

	2. OM activities after completion of the Project	2.0 hours
	3. Review and revision of the VWC action plan	2.0 hours
	4. Recapitulation and evaluation of the workshop	1.0 hour

5) Methodologies

Applying indicators set in Module 5, review and evaluation of the activities will be done by the community members with using participatory evaluation methods such as PRA. The evaluation results, recommendations and lessons learnt will be reflected in the OM activities by the communities in the post-project period and these will also be compiled as the completion report to DWR.

6) Output from the Activity

- Summary of results of the evaluation on achievement of the expected outputs and impacts of the interventions
- Action plans of VWCs on OM activities after completion of the Project

D Spot Activities during the construction stage

Module 12 Strengthening OM system through provision of continuous supervision and monitoring

1) Objectives

- To implement OM activities for water supply system in accordance with the action plan formulated in module 12, based on the arrangement made between VWC and private maintenance service provider under supervision and monitoring by DWR and relevant administrative organ
- To build capacity of user communities in OM in each sites through feed back as the result of monitoring on daily OM and solving various problems on a case by case

2) Target Group

Staffs of Area Council, TAC-MDFT members, Private maintenance service provider, community members in targeted 18 sites and VWC members

3) Responsible Persons and Assignment Period

Responsible Person	Assignment Period	Scope of Works
Japanese Consultant	18days×2times *	Confirmation and feed back of supervision of OM system by the government

*1st time: 6 months later of launch of construction

*2nd time : 14 months later of launch of construction

4) Methodologies

Evaluating the outcome of precedent activities through reviewing monitoring on daily OM activities by TAC-MDFT members and interviewing to DWR and local authorities, of which findings are reflected on the subsequent activities.

5) Output from the Activity

- Report of interviewing
- Report on activities

(2) Undertakings to be borne by The Gambian side

Among activities described in (1) above, The Gambia side (i.e. DWR) will be solely responsible for implementation of activities in each targeted site by TAC-MDFT members after relevant OJT is provided by local consultant/NGO. For achieving the Project objective, required input along with planned schedule is indispensable so that undertakings by The Gambian side shall be assured.

After the constructed water supply facilities are handed over to the target communities and have started their operation, DWR will continue monitoring of the communities on a) collection and management of the maintenance fund, b) hygiene practice of the community including environmental management of the water sources, and c) daily maintenance activities of the facilities as well as prevention of waste of water from public faucets.

Detailed plan of monitoring and evaluation will be discussed and formulated with DWR and local authorities during implementation of the Soft Component programme in the Project. After Japanese consultant implements the monitoring and feed back of the result, The Gambian side will take responsibility for monitoring and evaluation continuously.

6. Resource procurement method for the implementation of Soft Component

The Soft Component will be implemented by Japanese consultant to be responsible for planning the Soft Component programme, supervising the entire implementation process of the programme, coordinating activities and subcontracting with local NGO/Consultant to entrust some activities as well as participation of DWR and Area Council and community health worker to be selected from each site.

Since DWR headquarters does not have a staff specialised in social development, the programme coordinator will be appointed from the local NGO or Consultants based in The Gambia. Local NGO or Consultants have knowledge and experience in water supply and

hygiene project of rural area in The Gambia so that it will be effective to implement the programme with them in order to prevent friction with related people by using local language.

Involving members of formed TAC-MDFT in OM activities in local government level, effective and efficient implementation of activities are expected in each site level. This is also aiming at OJT for TAC-MDFT members in monitoring and evaluation activities. Furthermore, employing community health workers in each target site enable the activities to be carried on in sustainable manner.

Personnel to be assigned to implement the Soft Component Programme are the following.

6-1 Japanese Consultant in charge of OM (1 person)

[Assigned period: Total 2. 37M/M (1. 5M/M in The Gambia)]

The consultant will be responsible for planning the Soft Component programme, supervising the entire implementation process of the programme, reporting to The Gambia and the Japanese side, and coordinating activities with the schedule of the construction works. This staff will also provide training and advices on approaches and methodologies of the planned activities to local staff who will be involved in implementation of the programme so that the expected outputs can be achieved from each activity. The consultant in charge of OM shall be sufficiently experienced in the social development field.

6-2 Programme Coordinator from Local NGO or Consultant (1 person)

[Assigned period: Total 8. 39M/M]

Under the supervision of the Japanese consultant, the programme coordinator will be responsible to manage the progress and outputs of each activity as well as performance of the personnel who will be directly involved in the activities at the village level and to make periodical reports to the Japanese consultant. The programme coordinator should be fully experienced in training of facilitators, promotion of community participation and formation of community-based organisation, and hygiene education. Fluent communication skills in local languages used in the target areas are also required.

6-3 Assistant Programme Coordinator from Local NGO or Consultant (1 person)

[Assigned period: Total 1. 5M/M]

Assistant programme coordinator will support programme coordinator in module 1 to 3 during pre-construction stage.

6-4 TAC members consisting of staffs of DWR, Ministry of Health and Department of Community Development (Total 15 persons: 3 persons/TAC x 5 Area Councils)

[Assigned period: Total 59. 3M/M]

DWR has motivators in each region to facilitate interaction with the communities in

establishment of the OM system. They conduct activities related to community mobilisation/sensitisation and capacity building as TAC members in cooperation with the motivators from the Ministry of Health and Department of Community Development under the TAC-MDFT system. Through the members of MDFT, three motivators from these organisations form one team to facilitate community mobilisation and training of VWC.

These motivators have been involved in intervention to establish OM system for wells with hand-pumps and solar pumping system funded by other donors. Through these experiences, they have developed skills and knowledge on participatory planning and evaluation, and training of VWC. Therefore, these existing human resources in regional offices of DWR and relevant organisation will be utilised in this project for implementation of the activities on capacity building of the target communities under supervision by the programme coordinator.

In consideration of different approaches and experiences of these motivators in supporting communities for OM and capacity building in accordance with the Projects they have been involved, OJT for the motivators will be required in this project to level out their skills and knowledge based on the proposed OM framework and to get same degree of understanding in approaches and methodologies of the planned activities.

6-5 MDFT members consisting of field workers of DWR, Ministry of Health and Department of Community Development (Total 39 persons: 3 persons/MDFT x 13 wards)

[Assigned period: Total 67.00M/M]

MDFT members will be involved in each ward level as field workers by communicating directly with communities. Since they are familiar with the condition of each target site, the detailed assistance will be provided to the communities through their activities.

6-6 Community Health Workers (Total 36 people: 2 person/site x 18 sites)

[Assigned period: Total 11.94M/M]

Proper understanding and practice of hygiene management by the user communities are indispensable for realisation of sustainable and safe water supply. Community health workers will be appointed among the residents of each target site and be trained in implementation of the participatory hygiene education in this Project in order to facilitate behavioural change of the community members on their own initiative. The rationale of the approach to train local human resources as the community health workers is that they live in the target communities of the village, hence ensuring continuation of hygiene education even after completion of the Project as well as appropriate contents of messages and methods of their delivery in hygiene education.

7. Implementation process of Soft Component activity

Approximately 22 months

(Pre-construction stage: 6 month, Construction stage: 15 months, Handing-over stage: 1month)

8. Outputs of Soft Component programme

Followings are outputs of Soft Component programme

- Progress report of Soft Component programme
(After completion of first and second field works by Japanese Consultant)
- Completion report of Soft Component programme (After the completion of all modules)
- Training manual
(to be used in improvement of OM system and participatory hygiene education in the communities)

Following materials will be submitted from local NGO/Consultant as appendix of monthly reports and final report and be referred to above reports finalised by Japanese consultant.

- Regulation and action of the VWC, rules of water use in each target sites
- Declaration of commitment to maintenance of solar pumping system to be signed by the target communities and witnessed by DWR and local authorities.
- Maintenance service contract to be made between the target communities and the private service provider
- Workshop report, Monitoring sheet of activities of TAC-MDFT and community health workers, and activity report of VWC
- Summary of evaluation on conditions of achieved outputs and efficiencies by the communities

9. Undertakings to be borne by The Gambian Side

In consideration of smooth implementation of the Project and output producing, planed inputs should be put in execution. It is expected that allocation of TAC-MDFT members by The Gambian side will not be changed and inputs for the activities will be implemented in proper period.

After constructed water supply facilities are handed over to the target communities and have started their operation, DWR and local authorities will continue monitoring and evaluation of activities of facilities. In case some issues come out, each stakeholder is supposed to start discussion to reach the solution. The continuous discussion will be the basis of relation building among the stakeholders and help the improvement of water supply service.

Establishment of discussion process requires persistent facilitation under the initiative of government and sufficient time. Even though there are some limitations in human resource, budget and equipments, continuous coordination is required which has been shown in similar project.

Since introduction of solar pumping system in rural water supply is facilitated as a policy of The Gambia, the number of communities to be targeted by similar project will be increased in middle and long term. Hence, under this situation, capacity building for the local government will be important issue in terms of decentralisation and transfer of authority. Increasing the involvement of local government replacing DWR centred OM system, establishment of basis for the improvement of rural water supply service by capacity development mentioned above.

Table 2-32 Summary of the Planned Activities in the Software Component Programme

Period	Contents of Activities	Target Group	Required Period (Approx.)	Total Period		Responsible Persons		Venue	Outputs from the Activities
				Time	Days	Japanese side	MM		
The Construction Stage	1. Action planning on establishment of OM system of the water supply facility and its monitoring and evaluation	Consultant personnel from DWR and staff from relevant organisations (approx. 7 persons)	4 days / All Period	1	4	Japanese Consultant	0.13	Local coordinator Assistant local coordinator	Monitoring and evaluation plan formulated by DWR
	2. Mobilisation of stakeholders of Area Council	Staff from Regional offices and Area Councils, Chair of the affected districts, members of the TAC-MDFT (Total 15 persons, approx. 15 persons/Region x 4 Regions)	1 days / Area Council	5	5	Japanese Consultant	0.17	Local coordinator Assistant local coordinator	Workshop proceedings
	3. Orientation of objectives, detailed activities and implementation set-up of the project	Community members in the targeted 18 sites	2 days / site	18	36		1.20 3.60	Local coordinator Assistant local coordinator TAC member MDFT member	Monitoring sheet of the activity recorded by the motivators
	4. Formation/reorganisation of VWCs	Community members in the targeted 18 sites	1 days / site	18	18		0.17 1.80	Local coordinator Assistant local coordinator TAC member MDFT member	Monitoring sheet of the activity recorded by TAC-MDFT, copies of bylaws for operation of VWC, declaration of commitment to maintenance of the solar-powered water supply system signed by the VWCs.
	5. Participatory analysis on problems related to present water and sanitation conditions in the target villages	Community members in the targeted 18 sites	2 days / site	18	54		0.50 1.80	Local coordinator Assistant local coordinator TAC member MDFT member	Monitoring sheet of the activity recorded by TAC-MDFT members.
	6. Enhancing mutual trust and relationship building among administrative organ, private contractor, and VWCs	TAC-MDFT members, staffs of private contractor in charge of OM, and VWC members	1 days / site	18	18		0.17 1.80	Local coordinator Assistant local coordinator TAC member MDFT member	Monitoring sheet of the activity recorded by TAC-MDFT members.
	7. Capacity building of VWCs	VWC members (total 180 persons, approx. 10 members/VWC x 18 sites)	2 days / site	18	36		0.33 3.60	Local coordinator TAC member MDFT member	Monitoring sheet of the activity recorded by TAC-MDFT members.
	7.2. Improvement of knowledge and skills on daily OM of the water scheme	VWC members (total 180 persons, approx. 10 members/VWC x 18 sites)	2 days / site	18	36		0.33 3.60	Local coordinator TAC member MDFT member	Monitoring sheet of the activity recorded by TAC-MDFT members.
	7.3. Training in financial management of OM fund	Treasurers of VWCs and lay attendants (total 198 persons, 1 treasurer & approx. 10 lay attendants/site x 18 sites)	2 days / site	18	36		0.33 3.60	Local coordinator TAC member MDFT member	Monitoring sheet of the activity recorded by TAC-MDFT members.
	7.4. Training for improvement of leadership required for facilitation of proper water use and skill for participatory planning and evaluation	VWC members (total 180 persons, approx. 10 members/VWC x 18 sites)	2 days / site	18	36		0.33 3.60	Local coordinator TAC member MDFT member	Monitoring sheet of the activity recorded by TAC-MDFT members.
	7.5. Training in conservation and management of water resources	VWC members (total 180 persons, approx. 10 members/VWC x 18 sites)	2 days / site	18	36		0.33 3.60	Local coordinator TAC member MDFT member	Monitoring sheet of the activity recorded by TAC-MDFT members.
	Construction Stage	8. Participatory hygiene education	Community health workers selected in each target site (total 36 persons, 2 persons/site x 18 sites)	5 days / Area Council	5	25	A	0.83 2.50	Local coordinator TAC member MDFT member
8.2. Implementation of the participatory hygiene education programme for facilitation of appropriate handling of the water sources and drinking water as well as improvement of hygiene practices		Community members in the targeted 18 sites	2 days / month/site	each site/month	154		1.20 7.70	Local coordinator TAC member MDFT member Community Health	Monitoring sheet of the activity recorded by community health workers
Facilitation of community participation in daily maintenance, protection of the water facilities and regular payment of the maintenance fund		Community members in the targeted 18 sites	1 days / month/site	each site/month	77		1.37 7.70	Local coordinator TAC member MDFT member	Monitoring sheet of the activity recorded by TAC-MDFT members, including report of the VWCs
Handing-Over Stage	10. Promoting of maintenance service contracts between the target villages and the private service provider	VWC members (total 180 persons, approx. 10 members/VWC x 18 sites)	2 days / site	18	36		0.33 3.60	Local coordinator TAC member MDFT member	Monitoring sheet of the activity recorded by TAC-MDFT members, copies of the maintenance service contracts
	11. Impact evaluation of the Software-Component Programme and finalisation of the action plan for OM in the post-project period	Community members in the targeted 18 sites, VWC, TAC-MDFT member, Private maintenance service provider	3 days / site	18	54		0.50 5.40	Local coordinator TAC member MDFT member	Summary of results of the evaluation on achievement of the expected outputs and impacts of the interventions. Action plans of VWCs on OM activities after completion of the Project.
Spot	12. Strengthening OM system through provision of continuous supervision and monitoring	Staff of Area Council, TAC-MDFT member, Private maintenance service provider, Community members and VWC members in the targeted 18 sites.	0.5 days / site	After Hand-over (2trips/site)	Japanese Consultant		1.20	DWR counterpart TAC member MDFT member	Report of interesting Report from Area Council Report from DWR
					Japanese Consultant		1.50	Local coordinator	
							1.50	Assistant local	
							(99.30)	TAC member	
							(67.00)	MDFT member	
							11.94	Community Health	

2-2-4-9 Implementation Schedule

The implementation schedule of the Project as a grant aid assistance project will be as follows:

- 1) Exchange of Notes (E/N)
- 2) Grant Agreement (G/A)
- 3) Consultant Agreement
- 4) Detailed Design Survey
- 5) Tender Documentation Preparation
- 6) Tender and Contractor Contract
- 7) Procurement of Materials and Equipment
- 8) Transport of Materials and Equipment/Customs Clearance
- 9) Construction of Water Supply Facilities
- 10) Handover of the Facilities

The Project will be implemented on the schedule for a period of about 24 months after execution of the E/N and the G/A between both Governments. The construction works will be carried out by a Japanese company, but the borehole drilling works at four sites will be done making the use of local companies in The Gambia. The construction of water supply facilities will be carried out on the responsibility and management of a company based in Japan, but some works will be undertaken by making the use of local companies in The Gambia. Therefore, the Project will be implemented as a project to be completed on liability for one fiscal year and the work period will be about 24 months. The implementation schedule is shown in Table 2-33.

The Project will be implemented as a grant aid project of Japan and a Japanese company will be the prime constructor to undertake the construction of water supply facilities, but the local workers in The Gambia will be employed for the work at each site in order to do the work economically. However, new construction and rehabilitation works will be done at 18 project sites in 4 regions, and the work period at each site will be limited. Therefore, the work schedule, construction work and quality control will be managed properly in the appropriate construction control by Japanese engineers.

Since the local companies and technicians having reliable technology are restricted, the sites where the works can be done concurrently in parallel will be limited to 5 to 7 sites. The optimum work schedules at 15 new construction sites and 3 rehabilitation sites are shown in Table 2-34. On these schedules, the works in each region will be done efficiently. These work schedules were worked out, taking into full consideration the following restrictive conditions for implementing the Project:

- ① Crossing The Gambia River dividing the country into 2, north and south regions by a ferry for transportation of materials

- ② Bad conditions of access roads in the rainy season and impassable unpaved roads in rural areas
- ③ Considerations for periods of work suspension due to rains

Table 2-33 Description of Implementation of the Project

	Construction	Consultant
Detailed Survey (About 8.5 months)	Preparation	. Detailed Design Survey . Preparation for Tender Document and supervision . Supervision of Procurement . Support for Soft Component
Construction and Supervision (About 14 months)	1) North Bank water supply facilities construction (3 sites) 2) Central River (north) water supply facilities Construction (4 sites) 3) Western water supply facilities construction (2 sites) 4) Lower River water supply facilities construction (3 sites) 5) Central River (south) water supply facilities construction (3 sites) 6) Central River (south) rehabilitation of existing water supply facilities (3 sites)	. Procurement and Supervision . Support for Soft Component

The implementation schedule based on the above is shown in Table 2-34.

Table 2-34 Project Implementation Schedule

Implementation Schedule	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Detailed Design	Detailed Design Study in Gambia																	(Total: 8.5months)			
	Tender Document Preparation in Japan																				
	Confirmation of Tender Documents in Gambia																				
	Tendering																				
Construction and Procurement	Procurement of Equipment																(Total: 14.0months)				
	Drilling works																				
	Construction of Water Supply Facilities																				
Softwear Component	[Gantt bar spanning months 1 to 21]																				(Total: 20.0months)

2-3 Obligations of Recipient Country

Given the case that the Government of Japan approves the project for implementation under Japan's grant aid scheme, in order for the project to precede in a smooth manner, The Gambian side needs to carry out the following obligations in addition to the tasks specified in 2-4-3(2).

(1) Responsibilities of The Gambian Side

- ① To secure, clear and reclaim the lands for construction of boreholes and water supply facilities.
- ② To construct or rehabilitate access roads to the target sites.
- ③ To secure, clear and reclaim the lands for the operation base of the construction works.
- ④ To arrange a stockyard for procured equipment and materials.
- ⑤ To provide information and materials necessary to the project
- ⑥ To assure the personnel and budget incurred for supervision of facilities construction and activity of Soft Component programme.
- ⑦ To operate and maintain effectively procured equipment and materials and constructed water supply facilities.
- ⑧ To bear all necessary costs other than those covered by the grant aid.
- ⑨ To take appropriate measures for their protection of test boreholes used as production wells until water supply facilities will be constructed.

(2) Procedures

- ① To accord Japanese nationals, whose services may be required in concord with the verified contracts of the project, their entry into The Gambia and stay therein for the performance of their work.
- ② To exempt equipment, materials and services in concord with the verified contracts of the project from customs duties, internal taxes and other fiscal levies which may be imposed in The Gambia.
- ③ To ensure prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the goods procured in concord with the verified contracts of the project.
- ④ To bear advising commission for an Authorization to Pay (A/P) and payment commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A).
- ⑤ To bear expenses for insurance incurred on the procured vehicles.

The aforesaid obligations of The Gambian side had been explained to and discussed with the Government of The Gambia. These are justified as adequate, considering the necessity and relevance to the executing agency and beneficiary communities.

2-4 Project Operation Plan

Establishment of OM system of the solar-powered water supply facilities in the Project is designed in full compliance with the “Policy on Management and Sustainability of Rural Water Supply: Solar Pumping Systems” finalised by the Government of The Gambia in 2008 based on the past experience in OM of rural water supply projects supported by the Japanese government and other donors centring on EDF since 1990’s. In this policy, the beneficiary communities are to bear the primary responsibility for OM while the OM companies contract the maintenance and repair services of the solar pumping system. DWR and the Local Government Authorities (hereafter LGAs) through the Technical Advisory Committee–Multi Disciplinary Facilitation Team (TAC-MDFT) is responsible for supporting the communities for proper management of VWC and water supply facilities and supervising the entire mechanism of OM activities implemented by the communities and the OM companies. This tripartite cooperation among i) the target communities, ii) the public sector, and iii) the OM company is to be employed as the basic framework of OM system of the Project.

Issues observed according to the progress of decentralisation and lessons from the past similar projects are also considered in formulation of OM plan of the Project. According to the “Local Government Act 2002” and “National Water Policy 2006” as the overall policy of the water sector, responsibility in provision of the rural water supply service including establishment of OM system is to be transferred from DWR to LGAs to be represented by the Area Councils. In response to this situation, TAC as decision-making body and its executing wing, MDFT, will be involved in OM of the Project. Aiming at integrated community development, TAC consists of the Regional Commissioner in charge of chairperson, Chief Executive Officer (CEO) of the Area Council in charged of vice-chairperson and officers stationed at the regional level from the related departments such as Ministry of Health, Department of Community Development, and DWR. Though situation varies from region to region, the motivators of DWR are also members of MDFT. While TAC and MDFT have not been placed as a part of the organisation of the local government yet, it is intended to be reorganised along with the decentralisation policy.

The “National Water Policy”, “National Water Bill (Draft)” which will regulate the institutional setting in the rural water supply and “National Integrated Water Resources Bill” state that the responsibility for the service provision of water supply should be devolved gradually to the local government. Until the local government equips with the required level of capacities in terms of staffing, expertise, and finance, the responsibility still remains in

DWR. Since the rural water supply sub-sector has been in the process of decentralisation, LGAs through TAC and MDFT will be involved in OM system of the Project while DWR will still play a major role in the provision of support service to the communities for the moment.

Fig. 2-11 shows the framework of the proposed OM system of the Project. In consideration of the issues found in the review of the current OM activities for the existing water supply facilities in the target areas, the following approaches are to be focused on in the OM plan of the Project.

(1) Confirmation of Awareness of the Target Communities on Ownership and Responsibilities for OM of the Water Supply Facilities

Based on the policy of the government that 'the responsibility of OM of water supply facilities and its ownership belong to the beneficiary communities', the community members of the target sites are users and responsible body for OM of the water supply schemes to be constructed in the Project. They are required to undertake necessary measures to maintain and utilise the facilities in sustainable manner. Willingness of the target communities on ownership and responsibilities was surveyed by key informant interviews and sample household survey. The survey results show that their awareness and willingness are high enough to be prepared for cooperation to the project. Also, the communities understand that the water supply facilities to be constructed in the Project will be handed over from DWR to the respective communities.

In the pre-implementation stage of the Project, understanding of the community members will be enhanced not only on users' rights but their responsibilities and duties in operation of the water scheme. Construction of water supply facilities will be commenced after the explicit commitment of the communities in operation and maintenance including cost-sharing is confirmed.

(2) Leadership of the Village Water Committee in Operation and Maintenance Activities

DWR requires the community members in each target site to form a VWC as the main body to lead OM activities at village level. The committee consisting of elected members among the user communities sharing one scheme will be placed under the Village Development Committee (VDC) that coordinates development issues and activities as a whole in the village. Approximately ten members will compose a VWC including chairperson, vice-chairperson, secretary, treasurer, auditor, advisor, operator and guard.

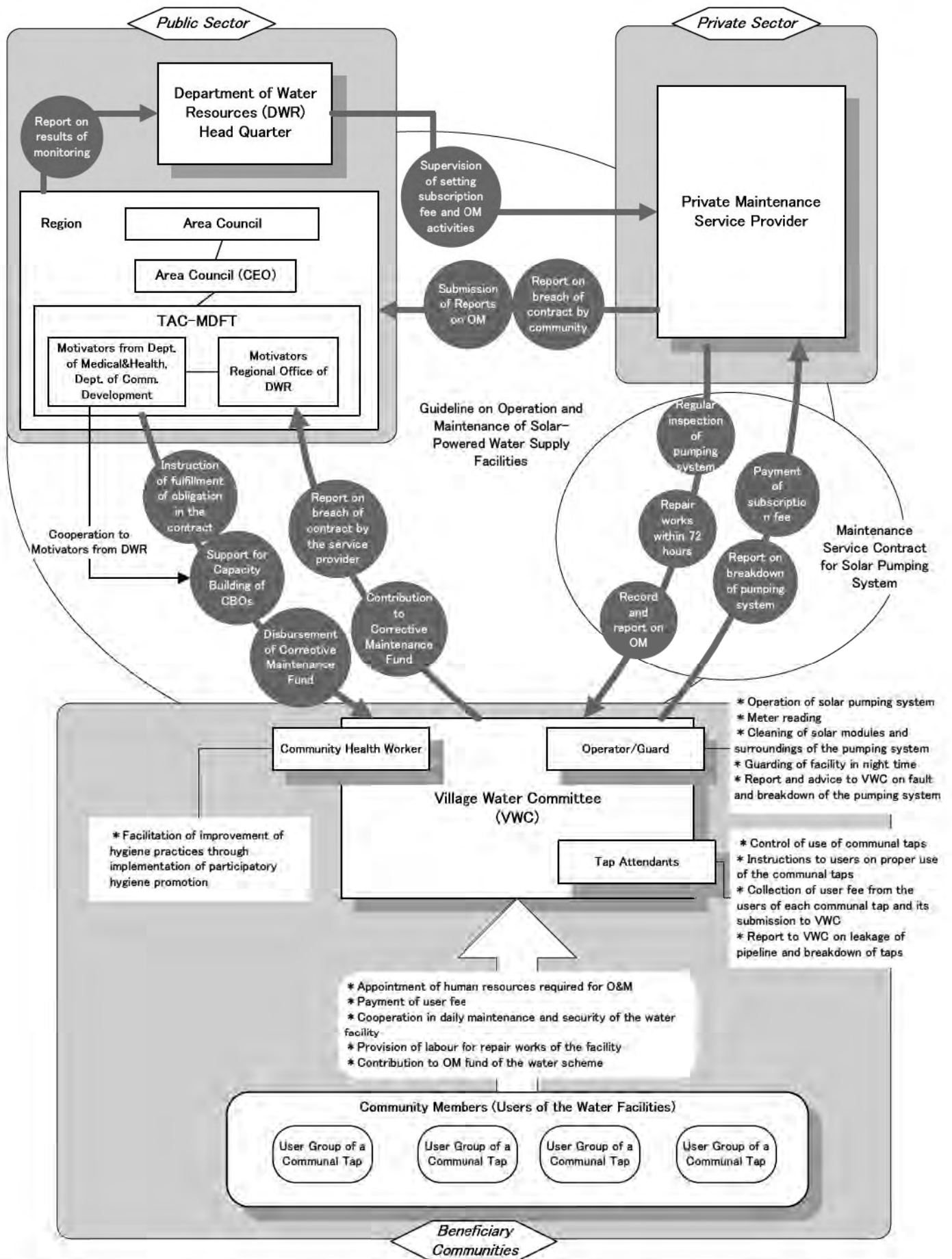


Fig. 2-11 Operation and Maintenance System of the Solar-powered Water Supply Facilities in The Gambia

Emphasis should be put on enhancement of understanding of both men and women on significance of active participation of women in decision-making process, with considering the social background of the target areas that the decision-making process for the common interests of the community is often dominated by males.

Roles and responsibilities of the VWC are as follows:

- 1) Preparation of action plan and facilitation of implementation of the plan for improvement of water and sanitation in the village
- 2) Collection of water tariff and payment to the maintenance service provider, daily OM activities including minor repairs of the water supply facility, and facilitation of allocation of resources (human resources, materials, and funds) required for OM
- 3) Provision of instructions for proper use of the water facilities and preparation of rules on water use
- 4) Conflict resolution related to use of water supply facilities
- 5) The support services for OM to be provided by the public and private sectors

In The Gambia VWCs responsible for OM of existing water supply facilities have been established in each target site either by themselves or by the external supports from the donors or government organisation. However, the degree of their performance varies. Thus, the options for formation of the VWC either to reorganise the existing one or to form a new committee will be decided through dialogue and discussion with the target communities in consideration of process of establishment of the existing committee, type of water supply facility which the committee is taking care of, and past experiences of the committee members to receive trainings for their capacity building.

Daily OM of the water scheme will be undertaken by the operator, tap attendants and guard to be appointed by the community members. They will conduct following duties as the members of VWC.

[Operator]

- 1) Daily operation of solar pumping system
- 2) Metering
- 3) Cleaning of solar modules and surroundings of the pumping system
- 4) Reporting and advise to VWC in case of trouble and breakdown of the solar pumping system

[Tap attendants]

- 1) Control of public faucets
- 2) Instructions to users for proper use of public faucets
- 3) Collection of user fee from users of each public faucet and its delivery to VWC
- 4) Reporting to VWC in case of leakage of pipeline and breakdown of taps

[Guard]

1) Prevention of theft and vandalism on the solar pumping system during night time

Motivators of DWR will provide training to VWC members on leadership skill, management of organisation, technical skills for operation of the scheme, setting and collection method of water tariff. Careful attention will be paid in the capacity building of VWC in these areas because there are few communities which currently keep financial records and account book in the target sites.

(3) Maintenance Service Contract with the OM Company (Private Service Sector)

The community represented by the chairperson of VWC will enter into a service contract with the OM company for the maintenance of the solar pumping system with witness from DWR and the Area Council after the water scheme is handed over from DWR to the community. Term of the contract is usually five years and the contract is renewed automatically unless negotiations for amendment are proposed by either party.

The progressive tariff according to the amount of water consumption (metered rate system) is applied for payment of the subscription fee to the OM company in the current maintenance service contract in The Gambia. The OM company is responsible for the maintenance and repair of the solar pumping system including a pumping unit, solar modules and pumping main, and water storage tank. The maintenance of the pipelines and public faucets remains the responsibility of the communities.

The community also appoints an operator, a guard and tap attendants as mentioned in (2) above and assures appropriate use and maintenance of the facilities under supervision of VWC. They are required to ensure payment of the subscription fee of the maintenance service contract to the service provider. Meanwhile, the service provider undertakes periodical inspection and maintenance of the solar pumping system and repair the system within seventy two hours after report of breakdown from the community is given. Table 4-1 shows responsibilities shared among the user communities, private service provider and DWR in OM of the solar-powered water supply scheme.

Table 2-35 Demarcation of Responsibilities in Operation and Maintenance of Solar-powered Water Supply Facilities

	Village	Private Service Provider	DWR
Operation	<ul style="list-style-type: none"> Meter reading by the operator (daily) 	—	—
Preventive Inspection and Maintenance	<ul style="list-style-type: none"> Cleaning of solar modules (brushing) and surroundings of the pumping system, and weeding by the operator Sensitisation of users by VWC and tap attendants on proper use of public faucets and prevention of waste of water as well as illegal connection 	<ul style="list-style-type: none"> Regular inspection, adjustment and repair of solar pumping system Recording the maintenance inventory and reporting to DWR and the community Reporting to DWR and the community on any trouble in the borehole and waste of water from the facility 	<ul style="list-style-type: none"> Monitoring and supervision of maintenance activities by the communities and private service provider
Prevention of Theft and Vandalism	<ul style="list-style-type: none"> Station of the security guard during the night Construction of the guard house Guarding of facilities in daytime Payment of salary to the guard 	<ul style="list-style-type: none"> Payment of salary to the guard (included in the subscription fee of the service contract)⁸ 	<ul style="list-style-type: none"> Adoption of specifications of the water facilities to prevent thefts
Repair works based on the maintenance contract	<ul style="list-style-type: none"> Reporting the service provider on breakdown of the solar pumping system 	<ul style="list-style-type: none"> Repair works within 72 hours from a report of breakdown Keeping spare parts of the solar pumping system 	<ul style="list-style-type: none"> Monitoring and supervision of repair works by the private service provider
Repair works which are not covered in the maintenance contract	<ul style="list-style-type: none"> Repair of distribution pipes and public faucets Arrangement of necessary measures for the repair works by the community or local contractor 	<ul style="list-style-type: none"> Execution of repair works at cost based on the ad hoc request by the community 	<ul style="list-style-type: none"> Provision of the technical support to the community based on the request from VWC Support of the communities in repair or replacement of pipeline (provision of materials and technicians paid by the communities)

Before the introduction of the policy on OM system of the solar-powered water supply facilities, 60% of the total amount of the charges collected based on the maintenance contract used to be meant for remuneration for services of the OM companies. However, within five years since commissioning of the new water schemes, breakdown of the pumping system has rarely happened so that DWR regarded the maintenance fee was overpaid. After the discussions on the ratio of the water tariff to be paid to the OM companies, stakeholders made consensus on reduction of the ratio from 60% to 50%. The OM companies also agreed to this reduction but further monitoring by the government is required to prevent deterioration in the quality of services.

⁸ This condition was included in the maintenance service contracts signed before

The OM companies pointed out that the late payment of the subscription fees by VWCs affects the sustainable provision of services for the water supply facilities. On the other hand, complaints from the communities are also reported on insufficient service of the OM companies such as delay to respond to requests by the communities for repair works. A relationship of trust needs to be established between both parties under the facilitation by DWR and LGAs for mutual understanding. Furthermore, regarding the Collective Maintenance Fund to be mentioned in (5) hereafter, the purpose to introduce the fund should be fully explained to both the beneficiary communities and the OM companies to make consensus. In this regard, periodical intervention by the government is expected and LGAs familiar with the situation of communities are supposed to play an important role.

Besides, the OM companies are responsible for reporting to the government on execution of the maintenance contract, details of the works conducted, conditions of the water facilities, amount of water consumption and accounting statement including the charges collected from the communities, etc. These responsibilities have not been fulfilled in appropriate time. Since these reports are to be referred by DWR and the Area Councils to provide proper information and technical support continuously to VWCs, through TAC, it is required to ensure that the OM companies fulfil their accountability.

(4) Support Services by the Public Sector

1) Support for the Communities by TAC-MDFT

The Area Councils have responsibilities in identification of needs related to development issues of the area and improvement of living conditions of the communities, and their realisation. The councils also provide support and advice to VWCs through TAC and MDFT, the working team of TAC at the ward level, to assure access to the sustainable water supply by the communities. Advice and instruction to the communities from LGAs and TAC-MDFT are effective to settle the issues related to OM which are originated in the social and cultural background of the particular area since those offices keep close relationship to the communities and coordinate interests among the community members.

As described in Table 2-35 above, the government will monitor performance of both the beneficiary communities and the OM companies and take administrative measures or provide arbitration for conflict resolution through TAC-MDFT in case of non-fulfilment of the contract by either party. Motivators in TAC-MDFT will monitor OM activities in each target site and report it to the Area Council through TAC and DWR headquarters in case that they observe late payment of the subscription fee or improper use of the water facilities by the community, or delay in inspection and repair works by the OM companies. The information will be crosschecked with

Announcement of the OM guideline in 2008.

reports submitted by VWCs and the OM companies to determine the necessity of interventions by the government.

2) Monitoring and Supervision by DWR in the Maintenance Service Contract

TAC-MDFT has already been established in each region across the country but they have not had enough capacity to provide supports to the communities in OM of the water supply facilities, especially in terms of the technical support for OM of the solar-powered water supply system. DWR will, therefore, be responsible to monitor and supervise the maintenance activities to be conducted by the communities and the OM company based on their obligations determined in the contract.

(5) Cost-Sharing for Operation and Maintenance

The expenses for OM of the constructed water scheme will basically be covered by the users. The costs to be borne by the user communities for OM of the facility are listed below:

- a) subscription fee for the maintenance service contract of the solar pumping system
- b) salary of the guard and compensation to the operator and others who are involved in the daily operation of the scheme
- c) cost for repairing facilities apart from the solar pumping system such as taps and distribution pipes

These expenses will be recovered by the collection of the water tariff from users of the facility. The communities who request for construction of water supply facilities are required to raise a certain amount of contribution in advance as a part of the OM fund prior to launch of the construction works in order to prove their commitment and financial capability. The amount of this contribution is GMD20,000 for construction of a solar-powered water supply facility according to the Policy on Management and Sustainability of Rural Water Supply (2008). The same strategy will be introduced in this project as well. The contribution in advance and water tariff collected from the community members will be kept in a bank account of the VWC and the subscription fee will be paid to the OM company with this saving. The policy further indicates that approximately GMD25,000 needs to be deposited in the bank account for sustainable OM after the launch of the operation of the scheme.

The amount of the water tariff to be charged to each household will be decided by each community under the initiative of VWC in consideration of number of user households, socio-economic conditions and vulnerable groups in the community. In the implementation of the Project, several options as well as information on indicative costs for OM are to be presented to the communities for settings an amount of user fee and its collection mechanism so that the communities will be able to raise the fund efficiently and appropriately.

As alternative sources for the OM fund apart from the collection of water tariff, most of the target

communities of the Project have incomes such as selling agricultural crops of the community gardens, support from VDC, and remittance from the family members working in urban areas or abroad. Since the majority of the target communities depend on their living on the income from agriculture, the monthly income level varies through the year and the expense in cash in lean months are a heavy burden for them. Payment of the water tariff will also be affected by the socio-economic conditions of the committee. It is, therefore, recommended to secure several sources of financing for OM costs by enhancing income generation through communal activities as well as facilitating fee collection in a relatively large amount in the harvest seasons. According to the policy, DWR does not encourage the fund raising depending on external assistance such as remittance from abroad as it would result in irregular collection of OM fund to be made only at the breakdown of the facility. This way of the collection method will not be taken into account as a reliable source of income for OM fund in the Project.

Based on deliberations in a consultative forum held at Mansakonko in July 2008, the subscription fee for the solar maintenance contract was set by DWR at GMD2.1/m³. Supposing the daily water consumption is to be 35litter/capita and six persons are in a household the amount to be paid by the household is GMD13.2/month. DWR is instructing the OM companies to reduce the ratio of the subscription fee to be kept as their remuneration from 60% to 50% as a result of review of the ratio of expenditures which were supposed to be recovered by the on-going rate. However, there are still some cases of arrears of the subscription fee by the communities.

As a result of the socio-economic survey implemented during the Preparatory Survey, community members are regarded to have ability-to-pay for the settled rate of the subscription fee. However, in order to prevent delay in payment to the OM company, activities to raise awareness of the community members will be implemented through the Soft Component for better understanding on penalties for arrears as well as importance of fulfilment of the payment. Penal provisions for non-fulfilment of payment by the communities are not clearly defined in the maintenance service contract form while the ones for delay in repairs and other negligence by the OM company are stipulated. It is, therefore, required to clarify responsibilities and penalties of both parties for non-fulfilment of the contract.

VWC will receive the balance of the collected subscription fee after the service provider deducts the remuneration for their services and the amount meant for the Collective Maintenance Fund for the solar pumping system which is to be mentioned hereafter. VWC is required to utilise this fund for payment for the salary of the guard, compensation to the operator and tap attendants, and for a part of their own maintenance fund which is meant for the maintenance and repair of the facilities to be borne by the communities.

In some similar projects previously implemented with support of other donors, each community was required to raise an individual maintenance fund to cover the replacement cost of the solar

pumping system and costs for repairs of the pumping system after the warranty period by the OM company. However, since the revenue from the water tariff is small in proportion to the size of community, their maintenance fund was insufficient to meet the required maintenance for small communities. In some cases, it has affected renewal of the maintenance contract after five-year-guarantee of the first contract. In order to solve these problems, DWR manages the Collective Maintenance Fund for the solar pumping system which is raised from 10% of each collection of the subscription fee from every community and pooled in an account. According to the policy, the fund can be also managed by the Area Council. This enables mutual help among the communities for the maintenance and replacement costs of the solar pumping systems. It is also expected that DWR will control utilisation of the fund to ensure proper replacement of the solar pumping system which will promote renewal of the maintenance contract between the community and the OM company.

All the communities contributing to the Collective Maintenance Fund have rights to utilise the fund. However, there could be some misunderstanding that relatively large communities have to bear the maintenance costs of small communities which have difficulty to recover the necessary costs with their own maintenance fund.⁹ The purpose of the Collective Maintenance Fund will be thoroughly explained to the target communities to make clear consensus on introduction and management of the Collective Maintenance Fund in the Project.

(6) Hygiene Promotion

Positive impacts on improvement of living conditions through utilisation of the water supply facilities can be realised by enhanced understanding and practice of proper use and management of safe water supply as well as the sense of ownership of the community members. Therefore, special attention is to be paid to the environmental sanitation for the water sources and hygiene practices of the users in OM of the water supply facilities.

Provision of safe water supply cannot be achieved only by the installation of the facilities but through hygiene promotion. If latrines, refuse pits and animal waters trough are installed close to the water sources without consideration of the environmental sanitation, it causes contamination of water sources. Moreover, poor awareness and practice of the community members in hand washing and safe means of transport and storage of drinking water will result in decrease of positive impacts of safe water supply. VWCs in the target communities will facilitate awareness raising and behaviour change of the community members in terms of

⁹ The communities with large population can also be benefited from the Collective Maintenance Fund in case that they cannot recover the costs from their own maintenance fund. Also, the community which applies for use of the part of the fund is required to repay the amount used after the maintenance or replacement of the facility. From these viewpoints, the Collective Maintenance Fund is an equitable system to realise the mutual help in the maintenance of the solar-powered water supply facilities among the communities regardless of the population size.

appropriate hygiene practices in collaboration with the community health workers to be trained as a part of the hygiene promotion activities in the Project. Increased awareness of the community members on sanitation and hygiene is indispensable to stimulate their willingness to contribute to OM including payment of the water tariff.

(7) Capacity Building and Institutional Strengthening of Stakeholders in Operation and Maintenance

Regarding the establishment of OM system of the constructed facilities described above, The Gambian side will bear the primary responsibility for it in conformity with the principle of the Japanese grant aid assistance on demarcation of responsibilities between the Japanese side and the recipient country. Taking it into consideration, the Japanese side will extend support only in capacity development and institutional strengthening of stakeholders related to OM as its scope of works, aiming at realisation of sustainable water supply from the constructed water facilities and earliest achievement of expected impacts. Details on interventions involving the Soft-Component Programme for establishment of OM system are described in “2-2-4-8 Interventions for Capacity Building and Institutional Strengthening (Soft Component programme)”.

2-5 Project Cost Estimation

2-5-1 Project Cost Estimation

2-5-1-1 Cost to be Borne by The Gambian Government

(1) Cost to be Borne by The Gambian Government

The cost required for implementation of the project by The Gambian side will be as follows.

Cost Item	Cost Estimate	Description
1) Land Acquisition/Clearance (Provision of target village)	3.09 Million GMD (Approx. ¥11.12 Million Yens)	<ul style="list-style-type: none"> • Land for new construction sites: 200 m²/sites x 15 sites • Access road and site clearance: 18 sites x 10 workers/day
2) Personnel Expense of the Counterpart and Field Allowance	0.18 Million GMD (Approx. ¥0.65 Million Yens)	<ul style="list-style-type: none"> • Field survey (Personnel expense and field allowance: 10 days/site) • Site inspections (Site transfer, Mid-term inspection and Handing-over : 1.5 days/site)
3) Fuel and Maintenance Cost for Vehicles	0.21 Million GMD (Approx. ¥0.76 Million Yens)	<ul style="list-style-type: none"> • Vehicles for DWR counterpart

4) Advance Deposit by VWC (Provision of Target village)	0.36 Million GMD (Approx. ¥1.30 Million Yens)	• Contribution from Beneficiaries at each 18 site
5) Expense for Motivators	0.32 Million GMD (Approx. ¥1.15 Million Yens)	Motivator/s from 5 regions at 36 days/site x 18 sites
6) Water Quality Monitoring	0.43 Million GMD (Approx. ¥1.55 Million Yens)	Water source for water supply facilities at 18 sites/year
7) Service Charge for Authorization to Pay (A/P)	0.01 Million GMD (Approx. ¥0.04 Million Yens)	5,000 GMD ×2 times
8) Payment Commission to Bank	0.11 Million GMD (Approx. ¥0.40 Million Yens)	0.05% of project cost
Total	4.71 Million GMD (Approx. ¥16.97 Million Yens)	Project period of 24 months from April 2010 to March 2012

The above estimated cost will be borne by The Gambian side through the DWR and the beneficiaries of target villages during the period of 2 years for the implementation of project. Of that total cost 3.45 million GMD for land acquisition/clearance and advance deposits by VWC will be borne by the beneficiaries of project sites.

On the other hand, the DWR will undertake about 1.26 million GMD consisting of the counterpart personnel expense, field allowance, expense of motivators, fuel, water quality monitoring, and bank service charges and commission. Since the total amount of undertakings of DWR corresponds to 14.3% of its development project cost in 2009, it is in the level DWR will be able to respond to without difficulty.

2-5-1-2 Condition for Estimation

- (1) Estimation Base: September 2009
- (2) Exchange Rate:
1 EUR = JPY133.81
1 US\$ = JPY97.55
1 GMD = JPY3.6345
1 CFA = JPY0.02040
- (3) Period of Construction: Implemented in twenty four(24) months according to the schedule shown in previous section.
- (4) Others: The project is to be implemented in accordance with the guidelines for grant assistance of Japanese Government.

2-5-2 Operation and Maintenance Cost

The water supply facilities in this project is categorized into two types; one in the solar power source facilities, to be installed in most of the sites except one, and the other, the facilities operated with commercial electric power source, as shown in Table 2-36. The operation and maintenance of the solar-powered water supply facilities will be implemented under an operation and maintenance agreement with the OM company because each VWC is unable to manage the operation and maintenance work technically. The period of the operation and maintenance agreement will be 5 years and ① one set of solar pumping system (solar panel, inverter and submersible motor pump) which will be introduced to pump up groundwater from a borehole will be maintained. The operation and maintenance cost in The Gambia will be covered by the water charges collected at the measured rate for the water supply volume and at the standard price of 2.1GMD/m³. On the other hand, the maintenance of ② other facilities (distribution reservoir, distribution pipeline and public faucets) will be made under the VWC's responsibility.

Table 2-36 Water Supply Facility and Responsibility of Maintenance

Types of Power Sources for Water Supply Facility		Responsibility of Maintenance
1)The solar-powered water supply facilities, new construction at 15 sites and conversion at 2 sites.	1) Solar pumping system	Operation and Maintenance Contract between the OM Company (5 year contract & guarantee)
	2) Distribution reservoir, distribution pipeline and public faucet	VWC (1 year guarantee by contractor)
2)The commercial electric powered water supply facilities, conversion 1 site	1) Water supply facilities	VWC (1 year guarantee by contractor)

The maintenance of the solar-powered water supply facilities by the OM company will be conducted by regularly checking and repairing it once per 3 months and issue a bill for the water charge for supplied water volume measured at 2.1GMD/m³ as standardized nationwide and collect the charge.

At present, 50% of the total collected amount is allocated to the operation and maintenance cost of the OM company, and the VWC deposits 10% at the joint maintenance account controlled by DWR while the remaining 40% is appropriated to the salaries of guard personnel and the repair of other facilities. The operation and maintenance system of DWR for the solar-powered water supply facilities will be functioning in the Project.

Table 2-37 Cost for Maintenance

Details	Amount (GMD/ m ³)	Note
Unit water charge paid by supply volume) : 2.1 GMD/ m ³ (2009)	2.10 (100%)	5 years contract
1) Local maintenance service company :	1.05 (50%)	Once per 3 months visit
2) Collective Maintenance Fund (DWR account) :	0.21 (10%)	Deposit for cooperation fund
3) Village water committee (VWC) :	0.84 (40%)	Expense for guard monthly and other expenses

The total collected amount per year from the villages (1,000 to 5,000 residents) under this Project is shown in Table 2-38 below.

Table 2-38 Maintenance Charges from Villagers

Scale of Village (population)	Village 1,000	Village 3,000	Village 5,000
Total amount of water charge from the village (GMD/year)	26,800	80,400	134,100
1) Routine maintenance by local service provider (GMD/year)	13,400	40,200	67,100
2) Collective Maintenance Fund (GMD/year)	2,700	8,000	13,400
3) Village water committee (VWC) (GMD/year)	10,700	32,200	53,600

On the other hand, there is one site of water supply facilities using the commercial electric power source. The operation and maintenance at this site will be carried out on the full responsibility of the VWC. If the DWR standard price of 2.1GMD/m³ is adopted, the results of simulation in consideration of the village population (1,996 persons), electric charges, and the maintenance and renewal of equipment including submersible motor pump are shown in Fig. 2-12 and show that the sustainable operation will be possible.

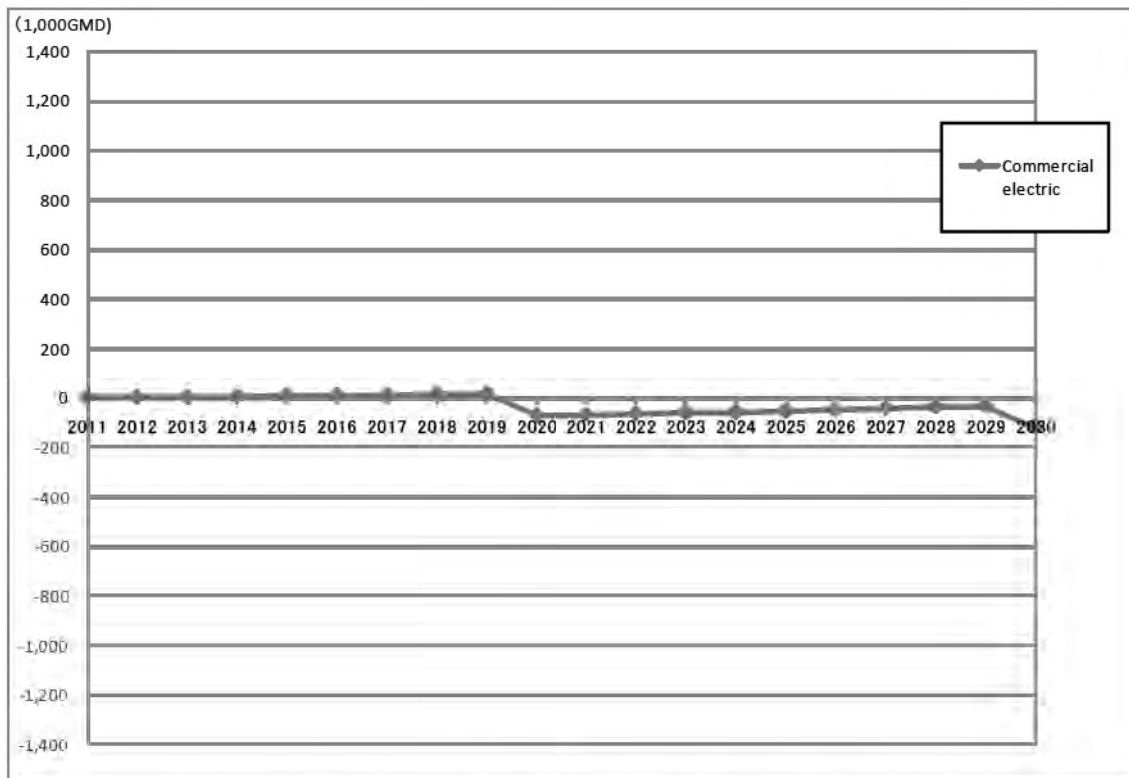


Fig. 2-12 Sustainability of Commercial Electric Powered Water Supply Facilities
(R-01 Toniataba, village population 1,996(2009), Water Rate 2.1GMD/m³)

The operation and maintenance of solar-powered water supply facilities are managed nationwide, based upon the water tariff is conducted at the DWR standard price of 2.1GMD/ m³ . In case of large village with the population of 2,000 and more, this system effectively works for sustainable OM of facilities for the time being. On the other hand, smaller villages are likely to face difficulty in the renewal of equipment by this system in the long run.

Fig. 2-13 and Fig. 2-14 illustrate the results of simulation for cases of smaller villages. According to this simulation, the rate of water tariff will have to be raised from 2.1GMD/ m³ to 4.0GMD/m³ in 10 years to ensure sustainable operation and maintenance in such villages. At present, DWR is considering for a small scale of village to use the Collective Maintenance Fund that is deposited at the DWR account for the guarantee period of 5 years.

In the case of paying the water charge of 2.1GMD/m³ from the average monthly income per household (3,200 GMD/month), the ability of the residents to pay water charges is: 35 $\text{€}/\text{capita}/\text{day} \times 10 \text{ persons} \times 30 \text{ days} \times 2.1\text{GMD}/\text{m}^3 = 22.1\text{GMD}/\text{month}$. If the water rate is increased to 4.0GMD/m³, the ability to pay will be 42.0 GMD/month. Therefore, the water rate payment accounts for 0.7 to 1.3% of the average monthly income per household, which is in affordable level residents.

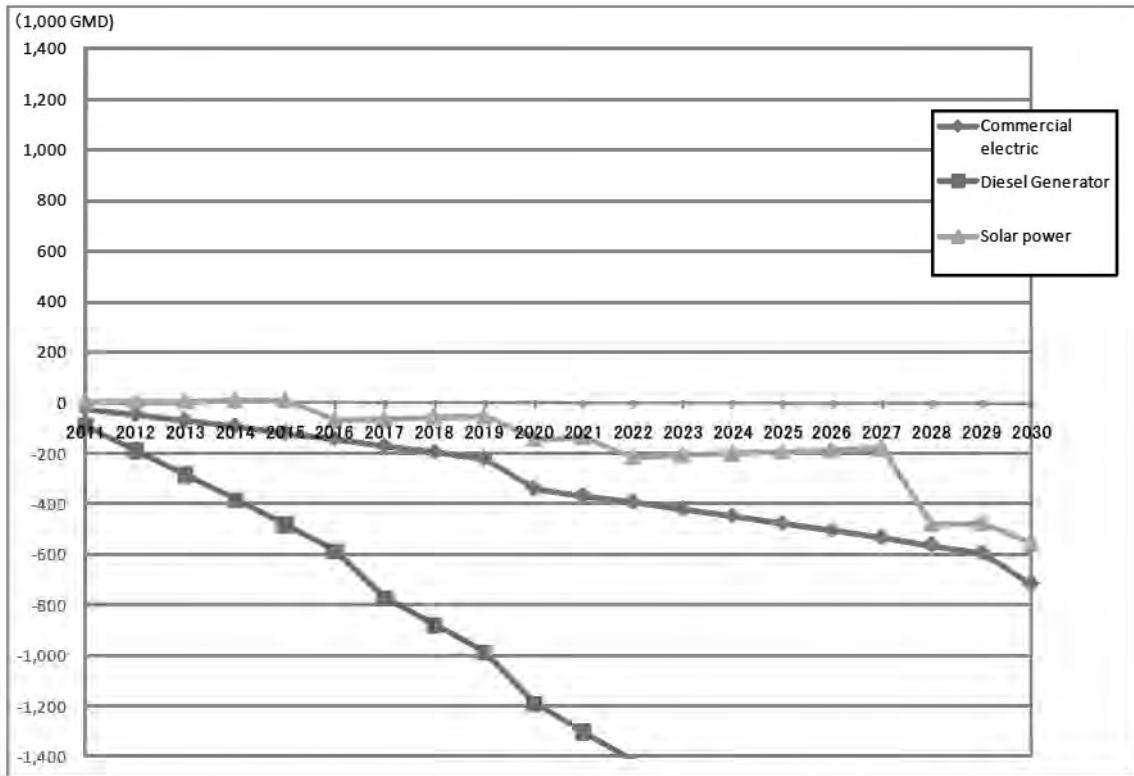


Fig. 2-13 Simulation of Sustainability for Operation & Maintenance at Small Village (1)
(N-14 Sotokoi sira, population 1,079(2009), Water Rate 2.1 GMD/m³)

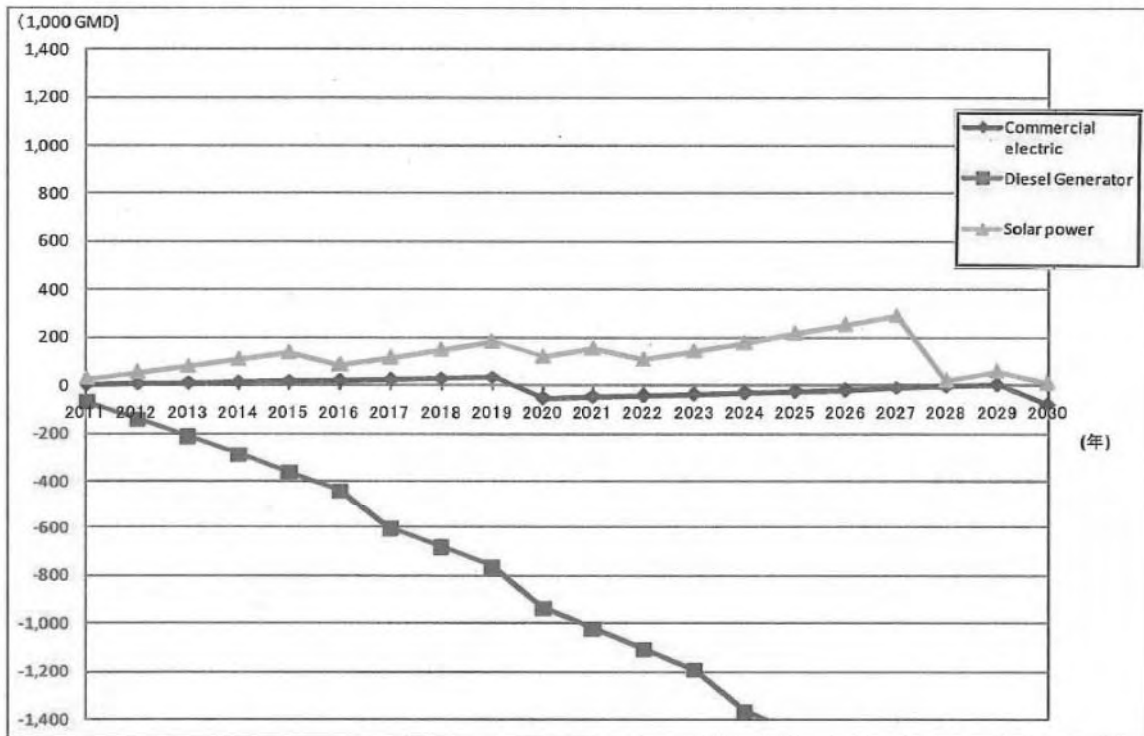


Fig. 2-14 Simulation of Sustainability for Operation & Maintenance at Small Village (2)
(N-14 Sotokoi sira, population 1,079(2009), Water Rate 4.0 GMD/m³)

(1) Precondition

1) Income

Annual Income	Unit water supply × Supply population × Water rate
Unit water supply	35 ℓ/capita/day
Water rate	2.1GMD/ m ³ (¥7.6/ m ³) • Standard water rate by DWR
Total amount of income	Types of Village by population in 2009: 1,000 to 5,000 • Case study is introduced by the smallest village namely N-14 Sotokoi sira, population 1,079(2009)
Payment rate (%)	80% due to leakage, unpaid, delay payment and others
Advance Fund	20,000 GMD(ca.¥72,000)

2) Expenditure

A. Operation and Maintenance Cost and Personnel Expense

Electricity/Fuel cost	• Commercial electricity (NAWEC) : 7.58 GMD/kWh • Fuel(diesel) :6.4GMD/m ³
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B. Operation and Maintenance Cost and Personnel Expense

Local O&M service company	50%(Routine maintenance 30% + Operation 20%)
Operator (VWC)	Monthly payment 700 GMD/month
Tap Attendant (VWC)	Voluntary bases without payment
Guard (VWC)	Monthly payment 700 GMD/month
Accountant (VWC)	Voluntary bases without payment
Chairman (VWC)	Voluntary bases without payment

C. Maintenance/repair and Renewal cost (Solar pumping system)

1. Submersible pump	Renewal 10 years 93,000÷10 = 9,300GMD/year, Annual cost
2. Solar panel	Renewal 18 years for 50% of total panel 20,000GMD/panel
3. Inverter	Renewal 6 years 81,000÷6 = 13,500GMD/year, annual cost

D. Maintenance/repair of water facilities

(Water reservoir, distribution pipeline, public faucet)

Water reservoir, distribution pipeline, public faucet	Maintenance/repair of water facilities 2,000~10,000GMD/year, Public faucet @100GMD/tap
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2-6 Other Relevant Issues

(1) Borehole Drilling

Concerning borehole drilling works there are several local Gambian companies having drilling equipment with experience in groundwater development projects. The Gambian companies have the capabilities and technical level consisting of institutional field work and provide a necessary drilling material for the project. Therefore, Japanese main contractor will select these local companies as a subcontractor to implement the drilling works. A Gambian company will be employed to construct boreholes for water supply facilities.

On the other hand, they have less experience for hydrogeological works such as borehole logging technology with equipment, interpretation of aquifer/s and determination of screen depth, therefore the Japanese main contractor must provide the hydrogeological engineer/s together with logging equipment/s to complete the borehole completion works.

(2) Borehole Drilling at Supplementary Site

In case of drilling work of boreholes has turned out unsuccessful during facilities construction period due to poor yield and/or inferior water quality, drilling another borehole in the same site may be instructed by the Consultant, based upon the success rate of 78.6 %. If re-drilling results in failure again, the contractor will be instructed to move to the Supplementary site. However, such an instruction will be issued only one time for the last chance of success.

(3) General Construction Work

Concerning general construction work the local contractor having appropriate technology with experiences will be employed in the works for the project under the Japanese main contractor.

However, since civil works in this project is to be carried out in compliance with the criteria of Japanese guidelines Japanese engineer/technician/s are essential to be dispatched for quality control of the work. The Japanese main contractor would employ appropriate local companies and implement the work smoothly and effectively.

(4) Accessibility in the Rainy Season

Concerning the project implementation it is necessary to take attention to the difficult accessibility to sites in the rainy season. The unpaved laterite road to the project sites in 4 regions is not easy to pass in the rainy season due to mud in flood conditions. Therefore, the drilling machine and large trucks are impossible to drive to the sites. During the heavy rainy season in July to September it should be recommended to stop construction works because of unsafe traffic accessibilities and poor workable conditions. The Japanese main contractor should be carefully to create the work implementation schedule considering the climatology and actual infrastructures in The Gambia.

(5) Quality Control on Concrete Work

Concerning the concrete work in the project, it the quality control programme shall be implemented thoroughly under the guidance and supervision of the experienced engineer/s to overcome difficulties in hot weather concreting, etc.

(6) Procurement of Equipment and Material

Upon conclusion of the Contract with DWR, the Japanese contractor shall conclude subcontracting with the Gambian contractor/s without delay and take steps to procure the materials and equipment for the project. Major construction materials and equipment for this project are local products, and there is a circulation that the materials are enough in the Gambian market at present. Their origins are mostly third countries of EU. The contractor is required to prepare his implementation schedule, reflecting such local market conditions into account and including a necessary period until their reception in the sites.

(7) Consultant Supervision

During the construction stage the resident engineer/s of the Consultant in The Gambia will supervise the construction work seamlessly from borehole drilling, construction of water supply facilities, and also supervision of Soft Component activities namely educational activities, hygiene education, operation and maintenance management without any delay of the project schedule.

(8) Security Management

There is no serious security problem at present in The Gambia. However the attention for risk management is required, to such cases as road robbery in night times as happened before. It is necessary to implement a risk management, security measures from the following viewpoints.

- 1) A movement of personnel and/or driving construction vehicle in the night is prohibited.
- 2) Traffic accidents shall be prevented by means of complying with the traffic regulations of The Gambia and containing driving at high speed .
- 3) The Japanese consultant/contractor shall make frequent exchanges of information with JICA Senegal Office and the Embassy of Japan in Senegal on security control. At the same time, they shall keep daily communication with DWR on security matters.
- 4) For the implementation of the works, the contractor shall establish safety control system to prevent accidents and endure safety of personnel during the field work for borehole drilling and excavation for the foundation of water reservoirs.
- 5) The premises of the construction site shall be enclosed with fences or ropes to limit the approaches of outsiders into the site. The residents in the village where the work in progress shall be continuously informed of work schedule, types of ongoing works, etc., to ensure their cooperation in the works.

6) Considering supervision of work there are many numbers of the project sites which are located on southern river bank and a northern river bank divided by the Gambia River. The limited construction period is comparatively short, therefore it secures safety and rapidity to complete by creating a network schedule and implementing construction works by the 2 teams in the north and the south.

CHAPTER 3
PROJECT EVALUATION AND RECOMMENDATIONS