

## 付属資料

1. Minutes of Meeting & Record of Discussion (Draft)
2. PDM & PO (案) (和文)
3. 主要面談者リスト
4. 質問票及び回答
5. 収集資料リスト
6. 事業評価表
7. PCM ワークショップ結果



付属資料 1 .

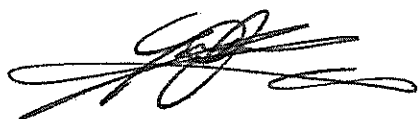
MINUTES OF MEETING BETWEEN  
JAPAN INTERNATIONAL COOPERATION AGENCY  
AND  
MINISTRY OF LANDS HOUSING WATER AND ENERGY  
OF THE REVOLUTIONARY GOVERNMENT OF ZANZIBAR  
OF THE UNITED REPUBLIC OF TANZANIA  
ON  
JAPANESE TECHNICAL COOPERATION PROJECT  
FOR  
ENHANCEMENT OF WATER SUPPLY MANAGEMENT OF  
ZANZIBAR WATER SUPPLY AUTHORITY PHASE 2

The Detailed Planning Survey Team (hereinafter referred to as “the Team”) organized by the Japan International Cooperation Agency (hereinafter referred to as “JICA”) visited The United Republic of Tanzania from March 10<sup>th</sup> to April 1<sup>st</sup>, 2011 for the purpose of detailed planning survey on the technical cooperation project concerning “Enhancement of Water Supply Management of Zanzibar Water Supply Authority Phase 2” (hereinafter referred to as “the Project”).

During its stay in Tanzania, the Team exchanged their views and had a series of discussions for the purpose of working out the detail of the Project with the Zanzibar Water Authority (hereinafter referred to as “ZAWA”) and Ministry of Lands, Housing, Water and Energy (hereinafter referred to as “MLHWE”) and other concerned organizations.

As a result of the discussions, both sides came to agree on the matters referred to in the document attached hereto.

Zanzibar, 30<sup>th</sup> March 2011



Mr. Yoshiki Omura  
Team Leader  
Detailed Planning Survey Team  
Japan International Cooperation Agency



Mr. Mwalim A. Mwalim,  
Principal Secretary  
Ministry of Lands, Housing, Water and Energy,  
The Revolutionary Government of Zanzibar  
The United Republic of Tanzania



Dr. Mustafa Ali Garu  
Director General  
Zanzibar Water Authority,  
The Revolutionary Government of Zanzibar  
The United Republic of Tanzania

## ATTACHED DOCUMENT

### 1. Draft of Record of Discussions

Both sides agreed to the draft of Record of Discussions (hereinafter referred to as "R/D") shown in Appendix I. After the approval of JICA headquarters, commencement of the Project will be determined by signing of the R/D.

### 2. Implementing Organization

Both sides agreed that ZAWA shall be the implementing organization of the Project.

### 3. Duration of the Project

Both side agreed that the duration of the Project will be three (3) years from the first dispatch of the experts for the Project.

### 4. Project Design Matrix

Both sides agreed to use the Project Design Matrix (hereinafter referred to as "PDM") and the Plan of Operations (hereinafter referred to as "PO") shown in Appendix II and III respectively as a tool for monitoring, evaluation and management of the activities of the Project. PDM and PO will be modified as needed during the Project after mutual consultations between JICA and the Tanzanian side.

### 5. Joint Coordinating Committee

The Joint Coordinating Committee (hereinafter referred to as "JCC") meeting will be held at least once a year and whenever necessity arises during the Project in order to fulfill the functions determined in Annex VI of R/D.

### 6. Technical Cooperation of African Development Bank

The African Development Bank (hereinafter referred to as "AfDB") is planning to fund technical assistance for institutional capacity development, of which some activities may duplicate JICA activities such as enhancing commercial, financial and technical capacity and human resource development. ZAWA should elaborately coordinate JICA and AfDB activities to eliminate duplication.

### 7. Target Ratio of Water Tariff Collection

The Team pointed out that despite endeavors of both ZAWA and JICA Phase-1 experts, ZAWA has very low ratio of tariff collection, which hampers sound management of ZAWA.

Both sides confirmed that the target ratio of water tariff collection should be more than 30% of total charges due for three consecutive months within the first year of the Project. In case that the target ratio is not accomplished by the mid-term review, JICA will consider substantial changes of the activities and components.

The Team recommended that ZAWA should immediately start making effort to raise collection ratio, and ZAWA agreed.

### 8. Pilot Area

Both sides confirmed that the pilot areas are determined by following criteria;

- a. Good water services
- b. Less asbestos cement (old) pipes

Although the pilot areas will be decided after commencement of the Project, the Team and ZAWA discussed and agreed to select pilot area in Makadara, Bububu and Taveta.

## **9. Non-Revenue Water Management Team and Non-Revenue Water Action Team**

The Non-Revenue Water Management Team (hereinafter referred to as "Management Team") will be established in order to make "Non-Revenue Water Reduction Annual Plan" and to manage the activity of Non-Revenue Water Action Team (hereinafter referred to as "Action Team"). The Action Team will be established in order to implement the activities concerning "Output 4" effectively.

The member of both teams is shown in Appendix IV

## **10. Criteria for Joint Evaluation**

Both sides agreed that the following five (5) criteria will be used for the joint evaluation of the Project in accordance with JICA guidelines:

(i)Relevance, (ii)Effectiveness, (iii)Efficiency, (iv)Impact and (v)Sustainability

## **11. Undertaking of the Government of the United Republic of Tanzania**

### **(1) Allocation of Budget**

Both sides confirmed that the following (a.-f.) will be allocated by the Tanzanian side to ensure effective implementation of the Project in accordance with the provision of the Agreement on Technical Cooperation between the Government of Japan and the Government of the United Republic of Tanzania signed in Dar es Salaam, Tanzania on November 2, 2004.

- a. Salaries and other allowances for the Tanzanian counterpart personnel.
- b. Allowances of the participants for the training provided in the Project.
- c. Office running expenses, such as electricity, water supply, gas, fuel, etc.
- d. Operational expenses for customs clearance, storage and domestic transportation for the equipment provided by JICA.
- e. Expenses for maintenance of equipment provided by JICA.
- f. Other contingency expenses related to the Project.

### **(2) Allocation of Personnel**

Both sides confirmed that the Tanzanian side will assign an appropriate number of counterpart personnel at the operational level in order to ensure the effective implementation of the Project. The list of counterpart personnel is attached to Annex IV of R/D.

### **(3) Project Office**

Both side confirmed that the office for the Project will be provided at ZAWA.

### **(4) Installation of meters and valves**

Both sides confirmed that ZAWA shall install the following items:

- a. All customer meters and necessary replacement of service pipes in the pilot areas
- b. Flow meters in the pilot areas
- c. Sluice valves in the pilot areas
- d. Bulk meters for production wells not yet installed

### **(5) Repairing Cost of Pipes**

Both sides confirmed that ZAWA will allocate the cost for repairing pipes in pilot areas.

Appendix I: Draft of Record of Discussions

Appendix II: Draft of Project Design Matrix

Appendix III: Draft of Plan of Operations

Appendix IV: Organizational Structure of the Project

DRAFT  
RECORD OF DISCUSSIONS  
BETWEEN JAPAN INTERNATIONAL COOPERATION AGENCY  
AND  
THE AUTHORITIES CONCERNED  
OF THE UNITED REPUBLIC OF TANZANIA  
ON  
JAPANESE TECHNICAL COOPERATION IN THE PROJECT  
FOR  
ENHANCEMENT OF WATER SUPPLY MANAGEMENT  
OF ZANZIBAR WATER AUTHORITY PHASE 2

In response to the request of the Government of The United Republic of Tanzania, the Government of Japan has decided to conduct the technical cooperation concerning "Enhancement of Water Supply Management of Zanzibar Water Authority Phase 2 (hereinafter referred to as "the Project").

Accordingly, Japan International Cooperation Agency (hereinafter referred to as "JICA") the official agency responsible for the implementation of the technical cooperation scheme of the Government of Japan, will cooperate with the authorities concerned of the Government of The United Republic of Tanzania for the Project.

JICA and the Tanzanian authorities concerned had a series of discussions on the framework of the Project. As a result of the discussions, and in accordance with the provisions of the Agreement on Technical Cooperation between the Government of Japan and the Government of The United Republic of Tanzania, signed in Dar es Salaam, Tanzania on November 2, 2004 (hereinafter referred to as "the Agreement"), JICA and Tanzanian authorities concerned agreed on the matters referred to in the document attached hereto.

Zanzibar, (day) (month), 2011

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Mr. Yukihide Katsuta,  
Chief Representative,  
Japan International Cooperation  
Agency, Tanzania Office

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Mr. Mwalim A. Mwalim,  
Principal Secretary  
Ministry of Lands, Housing, Water and Energy,  
The Revolutionary Government of Zanzibar  
The United Republic of Tanzania

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Dr. Mustafa Ali Garu  
Director General  
Zanzibar Water Authority,  
The Revolutionary Government of Zanzibar  
The United Republic of Tanzania

# ATTACHMENT OF RECORD OF DISCUSSIONS

## **I. Cooperation between JICA and the Government of the United Republic of Tanzania**

1. The Government of the United Republic of Tanzania will implement the Project in cooperation with JICA.
2. The Project will be implemented in accordance with the Master Plan which is given in Annex I.

## **II. Measures to be Taken by JICA**

In accordance with the laws and regulations in force in Japan and the provisions of Article III of the Agreement, JICA, as the executing agency for technical cooperation by the Government of Japan, will take, at its own expense, the following measures according to the normal procedures of its technical cooperation scheme.

### **1. Dispatch of Japanese Experts**

JICA will assign Japanese experts to the Projects as listed in Annex II. The provision of Article III of the Agreement will be applied to the above-mentioned experts.

### **2. Provision of Machinery and Equipment**

JICA will provide such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in Annex III. The provision of Article III of the Agreement will be applied to the Equipment.

### **3. Training of Tanzanian Personnel in Japan or Third Countries**

JICA will receive the Tanzanian personnel connected with the Project for technical training in Japan or third countries. The provision of Article III of the Agreement will be applied to the training.

## **III. Measures to be Taken by the Government of The United Republic of Tanzania**

1. The Government of The United Republic of Tanzania will take necessary measures to ensure that the self-reliant operations of the Project will be sustained during and after the period of Japanese technical cooperation, through full and active involvement in the Project by all related authorities, beneficiary groups and institutions.

2. The Government of The United Republic of Tanzania will ensure that the technologies and knowledge acquired by the Tanzanian nationals as a result of the Japanese technical cooperation will contribute to the economic and social development of The United Republic of Tanzania.

3. In accordance with the provisions of Article V of the Agreement, the Government of The United Republic of Tanzania will grant privileges, exemptions and benefits to the Japanese experts and their families referred to in article II-1 above.

4. In accordance with the provisions of Article VII of the Agreement, the Government of The United Republic of Tanzania will take the measures necessary to receive and use the equipment provided by JICA under Article II-2 above and equipment, machinery and materials brought in by the Japanese experts referred to in Article II-1 above.

5. The Government of The United Republic of Tanzania will take necessary measures to ensure that the knowledge and experience acquired by the Tanzanian personnel from technical training in Japan will be utilized effectively in the implementation of the Project.

6. In accordance with the provisions of Article V of the Agreement, the Government of The United Republic of Tanzania will assign Tanzanian counterpart personnel and provide administrative personnel as listed in Annex IV.

7. In accordance with the provisions of Article V of the Agreement, the Government of The United Republic of Tanzania will provide the buildings and facilities as listed in Annex V.

8. In accordance with the laws and regulations in force in The United Republic of Tanzania, the Government of The United Republic of Tanzania will take necessary measures to supply or replace at its own expense machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided by JICA under II-2 above.

9. In accordance with the laws and regulations in force in The United Republic of Tanzania, the Government of the United Republic of Tanzania will take necessary measures to meet running expenses necessary for the implementation of the Project.

#### **IV. Administration of the Project**

1. The Principal Secretary of Ministry of Lands, Housing, Water and Energy (hereinafter referred to as “MLHWE”), the Project Director, has the overall responsibility for the administration and implementation of the Project.

2. The Director General of Zanzibar Water Authority (hereinafter referred to as “ZAWA”), the Project Manager, will be responsible for the managerial and technical matters of the Project.

3. The Chief Advisor of the Japanese experts in the list of Japanese Experts in Annex II will provide the necessary advice to the Project Manager on any matters pertaining to the implementation of the Project.

4. The Japanese experts will provide necessary technical guidance and advice to the Tanzanian counterpart personnel on technical matters pertaining to the implementation of the Project.

5. For the effective and successful implementation of the Project, a Joint Coordinating Committee will be established whose functions and composition are described in Annex VI.

#### **V. Joint Evaluation**

Evaluation of the Project will be conducted jointly by JICA and the Tanzanian authorities concerned at around one (1) year after commencement and during the last six (6) months of the Project term in order to examine the level of achievement.

#### **VI. Claims against Japanese Experts**

In accordance with the provisions of Article VI of the Agreement, the Government of The United Republic of Tanzania undertakes to bear claims, if any arises, against the Japanese experts engaged in the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in The United Republic of Tanzania except for those arising from the willful misconduct or gross negligence of the Japanese experts.

#### **VII. Mutual Consultation**

There will be mutual consultation between JICA and the Government of The United Republic of Tanzania on any major issues arising from, or in connection with this Attached Document.

#### **VIII. Measures to Promote Understanding of and Support for the Project**

For the purpose of promoting support for the Project among the people of the United Republic of Tanzania, the Government of The United Republic of Tanzania will take appropriate measures to make the Project widely known to the people of The United Republic of Tanzania.

#### **IX. Terms of Cooperation**

The duration of the technical cooperation for the Project under this Attached Document will be three (3) years from the date of Japanese expert's arrival in The United Republic of Tanzania.



Annex I	Summary of the Project
Annex II	List of Japanese Experts
Annex III	List of Machinery and Equipment
Annex IV	List of Tanzanian Counterpart
Annex V	List of Buildings and Facilities
Annex VI	Joint Coordinating Committee

## **Annex I Summary of the Project**

### **1. Overall Goal**

ZAWA water supply services are improved.

### **2. Project Purpose**

Financial condition of ZAWA is improved in the Project Area.

### **3. Outputs**

[Output 1] Capacity of Water Utility Management is enhanced in ZAWA.

[Output 2] Water tariff collection ratio of the Project area (West Urban of Unguja) is increased.

[Output 3] Capacity of Planning of NRW reduction of ZAWA is enhanced.

[Output 4] Capacity of implementing NRW reduction is enhanced through pilot project.

### **4. Activities**

[Output 1] Capacity of Water Utility Management is enhanced in ZAWA.

1-1 Framework of management information system is established.

1-2 Key performance indicators are defined and recorded every month.

1-3 An organizational restructure plan of ZAWA is prepared with coordination of the Board of Directors of ZAWA and Ministry of Lands, Housing, Water and Energy.

[Output 2] Water tariff collection ratio of the project area (West Urban of Unguja) is increased.

2-1 Every year Revenue Expense Annual Plan is formulated including target collection ratio and target investment.

2-2 According to Revenue Expense Annual Plan, Commercial & Customer Service Director (CCD) formulates Annual Action Plan to achieve the target water tariff collection ratio.

2-3 All customers are invoiced and tariff is collected accordingly.

2-4 Tariff collection measures are upgraded in a customer oriented manners.

2-5 According to the Action Plan, actions for non -payers are implemented.

2-6 Lessons from activities results are reflected to the next Revenue Expense Annual Plan.

2-7 Meter installation is enhanced to change from flat rate to volumetric rate.

2-8 Water tariff is monitored for the appropriate revenue with expenses.

2-9 Awareness creation for customers on water payment is conducted.

[Output 3] Capacity of Planning of NRW reduction of ZAWA is enhanced.

3-1 Non Revenue Water Management team (NRWMT) is organized with directors of ZAWA headed by Director General.

3-2 Trainings for NRWMT to get management knowledge such as Non-Revenue Water reduction, zoning, and water balance are conducted.

3-3 NRWMT decides pilot areas for non -revenue water reduction activities in Makadara, Bububu, and Taveta.

3-4 NRWMT formulates “Non-revenue Water Reduction Annual Plan in pilot areas” including yearly goal, budget, equipment, man power, etc.

3-5. NRWMT improves procurement and inventory control system of spare parts.

3-6 NRWMT analyzes the results of NRW reduction activities in pilot areas.

3-7 With the experiences in pilot areas, NRWMT formulates the development plan for all zones of

Urban West Region Unguja.

[Output 4] Capacity of implementing NRW reduction is enhanced through pilot project.

4-1 Non-Revenue Water Action Team (NRWAT) is organized.

4-2 NRWAT conducts maintenance work on networks and customer database of Urban West Region Unguja.

4-3 NRWAT is trained for water balance analysis.

4-4 NRWAT installs water meters for all customers and flow meters in the pilot areas.

4-5 OJT of baseline survey for NRWAT is conducted in pilot areas.

4-6 OJT of leakage detection, pipe repairing and rehabilitation of pipes for NRWAT is conducted in pilot areas.

4-7 NRWAT evaluates the NRW reduction activities in the pilot area, and report to NRWMT.

## Annex II List of Japanese Experts

The expertise of Japanese experts to be dispatched is as described below. Other experts in specific expertise will be dispatched if necessary upon mutual agreement.

- Chief Advisor/ Water Utilities Management
- Non-Revenue Water Management
- Network Management/ Mappings/Spare Parts Inventory Control
- Leakage Detection
- Customer Service

### **Annex III List of Machinery and Equipment**

The Equipment to be supplied is as described below. Other Equipment will be supplied upon mutual agreement.

- a. Customer meters
- b. Bulk meters
- c. Flow meters
- d. Potable ultrasonic flow meters
- e. Valves
- f. Leakage detection equipment and appurtenances
- g. Pickup track
- h. Laptop PC
- i. Tapping machinery for service connection

#### **Annex IV List of Tanzanian Counterpart**

- 1) Project Director: The Principal Secretary of MLHWE, Zanzibar
- 2) Project Manager: The Director General of ZAWA
- 3) The Deputy Project Manager:
  - The Commercial and Customer Relation Director
  - The Finance and Administration Director
  - The Technical Director
- 4) Counterpart Personnel: All Related Staff of ZAWA in the Project Area

**Annex V List of Buildings and Facilities**

- 1) Offices space for Japanese experts in ZAWA
- 2) Other facilities mutually agreed necessary for the Project

## **Annex VI Joint Coordinating Committee**

The Joint Coordinating Committee (hereinafter referred to as “JCC”) will be held at least once a year and whenever necessity arises.

### **1. Functions**

- 1) To discuss and decide overall strategies in the management and coordination of the Project,
- 2) To review and endorse the annual plan of the Project
- 3) To monitor and evaluate the progress of the project
- 4) To make decisions relevant to the overall management of the Project

### **2. Composition**

- 1) Chairperson: Principal Secretary, MLEWE
- 2) Members:
  - a. Tanzanian side
    - Representative of Board of Directors of ZAWA
    - Director General of ZAWA
    - Commercial and Customer Relation Director of ZAWA
    - Finance and Administrative Director of ZAWA
    - Technical Director of ZAWA
    - Representative of Ministry of Finance and Economic Affairs, Zanzibar
  - b. Japanese side
    - Japanese experts of the Project
    - Representative(s) of JICA Tanzania Office
    - Any person designated by JICA Head Quarter

#### Notes:

- The Chairperson may have persons relevant to the agenda participate in the JCC meetings.
- Official(s) of the Embassy of Japan may attend the JCC meeting as observer(s).

*Handwritten signature: Mary*



## Appendix II: Project Design Matrix (PDM)

Project Name: "Enhancement of Water Supply Management of Zanzibar Water Authority Phase 2"

Duration: xx 2011 – xx2014 (3 years)

Implementing agency: Zanzibar Water Authority (ZAWA)

Direct target group: about 300 staff related to non revenue water management

Indirect target group: about 80,000 registered customers in West Urban Area of ZAWA

Project Area: Unguja, Zanzibar

Version March 30, 2011

Narrative Summary	Verifiable Indicator	Means of Verification	Assumptions
<b>[Overall Goal]</b> ZAWA water supply services are improved.	At the point of 2017: All the operation and maintenance costs of ZAWA are covered by the revenue earned by ZAWA's services	ZAWA Annual Report	
<b>[Project Purpose]</b> Financial condition of ZAWA is improved in the Project Area.	Financial performance indicators are improved in the Project Area.	ZAWA Annual Report	AfDB funded network rehabilitation will be implemented to the Urban West region of Unguja.
<b>[Output]</b> 1. Capacity of Water Utility Management is enhanced in ZAWA. 2. Water tariff collection ratio of the project area is increased. 3. Capacity of Planning of NRW reduction of ZAWA is enhanced 4. Capacity of implementing NRW reduction is enhanced through pilot project	1-1 Defined key indicators  2-1 Water tariff collection ratio is improved to 30% of total due charged amounts in the Project Area.  3-1 NRWMT formulates Non-revenue Water Reduction Annual Plan in pilot areas  3-2 NRWMT formulates Non-revenue Water Reduction Rolling Plan for all zones of Urban West Region.  4-1 Members of NRWAT acquires leakage detection technique. 4-2 NRW ratio is reduced from xx% to yy% in the pilot areas.	1-1. Monthly Performance Reports  2-1. Monthly Performance Report  3-1 Non-revenue Water Reduction Annual Plan in pilot areas 3-2 NRW reduction plan for all zones of Urban West Region.  4-1 Project Monthly Report 4-2 Project Monthly Report	Water sector policy of Zanzibar government is not changed.

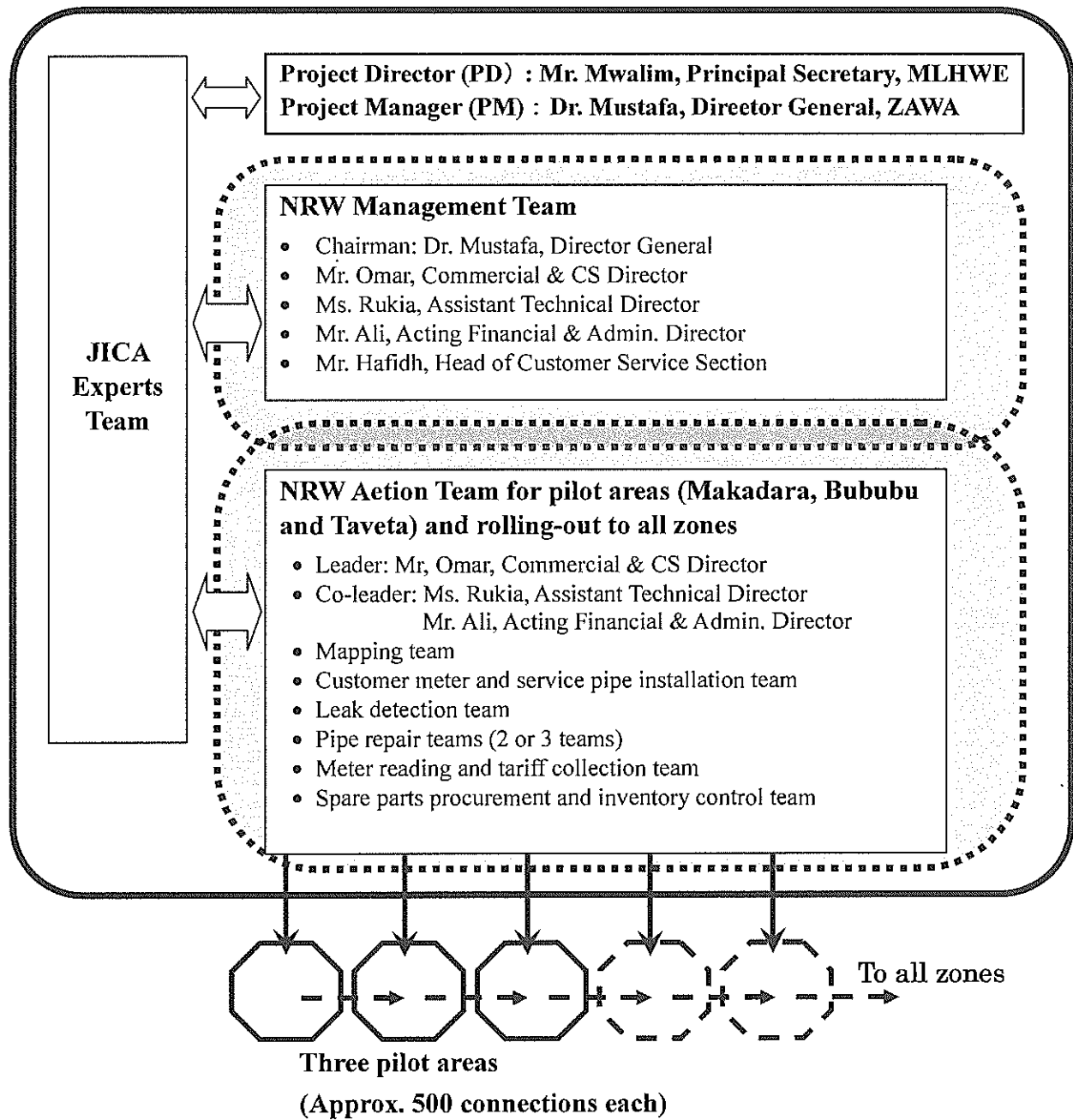
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<p><b>[Activities]</b></p> <p>1-1 Framework of management information system is established.</p> <p>1-2 Key performance indicators are defined and recorded every month.</p> <p>1-3 An organizational restructuring plan of ZAWA is prepared with coordination of the Board of Directors of ZAWA and Ministry of Lands, Housing, Water and Energy.</p> <p>2-1 Every year Revenue Expense Annual Plan is formulated including target collection ratio and target investment.</p> <p>2-2 According to Revenue Expense Annual Plan, Commercial &amp; Customer Service Director (CCD) formulates Annual Action Plan to achieve the target water tariff collection ratio.</p> <p>2-3 All customers are invoiced and tariff is collected accordingly.</p> <p>2-4 Tariff collection measures are upgraded in a customer oriented manner.</p> <p>2-5 According to the Action Plan, actions for non-payers are implemented.</p> <p>2-6 Lessons from activities results are reflected to the next Revenue Expense Annual Plan.</p> <p>2-7 Meter installation is enhanced to change from flat rate to volumetric rate.</p> <p>2-8 Water tariff is monitored for the appropriate revenue with expenses.</p> <p>2-9 Awareness creation for customers on water payment is conducted.</p> <p>3-1 Non Revenue Water Management team (NRWMT) is organized with directors of ZAWA headed by Director General.</p> <p>3-2 Trainings for NRWMT to get management knowledge such as Non Revenue Water reduction, zoning, and water balance are conducted.</p> <p>3-3 NRWMT decides pilot areas for non-revenue water reduction activities in Makadara, Bububu, and Taveta.</p> <p>3-4 NRWMT formulates "Non-revenue Water Reduction Annual Plan in pilot areas" including yearly goal, budget, equipment, man power, etc.</p> <p>3-5. NRWMT improves procurement and inventory control system of spare parts.</p> <p>3-6 NRWMT analyzes the results of NRW reduction activities in pilot areas.</p> <p>3-7 With the experiences in pilot areas, NRWMT formulates the development plan for all zones of Urban West Region Unguja.</p> <p>4-1 Non-Revenue Water Action Team (NRWAT) is organized.</p> <p>4-2 NRWAT conducts maintenance work on networks and customer database of Urban West Region Unguja.</p> <p>4-3 NRWAT is trained for water balance analysis.</p> <p>4-4 NRTAT installs water meters for all customers and flow meters in the pilot areas.</p> <p>4-5 OJT of baseline survey for NRWAT is conducted in pilot areas.</p> <p>4-6 OJT of leakage detection, pipe repairing and rehabilitation of pipes for NRWAT is conducted in pilot areas.</p> <p>4-7 NRWAT evaluates the NRW reduction activities in the pilot area, and report to NRWMT.</p>	<p><b>[Inputs]</b></p> <p>The Japanese side</p> <p>Japanese Experts</p> <p>1. Leader/ Water Utilities Management</p> <p>2. NRW Management</p> <p>3. Network Management/ Mapping/ Spare Parts Inventory Control</p> <p>4. Leak Detection</p> <p>5. Customer Service</p> <p>Equipment</p> <p>1. Customer meter</p> <p>2. Bulk meter</p> <p>3. Flow meter</p> <p>4. Portable ultrasonic flow meter</p> <p>5. Valve</p> <p>6. Leakage detection equipment and appurtenances</p> <p>7. Pickup truck</p> <p>8. Laptop PC</p> <p>9. Tapping machine for service connection</p> <p>Training</p> <p>1. Training in Japan, the third country and water utility in Tanzania</p> <p>The Tanzanian side</p> <p>1. Allocation of counterparts</p> <p>2. Installation costs for customer meter, bulk meter, flow meter and valves</p> <p>3. Repair cost for pipes</p> <p>4. Office rooms for Japanese experts</p>	<p>[Pre-conditions]</p>
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Appendix IV

Organizational Structure of the Project



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**付属資料 2. PDM<sub>0</sub> (案)**

プロジェクト名: タンザニア国 ザンジバル水公社経営基盤整備プロジェクトフェーズ2  
 プロジェクト実施期間: 2011年11月 - 2015年10月 (4年間)  
 プロジェクト実施機関: ザンジバル水公社(ZAWA)  
 ターゲットグループ(直接): ZAWA の無収水管理に関する職員 300名  
 ターゲットグループ(間接): ZAWA の西部都市地域の給水顧客 7万戸  
 プロジェクトエリア: ザンジバル・ウングジャ島

バージョン 2011年3月30日

プロジェクト要約	指標	入手手段	外部条件
<p><b>上位目標</b>                      ZAWA によって安定した水道サービスが提供される。</p>	<p>2017年時点での ZAWA の運営維持管理費用の内、減価償却費と電気代を除いた支出の全てを水道サービスの収入で賄う。</p>	<p>ZAWA 年報</p>	
<p><b>プロジェクト目標</b>                      無収水対策を通じて ZAWA のプロジェクトエリアでの財務状況が改善される。</p>	<p>プロジェクトエリアにおける主要財務指標(コストリカバリー率、総収支額等)が改善される。(具体的な指標は活動 1-2 を通して設定)</p>	<p>ZAWA 年報</p>	<p>アフリカ開発銀行によるウングジャ島西部都市地域を対象とした管路更新のための融資が実行される。</p>
<p><b>アウトプット</b>                      1. ZAWA の水道事業経営能力が向上する。                      2. プロジェクトエリアにおける水道料金徴収率が向上する。                      3. ZAWA の無収水削減計画策定能力が向上する。                      4. ZAWA の無収水削減実施能力が向上する。</p>	<p>1-1 活動 1-2 において設定される主要成果指標(総配水量、配水量に対する料金徴収率等)が改善する。                      2-1 プロジェクトエリアにおける水道料金徴収率が全課金額の 30% に達する。                      3-1 無収水削減年次計画が毎年策定される。                      3-2 プロジェクト終了までにウングジャ島西部都市地域全体の無収水削減計画が策定される。                      4-1 パイロットエリアにおける無収水率が XX% から YY% に減少する。(具体的な指標は活動 4-5 の後に設定)</p>	<p>1-1 経営成果月報                      2-1 経営成果月報                      3-1 プロジェクト進捗報告書                      3-2 プロジェクト進捗報告書                      4-1 プロジェクト進捗報告書</p>	<p>ザンジバル政府の政策(ザンジバルビジョン 2020 における全国民への安全な水へのアクセス向上)が大きな変更なく継続される。</p>

**活動**

- 1-1 経営情報システムの枠組みを構築する。
- 1-2 主要成果指標を設定し、毎月記録する。
- 1-3 主要成果指標の改善に向けた具体的な取り組みを行う。
- 1-4 ZAWA の経営陣及びザンジバル土地住宅水エネルギー省と協力して組織改善案を作成する。
- 2-1 各年度の目標料金徴収率及び目標設備投資額を定めた年間収支計画を策定する。
- 2-2 年間収支計画に従って、目標料金徴収率を達成するための年間活動計画を策定する。
- 2-3 顧客の水道料金支払い促進活動を行う。
- 2-4 全ての顧客に対して請求書を発行し、請求書に従った料金徴収を行う。
- 2-5 料金徴収方法を顧客志向に改善する。
- 2-6 年間活動計画に基づき、未納顧客対策を実施する。
- 2-7 活動の結果から得られた教訓を反映させ、次年度の年間収支計画を策定する。
- 2-8 量水器の設置を進め、定額制から従量制に切り替える。
- 2-9 収支状況を勘案し、水道料金をモニタリングする。
- 3-1 ZAWA の総裁を長として幹部による無収水マネジメントチームを結成する。
- 3-2 無収水マネジメントチームに対し、研修（無収水管理、配水管理区画の設定、配水量管理等）を行う。
- 3-3 無収水マネジメントチームは無収水削減活動を行うパイロットエリアを選定する。
- 3-4 無収水マネジメントチームは、パイロットエリアにおいて、当該年に期待する成果と予算・資材・人員等の投入を取りまとめた「無収水削減年次計画」を作成する。
- 3-5 無収水マネジメントチームは、スパアパーツの調達及び在庫管理方法の改善を行う。
- 3-6 無収水マネジメントチームは、パイロットエリアにおける無収水削減活動の結果を分析する。
- 3-7 無収水マネジメントチームは、パイロットエリアでの活動を総括し、活動の成果をウングジャ島西部都市地域に展開するための展開計画を策定する。
- 4-1 無収水アクシオンチームを結成する。
- 4-2 無収水アクシオンチームは、プロジェクトエリアにおける管路図及び顧客情報データベースを整備する。
- 4-3 無収水アクシオンチームは、水収支の分析についての講習を受ける。
- 4-4 無収水アクシオンチームは、パイロットエリアにおいて、全ての顧客への量水器及び流量計を設置する。
- 4-5 パイロットエリアにおいて、無収水アクシオンチームに対し無収水の現状調査についてのOJTを行う。
- 4-6 パイロットエリアにおいて、無収水アクシオンチームに対し漏水探知、配水管修理、配水管更新についてのOJTを行う。
- 4-7 無収水アクシオンチームは、パイロットエリアにおける無収水削減活動を分析・評価し、無収水マネジメントチームに報告する。

**投入**

- 日本側
- 日本人専門家
- 1. リーダー/ 水道事業経営
  - 2. 無収水管理
  - 3. 管網維持管理/配水管網図 / スペアパーツ在庫管理
  - 4. 漏水探知
  - 5. 顧客サービス
- 資機材
- 1. 量水器
  - 2. バルクメーター
  - 3. 流量計
  - 4. 携帯型超音波流量計
  - 5. 仕切弁
  - 6. 漏水探知機器
  - 7. 車輛 (漏水測定用)
  - 8. ラップトップ PC
  - 9. 給水管接続用穿孔機
- 研修
- 日本、タンザニアあるいは第3国での研修
- タンザニア側
- 1. カウンターパートの配置
  - 2. 量水器、バルクメーター、流量計、仕切弁の設置費用
  - 3. 配水管の修理費用
  - 4. 日本人専門家の事務所

前提条件







## 付属資料3. 主要面談者リスト

### <タンザニア国側>

1. Ministry of Lands, Housing, Water and Energy (MLHWE) (ザンジバル共和国土地・住宅・水・エネルギー省)  
Mr. Mwalim A. Mwalim Principal Secretary (次官)  
Mr. Tahir M.K. Abdulla Deputy Principal Secretary (次官補)  
Mr. Ayoub M. Mohmoud Director Planning, Policy and Research (計画・政策・調査部長)  
Mr. Salhina Mui. Amein Policy Officer (政策課)  
Mr. Yussuf A. Ali Planning Officer (計画課)  
Ms. Faraji Y. Abass Training Officer (研修課)  
Ms. Fajma A. Suleimad Administration Officer (総務課)
2. Zanzibar Water Authority (ZAWA) (ザンジバル水公社)  
Dr. Mustafa Ali Garu Director General (総裁)  
Mr. Omar Ali Yussuf Commercial and Customer Relation Director (営業・顧客サービス部長)  
Ms. Rukia M. Ali Assistant Technical Director (技術副部長)  
Mr. Ali T. Mohamed Acting Financial & Admin. Director (財務・総務副部長)  
Mr. Masuun K. Masuun Network Engineer (技術部)  
Mr. Haji Shaabaw Head of Water Resources (技術部)  
Mr. Abdaccan R Ali Planning Officer (技術部)  
Mr. Maulio Kinange Haji Credit Control (営業・顧客サービス部)  
Mr. Ali A. Ahamed Customer Database (IT) (営業・顧客サービス部)  
Mr. Sahim Skimain Customer Database (IT) (営業・顧客サービス部)  
Mr. Ojhman J. Ojhaman Procurement Officer (財務・総務部)  
Mr. Ramadhan Mo Muouhamud Human Resources Officer (財務・総務部)  
Mr. Khadija M. Juma Lawyer (法務 Unit)  
Mr. Rashio J. Khamis Internal Auditor (内部監査 Unit)
3. Arusha Urban Water Supply and Sewerage Authority (アリュューシャ市上下水道公社)  
Mr. Asili A. Munisi Managing Director (総裁)  
Mr. Ruth Shushu Koya Technical Manager (技術部長)  
Mr. Gasto F. Mkawe Planning & Construction Engineer (計画・建設部)

### <日本側>

1. 日本大使館  
特命全権大使  
一等書記官
2. JICA タンザニア事務所  
勝田 幸秀 事務所長  
長谷川 敏久 事務所次長  
山本 哲也 事務所員  
Mr. Msuya M. Mariango プロジェクト担当アシスタント



## 付属資料4. 質問票及び回答

\*書面による統一した回答は無かったが、断片的に得られた質問に関連する回答及び情報は「収集資料」に収録した。

QUESTIONNAIRE  
TECHNICAL COOPERATION PROJECT  
FOR ENHANCEMENT OF WATER SUPPLY MANAGEMENT OF  
ZANZIBAR WATER AUTHORITY PHASE 2  
Prepared by JICA Detailed Planning Study Team

March 2011

### To Zanzibar Water Authority (ZAWA)

The detailed planning study team shall be furnished with general and specific information for preparation of the proposed technical cooperation project in order to identify the need of the project and to decide the scope of cooperation and project components.

If you find some of the questions might not be relevant to the governorate or the country, please suggest a more appropriate alternative question or revision and provide answers. It is not necessary to follow the form presented here as long as the substance is dealt with. Any material already prepared which accurately covers some of the questions may be submitted in its original form.

Please answer in detail as much as possible in writing to the following questions, and provide available data and information requested herein:

#### **1. Progress of ZAWA Strategic Business Plan (July 2008 – June 2013)**

##### **1.1. Annual operational plan for Year 2 (2009/2010) and Year 3 (2010/2011)**

A detailed operational Plan for Year 1 (2008/2009) was prepared in ZAWA Strategic Business Plan. The subsequent annual operational plans will be prepared in sequence by the first month of the year in which it is supposed to be implemented according to the Strategic Business Plan.

(1) Please provide us with annual operational plan for Year 2 (2009/2010) and Year 3 (2010/2011)

(2) Progress of the above annual operational plans

##### **1.2. Progress of implementation of strategic actions for non revenue water reduction**

Please describe the present progress and current situation of each strategic action for non revenue water reduction planned in ZAWA strategic Business Plan as shown below.

*Strategic Actions for Effective and Efficient Water Services Provision*

No.	Goal	Strategic Actions	Key Milestones and Deliverables	Due Date	Present progress and current situation
C4	Reduced Non Revenue Water	C4.1 Carry out production metering for all production wells/plants and inflows into reservoir	Accurate production meters installed	June 2009	
		C.4.2 Carry out Universal Metering for all active water connections	At least 5,000 meters installed per year on existing connections	Annual	
		C4.3 Institute a leakage timely reporting and prompt response to leaks and ensures a comprehensive tracking system	Leakage coordination system in place	Dec. 2008	
			100% response to all reported leaks	From Jan 2009	

**1.3. Progress of the planned investment plan**

The draft 5 year investment plan was prepared in ZAWA Strategic Business Plan, in which the estimated cost was 71 million US\$ and expected source of fund was AfDB/ UNHABITAT.

- (1) The present progress and current situation of the planned investment plan
- (2) If fund source was secured and the investment project was commenced or under preparation, please describe the detailed contents of the investment project and its implementation time schedule.

**2. Donor's cooperation to ZAWA in water supply sector**

Please describe the detailed contents of donor's cooperation other than JICA in water supply sector, if you have.

- (1) AfDB
- (2) UNHABITAT
- (3) FINNIDA
- (4) UNICEF

- (5) UNDP
- (6) KfW
- (7) The others, if any

### 3. Organization and financial status of ZAWA

#### 3.1. Organization

- (1) Please provide us with the latest organization chart of ZAWA, and future plan, if any change is expected.
- (2) Please describe the work responsibility of each division and its staff composition as of March 2011.

#### 3.2. Financial status

- (1) Auditor's report showing income statement and balance sheet of last two fiscal years (2008/2009 and 2009/2010)
- (2) Budget of this fiscal year (2010/2011)

### 4. Performance records of ZAWA and water supply service conditions

- (1) Annual report of ZAWA in last two fiscal years
- (2) Performance records of ZAWA

Please fill out the following sheet or provide us with it in your own format, if you have:

Table A: Performance of ZAMA							Remarks
	2006	2007	2008	2009	2010		
<b>A. General</b>							
1	Total Area						
2	Service area coverage						
<b>B. Commercial</b>							
3	Number of registered connections						
4	Number of metered water connections.						
5	Amount of water produced in cubic meters						
6	Amount water billed in cubic meters						
7	No Revenue Water (NRW) Ratio						
8	Amount billed in TSH						
9	Amount billed to different consumers in M3						
	• Domestic metered						
	• Domestic unmetered						
	• Commercial/Industrial						
	• Institutional						
	• Others (specify)						
10	Amount Collected in TSH						
11	Collection efficiency (%)						
12	Staff/1,000 connections						
13	Register on written complaints						
14	Number of the complaints for the month						
15	Number of the complaints resolved						
16	Register of disconnections carried out (how many unjustified & compensated?)						

- (3) Technical key indicator in last fiscal year and this fiscal year (after completion of Japan's grand aid program phase 2)
- Capacity of water production by water source
  - Actual average daily water production by water source
  - Average daily water consumption by water user (estimated)
  - Average water consumption per person per day in urban, sub-urban and rural area (estimated)
- (4) A zoning map of water supply service conditions showing daily water supply service hours by area

## 5. Network maintenance and Non Revenue Water (NRW) reduction

### 5.1. Present NRW condition

- (1) The latest NRW rate and water balance on your estimation.

Please fill out the following sheet of water balance:

Water Balance		m <sup>3</sup>	%
Revenue Water	Billed Metered Consumption		
	Billed Unmetered Consumption		
Non Revenue Water	Unbilled Metered Consumption		
	Unbilled Unmetered Consumption		
	Unauthorized Consumption		
	Metering Inaccuracies		
	Leakage on Transmission/Distribution Mains		
	Leakage & Overflow at Utility Storage Tanks		
	Leakage on Service Connections up to Water Meter		
Total			

- (2) How do you estimate the above NRW rate and water balance? Please describe your present methods of estimation.

### 5.2. Installation of water flow meter and customer meter

For measuring accurate NRW rate, it is essential to install water flow meter at water source and network, and customer meter at all service connections.

- List of water flow meter installed at water source and network at present and its location map.
- Your plan for procurement and installation of water flow meter up to 2013
- Number of customer meter installed at service connections and its location map
- Your plan for procurement and installation of customer meter up to 2013

- (5) Was it completed to install customer meter at all service connections (800 each) in Makadara pilot area? And is water tariff collection based on water consumption being implemented at present in the pilot area? If it is not yet, please describe the present situation of Makadara pilot area and the problems which you encounter.
- (6) How do you calibrate water flow and customer meters? Please describe your present calibration system and available equipment for calibration.

### **5.3. Network maintenance**

- (1) Monthly record of number of pipe repair in last and this fiscal years
- (2) Number of pipe repair team and staff composition
- (3) List of available pipe repair tools, equipment and vehicles
- (4) Budget for network maintenance in last and this fiscal years
- (5) Do you employ the contractor for pipe repair and service connection works? If you do, please answer the following questions:
  - a. Demarcation between the works to be done by ZAWA and by the contractor.
  - b. How many contractors are registered in ZAWA for pipe repair and service connection works? Please provide us with the list of contractors.
  - c. How do you supervise their works? What commissioning tests do you conduct when works are completed?
  - d. How do you evaluate their capability for pipe repair and service connection works?
  - e. Do you have some training programs for contractors for pipe repair and service connection works? If you have, please describe the details of the programs.
- (6) List of the existing call centers for receiving leak information from customers
- (7) Do you record reaction time from receiving leak information until completion of pipe repair? Please provide us with monthly performance record of pipe repair and reaction time of this fiscal year, if it is recorded.
- (8) Please describe the problems which you encounter at present in network maintenance.
- (9) Do you think what kinds of technical cooperation are useful for you in network maintenance? Please describe your needs in detail according to your priority.

### **5.4. Leak detection**

- (1) Please describe your routine activities for leak detection

- (2) Number of leak detection team and staff composition
- (3) List of available equipment for leak detection
- (4) Please describe the problems which you encounter in leak detection at present.

#### **5.5. Computerized network mapping system and customer database**

Computerized network mapping system and customer database are essential tools for NRW reduction.

- (1) Please describe present situation of computerized network mapping system (CAD or GIS) including service connection pipes. If it is not completed, please describe your planned time schedule to complete it, too.
- (2) Please describe present situation of customer database. How many customer data of 60,000 customers are rectified and input to GIS up to now?

#### **5.6. Meter reading, billing and water tariff collection**

- (1) Number of staff for meter reading, billing and water tariff collection at present
- (2) Number of customers to which water tariff based on water consumption is being applied at present
- (3) Monthly billing and collection data with collection ratio in recent one year
- (4) Your routine activities for finding illegal connection and its rationalization
- (5) Please describe the problem which you encounter in meter reading, billing and water tariff collection.
- (6) Do you think what kinds of technical cooperation are useful for you in meter reading, billing and water tariff collection? Please describe your needs in detail according to your priority.

#### **5.7. Candidate pilot project area for NRW reduction**

In the course of this technical cooperation project, pilot project(s) for NRW reduction may be conducted aiming at transfer of practical technology and skills. For conducting NRW reduction pilot project, installation of water flow meter at network and customer meter at all service connections within a pilot project area are essential.

- (1) Do you have some ideas on candidate pilot project area other than Makadara where all customer meters were installed or are planned to be installed soon? If you have, please describe the present situation of the candidate area and provide us with its network drawings.



## 6. Staff training

- (1) The records of staff training in last two fiscal years
  - a. Number of trainees (managers, engineers and operators/office clerks/workers) by each training course
  - b. Budget for staff training
- (2) Your plan and budget for staff training in this fiscal year
- (3) Do you have trainers for staff training in your office? If you have, please describe their name and training course they teach, and records of staff training in your office.
- (4) Is the training experience of staff considered in position assignment, payroll and promotion?
- (5) What kind of technical cooperation do you need in staff training in this Project?

## 7. Information about procurement of materials and equipments

Please provide us with information about availability of procurement and price in local market of the following materials and equipments which may be used in NRW reduction pilot project.

- (1) Sluice valve
  - 3" (φ 75)
  - 4" (φ 100)
  - 6" (φ 150)
  - 8" (φ 200)
  - 10" (φ 250)
  - 12" (φ 300)
- (2) Water flow meter
  - 3" (φ 75)
  - 4" (φ 100)
  - 6" (φ 150)
  - 8" (φ 200)
  - 10" (φ 250)
  - 12" (φ 300)
- (3) Customer meter
  - 1/2" (φ 13)
  - 1" (φ 25)
- (4) Some kinds of Leak detection equipments such as pipe locator and sound detector available at local market



付属資料5. 収集資料リスト (■収集資料/口専門家作成資料)

主官部長	文書管理部長	主管部長	情報管理部長	技術情報部長	図書館受入日

地域	アフリカ	プロジェクトID	調査団番号	調査の種類又は指導科目	担当部課	地球環境部 水資源第二課
国名	タンザニア	配属機関名	ザンジバル水公社 (ZAWA)	現地調査期間又は派遣期間	2011年3月9日～4月2日	井上 雄貴

番号	資料の名称	形態(図書、ビデオ、地図、写真等)	収集資料	専門家作成資料	JICA作成資料	発行機関	取扱区分	図書館記入欄
<b>A</b>	<b>政策・法令資料</b>							
A-1	Zanzibar National Water Policy, 2004	CDに収録	*			MWCEL(現 MLHWE)	JR・CR( )・SC	
A-2	Zanzibar Poverty Reduction Plan (ZPRP), March 2002	CDに収録	*			The ZPRP - Popularisation Task Force	JR・CR( )・SC	
A-3	The Water Act, No.4 of 2006/ The Water Regulation (Amendment) of 2008) *水法改訂版 ZAWA水道料金表	CDに収録	*			MWCEL(現 MLHWE)	JR・CR( )・SC	
<b>B</b>	<b>ZAWA関連資料</b>							
B-1	ZAWA Strategic Business Plan (July 2008 - June 2013)	CDに収録	*			ZAWA	JR・CR( )・SC	
B-2	ZAWA Strategic Business Plan 1st Draft (2008-04-11)	CDに収録	*			ZAWA	JR・CR( )・SC	
B-3	Annual Technical Report 2008-09	CDに収録	*			ZAWA, Technical Directorate	JR・CR( )・SC	
B-4	Annual Technical Report 2009-10	CDに収録	*			ZAWA, Technical Directorate	JR・CR( )・SC	
B-5	ZAWA Action Plan 2010-11	CDに収録	*			ZAWA	JR・CR( )・SC	
B-6	ZAWA Main Problems (by Ms. Rukia)	CDに収録	*			ZAWA, Technical Directorate	JR・CR( )・SC	
B-7	ZAWA Management Challenges (by Mr. Omar)	CDに収録	*			ZAWA, Commercial and Customer Relation Directorate	JR・CR( )・SC	
B-8	Billing Statistics 2011.02 *2011年2月の水道料金請求額と徴収額	CDに収録	*			ZAWA, Commercial and Customer Relation Directorate	JR・CR( )・SC	

付属資料5. 収集資料リスト (■収集資料/□専門家作成資料)

主務部長	文書管理部長	主管部長	情報管理部長	技術情報部長	図書館受入日

地域	アフリカ	プロジェクトID	調査団番号	調査の種類又は指導科目	地球環境部 水資源第二課
国名	タンザニア	配属機関名	ザンジバル水公社 (ZAWA)	現地調査期間又は派遣期間	井上 雄貴
				詳細計画策定調査	担当部課
				2011年3月9日～4月2日	担当者氏名

番号	資料の名称	形態(図書、ビデオ、地図、写真等)	収集資料	専門家作成資料	JICA作成資料	発行機関	取扱区分	図書館記入欄
B-9	ZAWA Organizational Structure	CDIに収録	*			ZAWA, Finance and Administration Directorate	JB-CR( ) SC	
B-10	Water supply vs Demand 2005-2009	CDIに収録	*			ZAWA, Technical Directorate	JB-CR( ) SC	
B-11	Boreholes and Pumps Data	CDIに収録	*			ZAWA, Technical Directorate	JB-CR( ) SC	
B-12	Urban Water Production 2008 by Boreholes	CDIに収録	*			ZAWA, Technical Directorate	JB-CR( ) SC	
B-13	ZUWSDP2 presentation *無償資金協力事業フェーズ2のプレゼン資料	CDIに収録	*			ZAWA	JB-CR( ) SC	
B-14	Financial Statements 2008-09, 30th June 2009	CDIに収録	*			ZAWA, Finance and Administration Directorate	JB-CR( ) SC	
B-15	Financial Statements 2009-10, 30th June 2010	CDIに収録	*			ZAWA, Finance and Administration Directorate	JB-CR( ) SC	
B-16	Revenue Budget Performance, Operational Budget Performance and Capital Budget Performance for the Period of July 2009 - June 2010	CDIに収録	*			ZAWA, Finance and Administration Directorate	JB-CR( ) SC	
B-17	Budget Performance, Operational Expenditure and Capital Expenditure for the Period of July - December 2010	CDIに収録	*			ZAWA, Finance and Administration Directorate	JB-CR( ) SC	
B-18	Budget for the year 2010/2011	A4複製本	*					
<b>C</b>	<b>ドナー関連資料</b>							
C-1	Appraisal Report, Zanzibar Water and Sanitation Project (ZWSP)	CDIに収録	*			AfDB	JB-CR( ) SC	
C-2	ZWSP Grant Protocol	CDIに収録	*			UN Habitat & ZAWA	JB-CR( ) SC	

付属資料 5. 収集資料リスト (■収集資料/口専門家作成資料)

主管部長	文書管理課長	主管課長	情報管理課長	技術情報課長	図書館受入日

地域	アフリカ	プロジェクトID	調査団番号	調査の種類又は指導料 目	担当部署	地球環境部 水資源第二課
国名	タンザニア	配属機関名	ザンジバル水公社 (ZAWA)	現地調査期間又は派遣 期間	担当者氏名	井上 雄貴

番号	資料の名称	形態(図書、ビデオ、地図、写真等)	収集資料	専門家 作成資料	JICA 作成資料	発行機関	取扱区分	図書館記入欄
C-3	ZWSP Loan Agreement	CDIに収録	*			AfDB & ZAWA	(JR・CR)・ SC	
C-4	ZWSP TOR for Utility Management	CDIに収録	*			AfDB & ZAWA	(JR・CR)・ SC	
C-5	Evaluation Report for Consultant for ZWSP, June 2009	CDIに収録	*			ZAWA	(JR・CR)・ SC	
C-6	Proposal for Improvement of Urban-West Region *Urban West Region配水管網整備プロジェクトのAfDBローン申請の要請書	CDIに収録	*			ZAWA	(JR・CR)・ SC	
C-7	Donor Support Projects 2007-10	CDIに収録	*			ZAWA	(JR・CR)・ SC	
D	その他							
D-1	Water Supply and Sewerage Disposal Services in Arusha City *アリシャ上下水道公社の事業概要書 Arusha Report for JICA Study Team	CDIに収録	*			Arusha Urban Water Supply and Sewerage Authorities	(JR・CR)・ SC	
D-2	Annual Report 2006/2007	CDIに収録	*			Arusha Urban Water Supply and Sewerage Authorities	(JR・CR)・ SC	
D-3	Annual Report 2007/2008	CDIに収録	*			Arusha Urban Water Supply and Sewerage Authorities	(JR・CR)・ SC	
D-4	Annual Report 2008/2009	CDIに収録	*			Arusha Urban Water Supply and Sewerage Authorities	(JR・CR)・ SC	
D-5	Key Indicator Monthly Report 2006-2011	CDIに収録	*			Arusha Urban Water Supply and Sewerage Authorities	(JR・CR)・ SC	
D-6	AUWSA New Tariffs from July 2009	CDIに収録	*			Arusha Urban Water Supply and Sewerage Authorities	(JR・CR)・ SC	
D-7	Corrective Action Request Form	CDIに収録	*			Arusha Urban Water Supply and Sewerage Authorities	(JR・CR)・ SC	



**1. 案件名**

国名：タンザニア連合共和国

案件名：ザンジバル水公社経営基盤整備プロジェクトフェーズ 2

(Project for Enhancement of Water Supply Management of Zanzibar Water Supply Authority Phase2)

**2. 事業の背景と必要性**

## (1) ザンジバル都市給水に係る現状と課題

タンザニア連合共和国（以下「タンザニア」）を構成するザンジバルは、ウングジャ島とペンバ島を中心とする島々から構成されている。中でも最大のウングジャ島では、西部都市地域（ストーンタウン及びその近郊）を中心に、1920年代から地下水・湧水を水源とした水道の整備が行われ、1990年までに100kmに及ぶ送配水管、送水場、7カ所の配水池が整備された。しかし、その後は財政難によって施設の改修や拡張が行われない状況が続き、給水量の不足により時間給水や断水を余儀なくされる状況となっている。

このような状況の下、我が国はタンザニアからの要請に基づき、2006年～2010年にかけて給水能力の強化を目的とした無償資金協力「ザンジバル市街地給水計画」（1期：2006～2008年、2期：2009～2010年）を実施し、給水能力の増強を行った。また、2008年まで水道料金は無料であったことから、2008年から2010年にかけて、ザンジバル水公社（以下ZAWA）に対し、水道料金の徴収を行い、水道事業体としての基盤を整備することを目的とした技術協力プロジェクト「ザンジバル水公社経営基盤整備プロジェクト」（以下フェーズ1）を実施し、料金徴収業務体制を確立した。

しかしながら、無償資金協力の対象区域外では、依然として給水状況が悪い地域が多く存在する。また、配水管及び給水管も老朽化による漏水が著しい。これは無収水を多くする大きな要因となっており、ZAWAが経営基盤を強化し、継続的に安定した給水を行っていく上での支障となっている。また、ZAWAが安定した給水を行っていくための経営基盤を整備するためには、漏水の削減による給水状況の改善を主な目的とした無収水対策に加え、フェーズ1で構築した料金徴収体制をもとに更なる料金徴収率の向上に向けた取り組みを強化していくこと、及び水道事業体としての経営能力を強化することにより、財務状況を改善していくことが必要となっている。

## (2) ザンジバルにおける都市給水に係る開発政策と本事業の位置づけ

2002年1月に策定されたザンジバル・ビジョン2020では、全国民の安全な水へのアクセス向上のための方策として、許容可能な料金で安全な水を供給するための管理体制の整備

や、全ての水利用者に対する効率的かつ効果的な水道料金の請求・徴収体制の構築が掲げられている。本プロジェクトは、ZAWA が全国民へ安定した水道サービスを提供するために、ZAWA の水道事業経営能力の向上、水道料金徴収率の向上、及び無収水削減能力の向上等を通じて ZAWA の財務状況を改善することを目的としており、同政策に合致している。

(3) ザンジバル都市給水に係る我が国及び JICA の援助方針

我が国の「対タンザニア国別援助計画」(2010年8月)では、援助重点分野の一つ「インフラ」において、水セクター開発プログラムを定めており、ザンジバルにおいては、都市地域における持続的かつ安定的な給水を目指し、ZAWA の経営基盤の強化に向けた支援を行うこととされている。

(4) 他の援助機関の対応

ZAWA の中期計画(2008-2013)がアフリカ開発銀行(AfDB)と国際連合人間居住計画(UN Habitat)の支援によって策定された。2008年からその実施を目的とした「ザンジバル上下水道プロジェクト(ZWSP: Zanzibar Water and Sanitation Project)」が、ペンバ島及びウングジャ島の村落地域を対象として AfDB の支援によって実施されている。

### 3. 事業概要

(1) 事業目的(協力プログラムにおける位置づけを含む)

本プロジェクトは、ザンジバルウングジャ島において、ZAWA の経営能力強化、水道料金徴収率の向上支援及び無収水削減能力の強化を行うことにより、ZAWA の財務状況の改善を図り、もって ZAWA が安全な水を安定的に供給することに寄与するものである。

(2) プロジェクトサイト/対象地域名

プロジェクトエリア: ザンジバル ウングジャ島

無収水対策に係る OJT を実施するパイロットエリア: プロジェクトの活動において、ウングジャ島西部都市地域から 1000 顧客程度のパイロットエリアを 3 地区設置する予定。

(3) 本事業の受益者(ターゲットグループ)

無収水管理に係る ZAWA 職員約 300 名

(4) 事業スケジュール(協力期間)

2011年11月~2015年10月を予定(計48ヶ月)

(5) 総事業費(日本側)

約3.4億円



(6) 相手国側実施機関

ZAWA

(7) 投入（インプット）

1) 日本側

・ 専門家派遣

チーフアドバイザー/水道事業経営、無収水管理、管網維持管理/配水管網図/スペアパーツ在庫管理、漏水探知、顧客サービス（総計 83M/M 程度）

・ 資機材供与

量水器、バルクメーター、流量計、携帯型超音波流量計、仕切弁、漏水探知機器、車輛（漏水測定用）、PC、給水管接続用穿孔機等

・ 本邦研修

無収水管理に関する研修（5 人、3 週間程度）

2) タンザニア側

・ カウンターパートの配置

・ 量水器、バルクメーター、流量計、仕切弁の設置費用

・ 配水管の修理費用

・ 専門家及びプロジェクトスタッフのための事務所スペースと光熱費

(8) 環境社会配慮・貧困削減・社会開発

1) 環境社会配慮

①カテゴリ分類：C

②カテゴリ分類の根拠

本プロジェクトは、ZAWA の水道事業経営能力の向上、水道料金徴収率の向上、及び無収水削減能力の向上等ソフト面での技術協力を行うものであり、環境への影響はほとんど見込まれない。

2) ジェンダー・平等推進/平和構築・貧困削減

特になし。

3) その他

特になし。

#### (9) 関連する援助活動

##### 1) 我が国の援助活動

- ・ ザンジバル市街地給水計画（1期：2006～2008年、2期：2009～2010年）を通じて、11本の井戸掘削、配水地3箇所建設、主要な送配水管の整備を行い、水供給能力の増強を行った。本プロジェクトでは、増強された水供給能力を顧客に確実に届けるための無収水対策を通じ、同無償資金協力で整備した施設の維持管理に必要な資金を捻出するための財務状況の改善を行う。
- ・ 技術協力プロジェクト「ザンジバル水公社経営基盤整備プロジェクト」(2008年～2010年)では、ZAWAの料金徴収業務体制の構築等を実施した。本プロジェクトでは、この料金徴収業務体制をもとに、料金徴収率向上のための更なる取り組みを支援し、ZAWAの財務状況の改善を図ることとしている。

##### 2) 他ドナー等の援助活動

- ・ 既述のZWSPの継続プロジェクトとして、ZAWAからAfDBに対し、ZWSPには含まれていないウングジャ島西部都市地域の配水管網整備を中心とした支援が要請されている。本プロジェクトは、パイロットエリアにおける無収水削減技術の習得を目的としたOJTの実施というソフト面の支援を行うものであり、AfDBの支援によるハード面の整備との相乗効果により、安定した水道サービスの提供が期待できる。

## 4. 協力の枠組み

### (1) 協力概要

- 1) 上位目標：ZAWAによって安定した水道サービスが提供される。

指標：2017年時点でのZAWAの運営維持管理費用の内、減価償却費と電気代を除いた支出の全てを水道サービスの収入で賄う。

- 2) プロジェクト目標：無収水対策を通じてZAWAのプロジェクトエリアでの財務状況が改善される。

指標：プロジェクトエリアにおける主要財務指標（コストリカバリー率、総収支額等）が改善される。（具体的な指標は成果1に係る活動を通して設定）

### 3) 成果及び活動

[成果1] ZAWAの水道事業経営能力が向上する。

指標 1-1：活動を通じて設定される主要成果指標（総配水量、配水量に対する料金徴収

率等)が改善する。(具体的な指標は活動を通して設定)

活動:経営情報システムの構築、主要成果指標の設定・記録・改善、組織改善案の作成。

[成果2] プロジェクトエリアにおける水道料金徴収率が向上する。

指標 2-1: プロジェクトエリアにおける水道料金徴収率が全課金金額の30%に達する。

活動:水道料金の目標年間徴収率等を定めた年間収支計画の策定、年間収支計画に基づいた年間活動計画の策定、年間活動計画に基づいた料金徴収活動(支払い促進活動、請求書の発行、料金徴収方法の改善、未納対策等)の実施、等。

[成果3] ZAWAの無収水削減計画策定能力が向上する。

指標 3-1: 無収水削減年次計画が毎年策定される。

指標 3-2: プロジェクト終了までにウングジャ島西部都市地域全体の無収水削減計画が策定される。

活動: 無収水マネジメントチームの結成、同チームへの無収水管理・配水管理区画の設定・配水量管理等に係る研修の実施、パイロットエリアの選定、パイロットエリアにおける無収水削減年次計画の策定、パイロットエリアにおける無収水アクションチームの活動結果の分析・総括、活動の成果をウングジャ島西部都市地域へ展開するための展開計画の策定、等。

[成果4] ZAWAの無収水削減実施能力が向上する。

指標 4-1: パイロットエリアにおける無収水率がXX%からYY%に減少する。(具体的な指標は無収水の現状調査後に設定)

活動: 無収水アクションチームの結成、同チームへの水収支の分析に係る講習の実施、同チームへの無収水の現状調査・漏水探知・配水管修理・配水管更新に係るOJTの実施、プロジェクトエリアにおける水路図及び顧客情報データベースの整備、パイロットエリアにおける量水器及び流量計の設置、パイロットエリアにおける活動の分析・評価及び無収水マネジメントチームへの報告、等。

#### 4) プロジェクト実施上の留意点

##### ①プロジェクト目標と成果の因果関係

本プロジェクトでは、目標とする「無収水対策を通じてZAWAのプロジェクトエリアでの財務状況が改善される」を達成するために、上述の4つの成果を定めている。成果1及び2において、水道事業経営能力の向上及び料金徴収率の向上を行うことで、ZAWAの経営状態の改善に資するのみならず、成果3及び4を実施するための資金の捻出に貢献する。また、成果3及び成果4では、それぞれ無収水削減に係る計画策定能力及び無

収水削減実施能力の向上を図ることで、生産した水が効率的に顧客に届くようにし、ひいては ZAWA の財務状況の改善に資するという枠組みである。

## ②プロジェクトの実施工程

本プロジェクトでは、成果 3 及び 4 において無収水削減に係る活動を行うこととしているが、これを行うためには、配水管、給水管の取替えや補修等のための資金が必要となる。そのため、本プロジェクトにおいては、まず成果 1 及び 2 を優先して実施して資金の捻出を図り、その資金を活用して無収水削減活動を行うこととする。

## ③パイロットエリアの選定

成果 1 及び 2 については、ZAWA の本部が管轄するウングジャ島全域を対象とした活動となるが、成果 3 及び 4 は、無収水削減に係る OJT を通じた技術移転を実施する予定であり、これに係る活動（水収支の分析、漏水探知、配水管の更新等）は、集中的に実施しなければ効果が限られることから、パイロットエリアを設定する。

選定するエリアについては、ZAWA の財務状況の改善に資するという観点から、多くの顧客が密集する地域を設定することとする。また、大規模な配水管の更新には多くの予算が必要となることから、水収支の分析や漏水探知を行うためには、比較的給水状況が良いエリアを選定する必要がある。更には、カウンターパートが OJT により確実に技術を習得し、経験を蓄積するためには、複数回の OJT を実施することが必要であることから、複数のパイロットエリアを選定することとする。

## (2) その他インパクト

本プロジェクトでは、上位目標として「ZAWA によって安定した水道サービスが提供される」を定めており、本プロジェクトによって財務状況が改善した ZAWA が、本プロジェクトで習得した技術を活用し、継続して給水サービスの向上に努める他、ウングジャ島西部都市地域の管路更新支援のために AfDB による融資が行われれば、ZAWA によって安定した水道サービスが提供されることが見込まれる。

一方、ザンジバル・ビジョン 2020 では、「全国民が安全な水へアクセス可能になること」を目標としているが、これを達成するためには、本プロジェクトで定める上位目標の達成に加え、現在 ZAWA が給水サービスを提供していない全ての国民に対して安全な水が提供できるよう、給水エリアを拡大していくことが求められる。

## 5. 前提条件・外部条件（リスク・コントロール）

(1) 事業実施のための前提

特になし。

(2) 成果達成のための外部条件

特になし。

(3) プロジェクト目標達成のための外部条件

ザンジバル政府の水政策（ザンジバル・ビジョン 2020 における全国民への安全な水へのアクセス向上）が継続される。

(4) 上位目標達成のための外部条件

アフリカ開発銀行によるウングジャ島西部都市地域を対象とした管路更新のための融資が実行される。

## 6. 評価結果

本事業は、ザンジバルの開発政策、開発ニーズ、日本の援助政策と十分に合致しており、また計画の適切性が認められることから、実施の意義は高い。

## 7. 過去の類似案件の教訓と本事業への活用

ザンジバル水公社経営基盤整備プロジェクトの終了時評価調査における提言では、相手組織の能力強化や行動変容のためには、専門家が継続して現地に滞在し、モニタリングを行うことが重要であると指摘されている。本プロジェクトは、同様に相手組織の能力強化とともに行動変容を促すものであるため、プロジェクトの実施過程において、少なくとも1人の専門家が現地に滞在するよう、専門家の現地活動日程を工夫することとする。

## 8. 今後の評価計画

(1) 今後の評価に用いる主な指標

4. (1) のとおり。

(2) 今後の評価計画

事業中間時点	中間レビュー
事業終了6ヶ月前	終了時評価
事業終了3年後	事後評価

以 上



## 付属資料7. PCM ワークショップ結果

### タンザニア国 ザンジバル水公社経営基盤整備プロジェクトフェーズ2 詳細計画策定調査 PCM ワークショップ結果

1. 日時：2011年3月17日（木）08:30-16:00  
 2011年3月18日（金）08:30-15:00
2. 場所：ZAWA 大会議室
3. 目的：PCM(Project Cycle Management)手法を用い、ザンジバル国関係者と日本国側事前調査団の間で、現状の課題を確認し、PDM（案）基礎資料を作成するために実施する。

#### 4. ワークショップ概要

##### 第1日目

項目	内容	担当
開会	開会の挨拶	Director General
	事前調査の目的とワークショップの目的の説明	調査団
ZAWA プレゼンテーション	ZAWA の直面する経営問題	ZAWA 営業部長、技術部長
無収水削減 プレゼンテーション	JICA マルチメディア教材：「水道事業における総合的な無収水削減対策～無駄な水を減らすために～」	調査団
PCM 説明 プレゼンテーション	PCM の概要説明とワークショップの進め方	調査団
問題分析	グループワークインストラクション	調査団
	水道公社経営課題、無収水対策にかかる問題分析（グループワークとプレゼンテーション）	参加者
目的分析	グループワークインストラクション	調査団
	水道公社経営課題、無収水対策にかかる問題分析（グループワークとプレゼンテーション）	参加者

##### 第2日目

項目	内容	担当
開会	挨拶	調査団
PDM 案提示	第1日目の分析結果を踏まえて調査団が作成したPDM案（プロジェクト要約部分）の説明	調査団
PDM の検討	グループワークインストラクション	調査団
	PDM の検討（グループワークとプレゼンテーション）	参加者
閉会	挨拶	ZAWA 営業部長

#### 5. 出席者：

- MLHWE：第1日目-5名、第2日目-5名
- ZAWA：第1日目-17名、第2日目-19名
- JICA/調査団：第1日目-4名、第2日目-3名
- 合計：第1日目-27名、第2日目-26名

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 PCM Workshop, 17 March 2011

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26	<b>Naoyuki Teshima</b>	JICA Consultant	

## 6. ワークショップの実施結果概要

### 6-1 ZAWA によるプレゼンテーション

オマール営業部長により、「ザンジバルにおける水供給システムの現状と ZAWA の経営課題」 ”STATUS REPORT ON ZANZIBAR WATER SUPPLY SYSTEMS AND ZAWA MANAGEMENT CHALLENGES”と題するパワーポイントによるプレゼンテーションがあった。  
(添付資料参照)

オマール営業部長の指摘する ZAWA の経営課題 ZAWA MANAGEMENT CHALLENGES は次の通り。

1. 高い漏水率 Leakages and high % of wastages.
2. ポンプの損傷 Pumps break down.
3. 配水管網の老朽化 Old infrastructures of the network distribution.
4. 不十分な水供給サービス Insufficient water services.
5. 顧客の砂漠化 Customer desertification.
6. 顧客の必要以上の貯水 Individual storages to beyond their capacity
7. 苦情処理、メンテナンス軽視と遅れ Complaints handling and neglect of maintenance and delay.
8. 資産の悪化 Deterioration of asset.
9. 無収水 Unaccounted for water.
10. 政治的介入 Political interferences.
11. 水質汚染 Water contaminations
12. 低回収率 Low revenue collection

続いてルキア技術部長により「ZAWA の直面する課題」 MAIN PROBLEMS FACED BY THE AUTHORITY のプレゼンテーションがあった。(添付資料参照)

1. 信頼性のかける水供給 Unreliable water supply
  - ・ 不十分な水製造 Insufficient water Production
  - ・ 高い無収水率 High unaccounted for water
  - ・ 不十分な作業用機器 Inadequate working tools and equipment
  - ・ 不十分な技術 Inadequate skills
2. 高い無収水率 High unaccounted for water
  - ・ 古い配水設備 Old water infrastructure
  - ・ 高い頻度の漏水 High frequency and number of leakages
  - ・ 迅速な修理ができない修理部品不足 Lack of spares for timely repair
  - ・ 漏水探知する機材の不足 Lack of equipment for leakage detection
  - ・ 流量計設置不足 Insufficient installation of flow meters
  - ・ バルクメーターの設置不足 Insufficient installation of bulk meters
  - ・ メーター不設置顧客が多い High number of unmetered customers
  - ・ 公共物汚損 Vandalism
  - ・ 不法接続 Illegal connection
  - ・ 水の無駄遣い Unefficient use of water
3. 不十分な水製造 Insufficient water production
  - ・ 不安定な電力供給 Unstable electric power cut off
  - ・ 高頻度のポンプ破損 High cases of pumps breakdown

- ・ 非効率なポンプ稼働 Low efficiency of pump functionability
  - ・ ポンプ修理技術の不足 Low capacity of knowhow on pump repairs
  - ・ 信頼性の低い防御機器 Unreliable protection devices
  - ・ 井戸の水量減少 Depletion of water in bore holes
  - ・ ドライシーズンの拡大 Elongated dry seasons
  - ・ 塩水侵入の危険性 Risk of saline water intrusion
  - ・ 不十分な取水地域の保護 Inadequate conservation of catchment areas
3. 水質汚染 Water Contamination
- ・ 水源地付近での人間活動 High human activities near the water sources
  - ・ 多くの水源地がフェンスで囲われていない High number of unfenced water sources
  - ・ 高頻度の漏水 High frequency of leakages
  - ・ 上水と下水の配管計画調整不足 Inadequate planning of water against sewage pipe network
  - ・ 多数の私用井戸 High number of private wells
4. 高オペレーションコスト High operational costs
- ・ 119 もある井戸 High number of wells (119)
  - ・ 古い水道施設 Old water infrastructure
  - ・ 最新機器の不足 Lack of updated tools and equipments

## 6-2 問題分析

ZAWA のプレゼンテーションで提起された経営課題の考慮しつつ、調査団から問題分析で取り上げる3つの中心課題をつぎのとおり提案した。

1. 高い無収水率 High Non Revenue Water Ratio
2. 低い水道料金徴収率 Low Water Tariff Collection
3. 不十分な経営管理システム Insufficient Management System

MLHWE と ZAWA からの参加者を3つのグループに分けた。各グループにつき1つの中心課題を検討した。各人で問題カードに問題を書き込み、各問題の関連を考えて模造紙に貼り付けることで問題分析を実施した。

問題分析の結果を各グループにプレゼンテーションしてもらった。各グループ（代表）の発表要約は次の通り。

1. 高い無収水率 High Non Revenue Water Ratio（オマール営業部長）
  - FAILURE POLICY: BUSSINES STRATEGIC PLAN IMPLEMENTATION
    - UN SKILLED STAFF
    - BUREAUCRACY
  - ILLEGAL CONNECTION
    - LACK OF PUBLIC AWARENESS
      - ・ LACK OF LAW INFORCEMENT
  - LEAKAGES
    - OLD INFURSTRUCTURE
      - ・ INSUFFICIENT FUND TO REHABILITATE THE OLD INFURSTRUCTURE
      - ・ LONG TIME REPAIRE AND MAINTANANCE
    - UNPROPER CONNECTION
    - POOR QUALITY OF MATERIALS
  - INSUFFICIENT REVENUE

- INSUFFICIENT WATER SUPPLY
- LACK OF DECENTRALAZIED CUSTOMER SURVICES
  - UNMITERED CUSTOMERS
  - POLITICAL INTERFIARANCE

2. 低い水道料金徴収率 Low Water Tariff Collection (アリ財務・総務副部長)

Staff	Customer	Technical	Political	Management
Lack commitment (Staffs)	Customers resistance	In adequate of water supply	Political interference	Insurficient revenue system
Inadequate Staff	Lack of awareness	Un reliable of water supply	Low tariff rate	Absence of realistic strategy for water tariff collection
Illegal Act by Employees	Lack of education	Illegal Connection	Un- authorized water committees	
	Negative attitude	Lack of power supply		

3. 不十分な経営管理システム Insufficient Management System (ルキア技術副部長)

- Polotical interference
- Inappropriate Coordination
  - Poor exercise of duties and responsibilities
    - Lack working tools
    - Lack of financial power
    - Lack of budget allocation in department
  - Un appropriate prioritization
  - In adequate professional respect
- Lack of appropriate spares
- Lack of tools and equipment
- Shortage of equipment
  - Financial Shortages
    - High number of staffs
    - High operational cost
    - Poor revenue collection
      - Centralized payment system
      - Poor services
      - Low people awareness
      - Poor enforcement of law
    - Financial dependency
- Improper information system
  - Improper data management system

- Poor monitoring system
- Lack of monitoring resources
- Unreliable baseline data

### 6-3 目的分析

問題分析の結果を元に目的分析を行った。問題分析の結果は次のとおり。

#### 1. 無収水率の低減 (Reduction of Non Revenue Water Ratio)

- POLICY: BUSSINES STRATEGIC PLAN IMPLEMENTATION
  - CAPACITY BUILDING
  - SIMPLIFIED WATER CONNECTION PROCEDURES
- LEGAL CONNECTION
  - INTRODUCE PUBLIC AWARENESS
    - ・ LAW ENFORCEMENT
- LEAKAGE CONTROL
  - REHABILITATION OF OLD INFRASTRUCTURE
    - ・ SUFFICIENT FUND TO REHABILITATE THE OLD INFRASTRUCTURE
    - ・ DONER CONTRIBUTION AND HIGH REVENUE COLLECTION
    - ・ TIMELY REPAIR AND MAINTANANCE
  - PROPER CONNECTION
  - STANDARDIZE QUALITY OF MATERIALS
    - ・ ADEQUATE INCOME (CUSTOMERS AND ZAWA)
- SUFFICIENT REVENUE
  - SUFFICIENT WATER SUPPLY
  - DECENTRALAZIED CUSTOMER SURVICES
    - HIGH NUMBER OF MITERED CUSTOMERS
    - POLITICAL WILLING AND AUTOMOUS OPERATION

#### 2. 水道料金徴収の改善 (Improvement of water Tariff Collection)

Staff	Customer	Technical			Political	Management
Highly committed of staff	Customer Willingness to Pay	Adequate Water Supply			Full Autonomous of the Authority	Proper Revenue Collection System
Conducive working environment	Positive Attitude	Rehabilitation of old Water Infrastructure	Reliable Water Supply	Water Demand Managment	Contractualization	Implimentation for Water Tarrif Collection Strategy
Proper Skilled Allocation and utilization of Human Resource	Rise Awareness	Reliable Power Supply			Political Leader should be Realistic	Committed Managers
Enforcement	Education				Realistic	

of the Law	to Customers		Tariff Rates	
	Improved Customer Care		Authorized Water Communities	
	Law Enforcement			Sound Management

### 3. マネジメントシステムの改善 (Sufficient Management System)

- Proper coordination system
  - Proper financial flow
  - Strong internal control system
  - Sufficient and proper budget allocation
- Good governess
- Sufficient Financial system
  - Good revenue collection
    - Good services
      - High people awareness to pay
  - Decentralized payment system
  - Strong enforcement of law
- Adequate number of staffs
  - Multi task staffs
- Financial independent
- Proper information system
  - Proper data management system
    - Good monitoring system
      - Sufficient Monitoring resources
- Reliable baseline data
- Strong Internal control system
  - Effective exercise of duties and responsibility
    - Sufficient working resources
- Proper prioritization
  - Professional respect

#### 6-4 PDM 案の検討

ZAWA の要請内容、ワークショップ前の調査結果、ワークショップ第 1 日目の分析結果を元に調査団が PDM のプロジェクト要約部分の素案を作成したワークショップ第 2 日目に参加者に調査団より提示した。

Project Design Matrix: PDM (Draft)

Project Name: "Enhancement of Water Supply Management of Zanzibar Water Authority

Phase 2”

Duration: XX 2011 – XX2014 (3 years)

Implementing agency: Zanzibar Water Authority (ZAWA)

Direct target group: about 30 staff related to non revenue water management

Indirect target group: about 80,000 registered customers in West Urban Area of ZAWA

Target Area: West urban area of Unguja Zanzibar

Version March 18, 2011

[Overall Goal]

ZAWA provides sustainable water supply services.

[Project Purpose]

Financial condition of ZAWA is improved by Non Revenue Water management.

[Output]

1. Capacity of Planning for Non-Revenue Water Management is enhanced in ZAWA.
2. Capacity of implementing NRW Plan of ZAWA is enhanced
3. Water tariff collection ratio of ZAWA is increased.

[Activities]

1. Capacity of Planning for Non-Revenue Water Management is enhanced in ZAWA.
  - 1-1 Non Revenue Water Management team is organized with directors and staff of ZAWA
  - 1-2 Conduct training the NRW Management team (NRWMT) to get management knowledge such as Sectioning water management, water flow management, leakage detection research, pipe repairing.
  - 1-3 NRWMT sets water distribution sections in the target area in Unguja.
  - 1-4 NRWMT decides pilot areas for non revenue water management activities in West Urban area Unguia.
  - 1-5 NRWMT formulate “Non-revenue Water Reduction Year Plan in pilot areas” including yearly goal, budget, equipments, man power, etc.
  - 1-6 NRWMT supervise NRW Action Team(Activity 2-1)
  - 1-7 NRWMT analyzes the results of NRW reduction activities in pilot areas, and formulate NRW Reduction Year Plan for pilot areas.
  - 1-8 With the experiences in pilot areas, NRWMT formulate the development plan for all ZAWA
2. Capacity of implementing NRW Plan of ZAWA is enhanced
  - 2-1 Non-Revenue Water Action Team (NRWAT) organized.
  - 2-2 NRWAT conducts maintenance work on networks and customer database.
  - 2-3 NRWAT is trained to get techniques installation of meters and bulk meters, and reading meters.
  - 2-4 NRTAT set water meters and flow meters in the urban area West Unguja.
  - 2-5 Japanese experts conduct OJT training for NRWAT to do baseline survey in pilot areas.
  - 2-6 Japanese experts conduct OJT training for NRWAT to do leakage detection, pipe repairing, rehabilitation of pipes in pilot areas.
  - 2-7 Japanese experts conduct OJT training for NRWAT to do supervising pipe repairing, rehabilitation of pipes in pilot areas
  - 2-8 NRTAT conducts NRW reduction activities according to NRW Year Plan.

2-9 NRWAT evaluates the NRW reduction activities using NRW ratio in the pilot area, and report to NRWMT.

3. Water tariff collection ratio of ZAWA is increased

3-1 Every year NRWMT formulate Revenue Expense Year Plan setting target collection ratio and target investment

3-2 According to Revenue Expense Year Plan, NRWAT formulate yearly Action Plan to achieve the target water tariff collection rate.

3-3 According to Action Plan, NRWAT do activities on distribution of bills, collection, complain treatment.

3-4 According to Action Plan, NRWAT make explanation about waterstopping for no payers in project area.

3-5 According to Action Plan, NRWAT do actions for non payers.

3-6 NRWAT formulate the next year revenue and expense plan reflected lessons from activities results.

3-7 NRWAT assist public KIOSK where water supply improved.

3-8 NRWAT focus on meter installation means from flat rate to specific rate.

3-9 NRWAT monitor water tariff.

このPDM案を3グループに分かれて検討した。各グループの検討結果は次の通り。

[Activities]

1. Capacity of Planning for Non-Revenue Water Management is enhanced in ZAWA.

1-1 Non Revenue Water Management team is organized with directors and staff of ZAWA

1-2 Conduct training the NRW Management team (NRWMT) to get management knowledge such as Sectioning water management, water flow management, leakage detection research, pipe repairing.

1-3 NRWMT sets water distribution zones in the target area in Unguja.

1-4 NRWMT decides pilot areas for non revenue water management activities in West Urban area Unguia.

1-5 NRWMT formulate “Non-revenue Water Reduction Annual Plan in pilot areas” including yearly goal, budget, equipments, man power, etc.

1-6 NRWMT supervise NRW Action Team (Activity 2-1)

1-7 NRWMT analyzes the results of NRW reduction activities in pilot areas, and formulate NRW Reduction Year Plan for pilot areas.

1-8 With the experiences in pilot areas, NRWMT formulate the development plan for all ZAWA

2. Capacity of implementing NRW Plan of ZAWA is enhanced

2-1 Non-Revenue Water Action Team (NRWAT) organized.

2-2 NRWAT conducts maintenance work on networks and customer database.

2-3 NRWAT is trained to get techniques installation of meters and bulk meters, and reading meters.

2-4 NRWAT set 100% water meters and flow meters in the pilot area West Urban Unguja.  
[Exclusive team for installation in pilot area]

Criteria for the Pilot Area Identification



1. Good Water Services
2. Less AC (Old) pipes
3. Proposed area: Makadara, Bububu, Taveta
- 2-5 OJT training for NRWAT to do baseline survey in pilot areas.
- 2-6 OJT training for NRWAT to do leakage detection, pipe repairing, rehabilitation of pipes in pilot areas.
- 2-7 OJT training for NRWAT to do supervising pipe repairing, rehabilitation of pipes in pilot areas
- 2-8 NRWAT conducts NRW reduction activities according to NRW Annual Plan. NRW Action Plan extended to all the project area.
- 2-9 NRWAT evaluates the NRW reduction activities using NRW ratio in the pilot area, and report to NRWMT.
- 2-10 Data distribution system establishment from meter readers to IT and GIS technician.
- 2-11 OJT training for data acquisition from bulk meter and customer meters
- 2-12 OJT training for leakage detector, pipe repair, rehabilitation of pipes in the pilot areas. [Training for water balance analysis.]
3. Water tariff collection ratio of ZAWA is increased
- 3-1 Every year NRWMT formulate Revenue Expense Annual Plan setting target collection ratio and target investment
- 3-2 According to Revenue Expense Annual Plan, NRWAT formulate Annual Action Plan to achieve the target water tariff collection rate.
- 3-3 Performing customer care activities, distribution of bulk and collection of revenue.
- 3-4 Make explanation, recommendation and solution about water stopping for non payers customers in project area (West Urban Uguja).
- 3-5 According to Action Plan, NRWAT do actions for non payers.
- 3-6 NRWAT formulate the next year revenue and expense plan reflected lessons from activities results.
- 3-7 NRWAT assist public KIOSK where water supply improved.
- 3-8 NRWAT focus on meter installation means from flat rate to volumetric rate.
- 3-9 NRWAT monitor water tariff.
- 3-10 OJT for tariff collection team and water demand management team
- 3-11 Awareness creation for customers on water payment

#### 6-5 ワークショップの総括

指標の検討、活動実施者の明確化まで行きつかなかったが、PDM の骨格は参加者のなかで共通理解できた。

フェーズ1 で水道事業体の組織的アイデンティティを確立するための活動が行われていたはずだが、議論を導くリーダーの役目を果たすことができる人材は限られている。

