report the outline of training to representative of the DWST and SWC Training Centers. At the same time, representative of the DWST and SWC Training Centers gathers related information from stakeholders to complete details such as the training contents.

2) Data Input

① Input the "Training ID", "Name of Training Course", "Support Agency", "Period of the Training", "Number of Trainees", "Contents", and "Visited place".

② Open the sheet of "Trainee(ID)" within same Excel file to prepare the trainee list.

③ Input the training ID by reference to the above "①". The cells of "Training Course", "Country", and "Period" are automatically displayed.

④ Input the cells of "No.", "Name", "Date of Birth", "Organization", "Position", "Mobile", "Email", "National ID", "Passport Number" and "Other Remarks" . The cell of "Age" is automatically displayed.

⑤ Each SWC Training Centre sends the data (Excel File) to DWST.

Methodology of data input for the Oversea Training-1 (Summary)

ID	Training Course	Country	Support Agency	Start	End	Duration (Days)	Number of Tainee	Training Contents	Visited Place	Remarks
D-1	1st Morocco Study Tour	Morrocco	JICA	09/May/2012	16/May/2012	8	8	①		

②**Preparation of the Trainee List**

Methodology of data input for the Oversea Training-2 (Trainee List)

ID   D-1 ③   **Training Course**   1st Morocco Study Tour   **Country**   Morrocco   **Period** From; 09/May/2012   To; 16/May/2012

No.	Name	Date of Birth	Age*	Sex (M or F)	Organization	Position	Mobile	Email	National ID	Passport Number	Other Remarks
1 ④		10/Feb/1981	31								
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											

* The age when the training was conducted

⑤**SWC sends the data (Excel File) to DWST.**

6 Utilization of the Monitored Data

6-1.Information sharing

As responsible agencies, each SWC Training Center manages the training data at the state level, and DWST manages the data at the national level. Furthermore, DWST organizes annual Joint Seminar that is attended by the representatives from each SWC Training Center. The time and venue are tentatively set in every **April and November** at DWSU/DWST in Khartoum.

The main objective of the Joint Seminar is sharing information of training plans, outputs and the expansion of the training system to whole states of Sudan. Stakeholders are expected to take the feedback during the Seminar and they shall reflect it to the Human Resources Development Plan of each organization with their own monitoring results.
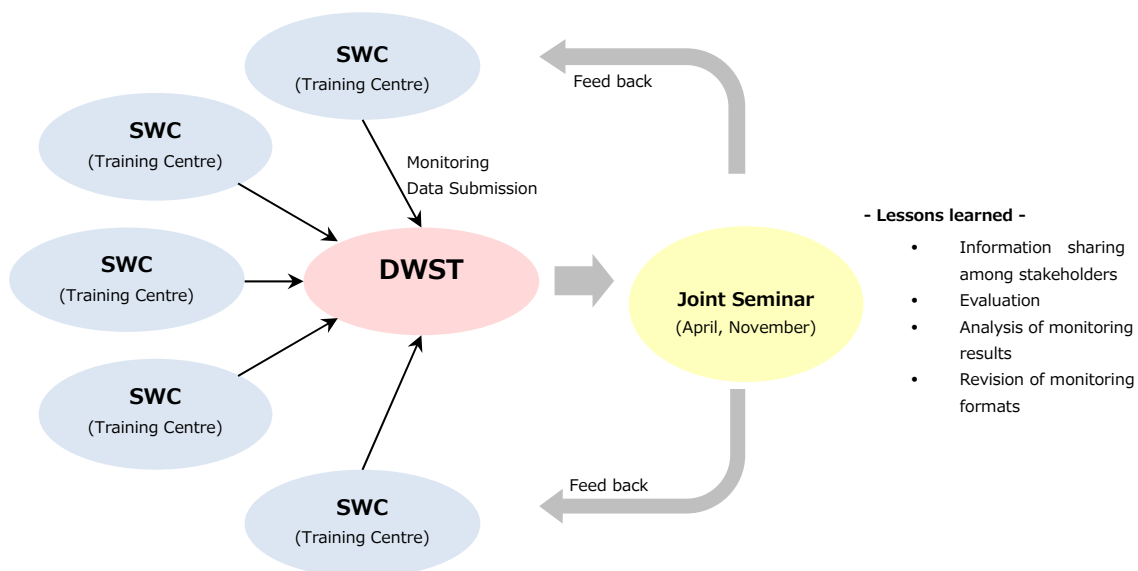
Figure 6-1 Information sharing between State and Federal Level

Table 6-1. Methodology and the interval of the information sharing

No	Method	Interval	Data to be shared	With Whom?
1	Mobile Phone	As needed	Latest monitoring data	・DG of SWC ・DG of Ministry of Physical Planning and Public Utility ・DWSU/DWST/M&E Dep.
2	Email	・Feb, May, Aug, Nov（Every three month）	Latest monitoring data	・DWSU/DWST/M&E Dep. ・Other SWC Training Centre
3	Joint Seminar	April and November	Latest monitoring data	・DWSU/DWST/M&E Dep. ・Other SWC Training Centre ・Other stakeholders (UNs, NGOs, etc.)
4	SWC Workshop	Annual (Feb)	Latest monitoring data	・DG of State Ministry of Physical Planning and Public Utility ・Other sector's staff in SWC ・DG of SWC ・DG of state admiration of training
5	Internal Meeting	Monthly	Latest monitoring data	・DG of SWC ・Manager of each sector ・Staff of SWC Training Centre ・Manager of Administration of SWC

6-2.Utilization of the Monitoring Data

Major ways of utilizing the monitoring results is as follows;

- **Evaluation of the progress of the capacity building**

Monitoring result shall be utilized as a basis for evaluating contribution of the trainings for SWC staff's capacity building and operation of the SWCs.

- **Development and the revision of the Human Resources Development Plan**

DWST and SWC Training Centers review the training implementation capacity of each organization through monitoring and will develop and revise the Human Resources Development Plan according to the latest implementation capacity.

- **Revision of the Human Resources Development Manual**

DWST and SWCs revise the Human Resources Development Manual based on the monitoring result and evaluation. Human Resources Development Manual shall be used widely at the national level, and it shall contain case studies of some States in order to share the "good practices".

- **Development and the revision of the DWST/SWC Training Plan**

DWST and SWC Training Centre develop and revise the annual training plan based on the monitoring results.
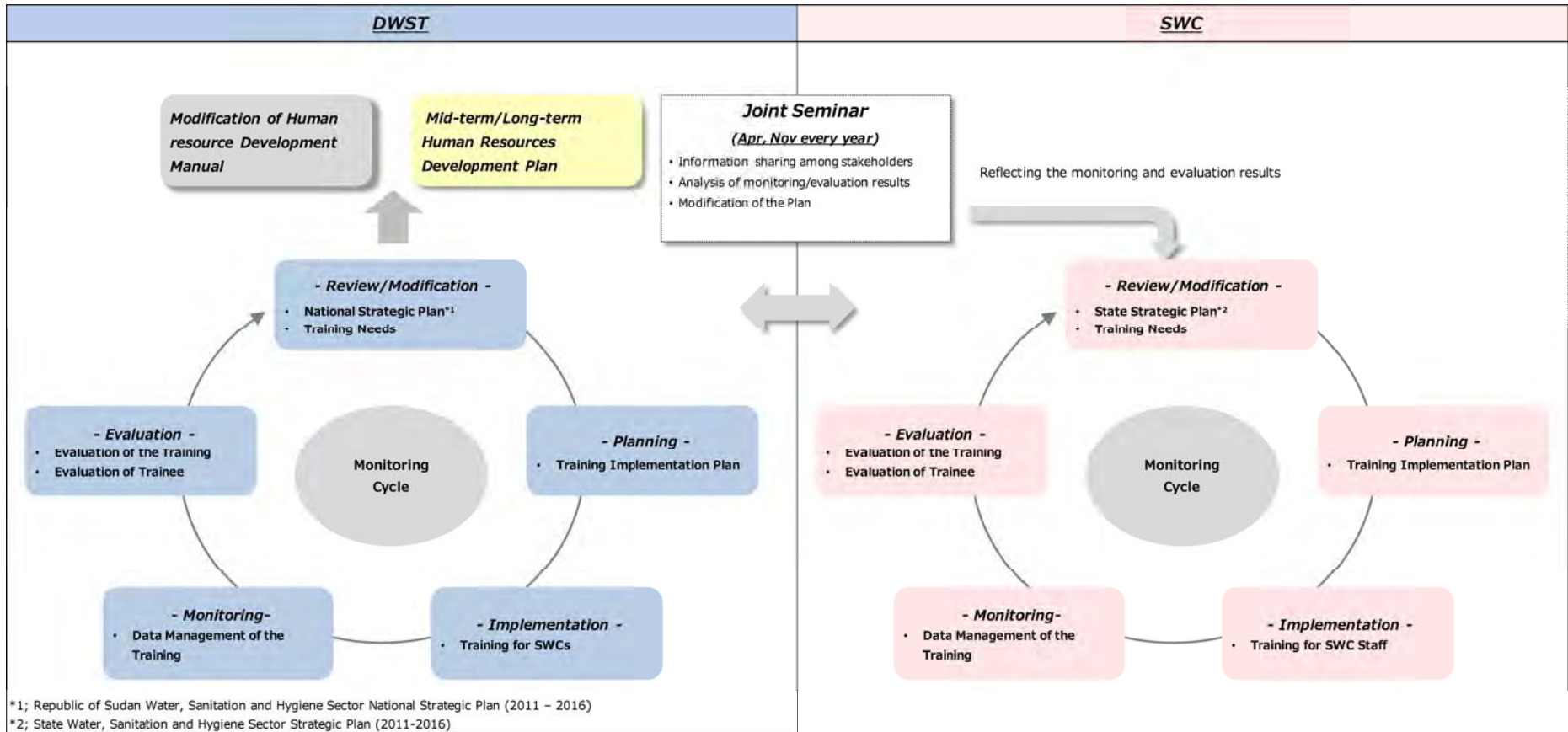
Figure 6-2 Monitoring cycle and the utilization of data

Appendix

1.Contact person of each SWC

No.	State	Name	Position	Phone Number	Email
1	Northern	Abdalla M.Mahmoud	TC Director		
2	River Nile	Nazar Mustafa Abbas Ahmed	TC Director		
3	Red Sea	Awwad Abdel Rahim A. Sadig	TC Director		
4	Khartoum				
5	El Gezira	Ehab Abd Alaal Elhaj	EG.computer		
6	Gedaref	Mr.Elbagir Ibrahim Osman			
7	Kassala	Mr. Ali hassan sadig	TC Director		
8	Sennar	Eman Elnour	EG.computer		
9	White Nile	Ahmed Eltyeb Suliman	TC Director		
10	Blue Nile	Abdelrahim Mohammed Mahmoud	TC Director		
11	North Darfur	Teyseir Ahmed Abdelrhman Omer	Monitoring & database		
12	South Kordofan	Mr.Yassir Kenany	TC Director		
13	West Kordofan	Mr.Ibrahim Shaib Mohamed	TC Director		
14	North Kordofan	Ms.Afra Mustafa Mohamed	TC Director		
15	West Darfur	Mr.Mohamed Hassan Mohamed	TC Director		
16	Central Darfur	.Mr.Ibrahim Abaker Digies	TC Director		
17	South Darfur	Mr.Hassan Adam Mohammed	TC Director		
18	East Darfur	Mr.Hassan Adam Mahmoud Basheer	TC Director		

A-1

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Human Resources Development for Water Supply in Sudan Phase-2

March 2015

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Ministry of Water Resources and Electricity (MWRE)
Drinking Water and Sanitation Unit (DWSU)
Drinking Water and Sanitation Unit Training Center (DWST)

Water Yard Monitoring Manual

- *Version.1*

March 2015

Location Map of Sudan

1. Northern
2. River Nile
3. Red Sea
4. Khartoum
5. El Gezira
6. Gedaref
7. Kassala
8. Sennar
9. White Nile
10. Blue Nile
11. North Kordofan
12. South Kordofan
13. West Kordofan
14. North Darfur
15. West Darfur
16. Central Darfur
17. South Darfur
18. East Darfur

Table of Contents

Attachment 1: Sennar SWC Water Yard Monitoring Plan

Attachment 2: White Nile SWC Water Yard Rehabilitation Plan

1 Outline of the Monitoring Activity of Water, Sanitation and Hygiene Sector

The National Policy for Water, Sanitation and Hygiene Sector is indicated in the Millennium Development Goals 7 (hereinafter "MDGs 7") and 25-Year's Strategic Plan in Sudan, and its Goals are improvement of safe water access and water consumption per capita.

Although targets to be achieved by 2015 and 2031 are shown on the MDGs 7 and 25-Year's Strategic Plan in Sudan, there are big differences between targets and the actual water supply situation in 2010 (refer to Table 1-2).

Table 1-1 : National Target of Water, Sanitation and Hygiene Sector

Period	Target		Remarks
	Rural Area	Urban Area	
By 2015	Providing 20 litres of safe water per capita per day to cover 79 % of the population.	Providing 90 litres of safe water per capita per day to cover 79 % of the population.	MDGs 7
By 2031	Providing 50 litres of safe water per capita per day to cover 100 % of the population.	Providing 150 litres of safe water per capita per day to cover 100 % of the population.	25-Year's Strategic Plan

Table1-2 : Population and the access to improved water and consumption by state, 2010

State	Total population	Rural population	Urban population	Total Access	Rural access	Urban access	Liters per capita per day		
							Average (l/c/d)	Rural (l/c/d)	Urban (l/c/d)
Northern	730,162	403,548	326,614	88.70%	87.20%	96.40%	41	30	55.4
River Nile	1,177,164	805,367	371,797	68.10%	58.10%	92.70%	46	43	73.8
Red Sea	1,469,654	781,961	687,693	58.20%	35.60%	93.60%	24.7	5	47.1
El Gezira	3,734,323	3,020,966	713,356	91.30%	89.50%	99.00%	32	25	62
Gedaref	1,419,404	990,578	428,826	59.90%	45.60%	96.30%	25.1	17.2	43.4
Kassala	1,884,086	1,248,137	635,949	54.00%	43.90%	82.80%	25.9	14.5	48.3
Sennar	1,341,860	1,092,012	249,848	82.20%	79.30%	92.90%	34	30	50
White Nile	1,821,749	1,061,000	760,749	61.10%	49.50%	84.20%	25.4	20.5	32.2
Blue Nile	875,944	680,295	195,649	50.80%	41.00%	81.70%	23.9	16.6	49.4
North Kordofan (Incl. Part of West Kordofan)	3,086,857	2,531,013	555,844	70.40%	63.80%	97.60%	28.3	25.4	41.5
South Kordofan (Incl. Part of West Kordofan)	2,508,268	2,116,645	391,623	70.90%	62.60%	98.00%	21.9	20.8	27.7
North Darfur	2,517,133	2,165,539	351,594	49.90%	43.70%	80.50%	12.1	7.3	41.7

1

West Darfur (Incl. Central Darfur)	1,377,140	1,097,814	279,326	44.70%	37.80%	78.30%	8.6	6.5	16.5
South Darfur (Incl. East Darfur)	4,309,227	3,496,255	812,972	52.10%	41.20%	92.50%	13	12.2	16.1
Total	28,252,971	21,491,130	6,761,840	64.81%	56.83%	91.12%	23.99	18.66	42.06

Source: "2008 Census and state statistic offices" and "State water corporations and WES Projects, 2010"

One of the urgent issues of the water sector in Sudan is a lack of data management and monitoring skills for water supply. The situation is totally the same at state level water sector which is operated by State Water Corporation (hereinafter "SWC"). Without proper data management and regular update of the water supply facilities in Sudan, the National Goal "Improvement of the safe water access and the water consumption per capita" cannot be achieved.

The policy for monitoring is mentioned in the "Water, Sanitation and Hygiene Sector National Strategic Plan (2012 – 2016)" based on the National Goals. However, monitoring of water supply facilities had not been conducted effectively in most of the Sudanese states due to the following factors;

- Lack of budget for the monitoring activity.
- Lack of implementation agency and person in charge of monitoring activities.
- Low reliability of the existing data of water supply facilities.
- Lack of the common format (Database) for monitoring data.
- Lack of comprehensive data management (sharing) system among the locality offices, the SWCs and the Federal Government.
- Lack of the feedback system of the monitoring results.
- No recording activities of Operation and Maintenance (hereinafter "O&M") data for the water supply facilities on site.

Donkey Carts in White Nile State

Water Yard in Sennar State

2 Objective of the Monitoring

Monitoring objectives which are mentioned in the "Water, Sanitation and Hygiene Sector National Strategic Plan (2012 – 2016)" are as follows;

2-1.Objective-1

Ensure that Monitoring and Evaluation (hereinafter) Unit at DWSU and SWC is well established and functioning and also starts monitoring the Sanitation and Hygiene components of the Water, Sanitation and Hygiene Sector Monitoring of different water resources, include basic overview of trends in water use, especially human use and livestock, rural and urbanization and possible environmental (waste water) problems and measure coverage and access to, and functionality and use of water supply and sanitation services in urban and rural areas.

2-2.Objective-2

Coordination of emergency preparedness operations at state level: There are three levels of coordination regarding the response to the emergency situation: at local (Locality), State (SWCs) and national level (DWSU).   Most of the states have emergency committee to manage the operations and facilitates linkages between the different levels. In most cases major support usually comes from the national level. UN agencies and NGOs usually play key role in emergency preparedness and response.

2-3.Objective-3

Coordination of M&E with the States in training in M&E, and share guidelines and standards, joint resources allocation, modern different Water, Sanitation and Hygiene Sector acceptable and sustainable technology through foreign and local investment for federal, states rural and urban levels. Relationship between DWSU and SWCs, roles and responsibilities are well defined.

2-4.Objective-4

Establishment of a Management Information System (MIS) fully integrated with an affordable and user friendly Geographic Information System (GIS like the Water Point Mapper of Water Aid; mobile phone based monitoring systems are being tested) for proper performance through processing and analysing monitoring data in place.

2-5.Objective-5

Monitor and report of national and internationally funded projects implemented at state level, which are channeled through DWSU.

3 Purpose of the Monitoring Water Yard

According to the "Water Supply and Environmental Sanitation Policy", around 63% of the drinking water in Sudan are supplied by ground water, which plays significant role in national water resources. However, the detailed usage of ground water and water supply facilities is unrevealed due to the shortage and low reliability of the existing data.

Furthermore, the data shortage of ground water and water supply facilities has detrimental effects on development of the operation and maintenance (O&M) plan at state level. Lack of data and continuous monitoring activity is recognized as a challenge against the efficiency and effectiveness of each SWC's operation.

There are multiple purposes of monitoring Water Yard O&M status; these can be classified from the viewpoints of (1) the Management, and of (2) Engineering of Water Yard O&M status.

The main purposes of monitoring agreed-upon among the SWCs and the DWSU are as follows;

No.	Classification	Category	Purpose
1	Management	O&M (state/national-level Management)	• To promote the O&M work of Water Yards • To select appropriate technology for the O&M • To find the training needs of operators and technicians for the O&M • To allocate suitable technician to each water yard
2		Community Level (On site)	• To promote the payment of water tariff from subscribers • To know the necessary spare parts for Water Yard • To promote the awareness of ownership of community people • To promote the community participation for spare parts purchase • To improve the communication between SWC and community • To decide the operation hours of water yard • To prevent water pollution (preservation of the sanitary environment) • To ensure smooth spare parts supply through the monitoring data
3	Engineering (Facility)	Power Supply Unit	• To select appropriate power unit • To install suitable quality equipment • To protect power cable and keep its quality • To promote the installation of the stabilizer to avoid unsterilized voltage damage • To know the suitable power supply method such as standby systems • To promote regular O&M for power supply unit • To improve the cable connection • To calculate suitable operation hours for the generator • To know the abrasions consistent with age and use

4			Borehole	• To find specific water yield to avoid draw down of the ground water • To know the water levels and capable pumping volume to select suitable submersible pumps • To know the suitable operation hours of pumps • To know the ages of the equipment (facilities) • To know the design of the borehole for rehabilitation • To prepare the O&M and rehabilitation plan • To promote installation of well cover to avoid water pollutions • To acknowledge the timing to change the equipment • To prepare the training plan for borehole's O&M and rehabilitation
5			Pump/Control Panel Unit	• To select the suitable capacity of control panel • To know the most damaged part of control panel and pumps • To promote the control panel protection (covering) • To check the voltage by the control panel
6			Water Quality	• To prevent water pollution • To prevent diseases which are caused by unsafe water • To serve safe drinking water for subscribers • To select suitable materials of casings according to the types of water • To prepare the training plan for the water disinfection for community people • To control the brackish water
7		Other		• To promote fencing around water yard for security • To know the sanitary environment of the water yard • To know the situation of elevation tank such as painting and leakages • To know the situation of water usage such as livestock and agriculture

4 Roles and Tasks of Implementation Agencies

<u><Ministry of Water Resources and Electricity></u>

- **Allocation of Budget for Monitoring to DWSU**

- **Authorization of the National Policy for monitoring**

<u><DWSU Monitoring and Evaluation Department></u>

- **Preparation of the Monitoring Plan**

- **Securement of the Monitoring Budget**

    DWSU Monitoring and Evaluation Department prepares the cost estimations based on the monitoring plan and submits it to Ministry of Water Resources and Electricity.

- **Management of monitoring data by maintaining the database**

    DWSU Monitoring and Evaluation Department manages the monitoring data which is submitted from each SWC Monitoring Unit by utilization of common formats

- **Instruction of the monitoring method to the SWCs**

- **Analysis of the monitoring data submitted by the SWCs**

- **Feedback the analyzed data to the SWCs**

    DWSU Monitoring and Evaluation Department compiles and analyses the monitoring data, and feed-back the results to each SWC

- **Holding the monitoring Joint Seminar in <u>April and November.</u>**

    To share the monitoring data and instruct the monitoring methodology to each SWC, DWSU Monitoring and Evaluation Department holds the Joint Seminar in April and November every year.

- **Preparation of Annual Monitoring Report (data book)**

    DWSU Monitoring and Evaluation Department annually prepares and publishes the national monitoring report, and shares it among the stakeholders such as the SWCs, the UN Agencies and the NGOs.

<u><SWC Monitoring Unit[1]></u>

- **Preparation of the annual monitoring plan**

- **Securement of the monitoring budget**

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[1] The name of monitoring unit may differ across different states.   <Example: White Nile SWC; Monitoring and Evaluation Unit Sennar SWC; Monitoring Follow-up and Evaluation Unit >

SWC Monitoring Unit prepares the cost estimations based on the monitoring plan and submits it to the State Government.

- **Data collection from the SWC Locality Offices (Sector)**

- **Management (input and update) of the monitoring data**

- **Analysis of the monitoring data**

- **Preparation of Annual Reports (data books)**

- **Feedback the result of the analyzed monitoring data to other SWC staff and localities/sectors**

- **Promotion and instruction of monitoring methods to all the sectors in the SWC**

- **Information sharing with stakeholders (SWC staff, DWSU, NGOs, UNs, Other related organizations)**

- **Technical support for each sector of SWC**

- **Regular monitoring data sharing with DWSU Monitoring and Evaluation Department**

SWC monitoring unit summarizes the state monitoring data of Water Yards and share the information with DWSU Monitoring and Evaluation Department at least twice a year. The timing of data sharing shall be decided in the discussion between each SWC and DWSU.

<SWC Locality Offices（Sector）>

- **Allocation of the staff in charge of monitoring**

- **Securement of the Monitoring budget**

SWC Locality Offices（Sector）secure the budget for monitoring based on the estimated cost by SWC Monitoring Unit.

- **Implementation of monitoring surveys on each site (baseline/ annual/ seasonal)**

SWC Locality Offices' (Sector) technical team conducts **baseline survey** of each Water Yard in the area in order to collect basic data of the facilities (refer to "Appendix-Ⅱ 1."). From the following year, SWC Locality Offices (Sector) conduct **annual/ seasonal surveys** to update the condition of facilities by visiting each site (refer to "Appendix-Ⅱ 2&3.").

- **O&M data collection from operators and technicians who are working on site, and conducting monthly survey (once per month)**

SWC Locality Offices (Sector) send their staff to collect daily O&M record from each operator or technician once a month. Collecting staff can be water tariff collector, locality office O&M team, and so on, but (s)he must be someone who regularly visits each Water

Yard (every month). Collecting staff also brings monthly survey sheet (refer to "Appendix-Ⅱ 4.") to check the condition of Water Yard.

- **Completion of Water Yard monthly survey**

  SWC Locality Offices (Sector) receives the monthly survey form from the collecting staff, and complete monthly survey for each Water Yard. It includes (1) condition of Water Yard which was checked on site, and (2) summary of operational cost per Water Yard (fuel for generator, electricity cost, consumables, and other expenses).

- **Daily O&M data management**

  SWC Locality Offices (Sector) receives the daily check sheet from the collecting staff, and compile the data on the O&M database. The total amount of collected water tariff shall be calculated at SWC Locality Offices (Sector) by summing up the daily record by the operators/ technicians.

- **Information sharing with SWC Monitoring Unit**

  SWC Locality Offices (Sector) send summary of Water Yard monitoring data (result of **annual surveys**) regularly to the SWC Monitoring Unit. The frequency of communication may be decided by the SWC and the localities, but it shall be at least twice a year (=frequency of communication between the SWC and DWSU monitoring units).

<u>\<Operator, Technician (Responsible Persons on Site) \></u>

- **Daily O&M record of the Water Yard**

  Operator of each water yard records the operational information of the facility on daily basis. The items to be checked include water supply amount (m^3/day), collected tariff (SDG/day), water levels (m), operation hours of the pump (hour/day), and so on.

- **Regular communication with SWC Locality Offices (Sector)**

8
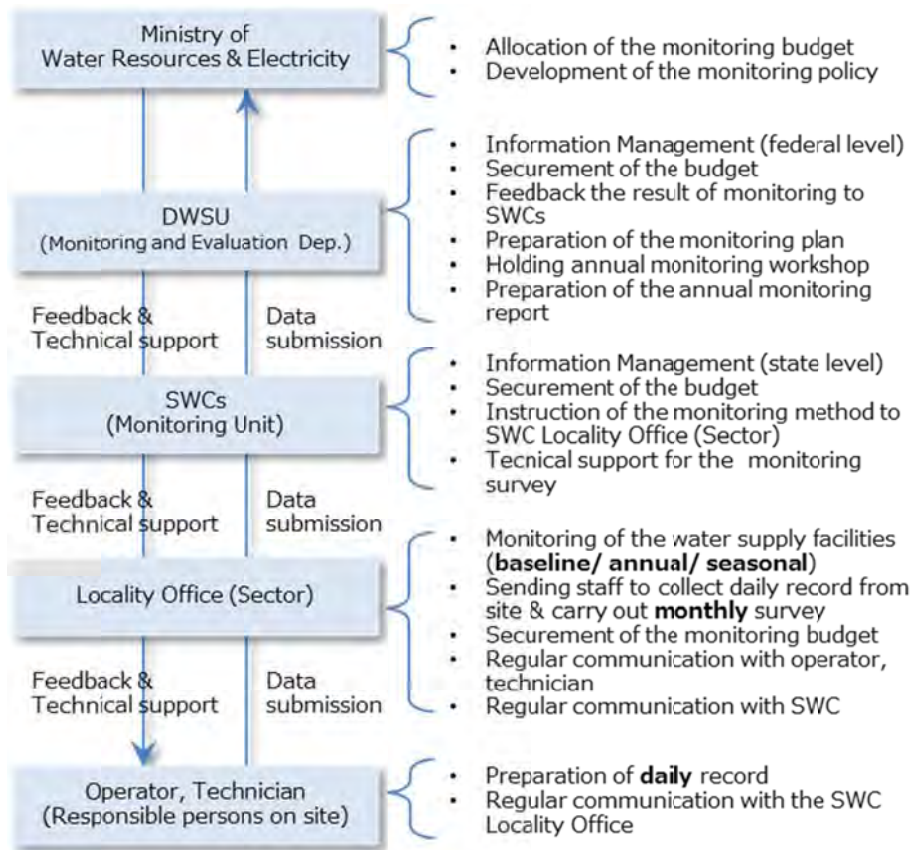
Figure 4-1. Main tasks of implementation agencies

Monitoring Planning (White Nile State)

Field Survey (White Nile State)

5 Structure of the implementation agencies

The structures of DWSU and SWC that include the monitoring units are as follows;
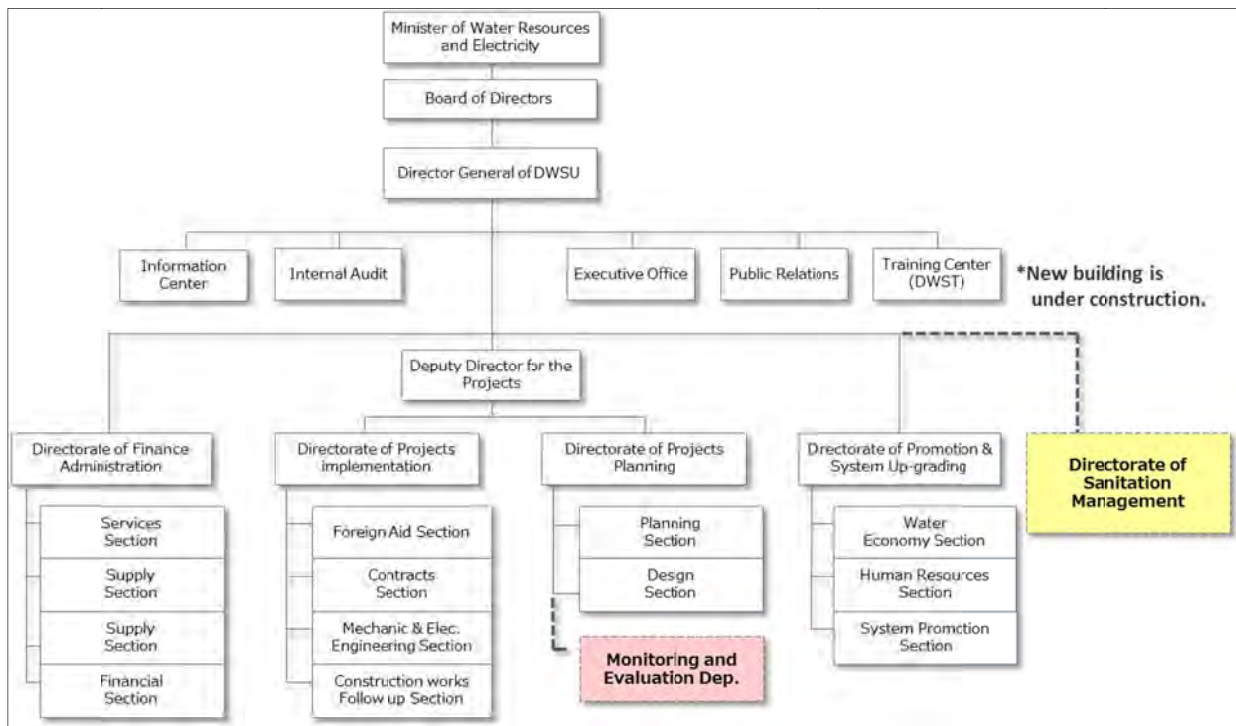
Figure 5-1 Structure of DWSU and Monitoring and Evaluation Department
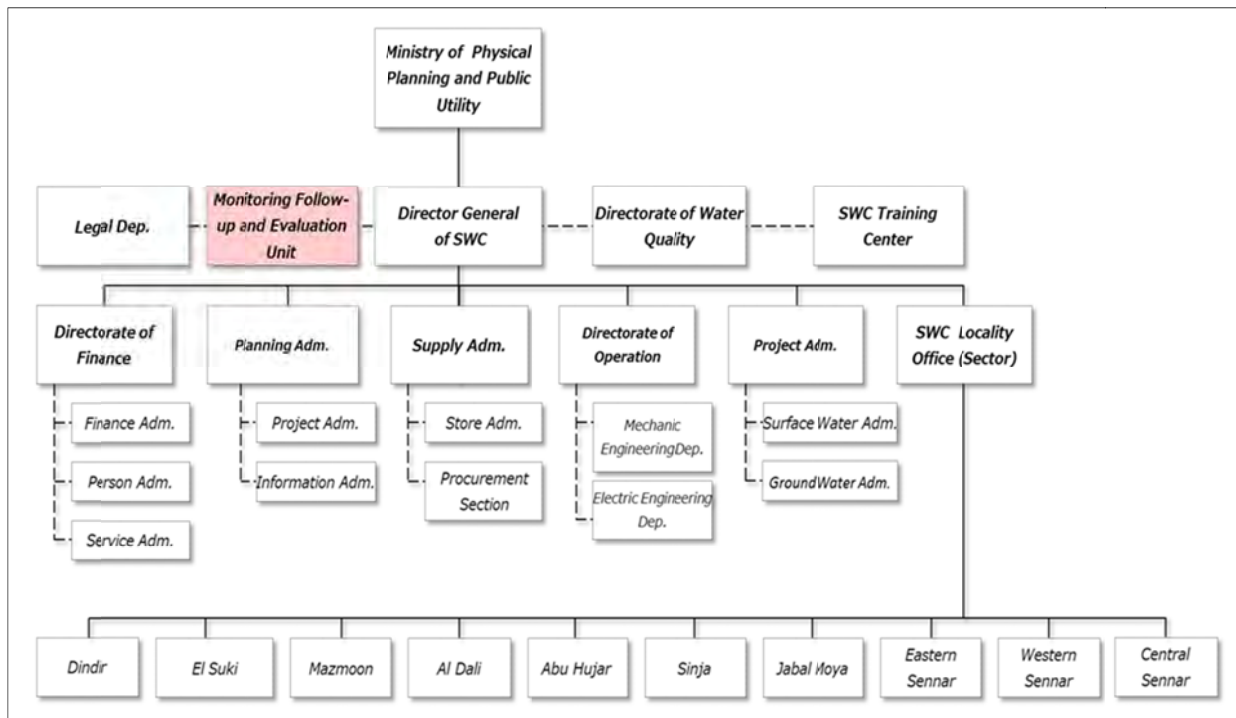
Figure 5-2 Structure of Sennar SWC and Monitoring Follow-up and Evaluation Unit

6 Methodology and data transfer

6-1.The Outline of the Monitoring Implementation

The initial step of monitoring implementation is to establish "monitoring unit" and to appoint responsible person(s) for the activities. After planning of activities and securing budget, **baseline survey** of the Water Yards is carried out (details in 6-2). The flowchart of monitoring implementation process is as follows;
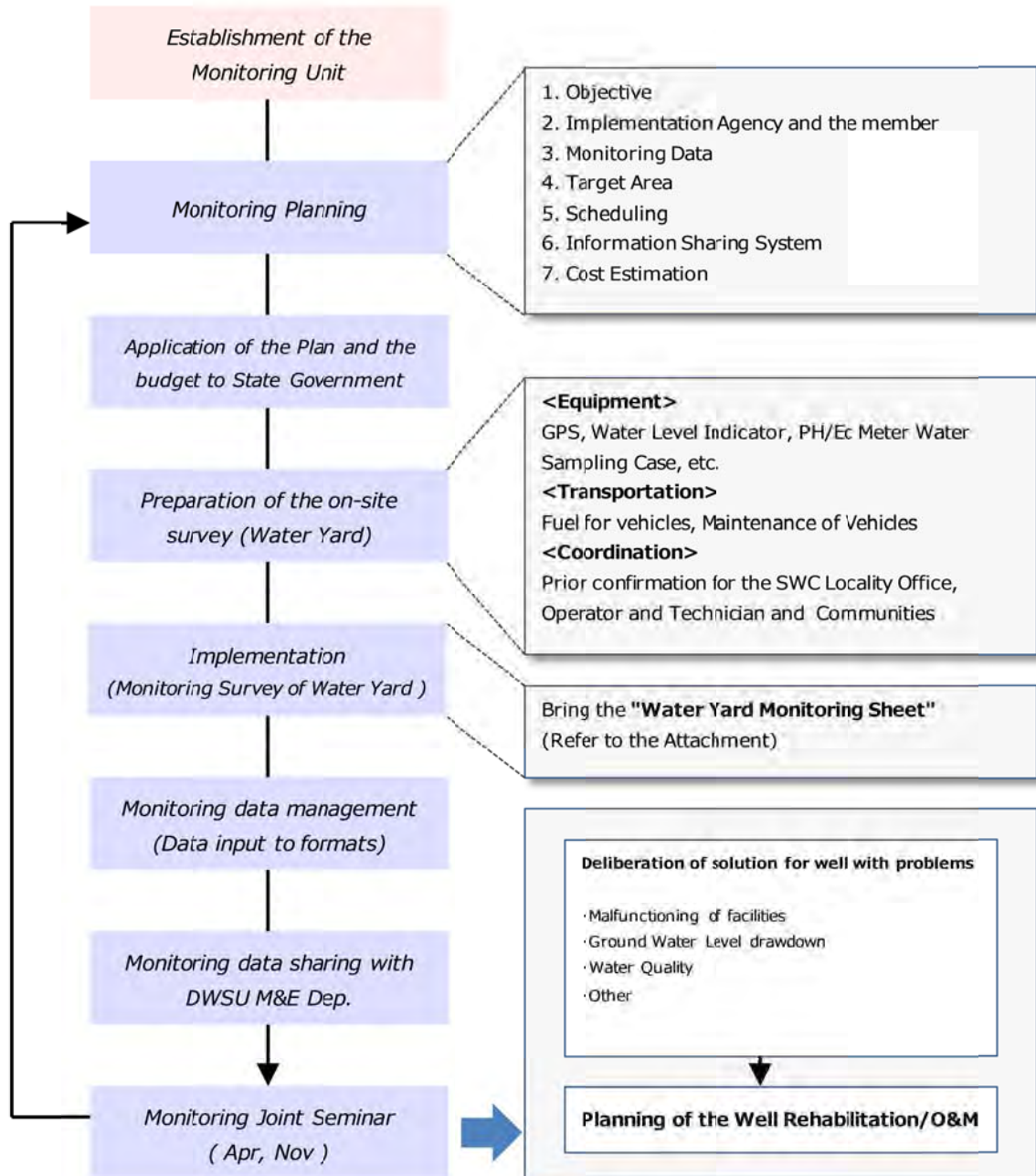
Figure 6-1. Monitoring Implementation Flowchart

11

6-2.Methodology of the Monitoring Implementation

The monitoring of water yards must be continuously conducted. However, regarding the unchangeable survey items such as location information (coordinate), name of village and well depth are enough to check only once at the baseline survey. On the other hand, changeable information such as condition of facilities, water quality and water tariff revenue should be monitored regularly after the baseline survey.

In consideration of the above situation, DWSU and SWCs have classified survey items by monitoring intervals (only once at baseline survey/annually/monthly/daily), and have appointed responsible SWC staff too (refer to "Appendix-Ⅳ 1.").

As for the implementation procedures of both the baseline survey and necessary monitoring after the baseline survey, details are shown in following "**(1)**" and "**(2)**".

（1）Initial Stage -Baseline survey

In order to obtain information and to check the current status of each Water Yard, the SWC Monitoring Unit conducts the **baseline survey**. The procedures of baseline survey are mentioned below:

1) SWC Monitoring Unit holds the Monitoring Workshop to prepare the plan in cooperation with DWSU M&E Dep.

2) DWSU M&E Dep. provides the existing water yard information such as "WASH Database" to SWC Monitoring Units.

3) DWSU M&E Dep. prepares the road maps which show the location of water yards.

4) SWC Monitoring Unit collects necessary water yard data from the State Ground & Wadi Corporation and population statistics data from the State Statistics Office.

5) SWC Monitoring Unit provides necessary equipment and data to SWC Locality Offices (Sector) that implement on-site surveys.

6) SWC Monitoring Unit instructs each SWC Locality Offices the methodology of the monitoring.

7) SWC Locality Office contacts the operator or representative of water yard, and informs them the monitoring schedule and preparations if needed.

8) SWC Monitoring Unit, SWC Locality Office and operators conduct on-site survey (baseline survey) by reference to "Monitoring Sheets (base line survey)" (refer to "Appendix-Ⅱ 1.").

9) SWC Monitoring Unit inputs the data to "Monitoring Formats" (refer to "6-3.")
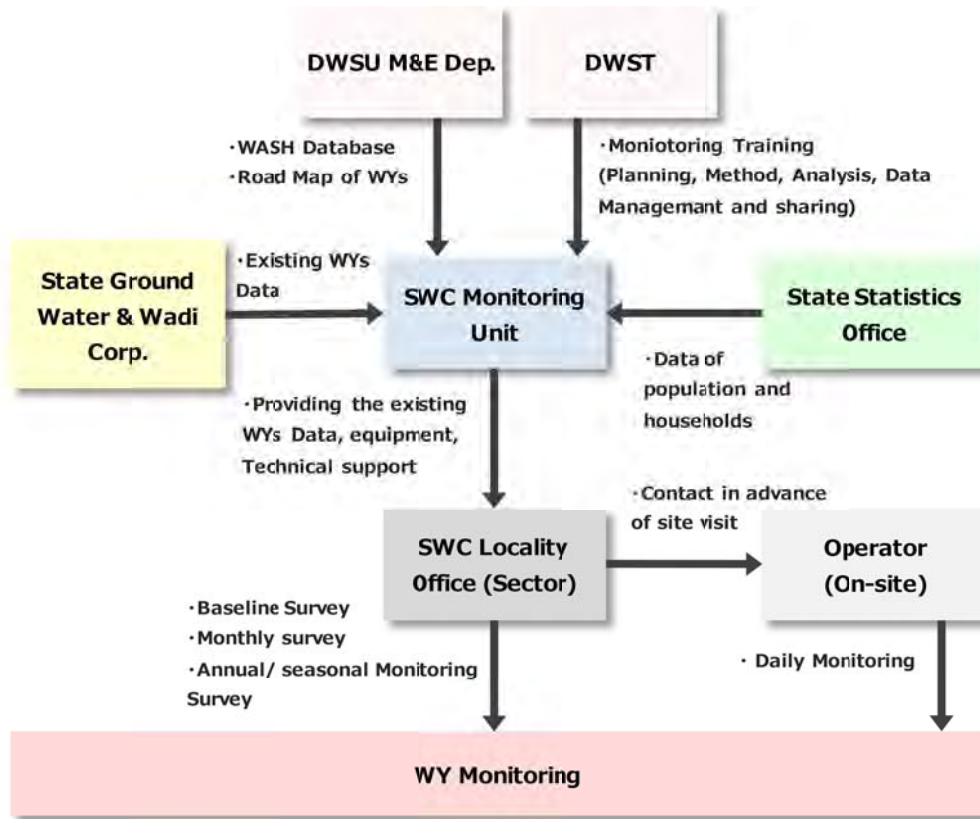
Figure 6-2.Cooperative framework among stakeholders at initial stage

(Baseline survey)

Field Survey (Sennar State)	Daily Monitoring Instruction to Operator (Sennar State)

13

（2）Second Stage –After Baseline Survey

After the baseline survey (first year), monitoring activity becomes **routine work** for the related monitoring units, SWC Locality Offices (Sectors) and individual operators or technicians. The procedures of monitoring activity are as follows;

1) Operator or technician on site keeps **daily record** of condition of each Water Yard by using daily check sheet. How to check each item is explained with photos in the instruction sheet (refer to Appendix-Ⅲ 1&2.").

2) Staff from SWC Locality Offices (Sectors) collects the daily record form at the beginning of next month. This collecting staff can be water tariff collector, O&M team member from the SWC Locality Office, and so on depend on the situation of each Locality Office (Sector).

3) The same staff from SWC Locality Office (Sector) fills in the **monthly survey** form when they visit the site. They fill in the whole sheet except for the Section B on site (refer to "Appendix-Ⅱ 4.").

4) The collecting staff brings back the (a) daily record form from the operator and (b) monthly survey form to the SWC Locality Office (Sector).

5) The SWC Locality Office staff that is responsible for monitoring fills in the Section B of the monthly survey form. Items under "Situation of Water Supply" can be calculated by summing up the data of operator's daily record. Items under "Operation Cost" can be calculated from each Locality's procurement record.

6) Monthly survey forms are managed (kept) by each SWC Locality Office (Sector) for their own record.

7) SWC Locality Office technical team (such as operation and maintenance team) conducts **seasonal survey** twice a year (dry and rain season) to measure SWL and DWL (refer to "Appendix-Ⅱ 3.").

8) SWC Locality Office (Sector) conducts **annual survey** once a year at each Water Yard by using annual survey form (refer to "Appendix-Ⅱ 2.").
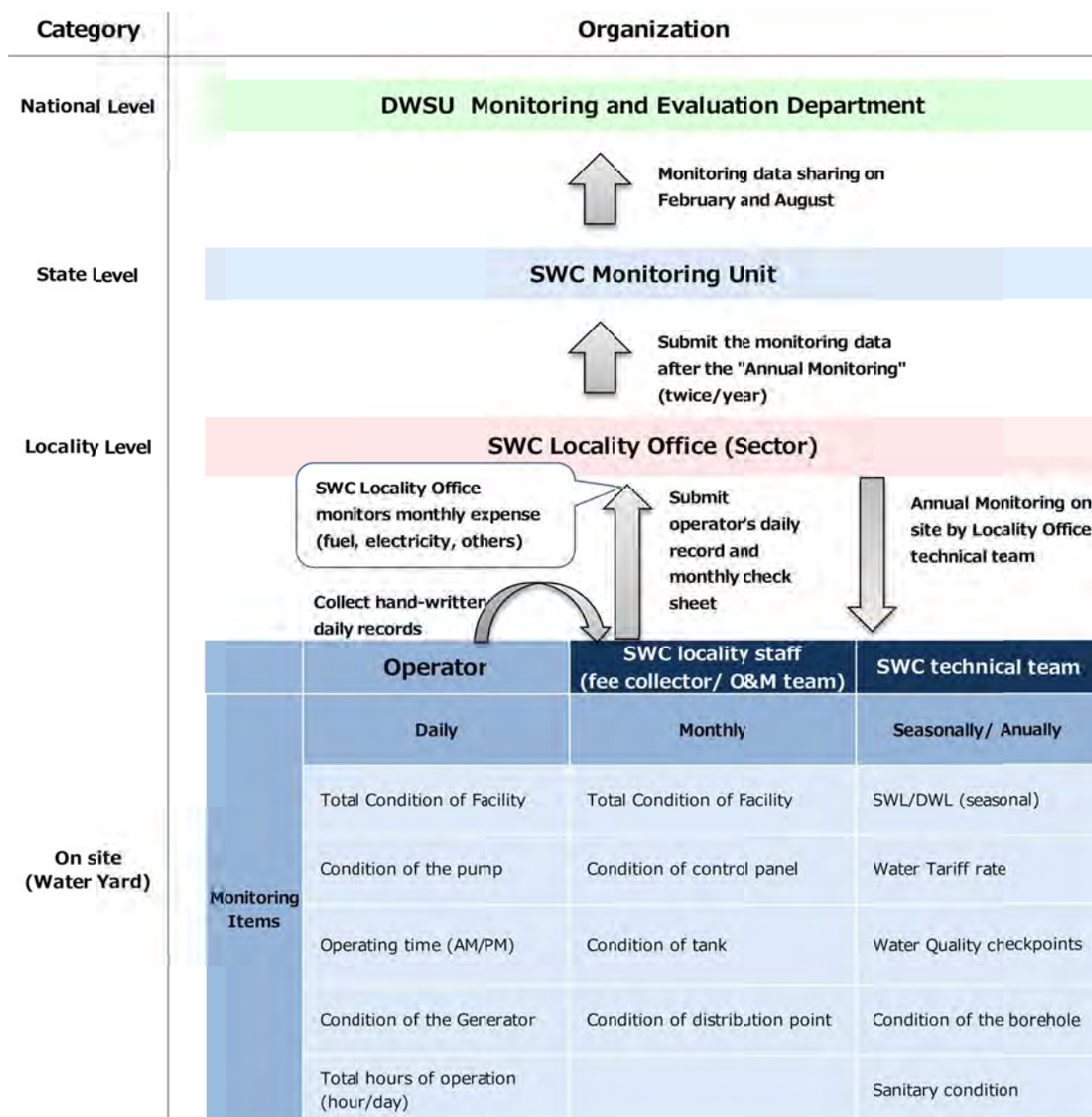
Figure 6-3. Flow of the monitoring data transfer

6-3.Input of the Water Yard Monitoring data

Methodology of monitoring data input is as follows;

① <u>SWC Monitoring Unit</u> conducts the Water Yard Monitoring Survey with "the Water Yard Monitoring Sheet" (refer to the "Appendix-Ⅱ").

② <u>SWC Monitoring Unit</u> fills in the "the Monitoring Water Yard Sheet" and paste picture (keep it as reports).

15

③ <u>SWC Monitoring Unit</u> inputs the updated data (Monitoring Format)

④ <u>SWC Monitoring Unit</u> inputs the detailed information of Water Yard such as "Basic Information", "O&M", "Water Tariff", "Water Source", "Water Quality", "Borehole", "Elevation Tank", "Distribution Pipes", "Sanitary Environment", etc based.(Monitoring Format).

⑤ <u>SWC Monitoring Unit</u> inputs the number of water yards by Locality (Sector).

⑥ <u>SWC Monitoring Unit</u> sends monitoring formats to <u>DWSU Monitoring and Evaluation Department</u> by email (**every <u>February</u> and <u>August</u>**).

⑦ <u>DWSU Monitoring and Evaluation Department</u> summarize the number of water yards by state.

Methodology of data input for the specific information of water yards -1

		1	2	3	4
Section A Basic Information	No	1	2	3	4
	Date_(Inspection)	18/11/2014	18/11/2014	18/11/2014	18/11/2014
	ID	WNT001	WNT002	WNT003	WNT004
	Locality	Tandalti	Tandalti	Tandalti	Tandalti
	Village(Municipality)	Omkytaisat	Elmelaih	Pshaeyer	Karmal
	Population of Village	1200	3000	1000	4000
	Household	200	500	150	600
	Population water served				
	Number of livestock which consume water <sheep /day>	1500	600	500	5000
	Number of livestock which consume water <goat /day>				
	Number of livestock which consume water <cow /day>	500	500	1000	3000
	Number of livestock which consume water <camel/day>				1500
	Distance to water yard from community (m)	1000	1000	500	1500
	Total Condition of Facility <Not Functioning, Functioning (Partially Damaged), All facilities are functioning >	Functioning	Functioning	Functioning	Functioning
	Water Supply Status (Public Water Fountain Only, Both Public Water Fountain and House Connection, House Connection				
Section B Operation and Maintenance	Organization of O&M	SWC Locality Office(Sector)	SWC Locality Office(Sector)	SWC Locality Office(Sector)	Private
	Number of Staff	4	2	2	2
	Committee of the water user				
	Representative (Contact Person)	Mohamed	Osman	Hammed	Mohammed
	Mobile of the representative on site	919614490	911032646	915536414	915599995
	Small Maintenance	SWC Locality Office(Sector)	SWC Locality Office(Sector)	SWC Locality Office(Sector)	
	Sapir parts supply	SWC Locality Office(Sector)	SWC Locality Office(Sector)	SWC Locality Office(Sector)	
	Operation Cost; Fuel for Generator(Litter/Month)	120	960	840	640
	Operation Cost; Fee for Electricity (SDG/Month)				
	Operation Cost; Other Consumable (Filters, Cables, Packing, etc.) (SDG/Month)				
	when is the last maintenance Borehole (MM/YYYY)	2013/10	2012/5	2012/4	2014/6
	when is the last maintenance control panel		2014/6	2015/5	2014/4
	when is the last maintenance Generator	2013/12	2014/9	2013/8	18/11/2014
	when is the last maintenance pipe network			2012/2	2014/6
Section C Water Tariff	Fixed (Household/SDG/Month)				
	Barrel (SDG/Barrel)	2.00	2.00	2.00	3.00
	Jelly Can (SDG/Jelly Can)	0.25	0.25	0.25	0.25
	By Flow Meter (SDG/m3)				
	Tariff Collected by	Operator	Operator	Operator	Operator
Section D Water Sources	Water source	Ground Water	Ground Water	Ground Water	Ground Water
	Treatment of water (Yes/No)	No	No	No	No
Section E Water Quality	Color	Clear		Clear	Clear
	Taste and Odor	None		None	None
	Temperature(℃)	29.7		34.7	36.0
	TDS(ppm)				
	pH	8.16		8.3	8.6
	EC (μs／cm)	741		712	808

④

17

Methodology of data input for the specific information of water yards -2

		WNT001	WNT002	WNT003	WNT004
Section F Specification of Borehole	Name, ID	WNT001	WNT002	WNT003	WNT004
	Casing diameter (inch)	8 5/8	8 5/8	6 5/8	8 5/8
	Lat. (UTM WGS 84)	12.57522	12.53534	12.51484	12.46451
	Lon. (UTM WGS 84)	31.49255	31.48146	31.5008	31.45169
	Elevation(m)	425	420	416	424
	Construction (Year)	2005	2004	1989	2007
	Funded by	Sudan(Federal)	Sudan(Federal)	Sudan(Federal)	Sudan(Federal)
	Total Depth(m)			218.6	
	SWL (m)		78.2	76.2	
	DWL (m)				
	Screen Position(m)			207.6-212.8/193.3-198.3/170-175	
	Screen Type	Johnson			Johnson
	Pump Position (m)		2	90	
	Pump Type		Submersible	Submersible	
	Pump_ size(inch)	3	2	2	2
	Pump Yield_(m3/h)			6.8	
	Date of the latest pumping test				
	Power Supply	Generator	Generator	Generator	Generator
	Condition of the Generator				
	Condition of the pump	Functioning	Not Functioning	Functioning	Functioning
	Spec of the Pump(kw)				
	Date of installation of the pump				
	Operating time (AM/PM)	6-9Am-12-2Pm	6-12Am/3-7Pm	7-12Am/1-6Pm	
	Total hours (hour/day)	5.0	10.0	10.0	22.0
	Condition of Valve	Functioning (Partially Damaged)	Functioning (Partially Damaged)	No Valve	No Valve
	Fence	Damaged	No Fence	Damaged	No Fence
	Well cover (Yes/No)	Yes	Yes	No	No
	Water level indicator (Yes/No)	No	No	No	No
	Overload Protection		No	No	No
	Control House (Yes/No)	Yes	Yes	Yes	Yes
Section G Elevation Tank	Material of Tank	No Tank	No Tank	FRP	Steel
	Capacity (m3)			45	45
	Condition of Tank	No Tank	No Tank	Very Bad (Malfunction)	Good
	Lat. (UTM WGS 84)			12.51484	12.46451
	Lon. (UTM WGS 84)			31.50108	31.45
	Elevation (m)			416	424
	Construction(Year)			0/0/1995	0/0/2004
	Fund (Elevation Tank)			Sudan(Federal)	Sudan(Federal)
	Height of Bottom(m)			6	7
	Gate Valve (Yes/No)	No	No	Yes	Yes
	Shape			Cubic	Cubic
	Condition of Valve	-	-	Damaged	Damaged
Section H Distribution Point	Ghrab (Yes/No)	Yes	Yes	Yes	Yes
	Distribution Point(Yes/No)	No	No	Yes	Yes
	Flow Meter (Yes/No)	No	No	No	No
	Animal Trough (Yes/No)	No	Yes	Yes	Yes
	Animal Trough condition	Good	Damaged	Damaged	Damaged

④ <UTM WGS84 (Decimal Degree)> !

Methodology of data input for the specific information of water yards -2

Section I Generator	Condition of the Generator	-	-	-	-
	Spec of of the Generator(kVA)				
	Date of installation of the Generator				
Section J Control Panel	Condition of Control Panel	Good	Damaged	Normal	Good
	Circuit Breaker	Exist(Good Condition)	Exist(Good Condition)	Exist(Good Condition)	Exist(Good Condition)
	Water Level Sensor	Non	Non	Non	Exist(Good Condition)
	Overload Protection	Exist(Good Condition)	Non	Exist(Good Condition)	Exist(Good Condition)
	phase failure	Exist(Good Condition)	Non	Non	Exist(Good Condition)
	Contactor	Exist(Good Condition)	Exist(Good Condition)	Exist(Good Condition)	Exist(Good Condition)
Section K Distribution Pipe	Type of pipe				
	Size (inch)	3	2	3	3
	Total Length (m)	7	6	6	12
	Construction (Year)	2005	2004	1995	2007
	Fund	Sudan(Federal)	Sudan(Federal)	Sudan(Federal)	Private
	Air Valve (Yes/No)	No	No	No	No
	Gate Valve(Pipe Network)(Yes/No)	No	No	Yes	No
	Condition of Pipe(Water Leakage)	Much	Much	Too much	Much
Section L Sanitation	Drainage	Non	Non	Non	Exist(Good Condition)
	Livestock (within 30m from BH)	Many	Many	Many	Many
	Solid Water (within 30m from BH)	Many	Many	Many	Many
	Excreta (within 30m from BH)	Many	Many	None	Many
	Public Tap Management	No Public Tap	Bad	Bad	Bad
	Distance from Latrine/Open Defecation(m)	none	none	none	none
	Community Participation	None	good	none	none
Rehabilitation (Yes/No)		Yes	No	Yes	Yes
Rehabilitation Date		2013/3		30/Jun/1905	2014/6
contents		Remove Ganretar		Remove pump	Remove Motor
Remarks					

④

Methodology of data input for the summary of water yards – state

No.	Locality (Sector)	Functioning	Functioning (Partially Damaged)	Not Functioning	Out the services	Total	Functioning Rate (%)
1	Kosti	⑤		7-58			
2	Raback						
3	Al Jabalain						
4	Tandalti	36	30	17	31	114	57.9%
5	Al Getaina						
6	Al Dweim						
7	Assalaam						
8	Omrimta						
9	Kawa						
	Total	**36**	**30**	**17**	**31**	**114**	57.9%

⑥ SWC Monitoring Unit submits data(excel files) to DWSU M&E Department by email

20

Methodology of data input for the summary of water yards – Sudan

No	State	Functioning	Functioning (Partially Damaged)	Not Functioning	Out the services	Total	Functioning Rate (%)
1	Khartoum	⑦					
2	El Gezira						
3	Gedaref						
4	Red Sea						
5	Northern						
6	River Nile						
7	White Nile						
8	Sennar						
9	Blue Nile						
10	Kassala						
11	North Kordofan						
12	South Kordofan						
13	West Kordofan						
14	North Darfur						
15	West Darfur						
16	Central Darfur						
17	South Darfur						
18	East Darfur						
	Total						

21

7 Utilization of the Monitored Data

7-1.Data Analysis

SWC Locality Offices (Sector) and SWC Monitoring Unit analyze data collected during baseline, annual, seasonal, monthly, and daily surveys. Data analysis is a critical part of monitoring activity since it can transform raw data into useful information for future plans and other activities. The method of data analysis is (1) summarizing collected raw data, and (2) extracting "useful information" out of the summary. Examples of "useful information" are as follows;

- For **baseline** survey, information regarding <u>condition of borehole and different components (generator, control panel, elevation tank, etc.)</u> is useful to determine the Water Yards to be rehabilitated. Similar data are useful in case of **annual** survey as well.
Recommended items to be analyzed are as follows;

\<Operation & Maintenance (O&M)\>
1) Situation of the O&M (SWC, Community, Other)
2) Operation Cost
\<Facility\>
1) Total Condition
2) Condition of the Pumps
3) Condition of the Generator
4) Condition of the Control Panel
5) Condition of the Elevated Tank
6) Water Leakage
\<Water Resources\>
1) Water Quality (Water laboratory)
2) Static Water Level
3) Dynamic Water Level
4) Drawn Down
\<Mapping\>
1) Mapping the location of the water yards in State (classify the functioning, malfunctioning, etc.)

- For **monthly** survey, information <u>regarding operation costs</u> is useful for each SWC Locality Offices (Sector) to manage the operation cost of each Water Yard.

22

7-2.Information sharing

Data that are collected and managed by each SWC Monitoring Unit shall be shared with DWSU Monitoring and Evaluation Department. The DWSU Monitoring and Evaluation Department promotes the information sharing system between Federal Level and State Level.

Furthermore, the DWSU Monitoring and Evaluation Department coordinates the Joint Seminar on every April and November (tentatively) to share the monitoring outputs with stakeholders. This Joint Seminar shall be organized with DWST which is responsible for sharing monitoring outputs of training.

The proposed methodology and the interval for the information sharing among stakeholders are as follows;

Table 7-1. Methodology and the interval for the information sharing among stakeholders

No	Method	Interval	Data to be shared	Remarks
1	Email	Every Feb, Aug	Latest monitoring data	Each SWC sends monitoring data to DWSU M&E Dep.
2	Joint Seminar/JCC	Every six month (Apr, Nov)	Latest monitoring data	DWSU M&E Dep. holds the Joint Seminar to share monitoring data among stake holders (SWCs, UNs, NGOs, etc.) and to promote the monitoring activity to all states
3	Mobile Phone	Any time (If required)	Latest monitoring data	DWSU M&E Dep. makes phone calls at SWCs to promote the data sharing
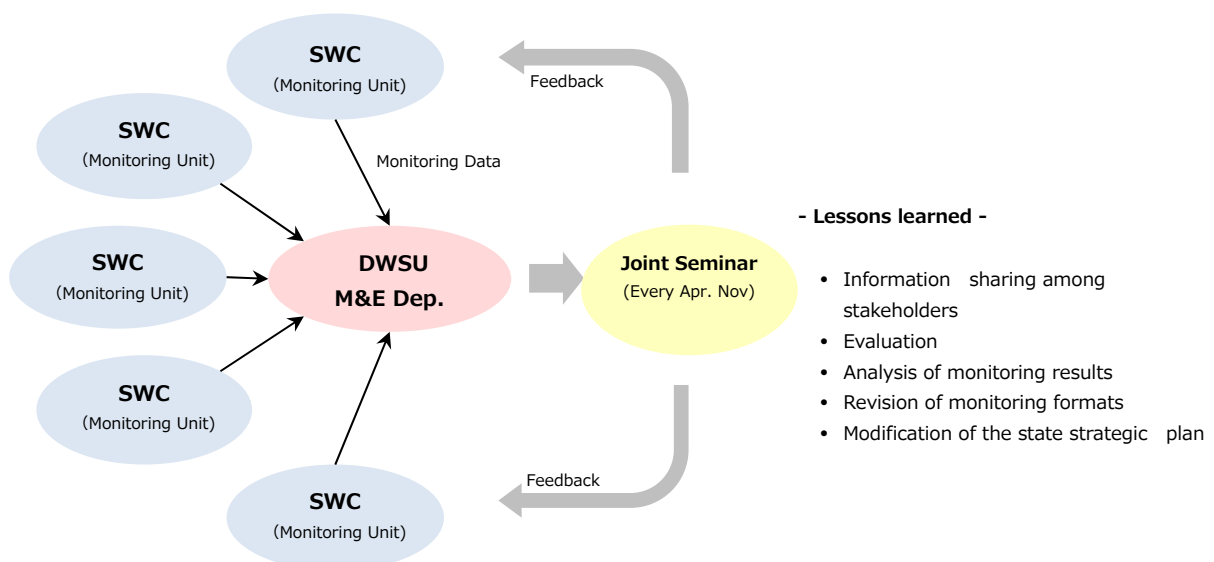
Figure 7-1 Information sharing

23

7-3. Utilization of the Monitoring Data

The expected utilization of the monitoring data is as follows;

- **Development and revision of "The National and State Water, Sanitation and Hygiene Strategic Plan"**

  DWSU and each SWC develop and revise "The National and State Water, Sanitation and Hygiene Strategic Plan" which reflects monitoring data such as condition of water supply facilities, water served population, water consumption and safe water access.

- **Development of the O&M/Rehabilitation Plan**

  Each SWC develops the O&M/Rehabilitation Plan of Water Yards to improve the water supply condition. O&M/Rehabilitation Plan (refer to "Attachment 2.") includes contents such as the target Water Yards, proposed cost and schedule of the rehabilitation work. This document plays critical role when each Locality allocate next year's budget for O&M work in their area.

- **Promotion of projects related to water supply from overseas**

  DWSU and each SWC accumulate and manage the monitoring data, and provide it to the development partners to promote future projects in the water sector in Sudan. Accurate information of current status of water supply facilities in Sudan helps the development partners to design and create new projects since effects of the project can be measured quantitatively.

- **Efficient equipment distribution**

  If the Federal Government or development partners have plan to provide and distribute maintenance equipment to the states, the monitoring data can be utilized for effective allocation of equipment based on the actual needs of each state. As the number of equipment is limited, they need to be distributed efficiently to improve the quality of water yard maintenance works. Water Yard monitoring data can help to minimize the gap between site maintenance needs and available equipment.
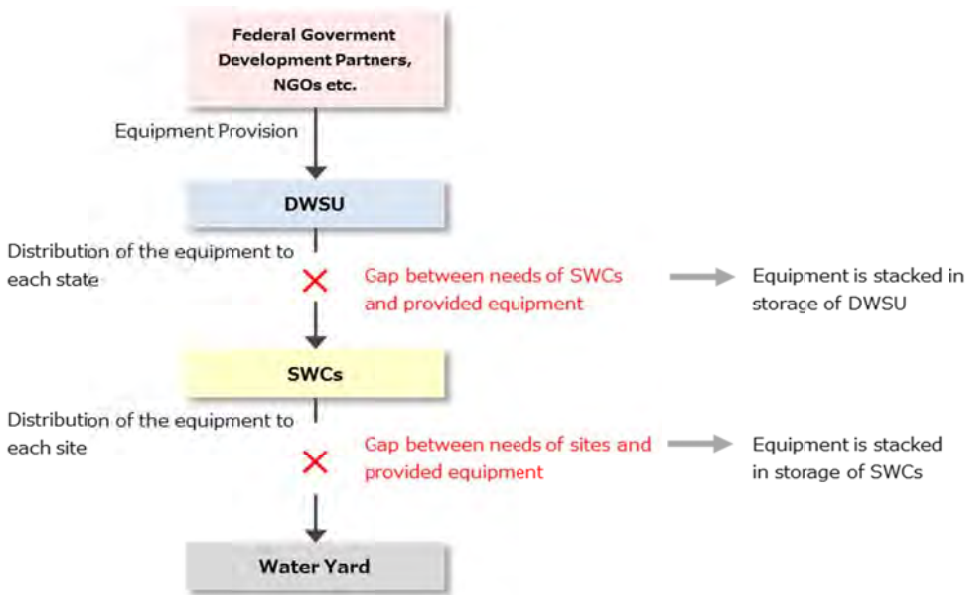
Figure 7-2 Case example of the equipment distribution without proper monitoring data

Appendix- I

1. Contact person

No.	State	Name	Position	Phone Number	Email
1	Northern	Asmhan Altigany Algozoly	Geologist		
2	River Nile	Ala Eldin Hassan Mohammed	Geologist		
3	Red Sea	Awwad Abdel Rahim Abdel Sadig	TC Director		
4	Khartoum				
5	El Gezira	Sami omer alamin	Monitoring of WY		
6	Gedaref	Rabie Suliman Ahmed	Geologist		
7	Kassala	Moutaz Hassab Elrassol			
8	Sennar	Yasir Adam Mohamed Ahmed	Geologist		
9	White Nile	Elrisala Mohammed Yousif	Field Hydrogeologist		
10	Blue Nile	Sadia Ibrahim Abdalla	Civil Engineering		
11	North Kordofan	Mohammed mohamedeen jbairh	Monitoring of data base		
12	South Kordofan	Musab Alshafie Alkhair	Geology		
13	West Kordofan	Ajbna Ahmed Haron	Geologist		
14	North Darfur	Ismail Ahmed Mohammed	Database officer		
15	West Darfur	Abdalgader Ahmed Abdalgader	Database officer		
16	Central Darfur	Mohamed Adam Abdulrhman	Moitoring & evaluation		
17	South Darfur	Asma Mohammed Abdalla	Engineer		
18	East Darfur	Abubaker Adam Haron	Geologist		

Appendix-Ⅱ

1. Water Yard Monitoring Sheet (for baseline survey)

Date; _____   Name; _____   Position; _____

Section A- Basic Information

ID _____   Date_(Inspection) _____   Locality _____

Village(Municipality) _____   Population of Village _____   Household _____

Poupulation (Water Served) _____

Number of Livestocks (livestock/day)   Camel _____   Cow _____

Sheep _____   Goat _____   Donkey _____

Distance to Water Point from the Community _____ m

Total Condition of Facility<1;Not Functioning 2;Functioning (Partially Damaged) 3;All facilities are functioning > _____

Water Supply Status _____ (Public Water Fautain Only, Both Public Water Fautain and House Connection, House Connection Only)

*Tandalti; WN-TD-### Kosti; WN-KS-### Kawa; WN-KW-### Raback; WN-RB-### Al Jabarain; WN-JB-###

 Al Dweim; WN-DM-### Assalaam; WN-AS-### Omrimta; WN-OM-###

Section B - Operation and Maintenance

Organization of O&M by _____   Number of Staff _____

Community Water Committee   Existing / not existing _____

Representative (Contact Person) _____   Mobile _____   Small Maintenance by _____

Spare parts supply by _____

Operation Cost;   Fuel for Generator _____ Litre/Month   Fee for Electricity _____ SDG/Month

Other Consumable Parts (Filters,Cables, Packings, etc) _____ SDG/Month

When is the last maintenance   Borehole _____ Month/Year   Control Panel _____ Month/Year

Generator _____ Month/Year   Pipe network _____ Month/Year

Section C -Water Tariff

Fixed (Household/SDG/Month) _____   Barrel (SDG/Barrel) _____

Jelly Can (SDG/Jelly Can) _____   Tariff Collected by _____

By Flow Meter (SDG/m3) _____

Section D -Water Sources

Water source _____   Treatment of water (Yes/No) _____

Section E -Water Quality

Color _____   Taste and Odour _____   Temperature(℃) _____

TDS (ppm) _____   pH _____   EC (μs／cm) _____

Section F -Specification of Borehole

Name, ID _____   Casing diameter (inch) _____

Lat. (UTM WGS 84) _____   Lon. (UTM WGS 84) _____   Elevation(m) _____

Construction /Year _____   Funded by _____   Total Depth(m) _____

SWL (m) _____   DWL (m) _____   Screen Position(m) _____

Screen Type _____   Pump Position (m) _____   Pump Type _____

Pump_ size(inch) _____   Pump Yield_(m3/h) _____   Date of the latest pumping test _____

Power Supply _____   Condition of the pump _____   Spec of Pump (kw) _____

Date of installation of the pump _____   Operating time (AM/PM) _____   Total hours (hour/day) _____

Condition of Valve _____   Fence _____   Water level indicator _____

Overload protection _____   Well cover _____   Control House _____

A-2

Section G -Elevation Tank

Material of Tank _____ Capacity (m3) _____ Condition _____

Lat. (UTM WGS 84) _____ Lon. (UTM WGS 84) _____ Elevation of Well (m) _____

Construction (Year) _____ Fund (Elevation Tank) _____ Height of Bottom(m) _____

Gate Valve _____ Shape _____ Condition of Valve _____

Section H -Distribution Point

Distribution Point _Yes / No_____ Flow Meter _Yes / No_____ Ghrab _Yes / No_____ Animal Trough _Yes / No_____

Animal Trough condition _____ Distance between public tap and animal trough _____ m

Section I -Generator

Condition of the Generator _____ Spec of of the Generator(kVA) _____ Date of installation of the Generator _____

Section J -Control Panel

Condition of Contol Panel _____ Circuit Braker _____ Water Level Sensor _____

Overload _____ Phase Failure _____ Contactor _____

Section K-Distribution Pipe

Type of pipe _____ Size (inch) _____ Total Length (km) _____

Construction Year _____ Funded _____ Air Valve _Yes / No_____

Gate Valve(Pipe Network) _Yes / No_____ Condition of Pipe(Water Leakage) _____

Section L -Sanitation

Drainage _____ Livestock (within 30m from BH) _____ Solid Waste (within 30m from BH) _____

Excreta (within 30m from BH) _____ Public Tap Management _____

Distance from Latrine/Open Defecation(m) _____ Community Participation _____

Rehabilitation

Date; _____

Contents;

Remarks

Remarks;

Problems, requests from community, suggestions, etc.

A-3

Picture

Full view	Borehole	Control Panel
	A-4	
	7-67	
comment;	comment;	comment;

Distribution Pipe	Public Tap	Ev Tank
comment;	comment;	comment;

Generator	Cable	Other (Damaged part etc.)
comment;	comment;	comment;

Other (Damaged part etc.)	Other (Damaged part etc.)	Other (Damaged part etc.)
comment;	comment;	comment;

Comment From Sucscriber

Problems, Request for SWC

A-4

2. Water Yard Monitoring Sheet (for annual survey)

WY ID; _____   WY Name; _____   Locality; _____

Date; _____   Name; _____   Position; _____

Section A- Basic Information

Village(Municipality) _____   Population of Village _____   # Household _____

Population (Water Served) _____   Distance to Water Point from the Community _____ m

Water Supply Status   (Public Water Fountain Only / Both Public Water Fountain and House Connection / House Connection Only)

*Tandalti; WN-TD-### Kosti; WN-KS-### Kawa; WN-KW-### Raback; WN-RB-### Al Jabarain; WN-JB-### Al Dweim; WN-DM-###

Assalaam; WN-AS-### Omrimta; WN-OM-###

Section B - Operation and Maintenance

Organization of O&M by _____   Number of Staff _____

Community Water Committee   Existing / not existing _____

Representative (Contact Person) _____   Mobile _____

Spare parts supply by _____   Small maintenance by _____

When is the last maintenance   Borehole _____ Month/Year   Control Panel _____ Month/Year

Generator _____ Month/Year   Distribution pipe _____ Month/Year   Transmission pipe _____ Month/Year

Section C -Water Tariff

Fixed (Household/SDG/Month) _____   Barrel (SDG/Barrel) _____

Jelly Can (SDG/Jelly Can) _____   Tariff Collected by _____

By Flow Meter (SDG/m³) _____

Section D -Water Sources

Checked during the baseline survey

Section E -Water Quality

Temperature (℃)		Chloride (mg/l)		Total dissolved solid (TDS, ppm)	
Turbidity (NCU)		Sulface		Calcium (mg/l)	
Dissolved oxygen		Iron (total) (mg/l)		Hydrogen sulphide (mg/l)	
pH		Manganese (mg/l)		Zinc (mg/l)	
EC (μs／cm)		Fluoride (mg/l)		Aluminium (mg/l)	
Total hardness (mg/l)		Ammonia (mg/l)			
Total alkalinity (mg/l)		Nitrate as NO_2 (mg/l)		E. coli or thermotolerant coliform bacteria	
Salinity		Nitrate as NO_3 (mg/l)		Pathogenic intestinal protozoa	

A-5

Section F -Specification of Borehole

Name, ID _____

Pump Position (m) _____ Pump Type _____

Pump size (inch) _____ Power Supply _____

Specification of pump (kW, pressure (m), capacity (l/sec)) _____

Condition of Valve _____ Fence _____ Water level indicator _____

Well cover _____ Control House _____

Section G -Elevation Tank

Condition of Valve _____

Section H -Distribution Point

Checked during the baseline/ monthly/ seasonal surveys

Section I -Generator

Checked during the baseline survey

Section J -Control Panel

Checked during the daily/ monthly surveys

Section K-Distribution Pipe

Air Valve _____ Gate valve (pipe network) _____

Section L -Sanitation

Drainage _____ Public tap management _____

Within 30m from BH	Livestock		Solid waste		Excreta	

Rehabilitation

Date; _____

Contents;

Remarks

Remarks;

Problems, requests from community, suggestions, etc.

Picture

Full view	Borehole	Control Panel
	A-7 7-70	
comment;	comment;	comment;

Distribution Pipe	Public Tap	Ev Tank
comment;	comment;	comment;

Generator	Cable	Other (Damaged part etc.)
comment;	comment;	comment;

Other (Damaged part etc.)	Other (Damaged part etc.)	Other (Damaged part etc.)
comment;	comment;	comment;

Comment From Sucscriber

Problems, Request for SWC

A-7

3. Water Yard Monitoring Sheet (for seasonal survey)

*This survey is conducted twice a year (dry season & rainy season).

WY ID & Name; _____   Locality; _____   Village (municipality); _____

Date; _____   Name; _____   Position; _____

Section A- Basic Information

Section B - Operation and Maintenance

Section C -Water Tariff

Section D -Water Sources

Section E -Water Quality

Section F -Specification of Borehole

Name, ID _____

SWL (m) _____   DWL (m) _____

Section G -Elevation Tank

Section H -Distribution Point

Animal Trough Condition _____

Section I -Generator

Section J -Control Panel

Section K-Distribution Pipe

Section L -Sanitation

Rehabilitation

Date; _____

Contents;

Remarks

Remarks;

Problems, requests from community, suggestions, etc.

Picture

Full view	Borehole	Control Panel
	A-9	
	7- 72	
comment;	comment;	comment;

Distribution Pipe	Public Tap	Ev Tank
comment;	comment;	comment;

Generator	Cable	Other (Damaged part etc.)
comment;	comment;	comment;

Other (Damaged part etc.)	Other (Damaged part etc.)	Other (Damaged part etc.)
comment;	comment;	comment;

Comment From Sucscriber

Problems, Request for SWC

4. Water Yard Monitoring Sheet (for monthly survey)

WY ID;		WY Name;		Locality;	
Date;		Name;		Position;	

Section A- Basic Information

Village(Municipality) _____

Number of Livestocks (livestock/month)　　Camel _____　Cow _____

　　　　　　　　　　　　　　　　　　　Sheep _____　Goat _____　Donkey _____

Total Condition of Facility<1: Not Functioning / 2: Functioning (Partially Damaged) / 3: All facilities are functioning >

Comments:

Section B - Operation and Maintenance

Situation of Water Supply		
Water Tariff Collection	Number of Subscriber (Person/Month)	
	Collected Water Fee (SDG/Month)	SDG
Water Supply	Amount(m³/Month)	m³
Operation hour	Operation hour (hours/Month)	hours
Operation Cost		
Operation Cost	Fuel for Generator (Litre/Month)	litre
	Fee for Electricity (SDG/Month)	SDG
	Consumable Items (Filters, Cables, Packing, etc.) (SDG/Month)	SDG
Other Expenses		SDG
		SDG
		SDG
		SDG
		SDG
		SDG

Section C -Water Tariff

Checked during the annual survey

Section D -Water Sources

Checked during the baseline survey

Section E -Water Quality

Checked during the annual survey

A-10

Section F -Specification of Borehole

Checked during the baseline/ annual/ seasonal surveys

Section G -Elevation Tank

Condition of Tank _____

Section H -Distribution Point   7-74

Condition of Ghrab _____

Condition of Flow meter _____

Section I -Generator

Replacement of consumable items (times/month)

Engine Oil		Air Filter	
Engine Oil Filter		Fuel Filter	

Section J -Control Panel

Condition of Control Panel _____

Circuit breaker		Indicator Lamp	
Water level sensor and relay		Insulating equip.	
		Contactor	
Overload protection		Phase failure	

Section K-Distribution Pipe

Checked during the baseline/ annual/ daily surveys

Section L -Sanitation

Checked during the baseline/ annual surveys

Rehabilitation

Date; _____

Contents;

Remarks

Remarks;

Problems, requests from community, suggestions, etc.

A-11

Picture

Full view	Borehole	Control Panel
	A-12 7- 75	
comment;	comment;	comment;

Distribution Pipe	Public Tap	Ev Tank
comment;	comment;	comment;

Generator	Cable	Other (Damaged part etc.)
comment;	comment;	comment;

Other (Damaged part etc.)	Other (Damaged part etc.)	Other (Damaged part etc.)
comment;	comment;	comment;

Comment From Sucscriber

Problems, Request for SWC

A-12

Appendix-Ⅲ

1. Daily Monitoring sheet for operators

WY ID _____ Operator's Name _____

WY Name _____ Mobile; _____ **Month;** _____

Date	Cleaning (Control House)	Water Tariff Collection		Water Supply (m3)	Operation									Water Quality (Tap Water)												Leakage				
		Number of Subscriber	Collected Water Fee (SDG)	By Flow meter (Meter Value)	Operating time								Operation hour (Hr/Day)	Color					Sands /Iron Rust	Taste and Odour					Elv. Tank	Dist. Pipe	Cotrol Valve	Trans. Pipe	Pub. Tap
					S	E	S	E	S	E	S	E		C	Br	Y	Bk	W		N	St	Sl	B	Sr					
1	☐																			☐						☐	☐	☐	☐	☐
2	☐																			☐						☐	☐	☐	☐	☐
3	☐																			☐						☐	☐	☐	☐	☐
4	☐																			☐						☐	☐	☐	☐	☐
5	☐																			☐						☐	☐	☐	☐	☐
6	☐																			☐						☐	☐	☐	☐	☐
7	☐																			☐						☐	☐	☐	☐	☐
8	☐																			☐						☐	☐	☐	☐	☐
9	☐																			☐						☐	☐	☐	☐	☐
10	☐																			☐						☐	☐	☐	☐	☐
11	☐																			☐						☐	☐	☐	☐	☐
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18	☐																			☐						☐	☐	☐	☐	☐
19	☐																			☐						☐	☐	☐	☐	☐
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22	☐																			☐						☐	☐	☐	☐	☐
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25	☐																			☐						☐	☐	☐	☐	☐
26	☐																			☐						☐	☐	☐	☐	☐
27	☐																			☐						☐	☐	☐	☐	☐
28	☐																			☐						☐	☐	☐	☐	☐
29	☐																			☐						☐	☐	☐	☐	☐
30	☐																			☐						☐	☐	☐	☐	☐
31	☐																			☐						☐	☐	☐	☐	☐

Clear; C
Brown; Br
Yellow; Y
Black; Bk
White; W

None; N
Steel; St
Salty; Sl
Bitter; B
Sour; Sr

WY ID _____   Operator's Name _____

WY Name _____   Mobile _____   **Month;** _____

Date	Submersible Pump			Control Panel					Generator									Electricity	Remarks (Necessary Maintenance)
	Total Condition	Voltage (V)	Pump Ampere (A)	Water level sensor	Circuit Breaker	Voltage protection (Phase failure Relay)	Contactor	Over load Relay	Sound /Vibration	Fuel Consumption (Galon/day)	Engine Oil	Engine Oil Filter	Coolant Water	Air Filter	Fuel Filter	Power Cabel	Generartor Belt	Meter Value (kW)	
1	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
2	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
3	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
4	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
5	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
6	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
7	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
8	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
9	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
10	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
11	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
12	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
13	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
14	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
15	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
16	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
17	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
18	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
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21	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
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23	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
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30	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		
31	☐			☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐		

2. Monitoring guide for operator

Check Point

Control House

Operator clean the control house to keep it clean.
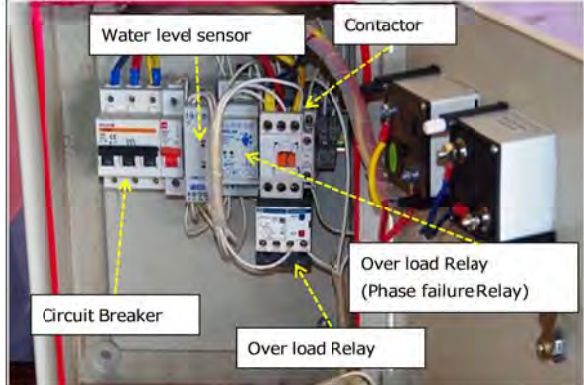If the cleaning is done, Please mark "∨" in box.

Flow Meter

If the flowmeter installed in water yard, write the meter value every morning

Water Quality

1. Put water with clear glass, and check the color.
2. Mark "∨" in the cell.
(Clear; C Brown; Br Yellow, Y Black; Bk White; W; White)

Control Panel

Water level sensor
Contactor
Over load Relay
(Phase failure Relay)
Circuit Breaker
Over load Relay

Water level sensor; Check the "lamp"
Circuit Breaker; Check the condition (heating, break)
Over load Relay; Check the condition (heating, break)
Contactor ; Check the condition (heating, break)

Elevated Tank (Leakage)

Check the break and leakages. If the condition is good, mark "∨".
Otherwise, mark "x".

Transmission & Distribution Pipe (Leakage)
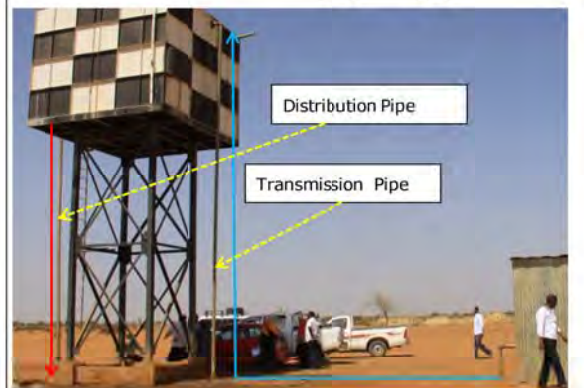
Distribution Pipe
Transmission Pipe

Check the break and leakages. If the condition is good, mark "∨".
Otherwise, mark "x".

A-15

Public Water Taps (Leakage)
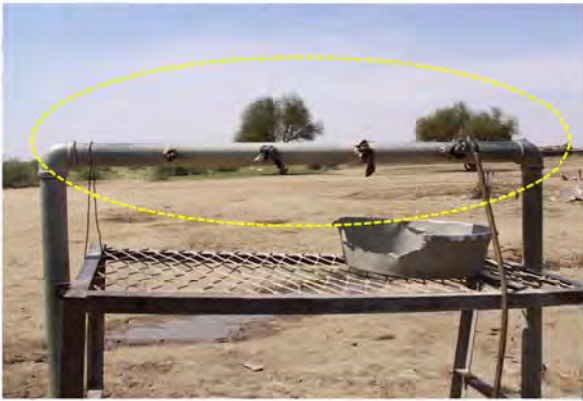
Check the break and leakages. If the condition is good, mark "✓".

Otherwise, mark "x".
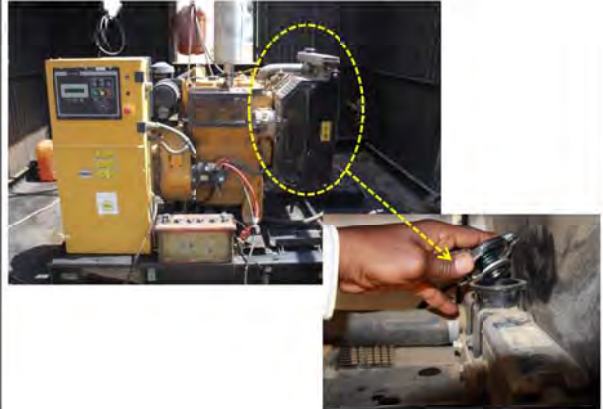
Generator (Engine Oil)
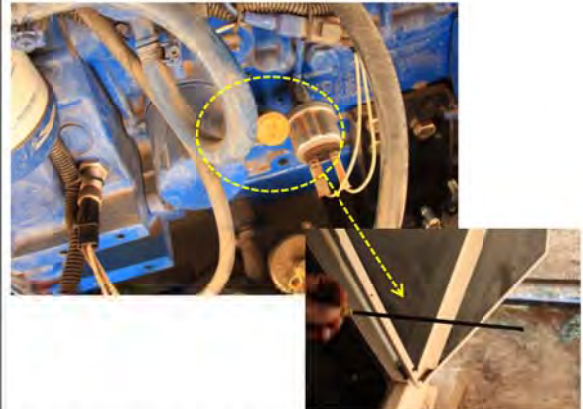
Pull out the oil gage, and check the amount and color of oil. If the condition is good, mark "✓".
Otherwise, mark "x".
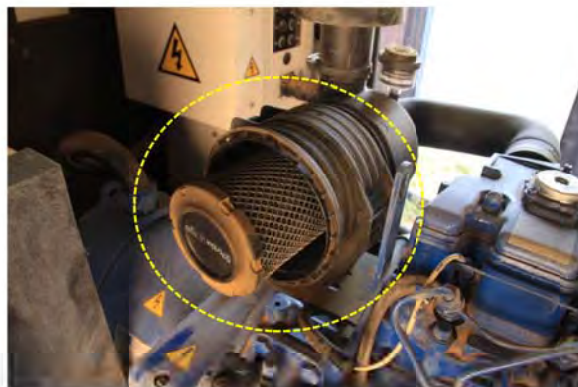
Generator (Engine Oil Filter)

Check the break and leakages. If the condition is good, mark "✓".

Otherwise, mark "x".

Generator (Radiator & Coolant Water)

1. Check the break and leakages of the radiator.
2. Remove the cap, and check the amount and quality of coolant water. If the condition is good, mark "✓".
Otherwise, mark "x".

Air Filter

Remove the cap, and check the break and the clogging.
If the condition is good, mark "✓". Otherwise, mark "x".
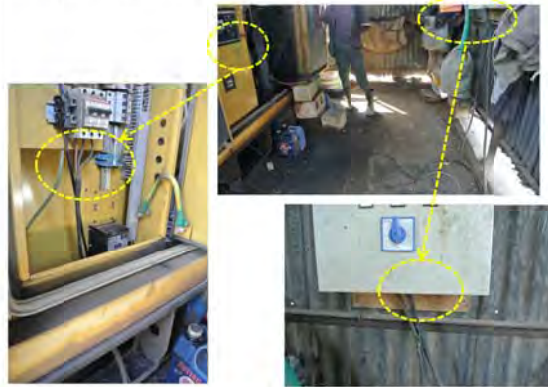
Electricity (Meter Value)

If the electric power s supplied, write the meter value in the cell.

Control Valve

Check the break and leakages. If the condition is good, mark "v ".

Otherwise, mark "x" .

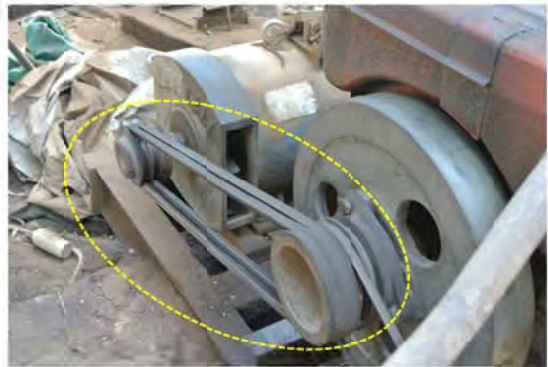**Power Cable Connection (Between generator and control panel)**

Check the connection between the control panel power cable and the generator

Generator (Basement Screw)

Check the stability of the attachment

Generator (Cell Belt)

Check the damage and looseness of the belts

Appendix-Ⅳ

1. Person in charge and the interval of water yard's monitoring

\<Section A Basic Information\>

Item	Person in charge	Interval	Means of the data collection	Remarks
No	SWC Monitoring Unit	Once at baseline survey	Prepared by SWC Monitoring Unit before on-site survey	
Date_(Inspection)	SWC Locality Office (Sector)	Annually	Surveyor writes a data on site	
ID	SWC Monitoring Unit	Once at baseline survey	Prepared by SWC Monitoring Unit before on-site survey	
Locality	SWC Monitoring Unit	Once at baseline survey	Prepared by SWC Monitoring Unit before on-site survey	
Village(Municipality)	SWC Monitoring Unit	Once at baseline survey	Prepared by SWC Monitoring Unit before on-site survey	
WY Name	SWC Locality Office (Sector)	Once at baseline survey		
Population of Village	SWC Locality Office (Sector)	Annually	Collecting a data from "State Static Office"	
Household	SWC Locality Office (Sector)	Annually	Collecting a data from "State Static Office"	
Population water served	SWC Monitoring Unit	Annually	Collecting a data from "Wash Database"	
Number of livestock which consume water \<sheep /day \>	Operator	Monthly	Operator ask owners the number of livestock , and reports the results to surveyors from SWC Locality Office (Sector).	SWC Locality Office (Sector) describe the average number of for 3days on motoring sheets
Number of livestock which consume water \<goat /day \>	Operator	Monthly	Operator ask owners the number of livestock , and reports the results to surveyors from SWC Locality Office (Sector).	SWC Locality Office (Sector) describe the average number of for 3days on motoring sheets
Number of livestock which consume water \<cow /day \>	Operator	Monthly	Operator ask owners the number of livestock , and reports the results to surveyors from SWC Locality Office (Sector).	SWC Locality Office (Sector) describe the average number of for 3days on motoring sheets
Number of livestock which consume water \<camel/day \>	Operator	Monthly	Operator ask owners the number of livestock , and reports the results to surveyors from SWC Locality Office (Sector).	SWC Locality Office (Sector) describe the average number of for 3days on motoring sheets
Number of livestock which consume water \<donkey/day \>	Operator	Monthly	Operator ask owners the number of livestock , and reports the results to surveyors from SWC Locality Office (Sector).	SWC Locality Office (Sector) describe the average number of for 3days on motoring sheets
Distance to water yard from community (m)	SWC Locality Office (Sector)	Annually	SWC Locality Office (Sector) ask operators the water access distance from cater of the closest community or measure the distance by using the satellite map (Google Earth etc.)	
Total Condition of Facility \<1;Not Functioning 2;Functioning (Partially Damaged) 3;All facilities are functioning \>	Operator	Daily	Operator check the condition of water yard	
Water Supply Status (Public Water Fountain Only, Both Public Water Fountain and House Connection, House Connection Only)	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site	In case the water yard are renovated, and water supply status is changed, SWC Locality Office (Sector) reports it to SWC Monitoring Unit. And then, SWC Monitoring Unit update the database.

\<Section B Operation and Maintenance\>

Item	Person in charge	Interval	Means of the data collection	Remarks
Organization of O&M	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site	
Number of Staff	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site	
Committee of the water user	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site	Check "existing" or "not existing" of committee of water user
Representative (Contact Person)	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site or directly contact to operators by the phone	If any changes, operator or the representative of community inform it SWC Locality Office (Sector)
Mobile of the representative on-site	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site or directly contact to operators by the phone	If any changes, operator or the representative of community inform it SWC Locality Office (Sector)
Small Maintenance	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site or directly contact to operators by the phone	If any changes, operator or the representative of community inform it SWC Locality Office (Sector)

Item	Person in charge	Interval	Means of the data collection	Remarks
Spare parts supply	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site or directly contact to operators by the phone	If any changes, operator or the representative of community inform it SWC Locality Office (Sector)
Operation Cost; Fuel for Generator(Litter/Month)	Operator/SWC Locality Office (Sector)	Daily/Monthly	Operator records the amount of fuel consumption by the handwriting, and calculates the monthly fuel consumption.	
Operation Cost; Fee for Electricity (SDG/Month)	Operator/SWC Locality Office (Sector)	Daily/Monthly	Operator records the electricity charges (NEC Supply) for the pump operation by the handwriting, and calculates the monthly cost.	
Operation Cost; Other Consumable (Filters, Cables, Packing, etc.) (SDG/Month)	Operator/SWC Locality Office (Sector)	Daily/Monthly	When the operator or community replace the consumable items of facilities, operator records the item and it's cost by the handwriting	

<Section C Water Tariff>

Item	Person in charge	Interval	Means of the data collection	Remarks
Fixed (Household/SDG/Month)	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site or directly contact to operators by the phone	If any changes, operator or the representative of community inform it SWC Locality Office (Sector)
Barrel (SDG/Barrel)	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site or directly contact to operators by the phone	If any changes, operator or the representative of community inform it SWC Locality Office (Sector)
Jelly Can (SDG/Jelly Can)	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site or directly contact to operators by the phone	If any changes, operator or the representative of community inform it SWC Locality Office (Sector)
By Flow Meter (SDG/m3)	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site or directly contact to operators by the phone	If any changes, operator or the representative of community inform it SWC Locality Office (Sector)
Tariff Collected by	SWC Locality Office (Sector)	Annually	Surveyor checks the situation on site or directly contact to operators by the phone	If any changes, operator or the representative of community inform it SWC Locality Office (Sector)

<Section D Water Sources>

Item	Person in charge	Interval	Means of the data collection	Remarks
Water source	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks the situation on site or directly contact to operators by the phone	
Treatment of water (Yes/No)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks the situation on site or directly contact to operators by the phone	

<Section E Water Quality>

Item	Person in charge	Interval	Means of the data collection	Remarks
Temperature(℃)	SWC Locality Office (Sector)	Annually	Surveyor checks it on site	
Turbidity	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Dissolved Oxygen (DO)	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Color	Operator	Daily	A laboratory staff analyze the water sample in their laboratory.	
pH	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Total Dissolved Solid (TDS)(ppm)	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
EC (μs／cm)	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Total Hardness	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Total Alkalinity	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Salinity	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Chloride	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Sulfate	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	

A-19

Iron (Total)	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Manganese	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Fluoride	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Ammonia	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Nitrite as NO2	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Nitrate as NO3	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Calcium	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Hydrogen sulphide	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Zinc	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Aluminum	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Chloride	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
E. coli or thermotolerant coliform bacteria	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Pathogenic intestinal protozoa	SWC Locality Office (Sector)	Annually	A laboratory staff analyze the water sample in their laboratory.	
Taste and Odour	Operator	Daily	Operator cheeks the item everyday	
Sand and/or iron rust, etc.	Operator	Daily	Operator cheeks the item everyday	

<Section F Specification of Borehole>

Item	Person in charge	Interval	Means of the data collection	Remarks
Name, ID	SWC Monitoring Unit	Once at baseline survey	Surveyor checks on site.	
Casing diameter (inch)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site.	
Lat. (UTM WGS 84)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site.	Surveyor must use the coordinate of "WGS84 decimal degree"
Lon. (UTM WGS 84)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site.	Surveyor must use the coordinate of "WGS84 decimal degree"
Elevation(m)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site.	
Construction /Year	SWC Locality Office (Sector)	Once at baseline survey	Collecting a data from "Wash Database" , "Ground Water and Wadi Corporation Database" , etc.	
Funded by	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	
Total Drilling Depth(m)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	In case the pipes for water level monitoring is not installed in borehole, surveyor refers to existing data. And
SWL (m)	SWC Locality Office (Sector)	Seasonally	Surveyor checks on site or check the existing data.	SWC Locality Office (Sector) have to inform the operator that stop the pumping before 4 hour of inspection. In case the pipes for water level monitoring is installed in borehole, operator shall daily observe the static water level.
DWL (m)	SWC Locality Office (Sector)	Seasonally	Surveyor checks on site or check the existing data.	In case the pipes for water level monitoring is installed in borehole, operator shall daily observe the dynamic water level.
Screen Position(m)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	If the rehabilitation with borehole is conducted, SWC monitoring unit updates the existing data of screen position.
Screen Type	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	If the rehabilitation with borehole is conducted, SWC monitoring unit updates the existing data of screen type
Pump Position (m)	SWC Locality Office (Sector)	Annually	Surveyor checks on site or check the existing data.	When SWC removes the submersible pump for maintenance, SWC Monitoring Unit updates the existing data.
Pump Type	SWC Locality Office (Sector)	Annually	Surveyor checks on site or check the existing data.	When SWC removes the submersible pump for maintenance, SWC Monitoring Unit updates the existing data.

Item	Person in charge	Interval	Means of the data collection	Remarks
Pump_ size(inch)	SWC Locality Office (Sector)	Annually	Surveyor checks on site or check the existing data.	
Pump Yield_(m3/h)	SWC Locality Office (Sector)	Once at baseline survey	Collecting a data from "Wash Database", "Ground Water and Wadi Corporation Database" etc.	
Submersible pump Voltage (V)	Operator	Daily	Operator daily checks the condition	
Submersible pump Ampere (A)	Operator	Daily	Operator daily checks the condition	
Date of the latest pumping test	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	
Power Supply	SWC Locality Office (Sector)	Annually	Surveyor checks on site or check the existing data.	
Condition of the pump	Operator	Daily	Operator daily checks the condition	
Spec of the Pump (kw, Pressure(m), Capacity(L/sec))	SWC Locality Office (Sector)	Annually	Surveyor checks on site or check the existing data.	
Date of installation of the pump	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	
Operating time (AM/PM)	Operator	Daily	Operator daily records the operation time	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Total hours (hour/day)	Operator	Daily	Operator daily records the operation time	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Condition of Valves	Operator	Daily	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Fence	SWC Locality Office (Sector)	Annually	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Well cover	SWC Locality Office (Sector)	Annually	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Water level indicator	SWC Locality Office (Sector)	Annually	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Control House	SWC Locality Office (Sector)	Annually	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)

<Section G Elevation Tank>

Item	Person in charge	Interval	Means of the data collection	Remarks
Material of Tank	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	
Capacity (m3)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	
Condition of Tank	Operator	Daily	Surveyor checks on site	See the leakage, aging degradation, painting etc. In case the any problem occur, operator inform it SWC Locality Office (Sector)
Lat. (UTM WGS 84)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site	
Lon. (UTM WGS 84)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site	
Elevation (m)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site	
Construction /Year	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	
Funded by	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	
Height of Bottom(m)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	
Gate Valve	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	
Shape	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	
Condition of Valve	SWC Locality Office (Sector)	Annually	Surveyor checks on site	Existence or nonexistence, condition case the any problem occur, operator inform it SWC Locality Office (Sector)

\<Section H Distribution Point\>

Item	Person in charge	Interval	Means of the data collection	Remarks
Ghrab condition	Operator	Daily	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Distribution Point	Operator/SWC Locality Office (Sector)	Annually	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Flow Meter	Operator/SWC Locality Office (Sector)	Daily	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Animal Trough	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Animal Trough condition	SWC Locality Office (Sector)	Seasonally	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)

\<Section I Generator\>

Item	Person in charge	Interval	Means of the data collection	Remarks
Condition of the Generator	Operator	Daily	Operator daily checks the condition	
Spec of of the Generator(kVA)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	
Date of installation of the Generator	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	

\<Section J Control Panel\>

Item	Person in charge	Interval	Means of the data collection	Remarks
Condition of Control Panel	Operator/SWC Locality Office (Sector)	Daily/Monthly	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Circuit Breaker	Operator/SWC Locality Office (Sector)	Daily/Monthly	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Water Level Sensor and Relay	Operator/SWC Locality Office (Sector)	Daily/Monthly	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Overload Protection	Operator/SWC Locality Office (Sector)	Daily/Monthly	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Indicator Lamp	Operator/SWC Locality Office (Sector)	Daily/Monthly	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Insulating equipment	Operator/SWC Locality Office (Sector)	Daily/Monthly	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Contactor	Operator/SWC Locality Office (Sector)	Daily/Monthly	Surveyor checks on site	In case the any problem occur, operator inform it SWC Locality Office (Sector)

\<Section K Distribution Pipe\>

Item	Person in charge	Interval	Means of the data collection	Remarks
Type of pipe	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Size (inch)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Total Length (km)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Construction Year	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Funded by	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site or check the existing data.	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Air Valve	SWC Locality Office (Sector)	Annually	Surveyor checks on site or check the existing data.	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Gate Valve(Pipe Network)	SWC Locality Office (Sector)	Annually	Surveyor checks on site or check the existing data.	In case the any problem occur, operator inform it SWC Locality Office (Sector)
Condition of Pipe(Water Leakage)	Operator	Daily	Operator checks condition of pipes	In case the any problem occur, operator inform it SWC Locality Office (Sector)

<Section L Sanitation>

Item	Person in charge	Interval	Means of the data collection	Remarks
Drainage	SWC Locality Office (Sector)	Annually	Surveyor checks on site	Surveyor instructs operators and communities on site to improve the situation
Livestock (within 30m from BH)	SWC Locality Office (Sector)	Annually	Surveyor checks on site	Surveyor instructs operators and communities on site to improve the situation
Solid Water (within 30m from BH)	SWC Locality Office (Sector)	Annually	Surveyor checks on site	Surveyor instructs operators and communities on site to improve the situation
Excreta (within 30m from BH)	SWC Locality Office (Sector)	Annually	Surveyor checks on site	Surveyor instructs operators and communities on site to improve the situation
Public Tap Management	SWC Locality Office (Sector)	Annually	Surveyor checks on site	Surveyor instructs operators and communities on site to improve the situation
Distance from Latrine/Open Defecation(m)	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site	
Community Participation	SWC Locality Office (Sector)	Once at baseline survey	Surveyor checks on site	

<Rehabilitation>

Item	Person in charge	Interval	Means of the data collection	Remarks
Rehabilitation	SWC Locality Office (Sector)	When it's implemented	Surveyor checks on site or check the existing data.	SWC Locality Office (Sector) and SWC Monitoring Unit writes down the details of rehabilitation on the monitoring sheet
Rehabilitation Date	SWC Locality Office (Sector)	When it's implemented	Surveyor checks on site or check the existing data.	

<Remarks>

Item	Person in charge	Interval	Means of the data collection	Remarks
Remarks	SWC Locality Office (Sector)	Annually	Surveyor checks on site	Trouble with facilities, Sanitary environment, Request from subscribers(community), Recommendation for improvement of the situation, etc.

Attachment-1

Sennar SWC

WY Monitoring Plan

Sennar State Water Corporation

Monitoring Plan

. - Water Supply Facility (Water yard)

Nov, 2014

Cooperation with DWSU and JICA

Table of Contents

1 Monitoring Purpose

The objectives of monitoring of Water Yard can be classified according to the focal points to be improved. The classified focal points to be improved and objectives of water yard's monitoring are as follows;

No.	Classification	Category	Objectives
1	Management	SWC (Governmental Management)	To promote O&M of Water Yards To select proper operation system To find the needs of the capacity building for the operator and technicians To select appropriate technology for the O&M To find the training needs of operation and technicians for O&M To allocate suitable technician to each water yard
2		Community Level (On site)	To promote and protect water yards To promote the payment of water tariff from subscriber To know the necessary spare parts for water yard To promote the awareness of ownership of community people To promote the community participation for spare parts purchase To improve the communication between SWC and community To prepare the training plan for community To decide the operation hours of water yard To prevent water pollution (sanitary environment) To sooth spare parts supply and it selection through the monitoring data
3	Engineering (On-Site)	Power Supply	To select approval power unit To install suitable quality equipment To protect power cable and keep it quality To promote the installation of the stabilizer to avoided the unsterilized voltage damage To know the suitable power supply method such as standby systems To promote regular the O&M for power supply unit To improve the cable connection To decide the suitable generator operation hour To know the that how long is the equipment used
4		Borehole	To find specific water yield to avoid draw down of the ground water To know the water levels and capable pumping volume to select suitable submesible pumps To know the suitable operation hours of pumps To know the ages of the equipment (facilities) To know the design of the borehole for the rehabilitation To prepare the O&M and rehabilitation plan To promote installation of well cover to avoid water pollution To decide the time-bound to change the equipment To prepare the training plan for borehole O&M and rehabilitation
5		Pump Control Panel	To select suitable capacity of control panel To know the most damage part of control panel and pumps To promote the control panel protection (covering) To check the voltage by the contoral panel To find the training needs of operator for save operation
6		Water Quality	To prevent the water pollution To prevent the disease which is couse by water To serve the safe drinking water for subscriber To select suitable materials according to the types of water To prepare the training plan for the water disinfection for community people To maintain the brakish water
7		Other	To promote the fencing for water yard for security To know the sanitary environment of the water yard To know the situation of elevation tank such as painting and lekages To know the situation of water usesage such as livestock, agriculture

1

2 Implementation Agency and the member

2-1. Implementation Agency and task

DWSU

<Implementation agency>

DWSU Monitoring and Evaluation Department

<Task of Implementation Agency>

- Development of Monitoring format and database
- Data analysis
- Feedback analysed data to SWCs
- Holding the monitoring Joint Seminar
- Dissemination of monitoring(Information sharing with decision makers)
- Instruction of the monitoring method to SWCs

Sennar SWC

<Implementation agency>

- Monitoring Follow-up and Evaluation Unit
- SWC Locality Sectors
- Operator and Technician on site

<Task of Implementation Agency>

- **Sennar SWC Monitoring Follow-up and Evaluation Unit**
- Data collection from other SWC sectors
- Data Management (input and update) of the monitoring data
- Analysis of the monitoring data
- Preparation of Annual Reports (data books)
- Preparation of Monthly Reports
- Feedback the result of the monitoring to other SWC staff
- Instruction of the monitoring method to other sector of SWC
- Securement of the monitoring budget
- Preparation of the annual monitoring plan
- Information sharing with stakeholders (SWC staff, DWSU, NGOs, UNs, Other related organization)
- Technical support for each sector of SWC

- **Sinja Water Treatment Plant**
- Water quality analysis of ground water (water yards)

- **SWC Sectors**
- Monitoring survey and the data collection on sites
- Securement of the monitoring budget

2

- Information sharing with SWC Monitoring Follow-up and Evaluation unit
- Data management at sector level

- **Operator and Technician on site**
- Daily/Weekly/Monthly record of operation hour, fuel consumption, water levels etc.
- Small maintenance (cable fixing, exchange the fuel and oil filter, maintenance record, etc.)
- Regular communication with SWC Sectors

2-2. Members and the tasks of each member

Member and its task are as follows;

Organization	No.	Name	Affiliation	Tasks
DWSU Monitoring and Evaluation Dep.	1	Mr. Omer Suni	Monitoring and Evaluation Department	・Data analysis ・Feedback analyzed data to SWCs
	2	Mr. Mohamed Yahiya	Monitoring and Evaluation Department	・Development of Monitoring format and database
	3	Mr. Sara sadig	Monitoring and Evaluation Department	・Data analysis
	4	Mr. Jamal	Civil Eng.	・Instruction of the monitoring method to SWCs
	5	Mr. Salah	Hdg Eng.	・Holding the Joint Seminar
Sennar Monitoring Follow-up and Evaluation Unit	1	Mr. Ali Hassan	Director of Planning and Information Department	・Preparation of Annual Reports (data books) ・Instruction of the monitoring method to other sector of SWC ・Preparation of the annual monitoring plan
	2	Mr. Zakaria Siddig	Manager of SWC/Trainig Centre Workshop	・Preparation of Monthly Reports ・Feedback the result of the monitoring to other SWC staff ・Securement of the monitoring budget ・Information sharing with stakeholders (SWC staff, DWSU, NGOs, UNs, Other related organization)
	3	Mr. Mohamed Jwoda	Manager of Eastern Sector	・Data collection from other SWC sectors ・Securement of the monitoring budget ・Technical support for each sector of SWC
	4	Mr. Abbas Hamid	Direcotor of Training Centre/Well Management	・Data collection from other SWC sectors ・Data Management (input and update) of the monitoring data
	5	Mr. Ahmed Widaa	Direcotor of Goround Water and Wadi Office	・Data collection from other SWC sectors ・Preparation of the annual monitoring plan
	6	Mr. Yasir Adam	Geologist of Sinja Secrtor	・Data Management (input and update) of the monitoring data ・Analysis of the monitoring data
	7	Mr. Ammar Hassan	Director of Sinja Sector	・Data Management (input and update) of the monitoring data ・Analysis of the monitoring data
	8	Mr. Asharaf Taheir	Director of Dali Sector	・Sampling and analysis for water quality ・Data Management (input and update) of water quality
	9	Mr. Tarig Osman	Financial Accountant	・Securement of the monitoring budget
	10	Representatives of Locality Offices(Secor)	-	・Data collection, Data share with Monitoring Unit

3

4

<SWC Monitoring Follow-up and Evaluation Unit>

5
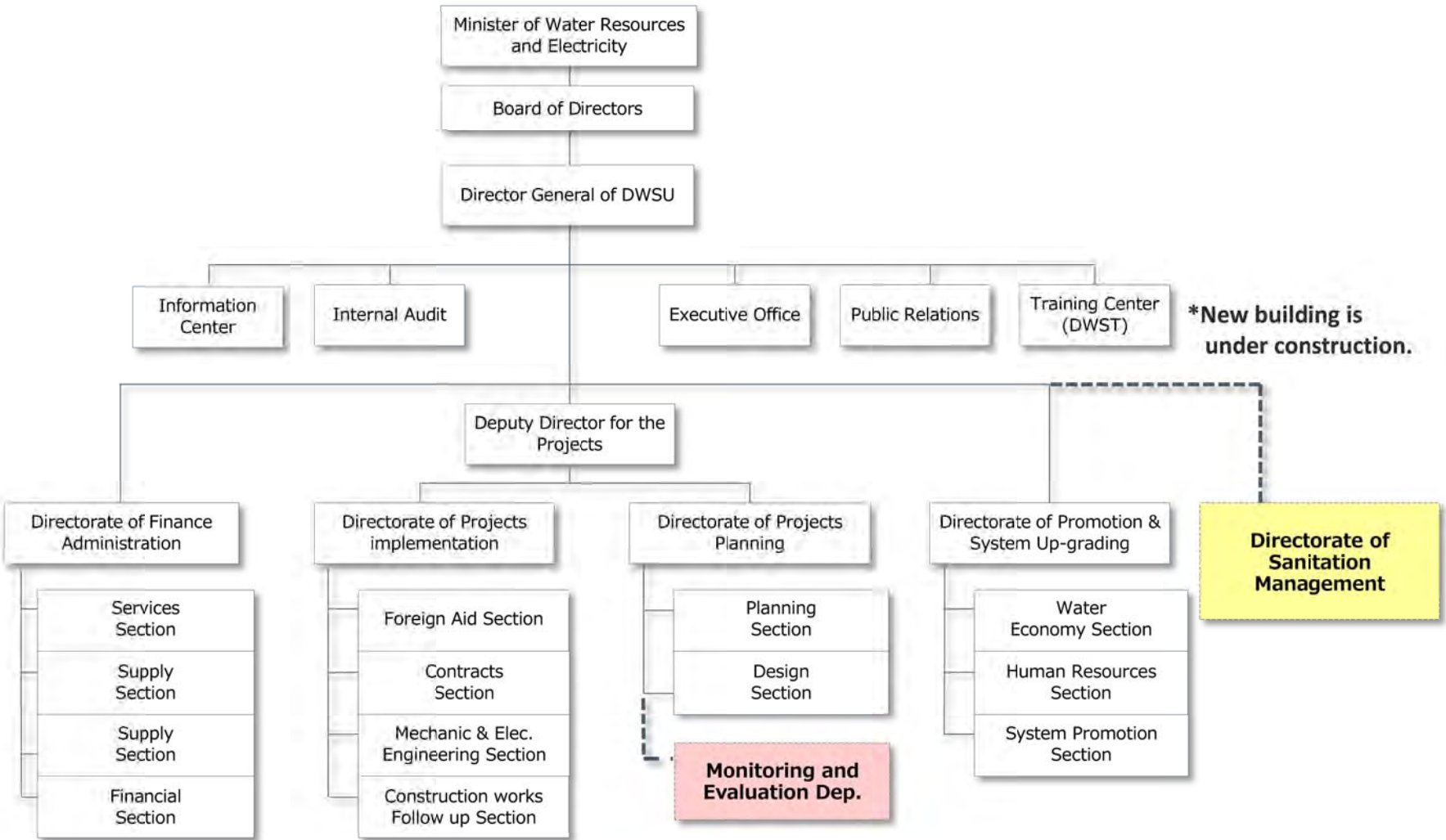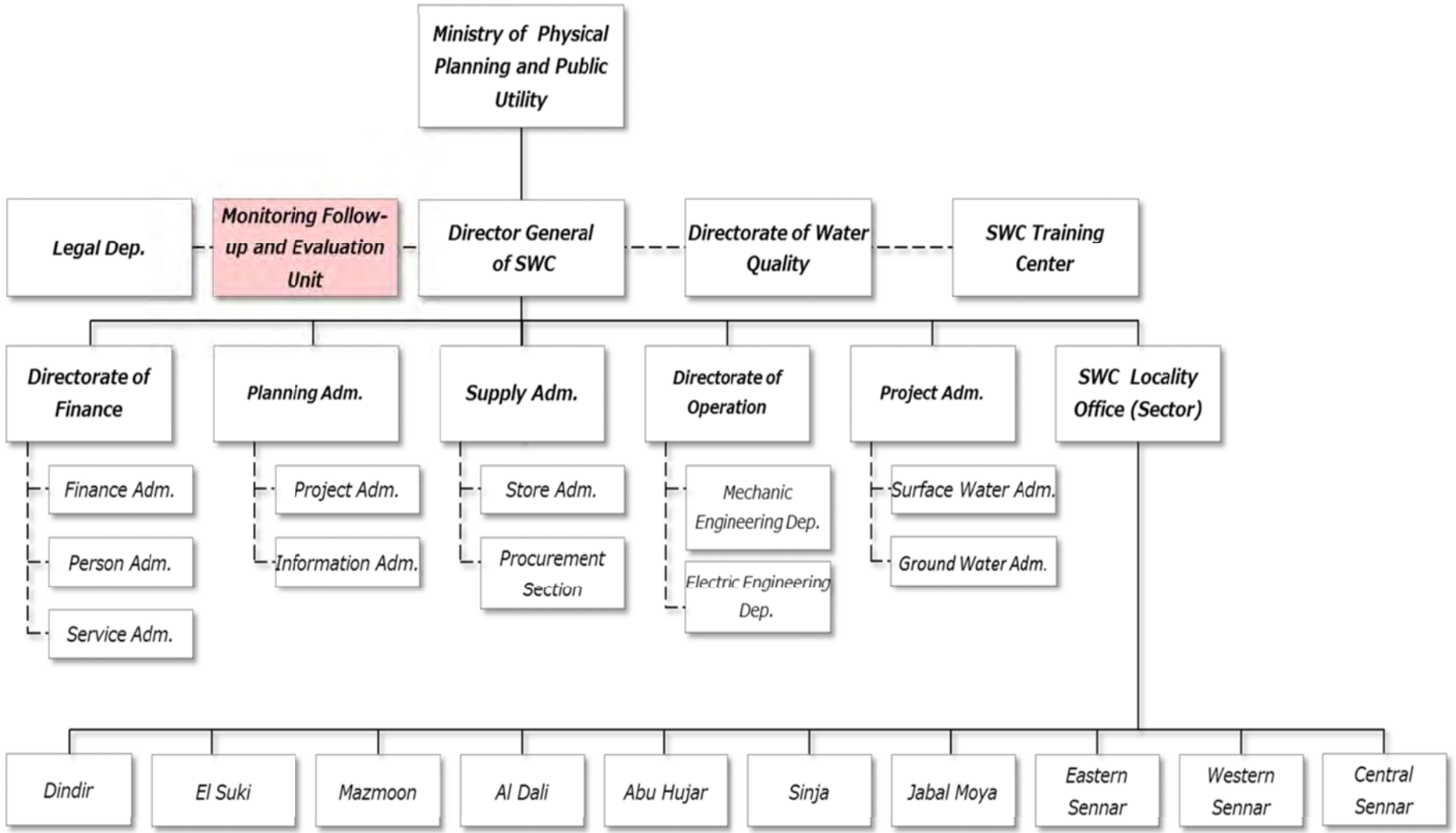
3 Monitoring Data

Refer to attachment

4 Target Area

All Localities in the State

No.	Locality	Target Number
1	West Sennar	138
2	Sinja	114
3	East Sennar	147
4	Central Sennar	23
5	El Suki	129
6	El Dindir	114
7	Abu Hujar	52
Total		**717**

< First Phase (From Oct2014 to March 2015) >

No	Locality	Target Number	Resposibility
6	Sinja	114	Mr. Ammar Hassan, Direcotr of Sinja Sector

6

Category	Locality	2014			2015												Person in charge
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Preparation																	
Planning			■														
Secotor																	
Impelmentation	**West Sennar (138)**							■	■								
	Sinja (114)			■	■												
	East Sennar (147)					■	■										
	Central Sennar (23)										■						
	El Suki (129)							■	■								
	El Dindir (114)														■	■	
	Abu Hujar (52)									■	■						
Reporting																	
Documentation of Report						■									■		

No.	Category	Item	2014			2015			Person in charge
			Oct	Nov	Dec	Jan	Feb	Mar	
1	Planning	Set up the Monitoring unit		■					Workshop Participants
2		Modification of monitoring format (database)		■					Workshop Participants
3		Preparation of Activity Plan		■					Workshop Participants
4		Budgeting; (Daily Allowance, Accommodation, Fuel for Vehicle, etc.)		■					Mr. Tarig Osman
5	Preparation	Preparation of on-site survey (Staffing, Vehicle, GPS, Case for Water Sampling, etc)		■					Mr. Ammar Hassan
6	Implementaton	On-site survey (water Yard Inspetion)			■	■			Mr. Yasir Adam
7		Water Quality Analysis			■	■			Mr. Ashraf Eltahir
8	Data Management	Input the new data and the update existing data			■	■	■		Mr. Ammar Hassan Mr. Yasir Adam
9	Documantation	Preparation of the monitorig report					■		Mr. Ammar Hassan Mr. Yasir Adam
10	Information sharing	Data sharing with DWSU by email						■	Mr. Abbas Hamid
11		Presentation at DWST (Joint seminar, Workshop, JCC, etc)						■	Mr. Abbas Hamid/Mr. Yasir Adam

5-3. The Survey flow

The Survey flow is as follows;

Activity	Remarks

Set up the Monitoring unit

Modification of monitoring form (database)

Preparation of Activity Plan

Budgeting
- Daily Allowance, Accommodation
- Fuel for Vehicle
- Other

Preparation
- Staffing
- Vehicle
- Case for Water Sampling
- Other

On-site Survey (Water Yard)

Borehole
- New Well Data
- Updating the existing well data

Interview with subscriber for collecting controversial points

Water Quality

Groundwater sampling

Investigation of water temperature, E.C. and pH (On-site)

Analysis of the other necessary items (Water Lab.)

Updating of database / format

Deliberation of solution for well with problems
- Malfunctioning of facilities
- Ground Water Level drawdown
- Water Quality
- Other

Data Sharing (SWC ⟺ DWSU)

Planning of Well Rehabilitation

Remarks:
- Monitoring Workshop
- SWC Monitoring Unit
- Locality Office / SWC Monitoring Unit
- SWC Water Lab.
- SWC Monitoring Unit / DWSU

Demarcation

SWCs

Work
1. Survey/Monitoring of Water Supply Facilities
2. Updating of the database and formats
3. Deliberation of solution for well with problems

Regular Submission and sharing of the water supply facility data →

Technical support and instruction ←

DWSU/DWST

Work
1. Decition of National Monitoring Policy
2. Intergrated management of water supply facilities data
3. Analysis of situation of Water Supply in each State
4. Holding the stakeholder meeting and workshop to share information

9

6 Information Sharing

6-1. Methodology and the interval of the information sharing

Methodology and the interval of the information sharing are as follows;

No	Method	Interval	Data to be shared	With Whom?
1	Mobile Phone	Any time (If required)	Latest monitoring data	・DG of SWC ・DG of Ministry of Physical Planning and Public Utility ・DWSU/DWST/M&E Dep.
2	Monthly Report	Every Month	O&M Record	・DG of SWC ・DG of Ministry of Physical Planning and Public Utility
3	Email	・Feb, Aug ・Weekly (If required)	Latest monitoring data	・DWSU/DWST/M&E Dep. ・Other SWC
4	Joint Seminar/JCC	Every six month (March, Aug)	Latest monitoring data	・DWSU/DWST/M&E Dep. ・Other SWC ・Other stakeholders (UNs, NGOs,etc.)
5	Sector Meeting	Before and after the implementation	Latest monitoring data	・Implemetation team members (Sector)
6	Internal Meeting of Monitoring follow-up and Evaluation Unit	Every 3month	Latest monitoring data	・DG of SWC ・Manager of each sector ・Managers of Administration ・Person in charge of each monitoring
7	Website	-	Latest monitoring data	・Anyone

6-2. Information sharing system

Information sharing system is as follows;
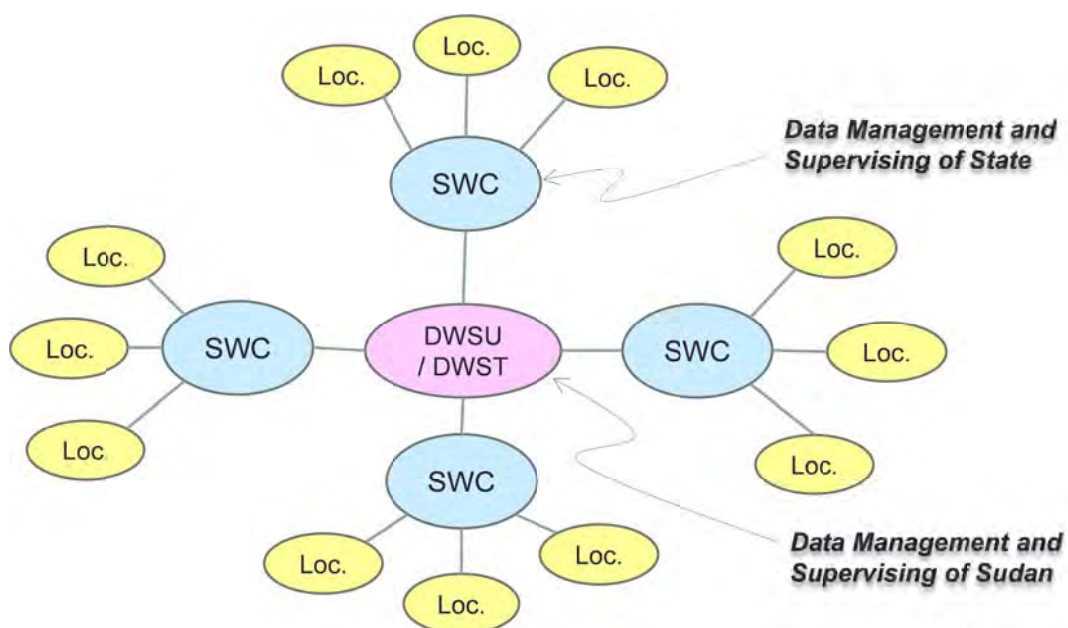
7 Necessary Cost for the monitoring

The estimated cost for monitoring of First Phase is as follows;

Annual Cost

Category	Item	Cost		
		Unit (SDG)	Qty.	Total (SDG)
Equipment	GPS	120	7	840
	Water Level Indicator	120	2	240
	PC (Computer)	5,000	1	5,000
	Ph/EC Meter	10,000	2	20,000
	Software	200	1	200
	Stationary	500	12	6,000
	Digital Camera	120	7	840
	Photo Copy Machine	500	2	1,000
	Water sampling case	5	1,000	5,000
Transportation	Maintenance cost for car	400	12	4,800
	Fuel	2,728	12	32,736
	Car Rent	6,000	12	72,000
Coomunication	Mobile charge	100	84	8,400
	Internet connection	250	12	3,000
Personal	Allowance	50	1,848	92,400
	Meals	10	1,848	18,480
	Accomodation	150	1,848	277,200
Other	-	-		-
Total				548,136

Cost estimation for Model Area (Singa)

Category	Item	Cost		Total (SDG)	Remarks
		Unit Cost	Qty.		
Equipment	PC (Desktop)	-	-	-	Use existing equipment of Training Centre
	PC (Laptop)	-	-	-	Use existing equipment of Training Centre
	Software	-	-	-	Use existing equipment of Training Centre
	External HD	800 SDG/Set	1 Set	800	
	Digital Camera	-	-	-	Use existing equipment of Training Centre
	Copy Machine	-	-	-	Use existing equipment of Training Centre
	Stationary	800 SDG/Team	2 Team	1,600	
	GPS	-	-	-	Use existing equipment of Training Centre
	Water Level Indicator	8,000 SDG/Set	1 Set	8,000	Existing Indicator(1), Additional (1)
	PH/Ec Meter	-	-	-	Use existing equipment of Training Centre
	Water Sampling Case	5 SDG/Unit	120 WY	600	102WY + 18(Emergency)
	Reagent	5,000	1 unit	5,000	
Transportation	Car Rent	3,000 Car/month	4 Car·Month	12,000	3000 car/month X 2team X 2month=4
	Fuel (Petro)	5.200 litter/SDG	850 litter	4,420	5 0 km/site, Consumption 6km/litter, 102 WY
Communication	Mobile Charge	50 SDG/Person/Month	8 Peson·Month	400	2 persons/team X 2 teamX 2month= 8 Peson·Month
	Network (Internet)	150 SDG/Month	2 Month	300	
Personal	Meals	40 SDG/Person/Day	62 Person·Day	2,480	3 persons/team X 2 team X 102 WY X 10 site/day =62 Peson·Day(on site)
	Allowance	50 SDG/Person/Day	62 Person·Day	3,100	3 persons/team X 2 team X 102 WY X 10 site/day =62 Peson·Day(on site)
Emergency Cost		10% of Total Cost		3,870	Worker on site, spare parts, car maintenance, etc.
Total				42,570	

8 Monitoring Data Analysis

Followings are required as analysis of the monitoring data.

- Operation & Maintenance (O&M)
1) Situation of the O&M (SWC, Community, Other)
2) Operation Cost

- Facility
3) Total Condition
4) Condition of the Pumps
5) Condition of the Generator
6) Condition of the Control Panel
7) Condition of the Elevated Tank
8) Water Leakage

- Water Resources
1) Water Quality (Water laboratory)
2) Static Water Level
3) Dynamic Water Level
4) Drawn Down

- Mapping
1) Mapping the location of the water yards in State (classify the functioning, Malfunctioning, etc.)

12

Attachment-2
White Nile SWC
WY Rehabilitation Plan

White Nile State Water Corporation Monitoring and
Evaluation Unit

Action Plan

- Water Yard Rehabilitation

Feb, 2015

Table of Contents

1 Monitoring Data Analysis

Monitoring Target Area; Tandalti Locality

Number of Monitored Water Yards; 114

1. General Condition

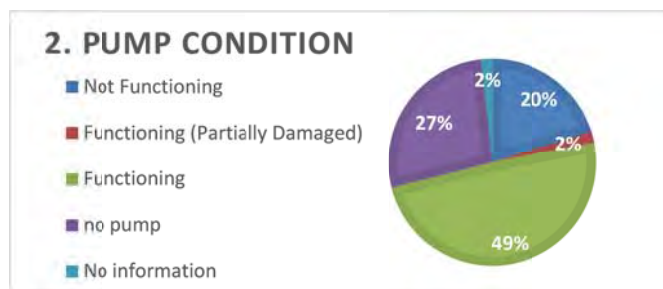| Not Functioning	17
Functioning (Partially Damaged)	30
Functioning	36
Out the services	29
No information	2
Total	**114**
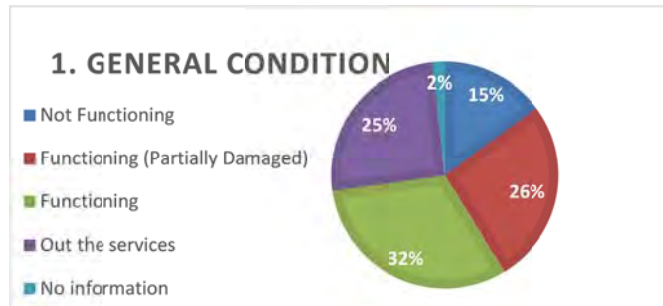
2. pump condition

Not Functioning	23
Functioning (Partially Damaged)	2
Functioning	56
no pump	31
No information	2
Total	**114**

3. Valve condition

Not Functioning	39
Functioning (Partially Damaged)	5
Functioning	11
No Valve	57
No information	2
Total	**114**
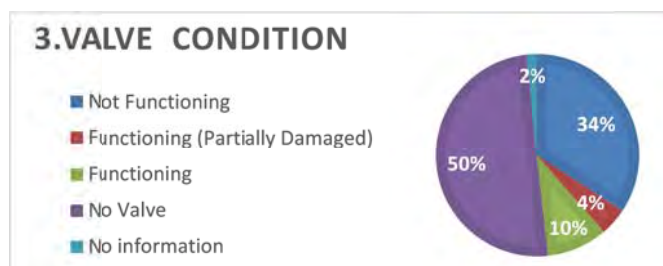
4. Fence condition

No Fence	71
Good Condition	10
Normal	8
Damaged	23
No information	2
Total	**114**

5.Control panel condition

Good	36
Normal	1
Damaged	9
-	68
Total	**114**
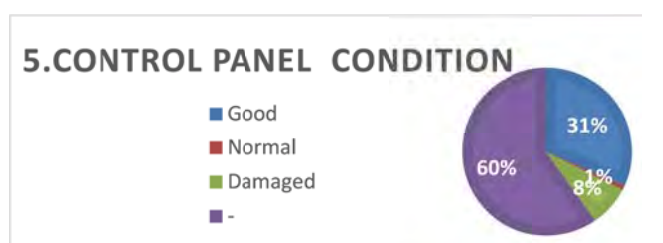
6.Generator condition

No Generator	12
Good	51
Normal	2
Damaged	10
-	39
Total	**114**
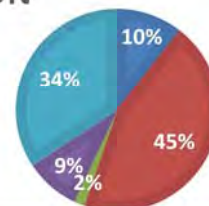
7.Ghrab condition (Yes/No)

Yes	35
No	79
Total	**114**
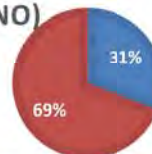
8.Elevation Tank condition

Very good	6
Good	42
Bit bad (leakage)	8
Bit (much leakage)	3
Very Bad (Malfunction)	11
No Tank	42
No information	2
Total	**114**
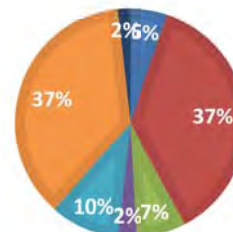
9.Public Tap MGT condition

Very good	0
Good	4
A bit bad	3
Bad	23
Too bad	16
No Public Tap	66
No information	2
Total	**114**
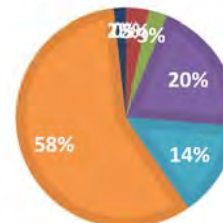
10.Distribution Point (Yes/No)

Yes	35
No	79
Total	**114**

11.Animal Trough condition

Good	23
Normal	4
Damaged	36
-	51
Total	**114**

3
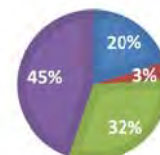
12.Control House (Yes/No)

Yes	54
No	60
Total	**114**
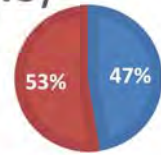
13. Water Quality

Water Color	
Clear	43
Brown	0
Yellow	3
Black	0
Blue	0
White	0
Other	13
Total	**59**
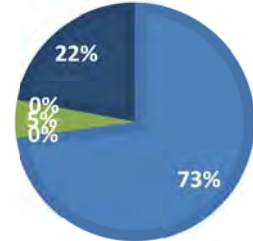
Taste and Odor	
None	49
Steel	0
Salty	9
Bitter	1
Sour	0
Total	**59**
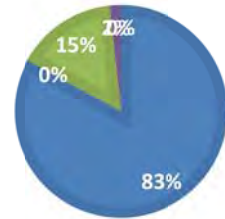
pH	
Within SD Standerd(6.5-8.0)	7
Bellow 6.5	0
Over 8.0	38
Total Sample	**45**

12.CONTROL HOUSE (YES/NO)

WATER COLOR

TASTE AND ODOR

PH
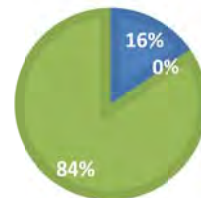
2 Period and the Target Number of the Rehabilitation

Target Period; <u>Feb 2015 – Feb 2016</u>

Target Area; <u>Tandalti</u>

Target Number; <u>10 WY</u>

3 Target Water Yard

No	Priority	Remarks
1	Water Needs	Water Yards located in villages which are suffering from water shortage.
2	Cost Performan	Water Yards that can be rehabilitated with low cost and can provide water for many people.

No.	ID	WY	Population of Village
1	WNT- 026	Tamlika	1,124
2	WNT- 025	Skarnaba	7,000
3	WNT- 108	Om Elgwra	800
4	WNT- 022	Abu Rukba	7,000
5	-	Elbah	-
6	WNT- 063	Elshaatoot	3,000
7	WNT- 002	Elmelaih	3,000
8	WNT- 082	Edelgym	2,000
9	WNT- 087	Omkhyniga	1,000
10	WNT- 085	Awlad Elnoor	-
Total			**24,924**

4 Rehabilitation and Cost Estimation

No	ID	WY	Rehabilitation	Unit Cost	Qty	Sub-Total	Total	Remarks
1	WNT-026	Tamlika	Elv. Tank (Maintenance)	50,000	1	50,000	78,500	Fixing leakage
			Control H. (Maintenance)	11,500	1	11,500		
			Fencing	15,000	1	15,000		
			P.Tap (Maintenance)	2,000	1	2,000		
2	WNT-025	Skarnaba	Elv. Tank (Installation)	30,000	1	30,000	65,000	Lifting up the existing tank on ground
			Control H Construction	20,000	1	20,000		
			Fencing	15,000	1	15,000		
3	WNT-108	Om Elgwra	Control H Construction	20,000	1	20,000	48,500	
			Fencing	15,000	1	15,000		
			Control P. (Maintenance)	7,500	1	7,500		
			P.Tap Construction	6,000	1	6,000		
4	WNT-022	Abu Rukba	Elv. Tank (Maintenance)	50,000	1	50,000	63,500	Fixing leakage
			P.Tap (Maintenance)	2,000	1	2,000		
			Control H. (Maintenance)	11,500	1	11,500		
5		Elbah	Elv. Tank (Maintenance Valve)	1,000	1	1,000	10,500	
			Fencing(Maintenance)	7,500	1	7,500		
			P.Tap (Maintenance)	2,000	1	2,000		
6	WNT-063	Elshaatoot	Fencing	15,000	1	15,000	70,000	
			Elv. Tank (Maintenance)	50,000	1	50,000		Fixing leakage
			Dis.p Pipe	5,000	1	5,000		
7	WNT-002	Elmelaih	Control H. (Maintenance)	11,500	1	11,500	54,000	
			Dist. Pipe (Replacement)	5,000	1	5,000		
			Fencing(Maintenance)	7,500	1	7,500		
			Elv. Tank (Installation)	30,000	1	30,000		Lifting up the existing tank on ground
8	WNT-082	Edelgym	Fencing	15,000	1	15,000	37,000	
			Control H. (Construction)	20,000	1	20,000		
			P.Tap (Maintenance)	2,000	1	2,000		
9	WNT-087	Omkhyniga	Fencing	15,000	1	15,000	56,000	
			Generator (Maintenance)	5,000	1	5,000		
			P.Tap Construction)	6,000	1	6,000		
			Elv. Tank (Installation)	30,000	1	30,000		Lifting up the existing tank on ground
10	WNT-085	Awlad Elnoor	Fencing	15,000	1	15,000	37,000	
			Generator (Replacement)	15,000	1	15,000		
			P.Tap (Maintenance)	2,000	1	2,000		
			Dist. Pipe (Construction)	5,000	1	5,000		
			Total				**520,000**	

5 Schedule

ID	WY	2015												2016		Person in charge
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
WNT- 026	Tamlika				▉											Mr. Yusuf Mohammed Mr. Ali Abd.
WNT- 025	Skarnaba					▉										Mr. Yusuf Mohammed Mr. Ali Abd.
WNT- 108	Om Elgwra						▉									Mr. Yusuf Mohammed Mr. Ali Abd.
WNT- 022	Abu Rukba						▉									Mr. Yusuf Mohammed Mr. Ali Abd.
-	Elbah								▉							Mr. Yusuf Mohammed Mr. Ali Abd.
WNT- 063	Elshaatoot								▉							Mr. Yusuf Mohammed Mr. Ali Abd.
WNT- 002	Elmelaih												▉			Mr. Yusuf Mohammed Mr. Ali Abd.
WNT- 082	Edelgym							▉								Mr. Yusuf Mohammed Mr. Ali Abd.
WNT- 087	Omkhyniga								▉	▉						Mr. Yusuf Mohammed Mr. Ali Abd.
WNT- 085	Awlad Elnoor											▉				Mr. Yusuf Mohammed Mr. Ali Abd.

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Human Resources Development for Water Supply in Sudan Phase-2

March 2015

添付資料-8

PWSC における研修貢献度

専門家とカウンターパートの研修貢献度の推移(井戸管理)

No.	管理業務事項	2012 CP	2012 専門家	2013 CP	2013 専門家	2014 CP	2014 専門家	2015 CP	2015 専門家
1	非常用発電機	80	20	90	10	100	0	100	0
2	宿舎の整備	-		100	0	70	30	100	0
3	開校式(オリエンテーション)準備	50	50	50	50	90	10	90	10
4	研修生データ整備	50	50	60	40	100	0	100	0
5	講師データ整備	80	20	100	0	100	0	100	0
6	講師との協議と調整	60	40	70	30	70	30	100	0
7	研修スケジュール	60	40	100	0	100	0	100	0
8	研修場所準備	100	0	50	50	90	10	100	0
9	テキスト作成	100	0	80	20	100	0	90	10
10	テキストの印刷製本	100	0	-	-	-	-	-	-
11	試験問題と模範解答の作成	100	0	0	100	100	0	100	0
12	研修用機材の確認	80	20	-	-	-	-	-	-
13	研修生への質問表作成	0	100	-	-	-	-	-	-
14	評価シートの作成	0	100	10	90	100	0	100	0
15	研修前ミーティング	50	50	50	50	70	30	80	20
16	開校式(オリエンテーション)	50	50	80	20	100	0	100	0
17	研修状況写真撮影	80	20	80	20	90	10	100	0
18	食事準備	100	0	80	20	100	0	100	0
19	試験の実施	100	0	100	0	100	0	100	0
20	講師評価シートの配布回収	50	50	-	-	-	-	-	-
21	研修内容評価シートの配布回収	50	50	50	50	100	0	90	10
22	宿舎評価シートの配布回収	-	-	-	-	-	-	-	-
23	試験の実施監督と採点	100	0						
24	試験結果の分析	50	50	100	0	100	0	100	0
25	研修終了証の作成	70	30	-	-	-	-	-	-
26	成績優秀者表彰状の作成	-	-	50	50	70	30	90	10
27	研修生へのインタビュー	100	0	50	50	50	50	80	20
28	閉校式	100	0	80	20	100	0	100	0
29	研修生への手当て支払い	100	0	100	0	100	0	100	0
30	講師への支払い	100	0	100	0	100	0	100	0
31	研修生へのインタビューの分析	0	100	0	100	90	10	100	0
32	評価シートの分析	0	100	0	100	90	10	100	0
33	研修終了後のミーティングと評価	50	50	50	50	90	10	80	20
34	報告書作成	0	0	50	50	90	10	90	10
35	次のプロジェクトのための整理整頓	-	-	-	-	-	-	-	-
	平均	64.8 %	31.9 %	64.1 %	35.9 %	91.1 %	8.9 %	95.9 %	4.1 %