南スーダン国
南スーダン都市水道公社
水道事業管理能力強化プロジェクト
終了時評価調査
報告書

平成25年11月
（2013年）

独立行政法人国際協力機構
地球環境部

環境
JR
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略　語　表

略語	英語名	日本語名
C/P	Counterpart	カウンターパート
GIS	Geographic Information System	地理情報システム
GIZ	German International Cooperation Agency	ドイツ国際協力公社
GPS	Global Positioning System	全地球測位システム
HQ	Headquarters	本部
IDP	Internal Displaced Person	国内避難民
JCC	Joint Coordination Committee	合同調整委員会
JICA	Japan International Cooperation Agency	独立行政法人国際協力機構
M/M	Minutes of Meeting, Man Month	協議議事録、人月
MDTF	Multi Donor Trust Fund	多国ドナー信託基金
MFEP	Ministry of Finance and Economic Planning	財務・経済計画省
MWRI	Ministry of Water Resources and Irrigation	水資源・灌漑省
OVI	Objectively Verifiable Indicator	客観的検証可能な指標
O&M	Operation and Maintenance	運転・維持管理
PDM	Project Design Matrix	プロジェクト・デザイン･マトリックス
PI	Performance Indicator	業務指標
PO	Plan of Operations	業務計画
R/D	Record of Discussion	討議議事録
ROSS	Republic of South Sudan	南スーダン共和国
SIP	Small Infrastructure Project	小規模インフラ・プロジェクト
SOP	Standard Operational Procedure	標準運転手順書
SSDP	South Sudan Development Plan	南スーダン開発計画
SSP	South Sudanese Pound	南スーダン・ポンド
SSUWC	South Sudan Urban Water Corporation	南スーダン都市水道公社
SUWASA	Sustainable Water and Sanitation in Africa	アフリカの持続可能な給水と衛生プログラム
TCP	Technical Cooperation Project	技術協力プロジェクト
TICAD	Tokyo International Conference on African Development	アフリカ開発会議
USAID	United States Agency for International Development	米国国際開発庁
USD	United States Dollars	米ドル
UWC	Urban Water Corporation	都市水道公社
WB	World Bank	世界銀行
WTP	Water Treatment Plant	浄水場

終了時評価調査結果要約表

I.　案件の概要	
国名：南スーダン国	**案件名：**都市水道公社水道事業管理能力強化プロジェクト
分野：水資源・防災	**援助形態：**技術協力プロジェクト
所轄部署：地球環境部	協力金額（評価時点）：2.75 億円
	協力相手先機関：南スーダン都市水道公社（SSUWC）ジュバ支所、本部
協力期間： 2010 年 10 月～2013 年 9 月（3 年間）	**日本側協力機関：**無し

1.　協力の背景と概要

スーダン共和国では、20 年以上に渡り政府とスーダン人民解放運動との間で内戦が続き、2005 年 1 月の南北包括的和平合意（Comprehensive Peace Agreement: CPA）の締結の後、南部スーダンは暫定政府を樹立した。その後、首都となったジュバでは、国内外からの帰還民により人口が急増し、現在の人口は 40 万人程度と推計されている。都市インフラについては、内戦の影響で維持管理がほとんど行われていない上に、多くの施設が既に老朽化しており、住民へのサービス提供機能が著しく低下している。

水資源・灌漑省（MWRI）傘下の南スーダン都市水道公社（SSUWC）ジュバ支所（職員 164 名）が、ジュバの浄水場および送配水施設からなる水道施設の運転・維持管理、料金徴収等を行なっている。しかしながら、ジュバ支所では、設備の老朽化に加えて、上水道施設の運転・維持管理にかかる職員の知識・技術不足、水質検査・確認体制の欠如、更新された顧客台帳の欠如、均等配水管理システムの欠如、必要な維持管理資機材や予算の不足により、計画的かつ効率的な配水が困難な状態になっている。加えて、上水道施設の運営に必要な支出を賄うために十分な料金収入を得られていない状態である。明確な財務状況の査定や適切な水道料金政策なしに、安価な定額制料金体系が採用されており、手書きの顧客台帳により料金徴収を管理する体制は非常に非効率的である。

SSUWC 本部（職員 38 名）は、こうした各支所が抱える技術的な問題の対処に関する指揮監督を行なうと共に、支所の運営に必要な予算を確保・措置する立場にあるが、実態を把握する制度上の枠組みや双方の十分な情報交換がない中で、適切な支援を行なうことが出来ない状態となっている。

このような状況から、南部スーダン政府（当時）より日本政府に対し、ジュバの給水事業改善に向けて、SSUWC ジュバ支所の水道事業運営管理能力の強化を目的とした技術協力プロジェクトが要請された。この要請に基づき、2010 年 2-3 月に詳細計画調査団が派遣され、水資源・灌漑省を監督機関とし、SSUWC 本部とジュバ支所をターゲット･グループとするプロジェクト骨子が作成された。これを受けて、2010 年 7 月南部スーダン政府（当時）を代表した水資源・灌漑省と JICA スーダン事務所が討議議事録に署名をし、日本政府が「都市水道公社水道事業管理能力強化プロジェクト」の実施を決定した。

2.　協力内容

(1)　上位目標：

1) SSUWC ジュバ支所が管轄する水道サービスの質が改善する。
2) 南スーダン都市水道公社の水道事業管理能力が向上する。

(2)　プロジェクト目標：
運転・維持管理能力の改善を通して、南スーダン都市水道公社ジュバ支所の水道事業運営能力が強化される。

(3)　成果（アウトプット）：
1)　SSUWC ジュバ支所の取水・導水・浄水施設の運転・維持管理能力が向上する。
2)　SSUWC ジュバ支所の送配水施設の運転・維持管理能力が向上する。
3)　SSUWC ジュバ支所の水質管理能力が向上する。
4)　SSUWC ジュバ支所の財務状況に関する理解が向上する。
5)　SSUWC 本部の SSUWC ジュバ支所サポート能力が強化する。

(4)　投入（2010 年 10 月～終了時評価時点（日本人専門家はプロジェクト終了時時点））

日本側：　総投入額　2.75 億円[1]
- 日本人専門家：専門家 8 名（合計 74.20M/M）
- 本邦および第三国研修（ケニア）：合計 53 名
- 供与機材：0.22 億円
- 公共水栓と流量計室の建設：0.13 億円
- プロジェクト運営費：0.22 億円

南スーダン側：
- プロジェクト要員：合計 15 名
- プロジェクト施設：プロジェクト事務所とプロジェクト活動用の研修室
- プロジェクト運営費：218,230 南スーダン･ポンド（約 7,576,072 円）[2]

II.　終了時評価調査団の概要

調査者：

【総括】	今井　達也	JICA 地球環境部水資源第二課　課長
【水道経営】	大村　良樹	JICA 国際協力専門員
【協力企画】	影山　正	JICA 地球環境部水資源第二課
【評価分析】	渡部　美久	有限会社アイエムジー

調査期間：2013 年 5 月 20 日～2013 年 6 月 6 日　　**評価種類：**終了時評価

III.　調査結果の概要

3-1.　実績の確認

（1）　＜成果 1＞

成果 1 はおおむね達成されている。

- 職員は適切な運転維持管理方法を身に付けており、浄水施設から給水される水の水質（濁度、残留塩素）が向上している。
- 職員は日常的な浄水場の運転維持管理状況を記録し、そのデータをコンピュータでまとめて月報・年報を作成することができるようになった。また、年間運転維持管理計画が作成できるようになった。
- 適切な運転維持管理方法を身に付けた職員の数が 11 名に増加した。
- 電力の供給が停止されているため、目標とする浄水場の運転時間（23.5 時間/日）を達成することは難しい。

（2）　＜成果 2＞

成果 2 はおおむね達成されている。

- 職員は日常的な送配水施設の運転維持管理状況を記録し、そのデータをコンピュータでまとめ

[1] プロジェクトでの精算時のレート（USD1=100.60）に基づいて計算。
[2] 平成 25 年度精算レート表の 6 月時（SSP1＝34.716 円）に基づいて計算。

て月報・年報を作成することができるようになった。また、年間運転維持管理計画が作成できるようになった。

・ 適切な運転維持管理方法を身に付けた職員の数が 10 名に増加した。
・ 電力供給が停止されたことにより、ポンプ運転計画に基づいた運営を 2012 年内に開始することは難しかったが、自家発電の稼働時間に基づき、ポンプ運転計画を修正し、それに基づいて運営を行っている。

（3） ＜成果 3＞

成果 3 は達成されている。

・ 職員は日常的な水質検査結果を記録し、そのデータをコンピュータでまとめて月報・年報を作成することができるようになった。
・ 2 名の職員が水質試験を適切にできるようになった。

（4） ＜成果 4＞

成果 4 は達成されている。

・ 料金徴収報告書が毎月作成されるようになった。
・ ジュバ支所の料金徴収の改善に向けた提言がなされた。
・ 顧客台帳データベースが作られ、職員がそれを使って顧客情報の管理をできるようになった。
・ 公共水栓は個別の管理人への委託により運営されることが決定された。

（5） ＜成果 5＞

成果 5 は達成されている。

・ SSUWC 本部がジュバ支所の月報と年報を審査できるようになった。
・ ジュバ支所、ワウ支所、マラカル支所の水道施設と水道サービスに係る情報収集調査が実施された。

（6） ＜プロジェクト目標＞

プロジェクト目標は達成される見込みがある。

・ 浄水部、配水部、財務部、水質検査室で、運転維持管理や料金徴収の状況、水質検査の結果が日常的に記録されるようになり、各部署の活動状況や課題が明確に把握されるようになった。
・ 適切な運転維持管理を行なうことで、水質（濁度、残留塩素）が向上した。
・ 顧客台帳データベースによる料金徴収作業の効率化により、料金収入が増加した。
・ 浄水量や浄水場の稼働時間等、電力供給の状況に影響される業務指標については、電力供給が停止されている状況下で、プロジェクト終了時までに目標値を達成することは難しい。
・ しかしながら、その他の業務指標の改善状況を踏まえて、職員の運転維持管理は向上していると判断できる。

3-2. 調査結果の要約

（1） 妥当性

妥当性は高い。本プロジェクトは南スーダン国民のニーズ、南スーダン国政府の開発政策、我が国の対南スーダン国援助政策と整合性が取れている。実践的な指導と実用的な研修を中心とした能力強化のアプローチは、ジュバ支所の管理職職員と技術スタッフが知識と能力をすぐに日常業務に反映させることができるため、適切であったと評価できる。

（2）　有効性

有効性はやや高い。日本人専門家の実地研修及びケニアと日本での研修を通じて、ジュバ支所の各部署において水道事業運営能力が大幅に改善している。職員の英語力、コンピュータ能力、計算能力は限定的であり、阻害要因となったが、日本人専門家は能力向上のために図や絵の活用や、能力の高い職員を通じた他の職員への伝達等のアプローチを用いて、ジュバ支所職員の能力レベル向上をもたらした。その結果、電力供給の状況と発電機の燃料の入手状況に左右される業務指標（浄水場稼働時間やポンプ場稼働時間等）を除けば、全ての業務指標において、2011 年の値から改善が見られる。安定した電力供給なしでは、成果 1 の指標 1-4（浄水場の運転時間が約 17.9 時間/日（2011 年平均）から 22 時間/日に増加する）にて設定されている運転時間をプロジェクト終了までに達成することは難しいが、職員は習得した知識と能力により、計画的な上水道施設の運転ができるようになっている。5 つの成果はほぼ達成されており、プロジェクト終了までにプロジェクト目標が達成されることが期待できる。

（3）　効率性

効率性は中程度である。プロジェクトに大きな影響を与えた外部条件の大幅な変化（緊縮財政、電力供給の停止、人事異動）を受けつつも、プロジェクトは期待される成果の発現を促進させるために、ポンプ運転計画の修正、インセンティブ（賞等）の付与、週例会議でのC/Pと日本人専門家の活発な議論等、適切な対応を行い、実用的なアプローチを採用した。プロジェクトの初期段階では、南スーダン側の 研修参加率の低さと限定的な英語力がプロジェクトの効率性を低下させる原因となっていたが、日本人専門家が職員と一緒に辛抱強く作業をし、同じ内容の研修を何度も繰り返し実施し、基礎英語やパソコンの研修を提供した結果、日々のデータ収集や適切な運転・維持管理作業等、日常業務の具体的な改善が見られている。政府予算の削減と不十分な電力供給により、成果1の浄水場の運転時間が十分に確保できなかったこと（指標1-4）や成果2の2012年の内にポンプ運転計画に基づいた運営をすることが難しかったこと（指標2-4）に挙げられる通り、成果の発現に一部制約があったものの、期待される成果の発現のためにほとんどのプロジェクト活動と投入が計画通りに実施されており、プロジェクトの効率性は中程度と評価できる。

（4）　インパクト

本プロジェクトは、大きなインパクトを発現する可能性がある。1)給水サービスへの顧客満足度、2)主要な業務指標、3)SSUWC本部による支所の報告書と計画の審査（内容確認）能力、という上位目標の3つの指標の達成度から判断し、プロジェクト終了後3-5年での上位目標達成は期待できると判断できる。1)に関しては、2010年の22.4％から2013年には36.4％に増加した。2)に関しては、電力供給の状況と直接関連のある指標を除けば、全ての指標でプロジェクト開始時点より改善が見られている。3)については、SSUWC本部はジュバ支所から提出された月報と年次計画の審査を行っており、既に何度も審査工程を経てきており、他の支所からの報告書も同様に審査できるようになっている。プロジェクト期間中、浄水量が減少したにもかかわらず、水質の改善により顧客満足度は上昇している。2013年の料金収入の増加傾向を踏まえ、上水道施設の運転時間は増加する見込みであり、それにより、顧客満足度が一層高まると考えられる。日常的な上水道施設の点検、

データ管理、週例会議を通じたコミュニケーション、本部への月例報告と本部による審査は、ジュバ支所の通常業務として定着している。SSUWC本部とジュバ支所の職員が確固たるコミットメントを持って、適切な運転・維持管理活動と財務管理を継続していけば、プロジェクトは大きなインパクトを発現する可能性がある。

（5）　持続性

持続性は中程度である。

＜政策・制度面＞2007 年に制定された水政策を実施するためのガイドラインが策定され、都市給水サービスの向上が目標とされている。

＜組織面＞プロジェクト活動で明らかとなったニーズに対応するため、ジュバ支所では計画・プロジェクト部と顧客サービス部が新設された。また、全部署の代表者が活動や課題を報告する場として、週例会議が定着している。一方で、SSUWC 本部の中間管理職ポストや水質検査室等に適切な人員配置が必要である。

＜技術面＞全体的に職員の施設運転維持管理能力、水質検査能力、財務管理能力は、向上しており、継続した運転維持管理、記録管理、定期的な情報共有の基盤ができた。

＜財政面＞財政的独立に向けた基礎が確立した。プロジェクトでは、浄水量の増加と水質の改善により、2014 年 1 月までに 24 時間給水を達成できると予想しており、大口顧客から確実に料金徴収をする等、料金徴収の効率化により、料金収入は増加しつつある。

3-3　効果発現に貢献した要因

（1）　計画内容に関すること

- 5 つの成果分野の一つとして SSUWC 本部のジュバ支所へのサポート能力を強化したことで、上位目標で設定されている他の支所への支援・監督するための基盤が構築された。

（2）　実施プロセスに関すること

- プロジェクト期間中、週例会議が実施され、ジュバ支所の各部署の職員が集まり、それまでに実施された活動結果、課題と対策等が話し合われ、そこで職員の間で安全な水を供給することへの強いオーナーシップとコミットメントが醸成され、プロジェクト活動の円滑な実施に貢献した。
- 日本人専門家は、主要な職員や管理職員を中心に能力強化をし、これらの主要な職員が、英語力や計算能力が限られている各部署の職員に運転・維持管理方法を通訳・説明するという 2 段階の方法を採用し、職員同士で互いから学び、技術移転を行う動きが生まれ、有効性の発現に寄与した。

3-4　問題点及び問題を惹起した要因

（1）　計画内容に関すること

- 本プロジェクトの成果およびプロジェクト目標の指標には、安定的な電力供給が得られるとの前提の下で設定されている項目があったが、電力供給が断続的もしくは遮断されたために、達成できない指標（例、プロジェクト目標の業務指標 P1~P6、D1~D3）が見られた。プロジェクトでは、限られた電力供給の中で、料金徴収を効率化し、料金収入から発電機の燃料を捻出し、自家発電によって浄水場を運転することで対応をした。

(2)　実施プロセスに関すること

・ SSUWC ジュバ支所職員の英語力、コンピュータ能力、計算能力は日本人専門家が想定していた以上に限定的であったが、日本人専門家は能力向上のために運転・維持管理方法を示した張り紙やマニュアルに図や絵を使い、文字が読めない職員や教育を受けたことがない職員も含めた全ての職員にわかりやすい、簡潔な教材を作る等の適切なアプローチを用いて、ジュバ支所職員の能力レベル向上をもたらした。

3-5　結論

南スーダン国政府の開発政策、日本政府の援助政策、受益者のニーズを踏まえ、本プロジェクトの妥当性は高いと評価できる。本プロジェクト実施により、ジュバ支所の基本的な運転・維持管理と運営の能力が強化されており、有効性は比較的高いと判断できる。一方で、全職員の能力レベルを引き上げることが、上水道施設のより一層の運営効率化を図るために肝要である。プロジェクト期間の初期段階では SSUWC 職員の活動への参加が計画通りに得られなかったが、これまで全体的な投入が期待される成果の発現に概ね転換されているため、効率性は中程度であると評価できる。ジュバ支所職員が適切な運転・維持管理と運営管理を継続的に取り組むことで、本プロジェクトは大きなインパクトを発現する可能性がある。プロジェクトの持続性を向上させるためには、適切な資格を持った職員を水質検査室、本部、財務部に配置することと、運転・維持管理費を賄うために収入を増加させることが必要である。

本プロジェクトはSSUWCジュバ支所と本部の運営管理能力強化にあたり、着実な進展を遂げている。期待されるそれぞれの成果の達成度から判断し、プロジェクト終了時までにプロジェクト目標が達成されることが期待できると考えられるため、本プロジェクトは予定通り終了する。

3-6　提言

(1)　プロジェクトで導入された運転・維持管理手順やデータ管理方法の継続的な実施

本プロジェクト開始前のジュバ支所では、体系的な運転・維持管理、電子化された記録管理、適切かつ定期的な水質分析は行われていなかったが、現在ではこれらの運転・維持管理、記録管理、水質分析を適切に実施できるようになった。今後の水道施設の給水量増加を見据え、事業体の運営を一層強化するためには、各部署がプロジェクトで導入された運転・維持管理手順やデータ管理方法に基づいて担当業務を確実に実施する必要がある。

(2)　内部研修計画の検討

本プロジェクトを実施する中で、主要な職員が自発的に他の職員に技術移転を行う動きが始まっている。職員同士での技術移転は、講師と研修生の間に既に信頼関係があり、共通言語でコミュニケーションを図ることができ、講師が研修生の学習ニーズに効果的に対応することができるため、有効である。今後、職員全体の運転・維持管理と料金徴収活動の能力レベルの底上げを図るために、組織的な内部研修の計画について、本部とジュバ支所が検討を始めることが望まれる。

(3)　他の支所への支援

本プロジェクトでは、SSUWC本部がジュバ支所の提出した月報と年次計画に対して、体系的に審査（内容確認）と助言を行なう仕組みを構築した。SSUWC本部はジュバ支所から提出された報

告書を審査することができるようになったが、ジュバ以外の支所が月報や年次計画の作成・提出をできるようにするためには、本部は他の支所に対して適切な指導や働きかけが必要である。SSUWC本部はジュバ以外の支所に対して、運営支援をするための効果的な戦略を立てる必要がある。

(4)　料金徴収の増加

SSUWCの財務的持続性を確保するためには、料金徴収を増加するための継続的な活動が求められる。ジュバ支所の財務部は電子化された顧客台帳の導入により、料金徴収活動がこれまでよりも効率的に実施されているが、財務部の請求書を配布する職員の数を増やすことで、より一層料金収入を増やすことができる。財務部では支払いを容易にし、料金徴収率を上げるために、ジュバ市内に支払い窓口を設置したり、銀行振り込みを可能にする等の方法について検討を進めている。また、各戸接続や商業施設にメーターの設置を進めることで、適切な料金徴収がなされると考えられる。

(5)　適切な資格を持った職員の採用

組織的持続性を確保するためには、空席になっているポストに適切な資格を持った職員を採用することが肝要である。中間レビューの提言にあるように、SSUWC本部の課長職のポスト（技術課長、商務課長）と水質検査室職員は早急に配置される必要がある。また、請求書を配布する職員が増員されることで、料金収入の増加が見込まれる。ジュバ支所にエンジニアを採用することで浄水部と配水部の技術能力のさらなる向上が見込まれる。

3-7　教訓

(1)　復興国における能力開発の方法

スーダンの長引く内戦によりSSUWCを含む公共インフラや施設を激しく破壊された。SSUWC職員のほとんどは学校教育を受けておらず、識字や計算のできないものもいる。プロジェクトの有効性と効率性を達成するためには、プロジェクト期間の早い段階でC/Pの能力レベルと学習ニーズを判断し、ターゲット・グループに適したアプローチを取ることが重要である。本プロジェクトでは、職員が自分達の手で運転・維持管理が実施でき、月報が作成できるように、標準運転手順書、運転・維持管理マニュアル、月報のフォーマットが何度も改訂された。日本人専門家は読み書きの能力に関わらず全ての職員に分かりやすく、簡潔な資料を作成するため、運転・維持管理手順を図や表で表したポスターやマニュアルを作成した。また、日本人専門家は運転・維持管理の基本概念と適切な運転・維持管理方法、水質検査、料金徴収、データ管理を長い時間をかけて繰り返し教えた。C/Pの能力レベルを把握し、能力レベルに合わせたアプローチを使うことは、復興国での能力向上には不可欠である。

Summary of Terminal Evaluation

1. Outline of the Project	
Country: South Sudan	**Project Title:** The Project for Management Capacity Enhancement of South Sudan Urban Water Corporation (SSUWC)
Issue/Sector： Water Resources	**Cooperation Scheme：** Technical Cooperation
Division in Charge: Global Environment Department	**Total Cost (up to the end of May 2013) :** 275,039,000 yen
Period of Cooperation: October 2010 – September 2013 (3 years)	**Partner Country's Implementing Organization:** SSUWC Juba Station and Headquarters **Supporting Organization in Japan:**

1-1. Background of the Project

In Sudan, after more than two decades of conflict between the government and the Sudan People's Liberation Movement (SPLM), the Comprehensive Peace Agreement (CPA) was signed and the Southern Sudan established an interim government in January 2005. The population of Juba, the capital of the Southern Sudan, has been rapidly increasing with a bulk of internally/internationally displaced people (IDP) returning and is now estimated to be around 400,000. As little maintenance work has been conducted for urban infrastructures due to the conflict, many facilities have become old and the service provision function has significantly decreased.

The South Sudan Urban Water Corporation's (SSUWC) Juba Station (164 staff members) is responsible for operating and maintaining water supply facilities in Juba consisting of water treatment, transmission and distribution facilities and collecting water bills. The Juba Station, however, faced difficulties in distributing safe water in an efficient manner due to the absence of: the knowledge and skills for the proper operation and maintenance of water supply facilities; timely and appropriate measures for operation and maintenance; the inspection and verification process of supplied water quality; an up-to-date customer ledger; a management system for equal water distribution; and necessary maintenance materials and budget, coupled with the degraded facilities. The Juba Station did not generate enough revenue to cover all the necessary expenses for the operation of water supply facilities. A low flat-rate system has been employed without clear valuation of the water supply cost or a proper water tariff policy. The bill collection system with handwritten ledgers was considerably inefficient.

SSUWC Headquarters (HQ) (38 staff members) is responsible for securing and distributing the government budget to area stations, and providing guidance and supervision on technical issues of the area stations. However, HQ was not able to provide appropriate instructions or support to area stations due to the lack of a clear institutional framework for information collection on the status of area stations' facilities and activities as well as sufficient mutual consultation between HQ and area stations.

Under these circumstances, there was an imminent need for a technical cooperation project to enhance the SSUWC Juba Station's operation and maintenance capacity for water supply services. In response to the request from the Southern Sudanese side, a mission for detailed planning was carried out from February to March 2010 and the project outline was developed with MWRI being the executing organization and SSUWC HQ and the Juba Station being the target organizations. In July 2010, the Record of Discussions (R/D) was signed between the Ministry of Finance and Economic Planning (MFEP), which represents the Government of Southern Sudan (then) for the Project, and the Resident Representative of the JICA Sudan Office. According to the R/D, the Project is carried out for the period of three years from October 2010.

1-2. Project Overview

(1) Overall Goal of the Project:

1) The quality of the water supply service extended by SSUWC-Juba is improved.

2) The management capacity of SSUWC is improved.

(2) Project Purpose:

The management capacity of SSUWC -Juba Station is enhanced through capacity development on operation and maintenance of water supply facilities.

(3) Outputs

1) Capacity of SSUWC-Juba Station with respect to operation and maintenance of water intake and treatment facilities is improved.
2) Capacity of SSUWC-Juba Station with respect to operation and maintenance of water transmission and distribution facilities is improved.
3) Capacity of water quality management of SSUWC-Juba Station is improved.
4) Understanding of financial conditions of SSUWC-Juba Station is enhanced.
5) Capability of SSUWC HQ to support SSUWC-Juba Station is enhanced.

(4) Inputs (As of the Terminal Evaluation)

Japanese side:

- Japanese Experts: A total of 8 Experts (a total of 74.20 M/M)
- C/P Training in Japan and Kenya: A total of 53 C/Ps
- Equipment: USD 220,829
- Construction of Public Water Tap Stands and Flow Meter Chambers: USD 124,899
- Operational Expenses: JPY 22,066,702 (Approximately USD 219,351)

South Sudanese Side：

- C/Ps: A total of 15 personnel
- Facilities: a room for Japanese Experts and training venues for the Project activities
- Operational Expenses: SSP 218,230 (Approximately JPY 7,576,072)

2. Evaluation Team

Members of Evaluation Team (Japanese side)	[Leader]	Mr. Tatsuya Imai, JICA Global Environment Department
	[Water Supply Management]	Mr. Yoshiki Omura, JICA Visiting Senior Advisor
	[Evaluation Planning]	Mr. Tadashi Kageyama, JICA Global Environment Department
	[Evaluation Analysis]	Ms. Miku Watanabe, IMG Inc.
Evaluation Period	May 20 – June 6, 2013	**Type of Evaluation：** Terminal Evaluation

3. Results of Evaluation

3-1. Achievements of Outputs and the Project Purpose

(1) Output 1

Output 1 has been mostly achieved.

- The capacity of the purification department's staff in O&M of the water intake and water treatment plant (WTP) has been strengthened, and the water quality (i.e., turbidity, residual chlorine) has been improved.
- Staff have become able to use computer and produce monthly and annual reports from the daily monitoring records of the volume of treated water, chlorine consumption, and operation of generators.
- Eleven staff out of the 25 trained staff in the purification department have acquired basic O&M skills for WTP.
- It is deemed difficult to achieve the average plant operating hour of 23.5 hours per day (OVI 1-4) by the end of the Project period due to the suspension of the electric power supply from the city.

(2) Output 2

Output 2 has been mostly achieved.

- Staff of the distribution department have become able to compile data of their daily activities as monthly and annual reports using computer.
- Ten out of the 13 trained distribution department staff have acquired adequate O&M skills for the operation of transmission and distribution facilities.
- Treating and distributing water according to the initially-formulated Pump Operation Plan was difficult due to the unstable power supply. Staff of the distribution department calculated possible operation hours of electric generators, based on which they revised the Pump Operation Plan. Staff started the operation of the facilities based on the revised plan.

(3) Output 3

Output 3 has been achieved.

- Staff of the water testing lab have became able to develop monthly and annual reports compiling the results of daily water tests.
- Two lab staff have acquired skills to conduct water quality tests.

(4) Output 4

Output 4 has been achieved.

- Revenue collection reports are prepared monthly.
- Based on the analysis of the cost structure, recommendations on the improvement of revenue collection and water tariff have been put forth in the budget plan and the annual plan of the Juba Station.
- A customer ledger database was developed, and staff have acquired skills to use the database for compiling customers' information and issuing bills.
- Through the pilot operation, it was determined that the public taps and tanker filling stations be managed by individual operators.

(5) Output 5

Output 5 has been achieved.

- SSUWC HQ has become able to carry out the evaluation of monthly and annual reports submitted by the Juba Station.
- The Project conducted a study on the Wau and Malakal stations to collect information on their facilities and status of service delivery.

(6) Project Purpose

The prospect for achieving the Project Purpose by the end of the project period is promising.

- Staff of the purification department, the distribution department, the water testing lab, and the financial department regularly monitor the water supply facilities and properly keep records of the operation status, water quality, and financial status, which contribute to identifying issues to be addressed at each department.
- The quality of water from the station as well as sampling points in the city has been improved and fulfills the standards (target ratios) for turbidity and residual chlorine.
- The amount of delivered bills increased due to the enhanced operational efficiency achieved from the customer ledger database developed by the Project.
- As for the indicators that are dependent on the availability of power supply and accessibility to fuel, achieving target operation hours defined in the PDM by the end of the Project period is deemed difficult without stable power supply.
- The management capacity of the Juba Station, however, has considerably improved in each department.

3-2. Summary of Evaluation Results

(1) Relevance

The Relevance of the Project is evaluated as high. The improvement of water supply services through the capacity enhancement of SSUWC is in line with the needs of South Sudanese people, the Government of South Sudan's development policy, and the Japanese Government's aid policy to South Sudan. The capacity development approach through hands-on instruction and practical training proved to be appropriate since the department managers and technical staff of the Juba Station could immediately apply knowledge and skills to their daily tasks.

(2) Effectiveness

The Effectiveness is relatively high. The management capacity of the Juba Station has considerably improved in each department though OJT by the JICA Expert Team and training in Kenya and Japan. Although staff's limited

skills of English, computer and arithmetic could be hindering factors, the JICA Expert Team adopted appropriate approaches for capacity development and succeeded in raising the skill level of the Juba Station's staff. As a result, except for the Performance Indicators (PIs) that are determined by the situations of power supply and accessibility to fuel (e.g. plant operating hour and pumping station operating hour), all the PIs have improved from the values in 2011. While achieving target operation hours defined in the PDM by the end of the Project period is deemed difficult without stable power supply, staff have become able to operate water supply facilities according to the plans using acquired knowledge and skills. The five Outputs have almost been achieved, and the prospect of achieving the Project Purpose by the end of the project period is promising.

(3) Efficiency

The Efficiency of the Project is evaluated as moderate. In consideration of the drastic changes in external conditions (i.e. fiscal austerity, interruption of the power supply, and transfer of personnel) that have significantly affected the Project, the Project has taken appropriate measures and practical approaches, including the revision of the Pump Operation Plan, the provision of incentives (e.g. award) and active discussions among C/Ps and the JICA Expert Team at weekly meetings, in order to facilitate the successful production of intended Outputs. While the South Sudanese staff's low attendance in the training and limited English skills reduced the efficiency of the Project at the initial stage of the Project, the JICA Expert Team patiently worked with staff, offered training in the same contents multiple times, and provided classes on basic English and computer literacy. As a result, the tangible improvements in daily practices have been observed including daily data collection and proper O&M procedures. Most Project activities have been conducted and inputs have been procured as planned to produce the intended Outputs although there have been some constraints in the production of Outputs (e.g., achieving the average plant operating hour of 22 hours per day as in OVI 1-4, operating distribution facilities based on the Pump Operation Plan as in OVI 2-4) caused by such issues as the decrease in the government budget and the insufficient power supply.

(4) Impact

As for the Impact of the Project, the prospect for achieving the Overall Goals within three to five years after the project completion is assessed as promising, judging from the achievement level of three OVIs: (1) the customer satisfaction rate on the water supply service; (2) essential PIs, and (3) SSUWC HQ's capacity in assessing area stations' reports and plans. Despite the decrease in the water production volume, the customer satisfaction has improved due to the improvement in water quality. Given the increasing trend of income from water bills in 2013, the operation hours of water supply facilities is likely to increase, which will lead to a further improvement in the customer satisfaction. The entire system of regular monitoring of water supply facilities, data management, communication through weekly meetings, and monthly reporting to and assessment by SSUWC HQ has become routine activities of the Juba Station. If all the staff of SSUWC HQ and the Juba Station fulfill their commitment and carry on with proper O&M activities and financial management, the Project will generate a large scale of impacts.

(5) Sustainability

The Sustainability is evaluated to be moderate.

<Institutional aspects>

In 2011, the ROSS adopted "Water, Sanitation and Hygiene (WASH) Sector Strategic Framework," which aims at the improvement of urban water supply services, as a guideline to realize the National Water Policy (2007).

<Organizational aspects>

As a result of needs identified through Project activities, the Juba Station established the department of planning and projects and is planning to set up the customer service department. Weekly meetings are being held involving all the departments of the Juba Station, which contributes in developing the ownership of staff of SSUWC Juba Station and HQ. It is essential to appoint eligible personnel to the opening positions in SSUWC HQ and Juba Station.

<Technical aspects>

Staff's capacity in operation and maintenance of water supply facilities, water quality testing, and financial management have been increased. The Project has built a sound technical foundation for continuous O&M, proper record keeping and regular information sharing.

<Financial aspects>

The Project has contributed to the establishing of a base for achieving SSUWC's financial independence. The Juba Station is committed to increase bill collection through the introduction of the efficient billing system and the new water tariff in order to achieve the operation of 24 hours by January 2014. The monthly revenue steadily

increased as a result of the efficient billing system introduced by the Project.

3-3. Contributing Factors

(1) Project Design

- Including the enhancement of the SSUWC-HQ's capacity to support the Juba station as an output of the Project contributed to building the foundations of HQ's providing support and supervision to other stations.

(2) Implementation Process

- C/Ps and the JICA Expert Team held weekly meetings to share and discuss the results of completed activities, outstanding issues and the countermeasures that should be taken by the SSUWC Juba Station and HQ, through which C/Ps' strong owndership of and commitment to supplying safe water have been developed. Weekly meetings contributed to the smooth implementation of the Project activities.
- The JICA Expert Team first trained managers and core staff to be department-level trainers so that they could translate the Experts' lectures and transfer the proper O&M methodologies to the staff whose English proficiency and basic arithmetic skills are limited. From this internal training approach, staff started to learn from each other and strengthen their capacity, which contributed to the effectiveness of the Project.

3-4. Hindering Factors

(1) Project Design

- Since some of the indicators of the Outputs and the Project Purpose were determined based on the assumption that WTP would receive a stable power supply from the city, there are indicators (e.g., P1-P6, D1-D3 of the performance indicators of the Project Purpose) that could not be achieved due to the suspension of the power supply. The Project operated the WTP using its own power generated by fuels purchased from collected water bills. The Juba Station has been working on applying the strategy for efficient billing to increase the bill collection.

(2) Implementation Process

- Although staff's limited skills of English, computer and arithmetic could be hindering factors, the JICA Expert Team adopted appropriate approaches for capacity development and succeeded in raising the skill level of the Juba Station's staff. The JICA Expert Team used figures and pictures in the posters and manuals illustrating operation procedures in order to make these materials simple and understandable for all the staff including the illiterate and the uneducated.

3-5. Conclusion

The Project has high relevance assessed from the ROSS's development policies, Japanese Government's aid policies, and the needs of the beneficiaries. The effectiveness of the Project is evaluated as relatively high because the Project has succeeded in building the basic O&M and managing capacity of the Juba Station; however, raising the skill level of all the staff is indispensable for further achievement of operational efficiency of the water supply facilities. The efficiency of the Project is evaluated as moderate since most inputs have been successfully converted to the expected Outputs in spite of the staff's low participation in the Project activities in the initial stage of the Project. The Project has good potential to generate a large scale of impacts if staff continues their effort in conducting proper O&M and financial management of the Juba Station. In order to enhance the sustainability of the Project, more efforts are required for appointing eligible staff in the laboratory, SSUWC HQ, and the financial department, and increasing revenue to cover O&M costs.

The Project has made a significant progress in developing the management capacity for the SSUWC Juba Station and HQ. Judging from the achievement level of each expected Output, the Project Purpose is expected to be achieved by the end of the Project period; therefore, the Project will be terminated as scheduled.

3-6. Recommendations

a. Ensuring the implementation of assigned tasks in accordance with the established procedures and data management system in each department

Before the Project implementation, there were no structured O&M procedures, digital record-keeping and data management system, or regular water quality analysis, all of which have been established by the Project. In order to further enhance the management capacity of the Juba Station for the expected increase of operation hours and water production, it is recommended that staff in the SSUWC Juba Station thoroughly conduct the newly-established O&M, water tests, and billing procedures in accordance with the O&M manual and data

management system developed by the Project.

b. Planning a structured internal training system

During the course of Project activities, core staff and C/Ps voluntarily started providing informal training for staff in each department. Peer training is effective since trainers can effectively respond to the trainees' learning needs using the already-established rapport and the shared language. Since raising staff's overall technical capacity is still necessary for further enhancing the skill level of O&M and bill-collection activities, it is recommended that the SSUWC HQ and the Juba Station start the planning of a structured internal training system.

c. Extending support to area stations

The Project laid out the SSUWC HQ's procedure in providing support to area stations through evaluating the Juba Station's monthly reports and upcoming plans and giving feedback in a systematic way. Although SSUWC HQ is capable of assessing reports submitted by the Juba Station, other area stations need proper guidance and attention to prepare and submit reports to SSUWC HQ. It is recommended that SSUWC HQ develop effective strategies to extend support to area stations outside Juba City.

d. Increasing bill collection

Continuous efforts in increasing bill collection are recommended in order to enhance SSUWC's financial sustainability under the ROSS's uncertain fiscal prospect. While the financial department of the Juba Station is carrying out the billing activities more efficiently than before through the digital customer ledger, a larger number of staff who deliver the bills would increase the income from water bills. The financial department has made efforts to introduce the methods that make customers' payments easier (e.g. payment through a direct deposit into the Juba Station's bank account, payment kiosks throughout the city). Installing meters for house connections and businesses will increase bill collection.

e. Recruiting qualified staff

Recruiting qualified staff in vacant positions is indispensable in enhancing the organizational sustainability. As recommended in the Mid-Term Review, directors' positions (i.e. technical director and commercial director) in SSUWC HQ and staff of the laboratory need to be filled as soon as possible. In addition, increasing staff for delivering bills will be of great help in increasing water bill collection. Appointment of engineers in the Juba Station would further increase the technical capacity of the purification and distribution departments.

3-7. Lessons Learned

a. **Methods of capacity development in a post-conflict country**

A prolonged civil war in Sudan severely devastated public infrastructures and institutions including SSUWC. Most of the staff are undereducated while some are even illiterate or innumerate. In order to achieve the efficiency and effectiveness of the Project, it is important to assess the level of capacity and learning needs of C/Ps in the early stage of the Project period and take approaches suitable for the target groups. In the Project, the SOP, O&M manuals, and format of monthly reports have been revised multiple times so that staff can conduct O&M and prepare monthly reports on their own. The JICA Expert Team developed posters and manuals using figures and pictures illustrating operation procedures in order to make these materials simple and understandable for all the staff regardless of their reading ability. The JICA Expert Team spent a long time for teaching basic concepts of O&M as well as proper O&M methodologies, water test, billing and data management. Identifying the C/Ps' level of capacity and taking appropriate approach for their skill levels are essential for capacity development in a post-conflict country.

目　　次

第1章　終了時評価調査の概要

1-1　終了時評価の背景と目的

1-1-1　終了時評価の背景

南スーダン都市水道公社水道事業管理能力強化プロジェクト（以下、「プロジェクト」）は日本国政府（独立行政法人国際協力機構「JICA」）と南スーダン政府（水資源・灌漑省「MWRI」）の間での 2 国間技術協力プロジェクトである。プロジェクト期間は 3 年で、2010 年 10 月に開始された。2013 年 9 月にプロジェクト終了を控え、2010 年 7 月 8 日に両国側に署名された討議議事録に基づいて、両国側の代表者からなる合同終了時評価調査団（以下、「調査団」）により終了時評価が実施された。

1-1-2　終了時評価の目的

終了時評価調査の目的は、以下の通りである。

(1) プロジェクト･デザイン･マトリックス（PDM）バージョン 3（「協議議事録（Minutes of Meeting、以下、M/M）ANNEX 7」を参照）に基づいて、投入と成果の達成度、プロジェクト期間終了までのプロジェクト目標達成見込みとプロジェクト終了後 3-5 年での上位目標達成見込みを確認する。
(2) プロジェクト活動実施における貢献要因と阻害要因を検証する。
(3) 評価 5 項目（妥当性、有効性、効率性、インパクト、持続性）の視点から総合的な評価を実施する（2-1「終了時評価の概要と評価項目」を参照）。
(4) プロジェクトの更なる改善に向けた提言を導出し、同様の JICA プロジェクトで参考となる教訓を得る。
(5) プロジェクトの方向性を協議・合意し、協議の結果に基づいて、終了時評価調査報告書を作成する。

1-2　終了時評価調査団員と調査日程

1-2-1　終了時評価調査団員

（1） 日本側

氏名	担当	組織・役職
今井達也	総括	JICA 地球環境部水資源第二課課長
大村良樹	水道経営	JICA 国際協力専門員
影山　正	協力企画	JICA 地球環境部水資源第二課
渡部美久	評価分析	有限会社アイエムジー

（2） 南スーダン側

氏名	組織・役職
Mr. Simon Koak	SSUWC 本部オフィス・マネージャー
Mr. Santurino Tongun	SSUWC 本部顧客サービス部長
Mr. Peter Tuburo	SSUWC ジュバ支所計画・プロジェクト部長

1-2-2　終了時評価調査日程

終了時評価調査は 2013 年 5 月 20 日から 6 月 6 日まで実施された（付属資料 1 及び「M/M Annex 1」を参照）。

1-3　プロジェクトの概要

1-3-1　プロジェクトの背景

スーダン共和国では、20 年以上に渡り政府とスーダン人民解放運動との間で内戦が続き、2005 年 1 月の南北包括的和平合意（Comprehensive Peace Agreement: CPA）の締結の後、南部スーダンは暫定政府を樹立した。その後、首都となったジュバでは、国内外からの帰還民により人口が急増し、現在の人口は 40 万人程度と推計されている。都市インフラについては、内戦の影響で維持管理がほとんど行われていない上に、多くの施設が既に老朽化しており、住民へのサービス提供機能が著しく低下している。

水資源・灌漑省（MWRI）傘下の南スーダン都市水道公社（SSUWC）ジュバ支所（職員 164 名）が、ジュバの浄水場および送配水施設からなる水道施設の運転・維持管理、料金徴収等を行なっている[3]。しかしながら、ジュバ支所では、設備の老朽化に加えて、上水道施設の運転・維持管理にかかる職員の知識・技術不足、水質検査・確認体制の欠如、更新された顧客台帳の欠如、均等配水管理システムの欠如、必要な維持管理資機材や予算の不足により、計画的かつ効率的な配水が困難な状態になっている。加えて、上水道施設の運営に必要な支出を賄うために十分な料金収入を得られていない状態である[4]。明確な財務状況の査定や適切な水道料金政策なしに、安価な定額制料金体系が採用されており、手書きの顧客台帳により料金徴収を管理する体制は非常に非効率的である。

SSUWC 本部（職員 38 名）は、こうした各支所が抱える技術的な問題の対処に関する指揮監督を行なうと共に、支所の運営に必要な予算を確保・措置する立場にあるが、実態を把握する制度上の枠組みや双方の十分な情報交換がない中で、適切な支援を行なうことが出来ない状態となっている。

このような状況から、南部スーダン政府（当時）より日本政府に対し、ジュバの給水事業改善に向けて、SSUWC ジュバ支所の水道事業運営管理能力の強化を目的とした技術協力プロジェクトが要請された。この要請に基づき、2010 年 2-3 月に詳細計画策定調査団が派遣され、水資源・灌漑省を監督機関とし、SSUWC 本部とジュバ支所をターゲット･グループとするプロジェクト骨子が作成された。これを受けて、2010 年 7 月南部スーダン政府（当時）を代表した水資源・灌漑省と JICA スーダン事務所が討議議事録に署名をし、日本政府が「都市水道公社水道事業管理能力強化プロジェクト」の実施を決定した。

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[3] 2011 年 7 月に南部スーダン（Southern Sudan）はスーダン共和国から分離独立し南スーダン共和国（South Sudan）となった。本報告書では国名を「南スーダン」と表記する。なお、プロジェクト開始当時（2010 年）の実施機関名は「南部スーダン都市水道公社」であったが、独立後は「南スーダン都市水道公社」に変更している。

[4] 南スーダン国政府は SSUWC に対し、給料・手当、化学薬品（現物）、発電機用の燃料（現物）を支給している。2012 年 7 月以降、緊縮財政による予算縮小により、政府は現物支給を停止し、給与支出を半額にしている。代わりに、SSUWC が料金収入の 8 割を納めていた上納金は、2012 年 7 月に料金収入の 2 割になり、2013 年 4 月には一時的に廃止となっている。プロジェクト報告書によると、ジュバ支所の料金収入は、2011/12 財政年では、86,369 南スーダン・ポンド（SSP）（約 285,000 円）だった。収入は少ないが、現在 SSUWC は自己資金によって上水道施設を運営している。

1-3-2　プロジェクトの要約

上位目標	1) SSUWC ジュバ支所が管轄する水道サービスの質が改善する。 2) 南スーダン都市水道公社の水道事業管理能力が向上する。
プロジェクト目標	運転・維持管理能力の改善を通して、南スーダン都市水道公社ジュバ支所の水道事業運営能力が強化される。
成果	1) SSUWC ジュバ支所の取水・導水・浄水施設の運転・維持管理能力が向上する。 2) SSUWC ジュバ支所の送配水施設の運転・維持管理能力が向上する。 3) SSUWC ジュバ支所の水質管理能力が向上する。 4) SSUWC ジュバ支所の財務状況に関する理解が向上する。 5) SSUWC 本部の SSUWC ジュバ支所サポート能力が強化する。
実施期間	2010 年 10 月－2013 年 9 月（3 年間）
実施機関	SSUWC ジュバ支所 SSUWC 本部

第2章　終了時評価調査の方法

2-1　終了時評価の概要と評価項目

本終了時評価調査は「新 JICA 事業評価ガイドライン　第 1 版」に基づき、プロジェクト・サイクル・マネジメント（Project Cycle Management：PCM）手法で用いられるプロジェクト・デザイン・マトリックス（Project Design Matrix：PDM）を活用して、プロジェクトの実績（投入の実績、活動の実績、成果の達成度、プロジェクト目標・上位目標の達成度・見込み）と実施プロセスを整理、確認するとともに、評価 5 項目（妥当性、有効性、効率性、インパクト、持続性）の観点から評価を行った。

評価 5 項目の主な視点は次の通りである。

1) **妥当性:**　プロジェクト目標や上位目標が南スーダン国の政策や我が国の援助政策との整合性が取れているか、ターゲット・グループのニーズと合致しているかなど、プロジェクトの正当性・必要性を検証、判断する。

2) **有効性:**　プロジェクト目標が計画通り達成されるか、プロジェクト目標の達成が成果の達成によって引き起こされるものか等により、プロジェクトの実施によってターゲット・グループに便益がどのようにもたらされているかを検証し、判断する。

3) **効率性:**　プロジェクトが効果的に投入資源を活用したかという観点から、投入実績と成果達成の状況を踏まえて、投入（インプット）がどのように効率的に成果（アウトプット）に転換されたかを検証・評価する。

4) **インパクト:**　上位目標達成の見込みとプロジェクト実施によりもたらされる長期的・間接的な効果や波及効果の有無を検証し、判断する。

5) **持続性:**　政策・制度面、組織面、財務面、技術面の観点から、プロジェクト終了後、プロジェクトで発現した効果がどのように定着・持続するかについて、検証・評価する。

2-2　終了時評価の手順と方法

本終了時評価では準備作業として本プロジェクトに関する既存資料をレビューした上で、評価 5 項目に係わる詳細な評価設問と評価指標・データ収集方法等を記述した評価グリッド案を作成した。その上で、2012 年 2 月に改訂された最新の PDM（PDM_3）に示されている指標を評価指標として活用して、情報･データの収集と分析を行った。（評価設問については、M/M Annex 4「Evaluation Grid（Results of the Evaluation）」を、評価用 PDM については M/M Annex 7「PDM version 3」を参照）

より具体的には、以下の手順で本プロジェクトに関する情報・データの収集・分析を実施した。

（1）資料レビュー

主な資料として以下のものを活用した。

- 詳細計画調査報告書（2010 年 7 月）、事業事前評価表（2010 年 4 月）、討議議事録（Record of Discussions（R/D）、2010 年 7 月 8 日）、中間レビュー報告書（2012 年 2 月）等の JICA 資料

- PDM、活動計画（Plan of Operations：PO）等、プロジェクト基礎資料
- 委託先コンサルタントの業務完了報告書（各年次、和文・英文）及びプログレス・レポート（各年次、和文）
- 専門家派遣実績データ、研修実績、供与機材リスト、本邦研修参加者リスト、カウンターパート（以下、C/P）リスト等のプロジェクト作成資料

(2) 質問票調査

評価グリッドの評価設問に基づいて、日本人専門家向け、C/P 向けの 2 種類の質問票を作成し、事前に配布した上で回収・分析した。

(3) 面接調査

評価グリッドの評価設問に基づいて、質問票への回答結果を基礎情報として、本プロジェクトの活動、管理・運営状況、C/P への技術移転状況、本プロジェクトに係わる上水道セクターの制度や組織の現状について、日本人専門家、水資源・灌漑省（MWRI）、SSUWC ジュバ支所の各 C/P、その他プロジェクト関係者に対して、個別またはグループによる面接調査を行い、追加情報の収集と分析を行った（面談者のリストは M/M Annex 2 「List of Interviewees」を参照）。

(4) 現地踏査

プロジェクトの現状と成果の達成状況を現地において把握・確認するため、本プロジェクトが対象としている SSUWC ジュバ支所と本部を訪問・視察し、上記の面接調査を行うとともに、SSUWC の運営管理状況や本プロジェクトによる技術移転状況について確認した。

第3章　プロジェクトの実績と実施プロセス

3-1　プロジェクトの実績

3-1-1　投入

（1） 日本側

日本側はプロジェクトに対し、以下の投入を行なった（詳細は M/M Annex 3-1 「Inputs by the Japanese Side」を参照）。

1） 日本人専門家（M/M Annex 3-1-1 「Assignment of Experts」を参照）

プロジェクト開始からプロジェクト終了時までに合計 8 名の専門家（合計 74.20M/M）が派遣された。下記の表に専門家の数、専門分野、派遣期間を示す。

表 3-1　日本人専門家の派遣分野と期間

派遣分野	人数	派遣期間（M/M）
チーフアドバイザー/水道事業運営	1	12.90
浄水場/ポンプ設備維持管理(1)	1	9.84
ポンプ設備維持管理(2)	1	1.00
送配水施設維持管理	1	12.53
水質管理	1	9.47
財務分析/水道料金	1	9.60
コミュニティ開発(1)	1	7.60
業務調整/コミュニティ開発(2)	1	11.26
合計	**8**	**74.20**

2） 本邦研修と第三国研修（M/M Annex 3-1-2 「Training in Japan and the Third Country」を参照）

日本側は MWRI、SSUWC 本部、ジュバ支所、ワウ支所、マラカル支所の合計 53 名の職員に対し、海外研修（本邦研修 6 名、ケニア研修 47 名）を実施した。

3） 供与機材（M/M Annex 3-1-3 「Provision of Equipment and Materials」を参照）

プロジェクト開始以来、施設運転・維持管理に必要な機材（例、水質検査キット、塩素注入器、流量計）、バイク、事務機器・用品（例、コピー機、コンピュータ、プリンター）、その他プロジェクトの実施に必要な機材や機械類が合計 220,829 米ドル（USD）分投入された。

4） 公共水栓と流量計室の建設

日本側は公共水栓 3 ヵ所と流量計室 11 ヵ所（合計 USD124,899）を建設した（下表 2 参照）。

表 3-2　公共水栓と流量計室の建設

品目	数量	価格 (USD)
公共水栓	3	75,530
流量計室	8	19,643
流量計室	3	11,944
フェンス	7	17,782
合計	**21**	**124,899**

5）日本側運営費　（M/M Annex 3-1-4 「Operational Expenses by Japanese Side」を参照）

プロジェクト開始以来 2013 年 6 月までに JICA より合計 22,066,702 円（約 USD219,351）[5]のプロジェクト運営費が投入された。

（2）南スーダン側

南スーダン側はプロジェクトに対し、以下の投入を実施した。（詳細は M/M Annex 3-2 「Inputs by the South Sudanese Side」を参照）

1）プロジェクト要員（C/P）（M/M Annex 3-2-1 「Assignment of C/P Personnel」を参照）

南スーダン側は、議長（1 名）、プロジェクト・ディレクター（1 名）、プロジェクト・マネージャー（1 名）、12 名の SSUWC 職員（本部、ジュバ支所）を C/P として配置した。

2）プロジェクト施設

南スーダン側より日本人専門家用のプロジェクト事務所とプロジェクト活動用の研修スペースが提供された。

3）南スーダン側運営費（M/M Annex 3-2-2 「Operational Expenses by South Sudanese Side」を参照）

南スーダン側はプロジェクト運営費として 218,230 南スーダン・ポンド（SSP）（約 7,576,072 円）[6]を負担した。

3-1-2　成果の達成状況

5 つの成果（アウトプット）に係る各指標の達成度は、終了時評価時点で次の通りである。

（1）成果 1 の達成状況

成果 1: SSUWC ジュバ支所の取水・導水・浄水施設の運転・維持管理能力が向上する。
指標 1-1　浄水場運転・維持管理データが集計された月報及び年報 1-2　浄水場に係る年間運転・維持管理計画書 1-3　浄水場の適切な運転・維持管理方法を身に付けた職員が 0 人から 11 人となる。 1-4　浄水場の運転時間が約 17.9 時間/日（2011 年平均）から 23.5 時間/日に増加する。

[5] プロジェクトでの精算時のレート（USD1=100.60）に基づいて計算。
[6] 平成 25 年度精算レート表の 6 月時（SSP1＝34.716 円）に基づいて計算。

1-5　浄水の濁度が 5NTU 以下になる割合が 90%から 100%に改善する。 1-6　浄水の残留塩素濃度が 1.5mg/l～2.0mg/l 内に入る割合が約 10%から 80%に改善する。

以下の達成状況から判断して、成果 1 は指標 1-4 を除き、ほぼ達成された。

浄水部職員の取水・浄水施設の運転・維持管理能力は、プロジェクト期間中に日本人専門家によって実施された一連の研修とケニアでの第三国研修によって強化された（M/M Annex 3-1-3「Training in Japan and the Third Country」及び M/M Annex 5 「Training in South Sudan」を参照）。プロジェクト内で実施されたテストの結果によると、浄水部の 25 名の職員のうち、11 名の職員が浄水場の適切な運転・維持管理方法を身に付けており、指標 1-3 は達成された（指標 1-3）。

日本人専門家の技術指導により、浄水部職員は取水ポンプ・システムと浄水場の運転状況を把握するためのベースライン調査を実施し、毎日の運転・維持管理情報を記録し、運転・維持管理計画を作成した。職員が日本人専門家の支援無しでも適切な運転･維持管理を実施できるように、C/P の協力の下、日本人専門家は運転・維持管理マニュアルと標準運転手順書を作成した（M/M Annex 6 「List of Reports, Manuals, Database and Training Materials」を参照）。職員は適切な塩素注入量や正しい逆洗の方法等、適切な運転･維持管理方法を習得し、それにより、水質が改善した。浄水の濁度（5NTU 以下になる割合）は 2011 年平均で 79%だったものの、今では常に 5NTU 以下を維持できるようになった（指標 1-5）。浄水の残留塩素濃度が 1.5mg/l～2.0mg/l 内に入る割合は 2011 年月平均の 31%から、2013 年 4 月には 91%までに改善した（指標 1-6）。

職員はパソコンを使い、浄水量、塩素消費量、発電機の運転時間等、毎日の維持管理記録をまとめた月報を作成できるようになった（指標 1-1）。職員の元々の運転・維持管理の能力を考えると、これは非常に大きな成果である。浄水部職員は毎日の維持管理の重要さを十分に理解しており､徹底した点検や施設の清掃が日常的な業務として定着している｡日本人専門家の支援により、主要な C/P は 2011 年と 2012 年に水質、給水、ポンプ運転に係る業務目標、課題と対策を含む、年次計画を作成しており、指標 1-2 は達成されたと判断できる（指標 1-2）。職員は自分達だけで簡単な計算をし、フォームを埋める方式で、月報を作成することができるようになった一方で、分析や計画能力は今後より一層向上される必要がある。

浄水場の運転時間（指標 1-4）については、SSUWC が料金収入から発電機の燃料を購入し、自家発電によって浄水場を運転しているという状況下では、プロジェクト終了時までに目標とする 1 日当たり 23.5 時間を達成することは難しい。目標である浄水場の運転時間（1 日当たり 23.5 時間、指標 1-4）は、浄水場がジュバ市から安定した電力供給が受けられるとの前提の下で 2011 年のベースライン調査時に設定された。2012 年 1 月には発電所から直接電線が引かれたものの、電力供給は断続的で、2013 年 1 月には電力供給が完全に遮断されている。終了時評価時点での浄水場の平均運転時間は 1 日当たり 13.7 時間であるが、効率的な料金徴収、新しい料金設定、水質の改善に伴う 2013 年の料金収入増加によって､外部からの電力供給なしでも運転時間が増加することが見込まれる（詳細は(4)「成果 4 の達成状況」を参照）。

(2) 成果 2 の達成状況

成果 2: SSUWC ジュバ支所の送配水施設の運転・維持管理能力が向上する。
指標 2-1 送配水施設の運転・維持管理データが集計された月報及び年報 2-2 送配水施設の運転・維持管理に係る年間運転・維持管理計画書 2-3 送配水施設の適切な運転・維持管理を身に付けた職員が 0 人から 10 人となる。 2-4 プロジェクトによって策定されたポンプ運転計画に基づいた運営が、2012 年の内に開始される。

指標の達成状況から判断して、成果 2 は電力供給の停止による影響から指標 2-4 に係る活動で遅れが出たものの、ほぼ達成した。

日本人専門家の指導の下で実施された調査活動によって、配水管網、送配水施設の運転状況、送水量等、送配水の状況についての配水部職員の理解が深まった。給水サービスと既存の送配水施設の調査に基づいて、ポンプ運転計画が 2012 年に作成された（指標 2-4）が、不安定な電力供給により、計画通りに浄水、配水することは困難であった。また、2013 年 1 月以降、発電所からの電力が完全に停止しているため、配水部職員は現時点での料金収入に基づいて、可能な発電機の運転時間を計算し、ポンプ運転計画を修正し、それに基づいて、運営を開始している。

ジュバ支所の職員は、プロジェクト開始までパソコンを使ってデータ管理や報告書の作成をしたことがなかった。日本人専門家はパソコン操作についての実践的な研修を行い、職員は自分達でデータを整理し、パソコンを使って月報と年報を作成できるようになった（指標 2-1）。月報と年報には、送配水施設の運転に係る情報として、送水量、漏水箇所と修理件数、パイプの設置と交換の件数等のデータが含まれている。日本人専門家は送配水施設の適切な運転や維持管理に係る実用的な研修を行い、漏水箇所の特定や新設された配水管網を記録するために全地球測位システム（Global Positioning System : GPS）と地理情報システム（Geographic Information System : GIS）が導入された。プロジェクトで実施された筆記と口答試験の結果によると、配水部の 13 人の職員のうち 10 人が送配水施設の適切な運転・維持管理能力を身に付けた（指標 2-3）。

日本人専門家の支援により、配水部職員は 2011 年と 2012 年に送水量や漏水箇所の修理状況等の業務指標、課題と対策、必要な資材を含む、年次運転・維持管理計画を作成しており、指標 2-2 は達成されたと判断できる（指標 2-2）。一方で、適切な運転・維持管理に必要な資材を購入するための予算不足により、漏水件数に対する修理件数は十分ではない。今後、配水管網の適切な維持管理を実施できるように、料金収入増加のための取り組みを継続することが望まれる。

(3) 成果 3 の達成状況

成果 3: SSUWC ジュバ支所の水質管理能力が向上する。
指標 3-1 水質試験結果が集計された水質報告書（月報・年報） 3-2 水質試験が適切にできる職員が 0 人から 2 人になる。

指標の達成状況から判断して、成果 3 は達成した。成果 3 に係る研修は全てほぼ計画通りに実

施されたものの、水質検査室職員が単位の概念や基本的な計算等、水質試験の基礎を理解するには予定以上に時間を要した。日本人専門家による継続的な実地訓練と繰り返しの水質試験により、2 名の水質検査室職員が水質試験を適切にできるようになった（指標 3-2）。

水質検査室職員は浄水場からは毎日、ポンプ場と高架水槽からは週ごとに、公共水栓と給水車への給水所からは月ごとに採水を行い、濁度、残留塩素、pH、伝導率、溶解性蒸発残留物（Total Disolved Solid : TDS）、色の水質検査を行なっている。基礎的なパソコン研修とデータ・フォーマット作成により、これらの職員は、水質検査の結果をまとめ、水質報告書を作成することができるようになった（指標 3-1）。

現時点での水質検査室の検査能力（人員、設備）は限定的であるため、現在の職員に対して、微生物等を含む、より多くの検査項目の研修を行うことは難しい。より幅広い項目の水質検査を実施するためには、適切な専門性を持った職員の配置と設備の整備を行うことが先決である。

(4) 成果 4 の達成状況

成果 4: SSUWC ジュバ支所の財務状況に関する理解が向上する。
指標 4-1 料金徴収報告書が毎月作成される。 4-2 料金徴収の改善に向けた提言がなされる。 4-3 共同水栓運営形態が確立される。

指標の達成度から判断し、成果 4 は達成された。財務部職員の協力により、日本人専門家はジュバ支所の料金収入の現状を調査した。費用構成に係る分析に基づいて、料金徴収の改善に向けた提言がなされ、ジュバ支所の予算計画と年次計画にまとめられた（指標 4-2）。この提言を元に、SSUWC で水道料金の改訂が検討された。今後のジュバ支所の財務的自立に向け、日本人専門家は料金設定や既存施設の費用回収の概念の研修を行った[7]。

財務部職員との協働により、日本人専門家は顧客台帳データベースを作成した。これにより、顧客情報の管理や請求書の作成が容易になり、料金徴収の効率化が図られた。財務部職員はケニアでの研修に参加し、各戸メーター接続・管理や顧客サービスについての知識を得た。日本人専門家は顧客台帳管理の研修に加え、基礎的なパソコンの使い方の研修も行った。一連の研修活動の結果、職員はデータベースから情報を取りまとめ、自分達の手で月報を作成することができるようになり、その作業は日常業務として定着している（指標 4-1）。一方で、効率的な料金徴収を阻む課題として、以下の 4 点が挙げられる。(1)請求書配達員の人数が不十分である、(2)浄水場から給水を受けているにもかかわらず、顧客台帳に載っていない顧客が多くいる、(3)顧客の所在を示す地図がない、(4)各戸接続にメーターを設置するための資材購入予算が不足している。

ベースライン情報収集活動を通じて、ジュバ支所職員は財務状況、メーターの設置状況、顧客の満足度等について、理解を深めた。公共水栓のパイロット運営と運営形態調査によって、日本人専門家は公共水栓と給水車への給水所の個人の管理者による運営を提案した（指標 4-3）。今後、共同水栓と給水車への給水所は増加が見込まれており、それに対応するため、プロジェクトでは

[7] SSUWC は研修の後、既存施設の運転・維持管理活動のために、暫定的料金を設定した。

管理人との契約書（案）とデータ管理フォーマットを作成した。JICA 無償協力プロジェクト「ジュバ市水供給改善計画」（2012-2015 年）が完成すると、120 箇所の公共水栓と 8 箇所の給水車への給水所が新設され、2015 年から稼動が開始される[8]。ジュバ支所は多くの管理人とそれぞれの活動を監督しなければいけないため、今後、財務部職員の契約管理能力の強化が必要となる。

（5） 成果 5 の達成状況

成果 5: SSUWC 本部の SSUWC ジュバ支所サポート能力が強化する。
指標 5-1 ジュバ支所が毎月提出する月報を SSUWC 本部が審査する。 5-2 SSUWC 本部が審査した年報と計画書がそれぞれ 2 ヶ年になる。 5-3 既存水道施設及び水道サービスが構築されたデータベースに入力される。

指標の達成度から判断し、成果 5 は達成された。

日本人専門家の指導により、SSUWC 本部はジュバ支所から提出された月報の審査（内容確認）を「SSUWC 本部の役割と報告・計画制度」に基づいて行なっている。SSUWC 本部はジュバ支所の管理職を招き、審査会議を毎月実施し、ジュバ支所から提出された月報の審査とフィードバックを行なっている（指標 5-1）。SSUWC 本部は、2011 年と 2012 年に、それぞれの年次報告書と翌年の年間計画の審査も行なった（指標 5-2）。支所に対してフィードバックをし、ガイダンスを与える制度は出来上がったが、この制度を適用し、定着させるためにはジュバ支所と他の支所を支援するための継続的な取り組みが必要である。

プロジェクトはワウ支所とマラカル支所の施設や給水サービスの情報収集調査を実施し、これらの情報は報告書に取りまとめられており、指標 5-3 は達成されたと判断できる（指標 5-3）[9]。この調査で 3 つの支所の現状が明らかとなったが、SSUWC 本部がこの情報をどのように今後の計画や運営管理に活用・反映するかは不明である。

3-1-3 プロジェクト目標の達成見込み

プロジェクト目標: 運転・維持管理能力の改善を通して、南スーダン都市水道公社ジュバ支所の水道事業運営能力が強化される。
指標 年間運営維持管理報告書で設定された主要な業務指標 25 項目のうち、80%以上の項目において 2011 年平均値と比べ改善する。

[8] ジュバ支所は現在 6 箇所の公共水栓（内 4 箇所が稼働中）と 4 箇所の給水車への給水所（内 1 箇所が稼働中）を管理している。2 箇所の公共水栓と 3 箇所の給水車への給水所は給水量不足のため稼動していない。

[9] プロジェクトでは安全面での懸念からその他の支所の調査は実施しなかった。全支所の情報を取りまとめた包括的なデータベースは、GIZ が SSUWC 本部の支援（資産管理）の一環で実施しているが、GIZ のデータベースは終了時評価時点で作成中であった。データベースの作成については、本プロジェクトの管理外であるため、必要な情報が収集・取りまとめられたという観点から、指標 5-3 は達成されたと判断できる。

表 3-3　主要な業務指標 25 項目の達成状況

番号	整理番号	指標	単位	2011年平均	2013年4月
浄水					
1	P1	日平均浄水量（推定）	m^3/日	5,208	3,711
2	P2	日平均浄水場稼働時間（推定）	時間/日	17.9	14.1
3	P3	日平均送水ポンプ場稼働時間	時間/日	28.2	27.2
4	P4	計画浄水量と実績との差	m^3/日	1,992	3,489
5	P5	運転率（平均浄水量の実績値／計画浄水量）	%	72	52
6	P6	運転率（平均運転時間／24時間）	%	74	58
配水					
7	D1	病院ポンプ場の日平均ポンプ運転時間	時間/日	5.8	3.3
8	D2	コニョコニョポンプ場の日平均ポンプ運転時間	時間/日	1.5	0.4
9	D3	浄水場からの全送配水量	m^3/日	4,928	2,232
10	D4	報告された漏水箇所数における修理箇所数の割合	%	55	100
11	D5	月当りの送配水管管理記録日数	日/月	0	30
水質					
毎日サンプリング（浄水場）					
12	W1	濁度の基準適合率	%	79	100
13	W2	残留塩素の基準適合率	%	31	91
週間サンプリング（市内の配水池）					
14	W3	週間サンプリングの必要日数に対する実績日数の割合	%	43	100
15	W4	週間サンプルの必要数に対する実績サンプル数の割合	%	19	100
16	W5	濁度の基準適合率	%	77	83
17	W6	残留塩素の基準適合率	%	13	100
月間サンプリング（市内の給水栓）					
18	W7	月間サンプリングの必要日数に対する実績日数の割合	%	63	83
19	W8	月間サンプルの必要数に対する実績サンプル数の割合	%	42	83
20	W9	濁度の基準適合率	%	76	100
21	W10	残留塩素の基準適合率	%	14	80
料金					
20	S1	請求書数	枚	545	476
21	S2	請求金額	SSP/月	249,348	330,842
24	S3	請求書配布数の割合（請求書数/全接続数）	%	16	13
25	S4	請求金額の割合（徴収金額/請求金額）	%	21	50

指標の達成度から判断し、プロジェクト終了時までのプロジェクト目標達成は期待できる。電力供給の状況と発電機の燃料の入手状況に左右される業務指標（表 3、P1-P6, D1-D3）を除けば、全ての業務指標において、2011 年の値から改善が見られる。

3-1-2「成果の達成状況」で触れたように、日本人専門家の実地研修及びケニアと日本での海外研修を通じて、ジュバ支所の各部署において水道事業運営能力が大幅に改善している。職員の英語力、コンピュータ能力、計算能力は限定的であり、阻害要因となったが、日本人専門家は能力向上のために運転・維持管理方法を示した張り紙やマニュアルに図や絵を使い、文字が読めない職員や教育を受けたことがない職員も含めた全ての職員にわかりやすい、簡潔な教材作る等の適切なアプローチを用

いて、ジュバ支所職員の能力レベル向上をもたらした。また、日本人専門家はまず主要な職員や管理職員を中心に能力強化をし、これらの主要な職員が、英語力や計算能力が限られている各部署の職員に運転・維持管理方法を通訳・説明するという 2 段階の方法を採用した。実務研修、チームワーク、議論を通じた問題解決等の能力向上アプローチは、南スーダン側から高く評価され、能力向上に極めて有効であった。

上記のような実地研修の結果、適切な運転・維持管理方法が浄水場、ポンプ場、配水管網に適用され、職員が上水道施設の定期的な点検を実施し、水量や塩素と硫酸アルミニウムの注入量等を記録している。日々の運転・維持管理記録は、プロジェクトで作成された電子データシートにまとめられている。ほぼ全員の職員がこれまで一度もパソコンに触れたことのなかったが、今では各部署の主要な職員が、データの取りまとめ、簡単な分析、月報の作成をパソコンを用いてできるようになった。配水部では、地図作成により配水管網の位置が理解され、漏水状況が適切に記録されることで、より体系的で効率的な漏水修理作業が実施できるようになった（表 3、D4）。水質検査は浄水場で毎日、ポンプ場と水槽で週ごと、公共水栓と給水車への給水所で月ごとに実施されるようになった（表 3、W3-4, W7-8）。浄水場と市内の採水地点の水は目標とする濁度と塩素の水準を満たしている（表 3、W1-2, W5-6, W9-10）。財務部はプロジェクトで作成された顧客台帳データベースを使い、大口顧客を特定することができるようになったため、料金収入増加を目指し、大口顧客から確実に徴収をできるように業務に取り組んでいる。大口顧客から優先的に料金徴収をすることによって、請求金額は 2011 年の月額平均 SSP 249, 348 から、2013 年 4 月には SSP 330, 842 に増加している[10]。

外部要因である電力供給の状況と燃料の調達状況に影響される指標に関しては、職員は現在の料金収入から浄水場とポンプ場の運転時間を計算し、ポンプ運転計画を修正し、修正された計画に沿って施設を運転している。安定した電力供給なしでは、PDM で目標に設定されている運転時間をプロジェクト終了までに達成することは難しいが、職員は習得した知識と能力により、計画的な上水道施設の運転ができるようになっている。また、効率的な料金徴収方法（電子顧客台帳を使ったデータ管理、大口顧客からの優先的な料金徴収）、改訂された水道料金、水質の改善による料金収入の増加が期待されており、1 日当たりの浄水場運転時間（終了時評価時点では 13.7 時間）は、今後増加することが見込まれる。

3-1-4　上位目標の達成見込み

上位目標: 1) SSUWC ジュバ支所が管轄する水道サービスの質が改善する。 2) 南スーダン都市水道公社の水道事業管理能力が向上する。
指標 1. ジュバ支所管内における水道事業に関する顧客満足度が向上する。 2. 全ての主要業務指標値がプロジェクト終了時点において改善される。 3. 支所から提出された報告書や計画書が本部により審査され、支所にフィードバックされる。

指標の達成度から判断し、プロジェクト終了後 3-5 年で上位目標達成が期待できる。一方で、限定

[10] 配達された請求書の数は 2011 年の月額平均 545 枚から 2013 年 4 月には 476 枚に減っている。これは浄水場の運転時間減少により給水量が低下したために、給水が滞り、請求書の受取を断った顧客がいたためである。

的な電力供給は上位目標達成への阻害要因になる。

プロジェクトで実施された給水サービスに係る社会状況調査によると、給水サービスに係る顧客満足度（指標 1）は、2010 年の 22.4%から 2013 年には 36.4%に増加した。ジュバ支所職員に対して、顧客から水質が改善したとの声が寄せられている。SSUWC の給水サービスが満足でない理由としては、不安定な給水、短い給水時間、不十分な給水量、低い水圧が挙げられた。

3-1-3「プロジェクト目標の達成見込み」で言及したように、電力供給の状況と直接関連のある指標（表 3、P1-P6, D1-D3）を除けば、全ての指標でプロジェクト開始時点より改善が見られている。プロジェクト終了後に適切な運転・維持管理が継続的に実施され、料金収入が増加することで、主要な業務指標は今後さらなる改善が期待される（指標 2）。

プロジェクトで作成された審査チェックリストに沿って、SSUWC 本部はジュバ支所から提出された月報と年次計画の審査（内容確認）を行なっている。SSUWC 本部は既に何度も審査工程を経てきており、他の支所からの報告書も同様に審査できるようになっていると考えられる（指標 3）。しかしながら、本部からの適切な指示と働きかけがなければ、ジュバ支所以外の支所は報告書を作成・提出することはほぼ不可能である。今後、どのように支所に対するサポートを行い、各支所を支援するドナー機関との調整を行うかについて、本部で検討をする必要がある。

SSUWC 本部は現在各支所についての運転・維持管理状況を把握すべく調査を行っているところである。プロジェクト実施期間中にはまだ他の支所の月報の審査とフィードバックは行なわれていないため、詳細な分析に基づいた適切な指導が各支所に提供されるかについては、現時点では不透明である。

3-2　プロジェクトの実施プロセス

3-2-1　プロジェクト管理、モニタリング、オーナーシップ

プロジェクトでは、日本人専門家、SSUWC ジュバ支所と本部の職員の間で、効果的でオープンなコミュニケーションが図られた。合同調整委員会は毎年開催され、プロジェクトの進捗に対するモニタリングが行なわれた。C/P と日本人専門家は週例会議を実施し、それまでに実施された活動結果、課題と対策等が話し合われ、そこで職員の間で安全な水を供給することへの強いオーナーシップとコミットメントが醸成された。日本人専門家は短い派遣期間の中で、派遣期間を調整し、日本人専門家がジュバ支所から不在になることを極力減らし、同時に、ジュバ支所職員の週例会議への参加を促した。その結果、ジュバ支所の全ての部署による週例会議が定着した。C/P と日本人専門家の協力が培われた週例会議を通じて、プロジェクトは変化の多い政治的・財務的状況に臨機応変に対応し、計画された活動が円滑に実施された。

3-2-2　モチベーションの維持・向上方法

日本人専門家はジュバ支所の職員、特に、英語、パソコン、計算の能力が限定的な職員のモチベーションを維持・向上させるために、様々な取り組みを行なった。中間レビューでは、職員が英語を理解できないことが研修への参加率が低い原因の一つであると指摘されており、日本人専門家は英語が話せない職員の研修内容理解を促進するために、状況に応じてどのような行動を起こすべきかについ

て、具体例を用いて説明した。また、説明には、施設の運転・維持管理方法を示した対応表や簡単な図等、視覚的な教材を用意した。プロジェクトのアシスタントや英語が話せる SSUWC 職員が日本人専門家の研修を通訳した。度重なる議論と修正の結果、簡単で、分かりやすい標準運転手順書とマニュアルが作成された。SSUWC 職員は、勤勉で、辛抱強い日本人専門家と一緒に働くことで、運転・維持管理の方法だけでなく、時間管理、問題解決、安全な水へのコミットメントを習得した。日本人専門家は研修後の習熟テストで成績のよかった職員に対して賞を与えるなど、適度にインセンティブを与え、職員のモチベーションを高めた。

3-3　中間レビュー提言への対応

3-3-1　提言 1: 広報活動の強化

中間レビューの提言を踏まえ、プロジェクトは様々な広報活動を実施した。ジュバ支所では、約 60 名の地元小中学生を招き、浄水場の社会見学を行なった。ジュバ支所職員は上水道施設の仕組みをポスターを使って小中学生に説明した。この発表を準備する過程で職員のモチベーションとオーナーシップが醸成された。地元テレビ局はこの社会見学の様子を放送した。また、社会見学では、地元ミュージシャンによって作られた「Water is Life」という水を大切にするための啓蒙ソングが流され、小中学生が一緒に歌った。プロジェクトでは、絵画コンテストを開催し、水の大切さに対する消費者の理解の増進に寄与した。今後も、SSUWC の役割に関する理解を深め、料金徴収を向上させるために、給水サービスの消費者の意識啓発をするための継続した取り組みが期待される。

3-3-2　提言 2: 南スーダン側の積極的なプロジェクト参加と日本側の側面支援の確保

中間レビューでは、SSUWC 職員の能力向上をさらに深めるために、会議や研修への南スーダン側の積極的な参加を求めた。その結果、C/P の週例会議や研修への参加度は中間レビュー以降高まった。各部署の職員は自分達で議題と配布資料を用意し、週例会議に積極的に参加するようになった。日本人専門家は追加的な基礎パソコン研修や英語研修を提供し、職員の基礎的なパソコン技術や英語力の向上に努めた。中間レビュー後、英語ができる SSUWC 職員やプロジェクトのアシスタントが研修をアラビア語に通訳をすることで、英語ができない職員の理解を促した。これらの取り組みと双方の参加により、能力向上が促進された。習熟度確認テストでは、研修を受けた職員の能力が大きく向上していることが確認された。

3-3-3　提言 3: 効果発現に必要な機材の追加投入

中間レビューの提言に従って、期待される成果の発現のために必要な機材が適切なタイミングで追加投入された。新しい塩素注入器が設置されたことにより、適切な量の塩素を注入できるようになった。藻等のつまりからの故障を無くすために、取水の流量計が電磁式のものに交換された。また、8 台のバイクが供与され、請求書の配達、採水、メーターの確認と配水パイプの点検がより効率的に実施されるようになった。

3-3-4　提言 4: 運転・維持管理活動に必要な予算の確保

継続的な運転・維持管理活動に必要な予算の確保は最も難しい。（中間レビューの提言で指摘された）試薬の費用とジュバ支所以外の支所の国内旅費も、化学薬品と発電機の燃料も、緊縮財政下の南

スーダン側からは支出されていない。一方で、ジュバ支所は料金収入の全てを運転・維持管理に活用できるようになっている。財務形態の変化に対応し、職員は料金収入に合わせて施設の運転時間を調整し、ポンプ運転計画を修正した。2014 年 1 月までに 24 時間のポンプ運転を目指し、ジュバ支所は改訂された料金に基づいた料金徴収、効率的な料金徴収方法、流量計の設置等、収入を増加させるのための取り組みを実施している。

3-3-5　提言 5: 必要な職員の雇用による組織強化

中間レビューで提言されたにもかかわらず、各部署と本部の主要なポストへの人員はまだ配置されていない。水質検査室職員の検査能力は向上している一方で、適切な資格のある職員を早急に採用する必要がある。また、SSUWC 本部と全支所の適切な計画立案と管理のためには、本部の中間管理職の雇用が引き続き期待される。

第4章　評価結果

4-1　5 項目による評価

4-1-1　妥当性：高い

本プロジェクトは南スーダン国民のニーズ、南スーダン国政府の開発政策、我が国の対南スーダン国援助政策と整合性が取れており、その妥当性は高いと評価できる。プロジェクトのアプローチも適切である。

(1) 南スーダン国民のニーズとの整合性

ジュバ市では、浄水の絶対的な不足と配水システムの不適切な運転・維持管理により、都市給水サービスが十分に供給されていないため、これらへの対処を主目的とする本プロジェクトは最終受益者のニーズと整合性が取れている。ジュバ支所は 1 日当たりの最大浄水能力 7,200 m^3 の浄水施設をもってジュバ市に給水しているが、給水先は目下、企業や工場にほぼ限られている[11]。人々は給水車で販売される未処理の川の水と塩分濃度の高い浅井戸の水を飲用している。ジュバ市の急速な人口増加に伴い、政府がジュバ市の住民に十分で安心して飲める水を供給することが急務となっている。

(2) 南スーダン政府の開発政策との整合性

上記の背景の下、南スーダン政府は水政策（2007）において、都市給水・衛生サービスの提供を社会経済開発の優先課題と位置づけている。その中で、政府は利用可能な水資源の効率的・公平・持続可能な開発と活用を促進することを目標としている。特に、政府は急増する都市人口に対し、安全で、手頃な価格で、安心できる給水・衛生サービス確保を約束している。水政策の具体的な目標には、都市給水・衛生サービスにおける全ての職員への技術・管理研修実施と、効率的な管理業務を通じた都市給水システムの財務的持続性の確保が含まれている。

(3) 日本の ODA 政策との整合性

日本の対南スーダン援助政策では、「ベーシック・ヒューマン・ニーズ（BHN）への支援」を南スーダンの開発支援に対する 3 つの優先課題の一つに位置づけている。また、BHN 支援は、2005 年にオスロで開催された第 1 回スーダン・コンソーシアム（支援国会合）において強調された、日本の基本的援助方針である「平和の定着」に向けた重点課題に掲げられている。南スーダンへの支援政策では、BHN 支援の一環で、給水システムの改善を含む、公共サービス強化を目標としている。加えて、日本は、2008 年の第 4 回アフリカ開発会議（TICAD IV）において、アフリカの 650 万人に対して、安全な飲料水を提供することを約束していた。

(4) プロジェクトアプローチの妥当性

SSUWC のジュバ支所と本部の運営能力を向上させるためのアプローチは妥当である。本プロジェクトでは主に、ジュバ支所の管理職と技術スタッフを対象に一連の実地訓練を行なった。日本人専門家は、職員と一緒に運転・維持管理活動を実施し、点検記録、上水道施設維持管理、各

[11] プロジェクト開始時点（2010 年）で、給水サービスにアクセスできるのは、ジュバ市内の人口のうちわずか 8%である。

部署間でのコミュニケーション、報告書作成に係る彼らの能力強化を図った。実践的な指導と実用的な研修を中心とした能力強化のアプローチは、ジュバ支所の管理職職員と技術スタッフが知識と能力をすぐに日常業務に反映させることができるため、適切であったと評価できる。

4-1-2　有効性：やや高い

プロジェクト終了時までにプロジェクト目標が達成される見込みは期待でき、プロジェクト目標達成と成果の発現には明確な関連性があるため、有効性はやや高いと評価できる。

(1) プロジェクト目標の達成見込み

3-1-3「プロジェクト目標の達成見込み」で言及したように、プロジェクト終了時までにジュバ支所の運営能力が強化されることは期待できる。2012 年からの不安定な電力供給により、本プロジェクトは浄水場とポンプ場の目標運転時間を達成することは困難である。その結果として、2011 年月平均に比べ、2013 年 4 月時点で改善が見られるのは 56%（14 項目）の業務指標に限られており、目標として設定されていた 80%には到達していない。一方、職員は料金収入から浄水場とポンプ場の運転時間を計算し、運転計画に基づいて計画的に上水道施設を運転するための能力と知識を習得している。2014 年 1 月までに経済的に自立した組織となり、24 時間運転を達成するために、SSUWC は適切な運転・維持管理活動を継続的に実施して、収入を増加させるための適切な取り組み（効率的な料金徴収システムの導入、水道料金の改訂、各戸接続に対するメーターの設置）を行なう予定である。料金徴収の向上により収入が増加すれば、職員は浄水場とポンプ場を長時間運転・管理し、より多くの水を生産することができると考えられる。

(2) プロジェクト目標と成果の因果関係

PDM で挙げられている 5 つの成果は、SSUWC の運営能力向上に必要な構成要素（取水・浄水施設の運転・維持管理「成果 1」、送配水施設の運転・維持管理「成果 2」、水質管理「成果 3」、財務管理「成果 4」、SSUWC 本部のジュバ支所へのサポート体制「成果 5」）を全て網羅している。従って、5 つの成果の発現はプロジェクト目標の達成に直結している。3-1-2「成果の達成状況」で触れたように、期待される成果はほぼ達成されたか、既に達成されており、SSUWC ジュバ支所の運転・運営能力、本部のサポート体制は向上されていると判断できる。

4-1-3　効率性：中程度

政府予算の削減と不十分な電力供給により、成果の発現に一部制約があったものの、期待される成果の発現のためにほとんどのプロジェクト活動が計画通りに実施されており、プロジェクトの効率性は中程度と評価できる。

(1) 成果の発現及び投入・活動と成果の因果関係

プロジェクトに大きな影響を与えた外部条件の大幅な変化（緊縮財政、電力供給の停止、人事異動）を受けつつも、プロジェクトは期待される成果の発現を促進させるために、ポンプ運転計画の修正、インセンティブ（賞等）の付与、週例会議での C/P と日本人専門家の活発な議論等、適切な対応を行い、実用的なアプローチを採用した。

活動の実施に必要なほとんどの投入は、適切なタイミングで供与され、成果の発現に効果的に貢献した。日本人専門家はプロジェクト実施期間中、ジュバ支所から不在になることを極力減ら

すために派遣のタイミングを調節したことによって、適切にプロジェクト活動が実施された。日本とケニアでの研修は顧客メーター管理、人材管理、配水管網の運転・維持管理、電気機械システムを含む、幅広い分野について複数回開催された。外国での研修機会は、本部、水資源・灌漑省、ジュバ支所、ワウ支所、マラカル支所の管理職や技術スタッフへ幅広く提供され、管理職から実務レベル職員のモチベーションとオーナーシップの醸成に貢献した。また、中間レビューの提言（提言 3）に対応し、塩素注入器、電磁式流量計、バイク等が追加的に投入され、ジュバ支所の運営の効率性を向上させた。

プロジェクトの初期段階では、南スーダン側の研修参加率の低さと限定的な英語力がプロジェクトの効率性を低下させる原因となっていたが、日本人専門家が職員と一緒に辛抱強く作業をし、同じ内容の研修を何度も繰り返し実施し、基礎英語やパソコンの研修を提供した結果、日々のデータ収集や適切な運転・維持管理作業等、日常業務の具体的な改善が見られている。

プロジェクトは情報共有を通して、GIZ や USAID と効果的な連携を図ってきた。GIZ や USAID を含むドナー機関は、SSUWC 本部の主催する都市水道ワーキング・グループで毎月集まり、情報共有を行なっている。また、GIZ と USAID の都市給水プロジェクト担当者は、本プロジェクトの進捗や活動計画が発表されたセミナーにも参加している。本プロジェクトで作成したジュバ支所とマラカル支所の既存施設や給水サービスに係る調査報告書は、現在 SSUWC の全支所の包括的データベースを作成している GIZ に提供された。USAID は現在、本プロジェクトで作成された配水管網情報の入ったジュバ支所の GIS 地図に追記する形で、顧客情報の入った GIS 地図を作成している。

(2) 成果発現への外部条件

2 つの外部条件（政府予算の削減と不十分な電力供給）により成果の発現が一部制約を受けた。予算の制約により、南スーダン側は水質試験の試薬と化学薬品の費用を捻出することが困難であった。支所の国内旅費の不足により、活動 5-5「他の支所及び水資源・灌漑省との月例会議の開催支援」の実施が妨げられることとなった。即ち、SSUWC 本部によって月例会議は開催されていたものの、ジュバ支所以外の支所の参加は得られなかった。

3-1-3「プロジェクト目標の達成見込み」で言及したように、2013 年 1 月から電力供給は完全に停止している。職員は運転計画を修正し、浄水場とポンプ場の運転時間を調整している。浄水量はやむを得ず減少しているものの、現在職員は計画的に施設の運転を実施できるようになっている。

4-1-4 インパクト：大きなインパクトを発現する可能性がある

プロジェクト終了後 3-5 年での上位目標達成は期待できると判断できる。SSUWC 本部とジュバ支所の職員が確固たるコミットメントを持って、適切な運転・維持管理活動と財務管理を継続していけば、プロジェクトは大きなインパクトを発現する可能性がある。

(1) 上位目標達成見込み

本プロジェクトの上位目標は、(1) SSUWC ジュバ支所が管轄する水道サービスの質が改善する、(2) 南スーダン都市水道公社の水道事業管理能力が向上する、である。3-1-4「上位目標の達成見

込み」で触れたように、(1) 給水サービスへの顧客満足度、(2) 主要な業務指標、(3) SSUWC 本部による支所の報告書と計画の審査（内容確認）能力、という 3 つの指標の達成度から判断し、プロジェクト終了後 3-5 年での上位目標達成は期待できる。プロジェクト期間中、浄水量が減少したにもかかわらず、水質の改善により顧客満足度は上昇している。2013 年の料金収入の増加傾向を踏まえ、上水道施設の運転時間は増加する見込みであり、それにより、顧客満足度が一層高まると考えられる[12]。日常的な上水道施設の点検、データ管理、週例会議を通じたコミュニケーション、本部への月例報告と本部による審査は、ジュバ支所の通常業務として定着している。SSUWC 本部とジュバ支所の職員は、現在の運転・維持管理活動を継続的に実施することが重要である。

(2) 上位目標達成への貢献要因・阻害要因

上位目標達成への重要な貢献要因は、プロジェクトで実施されてきたジュバ市の都市給水サービスの質改善を目指した開発パートナー（USAID、GIZ、多国ドナー信託基金「MDTF」等）との協力が挙げられる。プロジェクト活動の中で、公共水栓の運営形態を検討するにあたり、日本人専門家は GIZ の公共水栓の運転手引きを参考にした。また、GIZ は現在作成中の資産管理データベースに活用するために、日本人専門家に対し、本プロジェクトで作成された支所に関するデータを共有するように要請してきている。アフリカの持続可能な給水と衛生（SUWASA）プログラムにおいて、USAID はワウ支所とマリディ支所が経済的に自立した組織となるように支援をしており、その中で、ワウ支所の顧客の位置情報、料金支払い状況、メーターの設置状況等を示した GIS 地図を作成した。USAID は現在、小規模インフラ・プロジェクトにて、同様の顧客情報入りの地図をジュバ支所の水道区域でも作成することを計画しており、その地図作成には本プロジェクトで作成された配水管網の地図が活用される予定となっている。このように開発パートナーの効果的な連携が相乗効果をもたらし、上位目標の達成を促進すると考えられる。

3-1-2「成果の達成状況」で触れたように、電力不足は給水サービスの質に負の影響をもたらし、上位目標達成についても阻害要因になり得る。

4-1-5 持続性：中程度

プロジェクトの持続性は中程度と評価できる。一方で、本プロジェクトでは、上水道施設の適切な運転・維持管理、水質検査、財務管理を実施するための技術的な基礎を習得した人材を輩出し、各部署で情報共有と連携をする組織内部の体制を作り上げた。他方で、燃料と運転・維持管理費用を確保することと SSUWC 本部とジュバ支所の組織を強化することは、今後、克服すべき課題となっている。

(1) 制度面

制度的持続性は、南スーダン政府の都市水道セクター開発に係る全般的な戦略に鑑みて、確保されていると判断できる。2011 年に南スーダン政府は水政策（2007 年）を実現させるためのガイドラインとして「上下水道と衛生（WASH）セクター戦略的枠組み」を採択している。WASH セクター戦略的枠組みでは、「持続可能、公平、費用回収の理念に基づいた都市給水サービスの効率的な改修、拡張、開発、管理の確保」を目指した都市給水戦略が掲げられている。「南スーダン開発計画（2011-2013 年）」は改善された上下水道インフラを経済的目標の柱の中で最も重要な 5 つの優先プログラムに位置づけており、本プロジェクトは同計画と整合性が取れている。

[12] ジュバ支所の料金収入は、2013 年 1 月の SSP 102, 272 から 4 月の SSP 166, 076 と着実な増加傾向にある。

(2) 組織面

組織面としては、まず SSUWC 本部とジュバ支所の各部署の役割と責任が明確に設定され、各関係部署に理解された。プロジェクト活動で明らかとなったニーズを元に、ジュバ支所では計画・プロジェクト部と顧客サービス部が新設された。ジュバ支所の計画と顧客サービスを適切に機能させるために、今後これらの新設された部署の組織強化と能力向上が必要である。現在、日本人専門家が出席しなくても週例会議がジュバ支所の全ての部署の参加により実施されており、今後も活動の進捗に係る情報共有や課題や計画を検討する上で、週例会議が重要な役割を果たしていくことが期待される。

人員配置は、組織的持続性への課題である。中間レビューでは SSUWC 本部とジュバ支所へ適切な資格を持った職員を増員する必要があると指摘された（提言 5）。しかしながら、終了時評価時点においても、本部の中間管理職レベル（技術課長、商務課長等）と水質検査室職員の両者とも配置に至っていない。収入を増加させるためには、料金徴収担当者の人数を現在の 4 名から大幅に増員する必要がある。現在ジュバ支所のエンジニアのポストは 4 席中 2 席しか埋まっておらず、浄水と配水分野での技術職員のニーズは高いため、大卒のエンジニアの増員が必要である。SSUWC 本部とジュバ支所への人員配置については、既に SSUWC 総裁から財務・経済計画省へ要請が提出されているとのことである。

(3) 技術面

本プロジェクトは継続的な運転・維持管理、適切な記録管理、定期的な情報共有に係る技術的基盤を確立した。ジュバ支所職員は、年次計画に基づいて運転・維持管理活動を実施するための基礎的な能力と知識を習得した。特に、浄水部、配水部、財務部の主要な職員は、プロジェクトで習得した能力と知識を使い、各部署の担当業務について、他の職員に技術を移転し始めている。適切な量の塩素や凝集剤を注入し、定期的な水質検査をできるようになった結果、水質が改善している。上水道施設の運転・維持管理に係る職員の技術能力は、既存の施設を適切に運転・維持管理する上で最低限必要な水準に達している。一方で、今後のポンプ運転時間の延長と浄水量の増加を見据え、新しく導入された運転・維持管理方法をジュバ支所全職員がプロジェクト終了時までに継続して実施する必要がある。

(4) 財務面

SSUWC の財務的自立は本プロジェクトの直接的な目的ではなかったものの、本プロジェクトは SSUWC が財務的自立を達成するための基盤構築に貢献した。南スーダン政府は発電機用の燃料の SSUWC への現物支給を停止しているため、ジュバ支所は料金収入から燃料を購入し、それに基づいて計画的に上水道施設を運転している。プロジェクトで導入された効率的な料金徴収の方法と 2013 年 2 月からの水道料金の値上げにより、毎月の収入は 2013 年 1 月の SSP 102,272 から 2013 年 4 月の SSP 166,076 へと確実に増加している。また、水質の改善により、顧客の料金支払い意欲は増加しており、これも料金収入の増加に貢献していると考えられる。プロジェクトで実施された収入予想によると、ジュバ支所は 2014 年 1 月には月間収入が SSP 202,000 に達し、24 時間運転が可能になることが予想されている。質と量の両面で給水が向上することを見込んで、ジュバ支所では市内に料金支払い窓口を設置したり、銀行振り込みでの料金支払いを可能にする等、SSUWC 事務所に出向くことが難しい顧客が料金の支払いを簡単にできるように、新しい料

金徴収方法の検討を始めている。また、ジュバ支所が改訂された料金で大口顧客から優先的に料金徴収をすることで、月間収入は増加していくものと考えられる。料金収入を発電機の燃料に充てることで、浄水場とポンプ場の運転時間が延長され、浄水量は増加し、その結果、給水サービスの質が向上していくことが期待されている。プロジェクト終了時までに目標である浄水場の運転時間（1 日当たり 17.9 時間。表 3-3 の指標 P2 参照）を達成することは難しいが、ジュバ支所は 2014 年 1 月の 24 時間運転を達成するために、効率的な料金徴収システムと新しい料金設定を導入することで料金収入を上げる計画である。

4-2　結論

本プロジェクトは SSUWC ジュバ支所と本部の運営管理能力強化にあたり、着実な進展を遂げている。期待されるそれぞれの成果の達成度から判断し、プロジェクト終了時までにプロジェクト目標が達成されることが期待できる。

南スーダン国政府の開発政策、日本政府の援助政策、受益者のニーズを踏まえ、本プロジェクトの妥当性は高いと評価できる。本プロジェクト実施により、ジュバ支所の基本的な運転・維持管理と運営の能力が強化されており、有効性は比較的高いと判断できる。一方で、全職員の能力レベルを引き上げることが、上水道施設のより一層の運営効率化を図るために肝要である。プロジェクト期間の初期段階では SSUWC 職員の活動への参加が計画通りに得られなかったが、これまで全体的な投入が期待される成果の発現に概ね転換されているため、効率性は中程度であると評価できる。ジュバ支所職員が適切な運転・維持管理と運営管理を継続的に取り組むことで、本プロジェクトは大きなインパクトを発現する可能性がある。プロジェクトの持続性を向上させるためには、適切な資格を持った職員を水質検査室、本部、財務部に配置することと、運転・維持管理費を賄うために収入を増加させることが必要である。

復興国で水道事業体の運転・維持管理と運営の基盤を敷くことは非常に難しいことであるが、本プロジェクトは SSUWC ジュバ支所と本部において、職員の運転・維持管理能力向上をもたらした。

第5章　提言と教訓

5-1　提言

5-1-1　プロジェクトで導入された運転・維持管理手順やデータ管理方法の継続的な実施

本プロジェクト開始前のジュバ支所では、体系的な運転・維持管理、電子化された記録管理、適切かつ定期的な水質分析は行われていなかったが、現在ではこれらの運転・維持管理、記録管理、水質分析を適切に実施できるようになった。本プロジェクト実施により、ジュバ支所では浄水部と配水部の職員が適切な運転・維持管理能力を、財務部職員がデータ管理能力を、水質検査室職員が定期的な水質検査能力を習得している。今後の水道施設の給水量増加を見据え、事業体の運営を一層強化するためには、各部署がプロジェクトで導入された運転・維持管理手順やデータ管理方法に基づいて担当業務を確実に実施する必要がある。

5-1-2　内部研修計画の検討

本プロジェクトを実施する中で、主要な職員が自発的に他の職員に技術移転を行う動きが始まっている。職員同士での技術移転は、講師と研修生の間に既に信頼関係があり、共通言語でコミュニケーションを図ることができ、講師が研修生の学習ニーズに効果的に対応することができるため、有効である。今後、職員全体の運転・維持管理と料金徴収活動の能力レベルの底上げを図るために、組織的な内部研修の計画について、本部とジュバ支所が検討を始めることが望まれる。

5-1-3　他の支所への支援

本プロジェクトでは、SSUWC 本部がジュバ支所の提出した月報と年次計画に対して、体系的に審査（内容確認）と助言を行なう仕組みを構築した。SSUWC 本部はジュバ支所から提出された報告書を審査することができるようになったが、ジュバ以外の支所が月報や年次計画の作成・提出をできるようにするためには、本部は他の支所に対して適切な指導や働きかけが必要である。SSUWC 本部はジュバ以外の支所に対して、効果的な取り組みや教訓を共有する場として定期的な会議を催したり、プロジェクトで作成されたフォーマットを使い定期的な報告書作成を義務づけるなど、運営支援をするための効果的な戦略を立てる必要がある。これらの対策により、SSUWC 本部と支所の間でのコミュニケーションと情報共有がさらに促進されると考えられる。

5-1-4　料金徴収の増加

南スーダン政府の財政の見通しが不透明な状況の中で、SSUWC の財務的持続性を確保するためには、本プロジェクトの直接の目標や成果の一部ではないものの、料金徴収を増加するための継続的な活動が求められる。ジュバ支所の財務部は電子化された顧客台帳の導入により、料金徴収活動がこれまでよりも効率的に実施されているが、財務部の請求書を配布する職員の数を増やすことで、より一層料金収入を増やすことができる。財務部では支払いを容易にし、料金徴収率を上げるために、ジュバ市内に支払い窓口を設置したり、銀行振り込みを可能にする等の方法について検討を進めている。また、各戸接続や商業施設にメーターの設置を進めることで、適切な料金徴収がなされると考えられる。メーターの設置を進めるために、プロジェクト実施期間中に日本人専門家の協力の下、ジュバ支

所はメーター設置に係る費用の概算を本部に提示することが期待される[13]。加えて、日本の無償資金協力プロジェクト[14]によって、2015 年までに 120 箇所の公共水栓と 8 箇所の給水車への給水所が新たに設置される予定であり、料金収入の増加に資すると期待される。多くの公共水栓の管理人を適切に管理・監督するためには、ジュバ支所はプロジェクトで作成された「公共水栓と給水車への給水所の管理形態の評価」報告書をもう一度見直し、教訓を分析し、公共水栓と給水車への給水所の管理における人員配置体制を計画し始めることが望まれる。ジュバ支所の契約管理能力も強化が必要である。

5-1-5　適切な資格を持った職員の採用

組織的持続性を確保するためには、空席になっているポストに適切な資格を持った職員を採用することが肝要である。中間レビューの提言にあるように、SSUWC 本部の課長職のポスト（技術課長、商務課長）と水質検査室職員は早急に配置される必要がある。また、請求書を配布する職員が増員されることで、料金収入の増加が見込まれる。ジュバ支所にエンジニアを採用することで浄水部と配水部の技術能力のさらなる向上が見込まれる。SSUWC 本部とジュバ支所への新しい職員を採用するための要請は既に財務・経済計画省に提出されているため、採用の進捗を確実にするためには財務・経済計画省に対して、適切な働きかけを継続する必要がある。

5-2　教訓

5-2-1　復興国における能力開発の方法

スーダンの長引く内戦により SSUWC を含む公共インフラや施設を激しく破壊された。SSUWC 職員のほとんどは学校教育を受けておらず、識字や計算のできないものもいる。プロジェクトの有効性と効率性を達成するためには、プロジェクト期間の早い段階で C/P の能力レベルと学習ニーズを判断し、ターゲット・グループに適したアプローチを取ることが重要である。本プロジェクトでは、職員が自分達の手で運転・維持管理が実施でき、月報が作成できるように、標準運転手順書、運転・維持管理マニュアル、月報のフォーマットが何度も改訂された。日本人専門家は読み書きの能力に関わらず全ての職員に分かりやすく、簡潔な資料を作成するため、運転・維持管理手順を図や表で表したポスターやマニュアルを作成した。また、日本人専門家は運転・維持管理の基本概念と適切な運転・維持管理方法、水質検査、料金徴収、データ管理を長い時間をかけて繰り返し教えた。C/P の能力レベルを把握し、能力レベルに合わせたアプローチを使うことは、復興国での能力向上には不可欠である。

以上

[13] ジュバ支所には多国ドナー信託基金によって供与された 2,000 個の流量計がある。
[14] 「ジュバ市水供給改善計画」（2012-2015）

Final Evaluation for "The Project for Management Capacity Enhancement of South Sudan Urban Water Corporation" in South Sudan

Date		Ms.Watanabe (Evaluation Consultant)	Mr.Imai and Mr.Kageyama (JICA members)	Mr.Omura (JICA member)
19-May	Sun	Narita→Bangkok		
20-May	Mon	Bangkok→Nairobi→9:25Juba(KQ350) Meeting with JICA Office Meeting with SSUWC (evaluation member) Meeting with Japanese Experts		
21-May	Tue	Meeting with SSUWC (interview with C/Ps)		
22-May	Wed	Meeting with SSUWC (interview with C/Ps) Meeting with GIZ		
23-May	Thu	Meeting with SSUWC (interview with C/Ps) Meeting with USAID expert at SSUWC		
24-May	Fri	Meeting with SSUWC (interview with C/Ps)		
25-May	Sat	Data Analysis		
26-May	Sun	Data Analysis		
27-May	Mon	Meeting with MWRI	Narita→Bangkok	
28-May	Tue	Meeting with SSUWC (interview with C/Ps)	Bangkok→Nairobi→9:25Juba(KQ350) Meeting with JICA Office Meeting with SSUWC HQ	
29-May	Wed	Meeting with SSUWC (interview with C/Ps)	Juba→Malakal Town Meeting with Minister of PI, UNS Meeting with SSUWC-Malakal Site visit at WTP at Malakaltown	
30-May	Thu	Meeting with SSUWC (interview with C/Ps)	Meeting with MoPI and SSUWC Malakal Site Visit at Malakal Town	Narita→Bangkok
31-May	Fri	Courtesy Visit to MD of SSUWC HQ Meeting with Japanese Experts	Malakal Town→Juba	Bangkok→Nairobi→9:25Juba(KQ350)
1-Jun	Sat	Site Visit		
2-Jun	Sun	Data Analysis		
3-Jun	Mon	Meeting on M/M Meeting with USAID SS Office		
4-Jun	Tue	Explanation on Draft Evaluation Report to MD SSUWC HQ Meeting on M/M Preparation for JCC		
5-Jun	Wed	AM: JCC (Reporting on Evaluation Results) PM: Signature on Minutes		
6-Jun	Thu	Report to Japanese Embassy and JICA Office 15:25Juba(KQ353)→Nairobi Nairobi→		
7-Jun	Fri	→Bangkok Bangkok→		
8-Jun	Sat	→Narita		

MINUTES OF MEETING
BETWEEN
THE AUTHORITIES CONCERNED OF
THE GOVERNMENT OF THE REPUBLIC OF SOUTH SUDAN
AND
JAPAN INTERNATIONAL COOPERATION AGENCY
ON
JAPANESE TECHNICAL COOPERATION
FOR
THE PROJECT FOR MANAGEMENT CAPACITY ENHANCEMENT OF SOUTH SUDAN URBAN WATER CORPORATION IN THE REPUBLIC OF SOUTH SUDAN

The Japanese Terminal Evaluation Team (hereinafter referred to as "the Team"), organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") headed by Mr. Tatsuya Imai, visited the Republic of South Sudan (hereinafter referred to as "South Sudan") from May 20th to June 6th, 2013, for the purpose of conducting terminal evaluation of the "the Project for Management Capacity Enhancement of South Sudan Urban Water Corporation in the Republic of South Sudan (hereinafter referred to as "the Project").

During its stay, the Team and the South Sudanese side formulated the Joint Evaluation Team, conducted a field survey, exchanged views and had a series of discussions with the South Sudanese authorities concerned. As a result of the discussions, the Team submitted the terminal evaluation report as attached and both sides agreed upon the description of the report.

Juba, June 5th, 2013

THE REPUBLIC OF SOUTH SUDAN
Office of the Undersecretary
Date:.....
MINISTRY OF WATER RESOURCES AND IRRIGATION

Mr. Tatsuya Imai
Leader
The Terminal Evaluation Team
Japan International Cooperation Agency

~~Mr. Laurence Muludyang~~, Mr. Isaac Jiabwol
~~Director of Urban Water Programs~~ Undersecretary
Ministry of Water Resources & Irrigation

Eng. Chamjok Chung Wiitour
General Manager
South Sudan Urban Water Corporation

Joint Terminal Evaluation Report

on

The Project for Management Capacity Enhancement of South Sudan Urban Water Corporation

June 5, 2013

List of Abbreviations and Acronyms

Abbreviation	Official Name
C/P	Counterpart
GIS	Geographic Information System
GIZ	German International Cooperation Agency
GPS	Global Positioning System
HQ	Headquarters
IDP	Internal Displaced Person
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
M/M	Minutes of Meeting, Man Month
MDTF	Multi Donor Trust Fund
MFEP	Ministry of Finance and Economic Planning
MWRI	Ministry of Water Resources and Irrigation
OVI	Objectively Verifiable Indicator
O&M	Operation and Maintenance
PDM	Project Design Matrix
PI	Performance Indicator
PO	Plan of Operations
R/D	Record of Discussion
ROSS	Republic of South Sudan
SIP	Small Infrastructure Project
SOP	Standard Operational Procedure
SSDP	South Sudan Development Plan
SSP	South Sudanese Pound
SSUWC	South Sudan Urban Water Corporation
SUWASA	Sustainable Water and Sanitation in Africa
TCP	Technical Cooperation Project
TICAD	Tokyo International Conference on African Development
USAID	United States Agency for International Development
USD	United States Dollars
UWC	Urban Water Corporation
WB	World Bank
WTP	Water Treatment Plant

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1. Introduction

1-1. Background and Purpose of the Evaluation

(1) Background of the Evaluation

The Project for Management Capacity Enhancement of South Sudan Urban Water Corporation (hereinafter referred as "the Project") is a bilateral technical cooperation project between the Government of Japan (through the Japan International Cooperation Agency: JICA), and the Government of South Sudan (through the Ministry of Water Resources and Irrigation: MWRI). The Project was launched in October 2010 for the duration of three years. As the end of the project period is approaching (September 2013), as laid out in the Record of Discussions (R/D) signed on the 8th of July 2010 by both governments, the terminal evaluation of the Project was conducted by the Joint Terminal Evaluation Team (hereinafter referred to as "the Terminal Evaluation Team"), comprised of representatives from both sides.

(2) Purpose of the Evaluation

The purposes of the evaluation are as follows:

1) To confirm the achievement levels of Inputs and Outputs and the prospect for the Project Purpose to be achieved by the end of the project period, and the Overall Goals within three to five years after the project completion, based on the Project Design Matrix (PDM) version 3 (see Annex 7);

2) To identify factors or issues that have promoted or hindered the implementation of project activities;

3) To conduct a comprehensive evaluation from the viewpoints of five evaluation criteria; Relevance, Effectiveness, Efficiency, Impact and Sustainability (see 2-2 "Criteria of the Joint Terminal Evaluation" for their definitions);

4) To draw up recommendations of the measures to be taken for the Project's further improvement and identify lessons learned to be referred to by similar JICA projects; and

5) To discuss and agree on the direction of the Project and prepare a joint terminal evaluation report based on the results of the discussions.

1-2. Members and Schedule of the Evaluation

(1) Members of the Evaluation

The members of the Terminal Evaluation Team are as follows:

1) Japanese Side

Name	Title	Position/Organization
Mr. Tatsuya Imai	Leader	Director, Water Resources Management Division 2, Water Resources and Disaster Management Group, Global Environment Department, JICA
Mr. Yoshiki Omura	Water Supply Management	Senior Advisor, Water Supply Development, JICA
Mr. Tadashi Kageyama	Planning Management	Deputy Director, Water Resources Management Division 2, Water Resources and Disaster Management Group, Global Environment Department, JICA
Ms. Miku Watanabe	Evaluation and Analysis	Consultant, IMG Inc.

2) South Sudanese Side

Name	Title	Position/Organization
Mr. Simon Koak	Office Manager	SSUWC HQ (Output 5)
Eng. Santurino Tongun	Director, Commercial and Customer Services	SSUWC HQ (Project Manager)
Mr. Peter Tuburo	Director, Department of Planning and Projects	SSUWC Juba Station (Project Planning)

(2) Schedule of the Evaluation

The Evaluation was conducted from the 20th of May to the 6th of June 2013 (see Annex 1 for the Evaluation Schedule.)

1-3. Outline of the Project

(1) Background of the Project

In Sudan, after more than two decades of conflict between the government and the Sudan People's Liberation Movement (SPLM), the Comprehensive Peace Agreement (CPA) was signed and the Southern Sudan established an interim government in January 2005. The population of Juba, the capital of the Southern Sudan, has been rapidly increasing with a bulk of internally/internationally displaced people (IDP) returning and is now estimated to be around 400,000. As little maintenance work has been conducted for urban infrastructures due to the conflict, many facilities have become old and the service provision function has significantly decreased.

The South Sudan Urban Water Corporation's (SSUWC) Juba Station (164 staff members) is responsible for operating and maintaining water supply facilities in Juba consisting of water treatment, transmission and distribution facilities and collecting water bills. The Juba Station, however, faced difficulties in distributing safe water in an efficient manner due to the absence of: the knowledge and skills for the proper operation and maintenance of water supply facilities; timely and appropriate measures for operation and maintenance; the inspection and verification process of supplied water quality; an up-to-date customer ledger; a management system for equal water distribution; and necessary maintenance materials and budget, coupled with the degraded facilities. The Juba Station did not generate enough revenue to cover all the necessary expenses for the operation of water supply facilities.[1] A low flat-rate system has been employed without clear valuation of the water supply cost or a proper water tariff policy. The bill collection system with handwritten ledgers was considerably inefficient.

SSUWC Headquarters (HQ) (38 staff members) is responsible for securing and distributing the government budget to area stations, and providing guidance and supervision on technical issues of the area stations. However, HQ was not able to provide appropriate instructions or support to area stations due to the lack of a clear institutional framework for information collection on the status of area stations' facilities and activities as well as sufficient mutual consultation between HQ and area stations.

Under these circumstances, there was an imminent need for a technical cooperation project to enhance the SSUWC Juba Station's operation and maintenance capacity for water supply services. In response to the request from the Southern Sudanese side, a mission for detailed planning was carried out from February to March 2010 and the project outline was developed with MWRI being the executing organization and SSUWC HQ and the Juba Station being the target organizations. In July 2010, the Record of Discussions (R/D) was signed between the Ministry of Finance and Economic Planning (MFEP), which represents the Government of Southern Sudan (then) for the Project, and the Resident Representative of the JICA Sudan Office. According to the R/D, the Project is carried out for the period of three years from October 2010.

[1] The Republic of South Sudan (ROSS) provides SSUWC with the budget for salaries and allowances, chemicals (in-kind) and fuel for generators (in-kind). Due to the budget cut under the fiscal austerity since July 2012, ROSS has suspended the provision of chemicals and fuel for generators and cut the salary expenditure in half. In exchange, the SSUWC's remittance to the government, which was originally 80% of the income from water bills, was reduced to 20% in July 2012, and 0% in April 2013. According to the Project Report, the Juba Station's monthly revenue from water bills in the fiscal year 2011/2012 was SSP 86,369 on average. SSUWC is currently operating its water supply facilities mostly from its own revenue although its level is still minimal.

(2) Summary of the Project

Overall Goals	1. The quality of the water supply service extended by SSUWC-Juba is improved 2. The management capacity of SSUWC is improved
Project Purpose	The management capacity of SSUWC -Juba Station is enhanced through capacity development on operation and maintenance of water supply facilities.
Project Outputs	1. Capacity of SSUWC-Juba Station with respect to operation and maintenance of water intake and treatment facilities is improved. 2. Capacity of SSUWC-Juba Station with respect to operation and maintenance of water transmission and distribution facilities is improved 3. Capacity of water quality management of SSUWC-Juba Station is improved. 4. Understanding of financial conditions of SSUWC-Juba Station is enhanced 5. Capability of SSUWC HQ to support SSUWC-Juba Station is enhanced
Project Period	From October 2010 to September 2013 (Three years)
Implementing Agency	SSUWC Headquarters and SSUWC Juba Station

2. Methodology of the Evaluation

2-1. Framework

In accordance with the *New JICA Guidelines for Project Evaluation* (the First Edition, 2010), the Terminal Evaluation Team evaluated the Project, taking the following steps:

Step 1. Prepare an evaluation grid that lists evaluation questions, data/information necessary for evaluation and information sources;

Step 2. Collect data and information necessary for the evaluation;

Step 3. Assess the Project's achievements in reference to the PDM ver. 3;

Step 4. Analyze the factors that promoted or inhibited the Project's achievements, including factors relating to the project design and the project implementation process.

Step 5. Analyze the Project from the viewpoints of five evaluation criteria, defined in 2-2 "Criteria of the Joint Terminal Evaluation";

Step 6. Draw up recommendations from the analysis;

Step 7. Share the preliminary evaluation results with stakeholders and discuss the future directions of the Project; and

Step 8. Reach an agreement on the evaluation results between the Japanese and South Sudanese sides.

2-2. Criteria of the Evaluation

Five evaluation criteria used in the evaluation are defined as follows:

Relevance	Relevance is assessed in terms of the Project's validity in relation to the development policy of the South Sudanese Government at the evaluation stage, Japan's Official Development Assistance (ODA) policy, and the needs of the Project beneficiaries, as well as the appropriateness of the project approach to address the needs.
Effectiveness	Effectiveness is assessed based on the prospect of achieving the Project Purpose by the end of the project period and whether this is due to the Project's Outputs.
Efficiency	Efficiency is assessed by focusing on the relationship between Outputs and Inputs in terms of timing, quality and quantity of Inputs. It measures to what extent Project Inputs have economically been converted into Outputs in consideration of the achievements of both Inputs and Outputs.
Impact	Impact is assessed based on the prospect of achieving the Overall Goals within three to five years of the project completion and the positive and negative changes have been produced, directly or indirectly as a result of project implementation.

Sustainability	Sustainability is assessed in terms of institutional, organizational, financial and technical aspects, by examining the extent to which the achievements of the Project will be maintained or further expanded by the South Sudanese side after the project period.

2-3. Evaluation Grid and Data Collection Methods

(1) Evaluation Grid

The Team evaluated the Project based on the evaluation questions listed in the evaluation grid (see Annex 4 for the list of evaluation questions and evaluation results of the questions.). The evaluation grid is comprised of three sections: (1) Project achievements; (2) Implementation Process; and (3) Evaluation by the Five Criteria.

(2) Data Collection Methods

The following sources of information and data were used in the joint terminal evaluation:

1) Interviews with and/or questionnaires' answers from stakeholders at SSUWC HQ, the Juba Station, MWRI as well as development partners (see Annex 2 "List of Interviewees");
2) Documents agreed upon by both sides prior to and/or during the course of the Project implementation;
3) Records of inputs from both sides and activities of the Project (see Annex 3 "Inputs") ;
4) Site visits (SSUWC Juba Station, pumping stations, public tap stands, tanker filling stations);
5) Documents that provide data and information indicating the degree of achievements of the Project Outputs, Project Purpose, and Overall Goals, and
6) Policy documents that show the project's relevance and sustainability.

3. Performance and Implementation Process of the Project

3-1. Performance of the Project

3-1-1 Inputs

(1) Japanese Side

The Japanese side provided the following inputs to the Project (see Annex 3-1 "Inputs by the Japanese Side" for details.).

1) Assignment of Experts

The Japanese side has assigned eight experts to the Project. The expertise and assigned periods of experts are the following. (see Annex 3-1-1 "Assignment of Experts").

Table 1. Expertise and Assigned Period of Experts

Expertise	Number (Person)	Assigned period (M/M)
Chief Advisor/Water Utility Management	1	12.90
Water Treatment Plant /Pumping Facilities Operation and Maintenance (1)	1	9.84
Pumping Facilities Operation and Maintenance (2)	1	1.00
Transmission and Distribution Facilities Operation and Maintenance	1	12.53
Water Quality Management	1	9.47
Financial Evaluation/Water Tariff	1	9.60
Community Development (1)	1	7.60
Coordinator/Community Development (2)	1	11.26
Total	8	74.20

2) Training in Japan and the Third Country

The Japanese side has provided overseas training to 53 staff members (6 people in Japan, and 47 people in Kenya) from MWRI, SSUWC HQ, the Juba Station, the Wau station and the Malakal station (see Annex 3-1-2 "Training in Japan and the Third Country").

3) Provision of Equipment and Materials

The Japanese side has provided equipment necessary for O&M of facilities (e.g. water quality test kit, chlorine injector, and flow meters), motor bikes, office supplies and equipment (e.g. a photocopier, desktop computers, and printers), and other machinery and equipment necessary for the implementation of the Project, which amounted to USD 220,829 (see Annex 3-1-3 "Provision of Equipment and Materials").

4) Construction of Public Water Tap Stands and Flow Meter Chambers

The Japanese side has constructed three public tap stands and 11 chambers for flow meters, which amounted to USD 124,899 (see Table 2 below).

Table 2. Construction Cost of Public Taps and Flow Meter Chambers

Item	Quantity	Amount (USD)
Public taps	3	75,530
Chambers for flow meters	8	19,643
Chambers for flow meters	3	11,944
Fence	7	17,782
Total	21	124,899

5) Operational Expenses by Japanese Side

The Japanese side has allocated the total amount of JPY 22,066,702 (Approximately USD 219,351) for the operational costs of project activities (see Annex 3-1-4 "Operational Expenses by Japanese Side").

(2) South Sudanese Side

The South Sudanese side has provided the following inputs to the Project. (see Annex 3-2 "Inputs by the South Sudanese Side" for details.)

1) Assignment of C/Ps

The South Sudanese side has assigned the Chair, one Project Director, one Project Manager, and twelve SSUWC members from SSUWC HQ and the Juba Station as C/Ps to the Project (see Annex 3-2-1 "Assignment of C/P Personnel").

2) Facilities

The South Sudanese side has provided a room in SSUWC Juba Station for Japanese Experts and training venues for the Project activities.

3) Operational Expenses by South Sudanese Side

The South Sudanese side has allocated the total amount of SSP 218,230 for the operational costs of project activities (see Annex 3-2-2 "Operational Expenses by South Sudanese Side").

3-1-2 Achievements of Outputs

(1) Achievements of Output 1

Output 1: Capacity of SSUWC-Juba Station with respect to operation and maintenance of water intake and treatment facilities is improved.
Objectively Verifiable Indicators (OVIs) 1-1. Monthly reports and annual reports in which O&M data is compiled. 1-2. Annual plan on water treatment plant. 1-3. The number of staff who acquired adequate O&M skills for WTP increases from 0 to 11 persons. 1-4. Plant average operating hour per day increases from 17.9 hours (2011 average) to 22 hours/day 1-5. The monthly average ratio that the quality of treated water with respect to turbidity is below 5 NTU increases from 90% to 100%. 1-6. The monthly average ratio that the quality of treated water with respect to residual chlorine falls in the range between 0.7 mg/l and 1.2 mg/l increases from 10% to 80 %.

Output 1 is evaluated to have mostly been achieved judging from the assessment on the implementation of activities as well as the levels of staff's capacity in O&M of water intake and treatment facilities.

The capacity of the purification department's staff in O&M of the water intake and water treatment plant (WTP) has been strengthened by a series of training activities that have been conducted by the JICA Expert Team throughout the Project period as well as the overseas training in Kenya (see Annex 3-1-3 "Training in Japan and the Third Country" and Annex 5 "Training in South Sudan"). According to the results of examination, it was assessed that eleven staff out of the 25 trained staff in the purification department have acquired basic O&M skills for WTP (OVI 1-3).

Under the technical guidance provided by the JICA Expert Team, staff of the purification department have conducted a baseline survey for understanding the status of the intake pumping system and WTP, maintained daily records of O&M, and prepared the O&M plan. In cooperation with C/Ps, the JICA Expert Team prepared O&M manuals and SOP so that staff can conduct proper O&M without an assistance of Experts (see Annex 6 "List of Reports, Manuals, Database and Training Materials"). Staff have mastered proper O&M methodologies including injecting appropriate amounts of chlorine and carrying out back wash. This has led to an improvement in the water quality; the turbidity of treated water constantly stays below 5 NTU in contrast to the monthly average ratio of 79% in 2011 (OVI 1-5) while the ratio of residual chlorine that falls within the target range (0.7 – 1.2 mg/l) improved from an average of 31% in 2011 to 91% in April 2013 (OVI 1-6).

Staff have become able to use a computer and produce monthly reports from the daily monitoring records of the volume of treated water, chlorine consumption, and operation of generators, which is a substantial improvement from their original skill level and understanding about O&M (OVI I-1). The department staff fully understand the importance of daily monitoring, with the thorough checking and cleaning of facilities having become their routine activities. With the support by the

JICA Expert Team, main C/P developed the annual plan in 2011 and 2012, which included the performance targets for water quality, water production, and pump operation, as well as the statements on outstanding problems, activities for addressing the problems, and required resources (OVI 1-2). Although staff can prepare monthly reports on their own through simple calculation and the filling out of the format developed by the Project, their analytical and planning capacity needs further improvement.

As for the operating hours of WTP (OVI 1-4), it is deemed difficult to achieve 22 hours per day by the end of the Project period under the condition in which SSUWC generates its own power by purchasing fuels for generators from collected water bills. When the baseline data was collected, SSUWC was receiving a relatively stable supply of electric power, which allowed WTP to be in operation for 17.9 hours per day on average. The target plant operating hours (22 hours/day, OVI 1-4) was determined at the time of the baseline survey in 2011 based on the assumption that WTP would receive a stable power supply from the city. Although the direct line from the city power was connected in January 2012, the power supply has been unstable and completely stopped since January 2013. Although the current average plant operating hours is 13.7 hours per day, the operating hours is expected to be increased even without external power supply, as a result of the forthcoming increase in bill collection in 2013 following the adoption of the strategy for efficient billing, new water tariff and improved water quality (see (4) "Achievements of Output 4" for details).

(2) Achievements of Output 2

Output 2: Capacity of SSUWC-Juba Station with respect to operation and maintenance of water transmission and distribution facilities is improved.
Objectively Verifiable Indicators (OVIs)
OVI 2-1. Monthly reports and annual reports in which O&M data is compiled.
OVI 2-2. Annual operation and maintenance plan on O&M of water transmission and distribution facilities.
OVI 2-3. The number of staff who acquired adequate O&M skills for transmission and distribution increases from 0 to 10 persons.
OVI 2-4. Application of a formulated Pump Operation Plan by the Project is started in 2012.

Output 2 is evaluated to have mostly been achieved judging from the achievement levels of its indicators.

Survey activities conducted under the instruction of the JICA Expert Team led to an improvement of the understanding of the distribution department staff on the distribution pipelines, the working condition of transmission and distribution facilities, and the transmission water flow. Based on the survey of the water supply service and existing transmission and distribution facilities, the Pump Operation Plan was developed in 2012 (OVI 2-4); however, treating and distributing water according to the plan was difficult due to the unstable power supply. Since January 2013, the city power has

been completely suspended. Staff of the distribution department then calculated possible operation hours of electric generators, based on which they revised the Pump Operation Plan, as the station is obliged to use only diesel for its operation.

Staff of the distribution department and other departments had never used a computer for data management and report writing before the Project started. The JICA Expert Team provided hands-on training on the use of a computer, and then the staff became able to compile data by themselves, as monthly and annual reports in the computer (OVI 2-1), on the operation of the transmission and distribution facilities including the volume of water flow, cases of water leakages and repairs, and the number of installations or replacements of pipes. Additionally, the JICA Expert Team has provided practical training in proper O&M in water transmission and distribution. GPS/GIS was introduced for identifying water leakages and recording newly installed distribution pipes. Based on the oral and written examination, the JICA Expert Team recognized that 10 out of the 13 trained distribution department staff have acquired adequate O&M skills for the operation of transmission and distribution facilities (OVI 2-3).

With the support by the JICA Expert Team, staff of the department developed the annual operation and maintenance plan in 2011 and 2012 covering performance targets in water flow and repairs of water leakages as well as outstanding problems, activities for addressing the problems, and required resources (OVI 2-2). Due to the lack of budget for purchasing necessary materials for proper O&M, the number of repair works against the cases of water leakages has not been sufficient. It is recommended that continuous efforts be made to generate more revenues to secure the proper maintenance of the distribution network.

(3) Achievements of Output 3

Output 3: Capacity of water quality management of SSUWC-Juba Station is improved
Objectively Verifiable Indicators (OVIs) OVI 3-3. Water quality management report (monthly and annual) in which water quality monitoring data is compiled. OVI 3-4. The number of staff who acquired adequate water quality test skills increases <u>from 0 persons to 2 persons.</u>

Output 3 is evaluated to have been achieved judging from the achievement levels of its indicators. While all training under Output 3 has been conducted as planned, a longer time frame than originally expected was needed for the lab staff to comprehend basic ideas of water quality tests including the concept of unit and simple arithmetic. Continuous On-the-Job Training (OJT) by the JICA Expert Team and repeated experiments have enhanced the water quality test skills of the two lab staff (OVI 3-2).

The water testing lab staff collect samples daily from WTP, weekly from pumping stations and elevated tanks, and monthly from water tap stands and tanker filling stations in Juba City, and

conduct water test on turbidity, residual chlorine, pH, conductivity, Total Dissolved Solid (TDS) and color. After training in basic computer literacy and the preparation of the data format, these staff became able to develop monthly reports compiling the results of daily water tests.

Given the current limited capacity of the water test laboratory (i.e. the staff and facilities), the training of the existing staff in testing more parameters including microbiology is difficult. Equipping the water test laboratory with qualified staff and proper facilities is essential in order to cater to the need for water quality tests.

(4) Achievements of Output 4

Output 4: Understanding of financial conditions of SSUWC-Juba Station is enhanced.	
Objectively Verifiable Indicators (OVIs)	
OVI 4-1	Revenue collection reports are prepared monthly.
OVI 4-2	Recommendations on revenue collection improvement are made.
OVI 4-3	Management method of public water tap stands is established.

Judging from the achievement levels of its indicators, Output 4 is evaluated to have mostly been achieved. In cooperation with the staff of the financial department, the JICA Expert Team conducted a study on the actual situation of the revenue collection in the Juba Station. Based on the analysis of the cost structure, recommendations on the improvement of revenue collection and water tariff have been put forth in the budget plan and the annual plan of the Juba Station (OVI 4-2). The recommendations have been reflected in the increase of the water bills. In view of the forthcoming financial independence of the Juba Station, the JICA Expert Team provided training in the concept of tariff setting and cost recovery for the existing operation of the Juba Station.[2]

In consultation with the staff of the financial department, the JICA Expert Team developed a customer ledger database to be used for compiling customers' information and issuing bills, which contributed to an achievement of efficiency in bill collection. Staff of the financial department participated in the training in Kenya on the metered system for house connection and customer services. In addition to the training for the management of customer ledger, the JICA Expert Team has also provided basic computer training for the staff. As a result of a series of these training activities, the staff have acquired skills to prepare monthly reports through extracting data from the database (OVI 4-1); the routine of compiling information to develop reports has been well established. However, there are still four major challenges that could hinder effective revenue collection: (1) the insufficient number of staff who distribute bills; (2) a large number of unidentified consumers using SSUWC's water for free; (3) the lack of a map indicating the location of customers; and (4) inadequate budget for purchasing water meters and other materials required for house connections.

[2] SSUWC developed the interim tariff to maintain the operation and maintenance of existing facilities after the training.

Through the activities of collecting the baseline information, staff of the SSUWC Juba Station have gained better understanding on the station's financial situation, status of installed water meters, and level of customer satisfaction. Following the pilot operation and studies on the management models for public taps and tanker filling stations, the JICA Expert Team recommended that the public taps and tanker filling stations be managed by individual operators (OVI 4-3). In preparation for increased public taps and tanker filling stations, the Project has developed a draft contract and data log sheet for site operators. When the JICA's Grant Aid project, "The Project for the Improvement of Water Supply System of Juba in South Sudan" (2012-2015), is completed, additional 120 public taps and eight tanker filling stations will be in operation in 2015.[3] Since the Juba Station will be required to manage a large number of site operators and monitor their activities, the financial staff's capacity in contract management needs to be strengthened.

(5) Achievements of Output 5

Output 5: Capacity of SSUWC HQ to support SSUWC Juba Station is enhanced.
Objectively Verifiable Indicators (OVIs) 5-1. SSUWC HQ examines the monthly reports submitted by SSUWC Juba Station every other month. 5-2. The number of annual reports and plans that SSUWC HQ examined becomes 2 each. 5-3. The existing water supply facilities and services are inputted into the established database.

Output 5 is evaluated to have been achieved judging from the achievement levels of its indicators.

With the guidance and instruction by the JICA Expert Team, SSUWC HQ has been carrying out the evaluation of monthly reports submitted by the Juba Station in accordance with "The Roles of SSUWC Headquarters and Reporting and Planning System". SSUWC HQ has been holding a review meeting with the management staff of the Juba Station, examining monthly reports submitted by the station, and providing feedback to the station every month (OVI 5-1). SSUWC HQ also reviewed and assessed annual reports and the up-coming year's plan of the Juba Station in 2011 and 2012 (OVI 5-2). While the structure of providing feedback and guidance to the station has been established, continuous efforts to support the Juba Station as well as other area stations are required for strengthening the newly established organizational structure.

The Project conducted a study on the Wau and Malakal stations to collect information on their facilities and status of service delivery. Along with the information on the Juba Station, the data on the Wau and Malakal stations was compiled in a report (OVI 5-3).[4] The study presented the current situation of each of the three area stations; however, it is still unclear as to how SSUWC HQ is going to incorporate and reflect the compiled information in its planning and management.

[3] The Juba Station currently manages four out of six public taps and one out of four tanker filling stations. Two public water tap stands and three tanker filling stations are out of order due to insufficient water flow.
[4] The Project did not conduct survey in other area stations due to safety concerns.

3-1-3 Prospect for Achieving the Project Purpose

Project Purpose: The management capacity of SSUWC-Juba Station is enhanced through capacity development on operation and maintenance of water supply facilities.
Objectively Verifiable Indicator (OVI) 1. 80% of 25 essential performance indicators set in the annual plan which are measurable at the SSUWC Juba Station is improved compared to the 2011 average.

Table 3. Progress in 25 Essential Performance Indicators

		Indicators	Unit	Monthly average in 2011	April 2013
Production					
1	P1	Average daily production volume (estimate)	m3/day	5,208	3,711
2	P2	Average plant operating hour per day (estimate)	hours/day	17.9	14.1
3	P3	Average daily clear water pumping station operating hours	hours/day	28.2	27.2
4	P4	Gap between design capacity and actual production	m3/day	1,992	3,489
5	P5	Operating ratio (actual average production/design capacity)	%	72	52
6	P6	Operating ratio (actual average operation hours/24 hours)	%	74	58
Distribution					
7	D1	Average daily pump operation hours of Hospital PS	hours/day	5.8	3.3
8	D2	Average daily pump operation hours of Konyokonyo PS	hours/day	1.5	0.4
9	D3	Total transmission and distribution flow from WTP	m3/day	4,928	2,232
10	D4	Percentage of No. of leakage repaired in No. of leakage reported	%	55	100
11	D5	The number of days that data on pipe maintenance is recorded per month	days/month	0	30
Water Quality					
Daily Sampling (purification plant)					
12	W1	Compliance ratio of turbidity	%	79	100
13	W2	Compliance ratio of residual chlorine	%	31	91
Weekly sampling (tank in the city)					
14	W3	Ratio of days that sampling was conducted to required total weekly sampling days	%	43	100
15	W4	Ratio of actual samples to the total number of required weekly samples	%	19	100
16	W5	Compliance ratio of turbidity	%	77	83
17	W6	Compliance ratio of residual chlorine	%	13	100
Monthly sampling (tap in the city)					
18	W7	Ratio of days that sampling was conducted to required total monthly sampling day	%	63	83
19	W8	Ratio of actual samples to the total number of required monthly sample	%	42	83

		Indicators	Unit	Monthly average in 2011	April 2013
20	W9	Compliance ratio of turbidity	%	76	100
21	W10	Compliance ratio of residual chlorine	%	14	80
Sales					
20	S1	Number of bills delivered	num	545	476
21	S2	Amount of bills delivered	SSP/month	249,348	330,842
24	S3	Bills issued/ a total number of connection	%	16	13
25	S4	Collected amount (SSP)/ a total amount billed	%	21	50

The prospect for achieving the Project Purpose by the end of the project period is evaluated as promising judging from the achievement levels of its indicators. Except for the Performance Indicators (PIs) that are determined by the situations of power supply and accessibility to fuel (i.e. P1-P6, D1-D3 in Table 3), all the PIs have improved from the values in 2011.

As discussed in 3-1-2 "Achievements of Outputs," the management capacity of the Juba Station has considerably improved in each department though OJT by the JICA Expert Team and overseas training in Kenya and Japan. Although staff's limited skills of English, computer and arithmetic could be hindering factors, the JICA Expert Team adopted appropriate approaches for capacity development and succeeded in raising the skill level of the Juba Station's staff. The capacity development approaches including hands-on training, teamwork and problem solving through discussions with C/Ps have been highly appreciated by C/Ps and proved to be a quite effective method for capacity development. The JICA Expert Team used figures and pictures in the posters and manuals illustrating operation procedures in order to make these materials simple and understandable for all the staff including the illiterate and the uneducated. The JICA Expert Team first trained managers and core staff to be department-level trainers so that they could translate the Experts' lectures and transfer the proper O&M methodologies to the staff whose English proficiency and basic arithmetic skills are limited.

As a result of the above-mentioned OJT, proper O&M procedures are currently applied to WTP, pumping stations and distribution network in which staff regularly monitor the water supply facilities and properly keep records of the water volume and dosage of chlorine and alum. Daily O&M records are compiled in electronic data sheets developed by the Project. Some of the staff who had never used a computer before the Project have become able to compile the data, conduct simple analysis and prepare monthly reports. Staff's understanding of the locations of distribution pipes through mapping and their practices of keeping records of the status of water leakages have enabled more organized and efficient repair work of water leakages (D4 in Table 3). Water quality tests are now been conducted daily on WTP, weekly on pumping stations and water tanks, and monthly on

public water taps and tanker filling stations (W3-4, W7-8 in Table 3). The quality of water from the station as well as sampling points in the city also fulfills the standards (target ratios) for turbidity and residual chlorine (W1-2, W5-6, W9-10 in Table 3). Using the customer ledger database developed by the Project, the financial department has become able to make sure that high-volume water users are billed in order to increase revenue. By placing a priority on the billing to high-volume water users, the amount of delivered bills increased from a monthly average of SSP 249,348 in 2011 to SSP 330,842 in April 2013.[5]

As for the indicators that are dependent on the availability of power supply and accessibility to fuel, which are external factors to the Project, staff of each department calculate possible operation hours for WTP and pump stations based on the income amount from water bill collection, revise the operation plans, and operate the facilities accordingly. While achieving target operation hours defined in the PDM by the end of the Project period is deemed difficult without stable power supply, staff have become able to operate water supply facilities according to the plans using acquired knowledge and skills. The daily plant operating hours, which is currently 13.7 hours, is expected to increase since the income from water bills will increase as a result of the efficient billing system (i.e. data management using the digital customer ledger, strategy of and billing high-volume users), revised water tariff, and improved quality of water.

3-1-4 Prospect for Achieving the Overall Goals

Overall Goals:
1. The quality of the water supply service extended by SSUWC-Juba is improved.
2. The management capacity of SSUWC HQ is improved.
Objectively Verifiable Indicators (OVIs)
1. The customer satisfaction on water supply service of SSUWC-Juba Station is enhanced.
2. All essential performance indicators are further improved from the final date of the Project.
3. All reports and plans submitted from area stations are assessed and guidance is given back to them.

The prospect for achieving the Overall Goals within three to five years after the project completion is promising judging from the achievement levels of its indicators; however, the limited power supply is likely to hinder the achievement of the Overall Goals.

According to the Social Condition Survey for Water Supply Service conducted by the Project, the customer satisfaction rate on SSUWC's water supply service (OVI 1) has increased from 22.4% in 2010 to 36.4% in 2013. Staff of the Juba Station received comments from customers that water

[5] The number of delivered bills decreased from a monthly average of 545 in 2011 to 476 in April 2013. This was because some customers rejected bills on the ground of failure of water provision caused by reduced operating hours and subsequent decrease of water production.

quality had improved. The elements of current dissatisfaction of SSUWC's water supply service include irregular water supply, short service hours, insufficient water supply and low water pressure.

As discussed in 3-1-3 "Prospect for Achieving the Project Purpose," all 25 essential performance indicators, except those linked with the power supply grid (i.e. P1-P6, D1-D3 in Table 3), have greatly improved since the Project started. The essential PIs are expected to be further improved after the Project period should proper O&M be continuously carried out and bill collection be increased (OVI 2).

Following the evaluation checklist developed by the Project, SSUWC HQ reviews and evaluates monthly reports and annual plans submitted by the Juba Station. Since SSUWC HQ has carried out the reviewing process multiple times, SSUWC HQ is already capable to assess reports and plans from other area stations (OVI 3) as well. However, without proper guidance and attention, area stations other than the Juba Station are unable to prepare and submit reports to SSUWC HQ. There is a need for discussions in SSUWC HQ in relation to how to extend support to other area stations and promote coordination among donors that support respective stations.

SSUWC HQ is currently in the process of studying and understanding the status of O&M in each of the area stations. Since reviewing reports of and providing guidance to area stations have not been carried out by SSUWC HQ during the Project period, whether SSUWC HQ can provide, based on detailed analysis, appropriate guidance to each respective area station is yet to be known.

3-2. Implementation Process of the Project

3-2-1. Project Management, Monitoring and Ownership

The Project has been conducted with an effective and open communication between the JICA Expert Team, SSUWC Juba Station and HQ staff members. Joint Coordination Committee meetings were held annually to monitor the overall progress of the Project. C/Ps and the JICA Expert Team have held weekly meetings to share and discuss the results of completed activities, outstanding issues and the countermeasures that should be taken by the SSUWC Juba Station and HQ, through which C/Ps' strong ownership of and commitment to supplying safe water have been developed. Given the Experts' short-term assignments, the JICA Expert Team arranged their fieldwork schedule so that their absence from the SSUWC Juba Station was minimized while encouraging C/Ps to attend weekly meetings. As a result, organizing weekly meetings among all the departments of the Juba Station became a routine activity. Through these regular meetings that have nurtured strong cooperation between C/Ps and the JICA Expert Team, the Project has responded flexibly to the ever-changing political and fiscal situations and made sure that the planned activities are conducted smoothly.

3-2-2. Methods of Maintaining and Enhancing Motivation

The JICA Expert Team made various efforts for maintaining and enhancing motivation of the staff of the Juba Station, especially those who have limited English proficiency and computer and basic arithmetic skills. The Mid-Term Review pointed out that the inability to comprehend training sessions was one of the factors for C/Ps' low participation in training sessions. In order to promote understanding of training contents among non-English speaking staff, the JICA Expert Team gave examples and cases as to what actions to be taken in specific cases of situation, and provided visual aids including tables and simple figures demonstrating proper O&M methodologies of facilities. The Project assistants and SSUWC's English speaking staff helped the JICA Expert Team by interpreting the training sessions for the staff whose English comprehension is limited. After discussions with C/Ps followed by multiple revisions, simple and user-friendly Standard Operational Procedures (SOPs) and manuals were developed. Working together with the JICA Expert Team who has a high level of diligence and patience, C/Ps learned O&M techniques as well as time management, problem solving and commitment for providing safe water. In order to raise C/Ps' motivation, the JICA Expert Team occasionally provided incentives for C/Ps, including an award to the staff who scored high on a comprehension test after training.

3-3. Responses to the Recommendations of the Mid-Term Review

3-3-1. Recommendation 1: Strengthen public relations

Following the recommendation of the Mid-Term Review, the Project conducted several public relations (PR) activities. The Juba Station invited 60 students from local elementary and secondary schools for a study tour of WTP. Staff of the Juba station presented the function of water supply facilities using posters to the school children. The process of preparing for presentation raised the motivation and ownership of staff. The local TV station broadcasted the study tour at the Juba station. A song called "Water is Life" was written by a local musician for raising awareness of water consumers in preserving water and played for the school children. The Project also organized a picture contest, which helped to promote a better understanding about the importance of preserving water. Continuous efforts in raising awareness of consumers on water supply services are encouraged for promoting better understanding about the function of SSUWC and improving bill collection.

3-3-2. Recommendation 2: Proactive contribution in the activities from both sides

The Mid-Term Review called for C/Ps' active participation in meetings and training as well as the JICA Expert Team's additional actions to fill the capacity gap. The level of C/Ps' participation in weekly meetings and training sessions has improved since the Mid-Term Review. Staff of each department proactively participated in weekly meetings with the issues for discussion typed up and

printed out in advance for distribution by themselves. The JICA Expert Team offered additional computer classes to teach basic functions of computer and English training to improve staff's English skills. Training course was interpreted by English-speaking staff and Project assistants. Through these efforts and contribution from both sides, capacity development has been promoted; a significant improvement in the capacity of trained staff was confirmed in the capacity assessment.

3-3-3. Recommendation 3: Input additional equipment necessary to enhance the Project effectiveness

Following the recommendation of the Mid-Term Review, additional equipment has been provided in a timely manner to produce expected Outputs. New chlorine injectors have enabled staff to measure appropriate amounts of chlorine. Flow meters for measuring raw water have been replaced with electromagnetic ones to avoid frequent malfunction from clogging with algae. A total of eight motor cycles have been provided to make the activities for bill delivery, water sampling, meter checking and monitoring of distribution pipes more efficient.

3-3-4. Recommendation 4: Secure necessary budget for O&M activities

Securing budget for continuous O&M activities seems to be the most difficult element. Neither the expenditures for reagent and the domestic travel for staff of area stations outside Juba City (as pointed out by the recommendation of the Mid-Term Review), nor the in-kind provision of chemicals and fuel for generators have been made under the fiscal austerity. In exchange, the Juba Station has been allowed to retain the full amount of the revenue from bill collection and use it for O&M. In order to respond to the changed financial regime, staff have revised the Pump Operation Plan so that operation hours of facilities match the level of the collected water bills. With a view to achieving the goal of 24 hour pump operation by January 2014, the Juba Station is in the midst of taking a number of measures in increasing bill collection, including charging bills according to the revised water tariff, adopting an efficient billing strategy, and installing water meters.

3-3-5. Recommendation 5: Strengthen the organization by recruiting necessary staff

Despite the recommendation made by the Mid-Term Review, some of the key staff in the respective departments and HQ have not been appointed. Although existing staff in the laboratory have been improving their skills in sampling tests, a larger number of eligible staff are urgently needed. Recruiting staff in the middle management positions in SSUWC HQ is recommended for better planning and management of SSUWC HQ and all the area stations.

4. Result of the Evaluation

4-1. Evaluation by the Five Criteria

4-1-1 Relevance: High

The Relevance of the Project is evaluated as high since the improvement of water supply services through the capacity enhancement of SSUWC is in line with the needs of South Sudanese people, the Government of South Sudan's development policy, and the Japanese Government's aid policy to South Sudan. The project approach (SBI/CBI) is also deemed appropriate.

(1) Relevance with the Needs of South Sudanese people

The Project is in line with the needs of the end beneficiaries since urban water supply had not been adequately provided in Juba due to the absolute lack of purified water and inappropriate O&M of the water distribution system. While the Juba Station with the water treatment capacity of 7,200 m^3 per day supplies treated water in the City, its coverage is mostly limited to businesses and factories in the city.[6] For drinking water, people rely on untreated river water distributed by water tankers or water from shallow wells with a high level of salt contamination. With the rapid increase in population of Juba, the Government was in need of urgently providing adequate and reliable water to people living in the city.

(2) Relevance with the Development Policy of the South Sudanese Government

Given the above-mentioned situation, the Republic of South Sudan (ROSS) sets the provision of urban water and sanitation as one of the priority areas for the nation's socioeconomic development in its "Water Policy" (2007). In the Policy, the Government aims to promote efficient, equitable and sustainable development and use of available water resources, and effective delivery of water and sanitation services. In particular, ROSS is committed to ensuring rapidly growing urban populations benefit from access to safe, affordable and reliable water supply and sanitation services. The specific objectives in the Policy include: to promote technical and management training of staff working at all levels in urban water and sanitation services; and to improve the financial sustainability of urban water systems through the introduction of efficient management practices.

(3) Relevance with the Japanese Aid Policy to South Sudan

Japan's assistance policy for South Sudan sets "Assistance for Basic Human Needs (BHN)" as one of the three priority areas for its development assistance towards South Sudan, which constitutes part of the Japan's assistance policy to Sudan in the consolidation of peace adopted at the first Sudan consortium in 2005 in Oslo. As part of the assistance for BHN, the aid policy for South Sudan aims

[6] The service coverage is only 8% of the city population.

at the enhancement of public service delivery including the improvement of water supply systems. Japan is committed to providing safe water to 6.5 million people in Africa, which was expressed at the Fourth Tokyo International Conference on Africa Development (TICAD IV) in 2008.

(4) Appropriateness of the Project Approach

The Project approach for improving the management capacity of the SSUWC Juba Station and HQ in South Sudan is deemed appropriate. The Project conducted a series of OJT activities primarily targeting department managers and technical staff of the Juba Station. The JICA Expert Team carried out the daily O&M activities with the department managers and technical staff and developed their capacity in record keeping, maintaining water supply facilities, communicating among departments and preparing reports. The capacity development approach through hands-on instruction and practical training proved to be appropriate since the department managers and technical staff of the Juba Station could immediately apply knowledge and skills to their daily tasks.

4-1-2 Effectiveness: Relatively High

The Effectiveness of the Project is assessed as relatively high because the prospect of the Project Purpose being achieved by the end of the project period is deemed promising and there is a clear linkage between the achievement of the Project Purpose and the successful production of Outputs.

(1) Prospect for Achieving the Project Purpose

As discussed in 3-1-3 "Prospect for Achieving the Project Purpose," the prospect for the management capacity of the Juba Station to be enhanced by the end of the Project period is evaluated as promising. Due to the unstable power supply since 2012, the Project faced difficulty in reaching the target operation hours of WTP and pumping stations. As a result, 56% (14 PIs) of the PIs marked improvement in April 2013, which is lower than the target rate of 80%. Under the current power supply situation, achieving the target operation hours and water production volume deemed difficult. On the other hand, staff acquired skills and knowledge to calculate possible operation hours of WTP and pump stations to match the expected revenue from bill collection and to operate the water supply facilities in accordance with the developed operation plans. In view of becoming a self-sustained organization and achieving 24 hour operation by January 2014, SSUWC intends to continue carrying out proper O&M activities and take appropriate measures (i.e. the efficient billing system, revised water tariff, and meter installation for house connections) to increase its revenue. Once the income increases due to improved bill collection, staff will be able to manage WTP and pump stations for longer hours and produce a larger amount of water.

(2) Causality between the Project Purpose and Outputs

The five Outputs cover all the major components (O&M of water intake and treatment facilities

[Output 1], O&M of water transmission and distribution facilities [Output 2], water quality management [Output 3], financial management [Output 4] and SSUWC HQ's support system to the Juba Station [Output 5]) that are necessary to enhance the SSUWC's management capacity. Therefore, the successful production of the five Outputs is directly linked to the achievement of the Project Purpose. As discussed in 3-1-2 "Achievement of the Outputs", most of the expected Outputs have been either achieved or mostly achieved. The capacity in the operation and management of the SSUWC Juba Station as well as in the support system by SSUWC HQ is assessed to have been improved.

4-1-3 Efficiency: Moderate

The Efficiency of the Project is evaluated as moderate since most Project activities have been conducted as planned to produce the intended Outputs although there have been some constraints in the production of Outputs caused by such issues as the decrease in the government budget and the insufficient power supply.

(1) Production of Outputs and Causality between Inputs/Activities and Outputs

In consideration of the drastic changes in external conditions (i.e. fiscal austerity, interruption of the power supply, and transfer of personnel) that have significantly affected the Project, the Project has taken appropriate measures and practical approaches, including the revision of the Pump Operation Plan, the provision of incentives (e.g. award) and active discussions among C/Ps and the JICA Expert Team at weekly meetings, in order to facilitate the successful production of intended Outputs.

Most inputs that are necessary for the implementation of activities have been allocated in a timely manner and used effectively to contribute to Output production. The JICA Expert Team adjusted the timing of its members' assignments to minimize the absence of the Team from the SSUWC Juba Station throughout the Project period, which helped timely implementation of Project activities. The overseas training in Japan and Kenya was organized multiple times in a wide variety of fields including customer meter management, human resource management, O&M of a water distribution network and of an electro-mechanical system. The opportunity for overseas training was extended to management and technical staff of HQ, MWRI, the Juba, Wau and Malakal stations, which has contributed to the nurturing of motivation and ownership to the Project of the staff from the management level to the field level. Following the recommendation of the Mid-Term Review (Recommendation No. 3), additional equipment including chlorine injectors, electromagnetic flow meter and motor cycles has been procured, which improved the efficiency of the Juba Station's operation.

While the South Sudanese staff's low attendance in the training and limited English skills reduced the efficiency of the Project at the initial stage of the Project, the JICA Expert Team patiently worked with staff, offered training in the same contents multiple times, and provided classes on basic English and computer literacy. As a result, the tangible improvements in daily practices have been observed including daily data collection and proper O&M procedures.

The Project has effectively cooperated with GIZ and USAID through information sharing. Donors including GIZ and USAID met monthly at the Urban Water Working Group meetings organized by SSUWC HQ. Project officers of GIZ and USAID were invited to seminars in which the Project's progress and planned activities were presented. The study report on the existing water supply facilities and services of the Juba and Malakal stations was shared with GIZ that is in the process of developing a comprehensive database on SSUWC area stations. USAID is currently developing a GIS map compiling customers' information in the Juba Station that is built on the GIS map of the distribution network developed by the Project.

(2) Important Assumptions of Outputs

Two issues that are related to the Outputs' Important Assumptions (risks of the decrease of the government budget and the insufficient power supply) have constrained output production. Due to the budget constraints, the expenses for reagent for water quality tests and chemicals have not been provided by the South Sudan side. The lack of provision of travel expenses for area stations hindered the implementation of the Project activity 5-5 "Assistance to SSUWC HQ in holding monthly meeting with stations and MWRI". While the monthly meetings have been organized by SSUWC HQ, no staff from the area stations other than Juba has participated in the meetings.

As discussed in 3-1-3 "Prospect for Achieving the Project Purpose," power supply has been suspended since January 2013. Staff has revised the operation plan and adjusted the operation hours of WTP and pump stations. While the water production volume has inevitably decreased, staff have been able to operate the facilities according to the planned schedule.

4-1-4 Impact: Good potentials to generate a large scale of impacts

The prospect for achieving the Overall Goals within three to five years after the project completion is evaluated as promising. If all the staff of SSUWC HQ and the Juba Station fulfill their commitment and carry on with proper O&M activities and financial management, the Project will generate a large scale of impacts.

(1) Prospect of Achieving the Overall Goals

The Overall Goals of the Project are (1) the improvement in the quality of the water supply service of the Juba Station and (2) the improvement of the management capacity of SSUWC HQ. As

discussed in 3-1-3 "Prospect for Achieving the Overall Goals", the prospect for achieving the Overall Goals within three to five years after the project completion is assessed as promising, judging from the achievement level of three OVIs: (1) the customer satisfaction rate on the water supply service; (2) essential PIs, and (3) SSUWC HQ's capacity in assessing area stations' reports and plans. Despite the decrease in the water production volume, the customer satisfaction has improved due to the improvement in water quality. Given the increasing trend of income from water bills in 2013, the operation hours of water supply facilities is likely to increase, which will lead to a further improvement in the customer satisfaction.[7] The entire system of regular monitoring of water supply facilities, data management, communication through weekly meetings, and monthly reporting to and assessment by SSUWC HQ has become routine activities of the Juba Station. It is important that staff of SSUWC and the Juba Station continuously implement the current O&M activities.

(2) Promoting and Inhibiting Factors for Achieving the Overall Goals

One of the major promoting factors to the achievement of the Overall Goals is the synergetic effects produced by the Project's cooperation with development partners (USAID, GIZ, MDTF, etc.) in improving the quality of urban water services in Juba City. During the Project, in selecting appropriate management models for tap stands, the JICA Expert Team referred to GIZ's operational procedure of public tap stands. GIZ requested the JICA Expert Team to share the database on the area stations developed by the Project so that GIZ could utilize the Project's database for the development of an asset management database. Under the Sustainable Water and Sanitation in Africa (SUWASA) program, USAID has been assisting the Wau and Maridi Stations in becoming self-sustained organizations. As part of the program, USAID developed a GIS map indicating the locations of customers' residences, payment information and the status of the meter installation of the Wau Station. USAID is planning to develop the similar type of a customer information map for the Juba Station under its Small Infrastructure Project (SIP), building on the GIS water distribution network database created by the Project. Effective cooperation with development partners will bring about synergy and promote the achievement of the Overall Goals.

As discussed in 3-1-2 "Achievements of Outputs", the power shortage has negatively affected the quality of the water supply service and will be a hindering factor for achieving the Overall Goals.

4-1-5 Sustainability: Moderate

The Sustainability of the Project is evaluated as moderate. On one hand the Project has developed human resources who have basic technical foundations to properly conduct O&M of water supply facilities, water quality tests and financial management, and built an internal mechanism for

[7] The Juba Station's income from bill collection has steadily increased from SSP 102,272 in January 2013 to SSP 166,076 in April 2013.

information sharing and collaboration among different departments. On the other hand, there are serious concerns in regards to the securing of the expenses for fuel and O&M and need for organizational strengthening of SSUWC HQ and the Juba Station.

(1) Institutional Aspects

Institutional sustainability is assessed to be ensured by the ROSS' overall strategies for urban water sector development. In 2011, the ROSS adopted "Water, Sanitation and Hygiene (WASH) Sector Strategic Framework" as a guideline to realize the National Water Policy (2007). The WASH Sector Strategic Framework provides for the urban water supply strategy that is aimed to "ensure efficient rehabilitation, expansion, development and management of UWS services on a sustainable, equitable and cost recovery basis". The Project is also supported by the "South Sudan Development Plan (2011-2013)," which places improved water and sanitation infrastructure as one of the top five priority programs under its Economic Pillar.

(2) Organizational Aspects

From the organizational perspective, roles and responsibilities of SSUWC HQ and each department of the Juba Station have been clearly defined and well understood among all parties. As a result of needs identified through Project activities, the Juba Station established the department of planning and projects and is planning to set up the customer service department. In order to function properly and improve the planning and customer services of the Juba Station, these new departments further require organizational strengthening and capacity development. Weekly meetings are being held involving all the departments of the Juba Station even during the absence of the JICA Expert Team, and are expected to continuously play an important role for sharing information on the progress of activities and discussing outstanding issues and upcoming plans.

Staffing issues pose challenges against organizational sustainability. The Mid-Term Review pointed out the need to increase qualified staff in SSUWC HQ and the Juba Station (Recommendation No. 5). At the time of the Terminal Evaluation, neither the management positions (i.e. a technical director and commercial director) in SSUWC HQ nor staff of the laboratory were recruited. In order to increase revenue, a larger number of staff is required for bill collection in addition to the existing four staff members. More engineers with a university degree are also necessary since the need for technical staff in water production and distribution is rising and the Juba Station currently has only two engineers out of four posts. It is reported that the request for appointing new staff both in SSUWC HQ and the Juba Station has been submitted to MFEP from the Managing Director of the SSUWC HQ.

(3) Technical Aspects

The Project has built a sound technical foundation for continuous O&M, proper record keeping and regular information sharing. Staff of the Juba Station have acquired basic skills and knowledge to carry out O&M activities in accordance with the annual plan. In particular, core staff of the purification, distribution and financial departments have started training their staff in respective assignments using skills and knowledge acquired from the Project. The quality of supplied water has improved as a result of injecting an appropriate amount of chlorine and flocculent and regular water tests. Staff's technical capacity in O&M of water supply facilities has reached a minimal level to properly operate and maintain the current facilities; however, continuously carrying out the newly introduced O&M procedures among all the staff in the Juba Station is necessary to raise the skill level of the station's staff for the extended pump operation and increased water production that are expected until the end of the Project period.

(4) Financial Aspects

The Project has contributed to the establishing of a base for achieving SSUWC's financial independence although it was not the main goal of the Project. Since the Government has suspended the in-kind provision of fuel for generators, the Juba Station has been purchasing the fuel using the revenue from bill collection and operating the water supply facilities according to its revised plan. The monthly revenue steadily increased from SSP 102,272 in January 2013 to SSP 166,076 in April 2013 as a result of the efficient billing system introduced by the Project and the revised water tariff applied in February 2013. Customers' increased willingness to pay due to improved water quality also seems to have contributed to the increase in the revenue. According to the revenue forecast created by the Project, the Juba Station will collect monthly revenues of SSP 202,000 and achieve 24 hours of operation by January 2014. While the quality and quantity of supplied water is expected to enhance, the Juba Station is examining the feasibility of new payment methods including setting up payment kiosks throughout the city and accepting payment through a direct deposit into the Juba Station's account in order to make payment easy for consumers who are unable to visit the SSUWC office. As long as the Juba Station continues ensuring the billing to large-volume water users and applying the revised water tariff, the monthly revenue will increase steadily. By investing collected bills in fuel for generators, the quality of water supply service will improve due to the extended operation hours of WTP and pump stations and the increased water production. Although it is deemed difficult to achieve the target plant operation hours per day (i.e. 17.9 hours, P2 in Table 3 of page 14) by the end of the Project period, the Juba Station is committed to increase bill collection through the introduction of the efficient billing system and the new water tariff in order to achieve the operation of 24 hours by January 2014.

4-2. Conclusion

The Project has made a significant progress in developing the management capacity for the SSUWC Juba Station and HQ. Judging from the achievement level of each expected Output, the Project Purpose is expected to be achieved by the end of the Project period.

The Project has high relevance assessed from the ROSS's development policies, Japanese Government's aid policies, and the needs of the beneficiaries. The effectiveness of the Project is evaluated as relatively high because the Project has succeeded in building the basic O&M and managing capacity of the Juba Station; however, raising the skill level of all the staff is indispensable for further achievement of operational efficiency of the water supply facilities. The efficiency of the Project is evaluated as moderate since most inputs have been successfully converted to the expected Outputs in spite of the staff's low participation in the Project activities in the initial stage of the Project. The Project has good potential to generate a large scale of impacts if staff continues their effort in conducting proper O&M and financial management of the Juba Station. In order to enhance the sustainability of the Project, more efforts are required for appointing eligible staff in the laboratory, SSUWC HQ, and the financial department, and increasing revenue to cover O&M costs.

Although laying the foundation for proper O&M and management of a water corporation in a post-conflict country is an enormous challenge, the Project has successfully brought about significant achievement in staff's operation and management capacity in the SSUWC Juba Station and HQ. In order to ensure the achievement of the Project Purpose by the end of the Project and further improve the sustainability and impact of the Project, the Joint Evaluation Team makes the following recommendations.

5. Recommendations and Lessons Learned

5-1. Recommendations

5-1-1. Ensuring the implementation of assigned tasks in accordance with the established procedures and data management system in each department

Before the Project implementation, there were no structured O&M procedures, digital record-keeping and data management system, or regular water quality analysis, all of which have been established by the Project. The Project also succeeded in assisting core staff of the Juba Station in acquiring proper O&M skills in the purification and distribution departments, data management skills in the financial department and regular water quality test in the laboratory. In order to further enhance the management capacity of the Juba Station for the expected increase of operation hours and water production, it is recommended that staff in the SSUWC Juba Station thoroughly conduct

the newly-established O&M, water tests, and billing procedures in accordance with the O&M manual and data management system developed by the Project.

5-1-2. Planning a structured internal training system

During the course of Project activities, core staff and C/Ps voluntarily started providing informal training for staff in each department. Peer training is effective since trainers can effectively respond to the trainees' learning needs using the already-established rapport and the shared language. Since raising staff's overall technical capacity is still necessary for further enhancing the skill level of O&M and bill-collection activities, it is recommended that the SSUWC HQ and the Juba Station start the planning of a structured internal training system.

5-1-3. Extending support to area stations

The Project laid out the SSUWC HQ's procedure in providing support to area stations through evaluating the Juba Station's monthly reports and upcoming plans and giving feedback in a systematic way. Although SSUWC HQ is capable of assessing reports submitted by the Juba Station, other area stations need proper guidance and attention to prepare and submit reports to SSUWC HQ. It is recommended that SSUWC HQ develop effective strategies to extend support to area stations outside Juba City; for example, organizing an area stations meeting periodically as a platform of sharing good practices and lessons learned or mandating all the area stations to submit reports regularly in the format developed by the Project. These measures will promote better communication and information sharing among SSUWC HQ and area stations.

5-1-4. Increasing bill collection

Although it is not a part of the Outputs or target objectives of the Project, continuous efforts in increasing bill collection are recommended in order to enhance SSUWC's financial sustainability under the ROSS's uncertain fiscal prospect. While the financial department of the Juba Station is carrying out the billing activities more efficiently than before through the digital customer ledger, a larger number of staff who deliver the bills would increase the income from water bills. The financial department has made efforts to introduce the methods that make customers' payments easier (e.g. payment through a direct deposit into the Juba Station's bank account, payment kiosks throughout the city). Installing meters for house connections and businesses will increase bill collection. In order to facilitate the process of installing meters, the cost of meter installation should be recommended during the Project period.[8] In addition, the Japan's Grant Aid project[9] will construct 120 public taps and 8 tanker filling stations by 2015 which is expected to contribute to an increase in bill collection. In order to properly manage and monitor the activities of a large number of site operators, the Juba Station is recommended to review the "Evaluation of the Management

[8] The Juba Station has 2,000 water meters granted by the Multi Donor Trust Fund (MDTF).
[9] The Project for the Improvement of Water Supply System of Juba in South Sudan (2012-2015)

Model for the Public Tap Stands and Tanker Filling Points", analyze lessons learned, and start planning the staffing structure of managing the public taps and tanker filling stations. The Juba Station's capacity in contract management also needs to be strengthened.

5-1-5. Recruiting qualified staff

Recruiting qualified staff in vacant positions is indispensable in enhancing the organizational sustainability. As recommended in the Mid-Term Review, directors' positions (i.e. technical director and commercial director) in SSUWC HQ and staff of the laboratory need to be filled as soon as possible. In addition, increasing staff for delivering bills will be of great help in increasing water bill collection. Appointment of engineers in the Juba Station would further increase the technical capacity of the purification and distribution departments. Since the request for appointing new staff for SSUWC HQ and the Juba Station has been submitted to MFEP, proper follow up is necessary to ensure the recruit process to make progress.

5-2. Lessons Learued

5-2-1. Methods of capacity development in a post-conflict country

A prolonged civil war in Sudan severely devastated public infrastructures and institutions including SSUWC. Most of the staff are undereducated while some are even illiterate or innumerate. In order to achieve the efficiency and effectiveness of the Project, it is important to assess the level of capacity and learning needs of C/Ps in the early stage of the Project period and take approaches suitable for the target groups. In the Project, the SOP, O&M manuals, and format of monthly reports have been revised multiple times so that staff can conduct O&M and prepare monthly reports on their own. The JICA Expert Team developed posters and manuals using figures and pictures illustrating operation procedures in order to make these materials simple and understandable for all the staff regardless of their reading ability. The JICA Expert Team spent a long time for teaching basic concepts of O&M as well as proper O&M methodologies, water test, billing and data management. Identifying the C/Ps' level of capacity and taking appropriate approach for their skill levels are essential for capacity development in a post-conflict country.

Annex 1: Evaluation Schedule

Date		Mission	Appointment (plan)	Meeting person
19-May	Sun	Narita→Bangkok		
20-May	Mon	Bangkok→Nairobi→9:25Juba(KQ350)		
		Security Briefing at JICA Office	11:00	Miyagi
		Meeting with JICA Office	11:30	Hanatani,Miyoshi
		Meeting with SSUWC (evaluation member)	15:00	Koak, Tongun, Tuburo
		Meeting with Japanese Experts	16:00	H. Sato
21-May	Tue	Meeting with SSUWC (interview with C/Ps)	9:30-11:30 14:00-15:00	Purification Dep. Laboratory Sec.
22-May	Wed	Meeting with SSUWC (interview with C/Ps)	9:30-11:30	Finance Dep.
		Meeting with GIZ	15:30	Christoph Hagenbruch
23-May	Thu	Meeting with SSUWC (interview with C/Ps)	9:30-11:30	Distribution Dep.
		Meeting with USAID expert at SSUWC (SUWASA office near USAID compound)	15:00	Abdoulaye BARRO
24-May	Fri	Meeting with SSUWC (interview with C/Ps)	9:30-10:30 10:30-11:30	Admin. Dep Santurino Tongun
25-May	Sat	Data Analysis		
26-May	Sun	Data Analysis		
27-May	Mon	Meeting with SSUWC (interview with C/Ps)	10:00-11:00	Simon Koak, Samuel Taban
28-May	Tue	Meeting with SSUWC (interview with C/Ps)	9:30-11:30	Area Manager
		SSUWC Juba (JICA mission)	9:00-9:30	Area Manager
		SSUWC HQ (JICA mission)	14:00	MD, Deputy MD
		USAID		
29-May	Wed	Meeting with SSUWC (interview with C/Ps)	(Reserved)	-
30-May	Thu	Meeting with SSUWC (interview with C/Ps)	(Reserved)	-
31-May	Fri	SSUWC HQ	15:00	MD, Simon Koak Area Manager of the Juba Station
		Meeting with Japanese Experts	16:00	H Sato
1-Jun	Sat	Site survey	9:00-11:30	H. Sato
2-Jun	Sun	Data Analysis		
3-Jun	Mon	Courtesy Visit to MWRI Meeting on M/M Distribution of Evaluation Report	9:00 11:00	Acting Undersecretary /DG for Planning Evaluation team (MD, Act. SG)
4-Jun	Tue	Finalization of Evaluation Report	10:00 -11:00	Evaluation team
		Explanation of Final Evaluation Report Meeting on M/M	13:30-14:30 15:00-16:00	MD Act SG (MWRI)
		Preparation for JCC		
5-Jun	Wed	**JCC (Reporting on Evaluation Results)**	9:30	DG-MWRI MD, CPs-SSUWC
		Signature on Minutes	13:00	DG-MWRI MD-SSUWC
6-Jun	Thu	Report to Japanese Embassy and JICA Office		

Annex 2: List of Interviewees

1. Ministry of Water Resources and Irrigation

Name	Position	Roles in the Project
Eng. Issac Liabwel C. Yol	Under secretary	Chairman
Mr. Laurence Lopula Busuk Muludyang	Director, Urban Water Program	Output 5

2. SSUWC HQ

Name	Position	Roles in the Project
Eng. Chamjok Chung Wiitour	Managing Director	Project Director
Mr. Simon Koak	Office Manager	Output 5
Eng. Santurino Tongun	Director, Commercial and Customer Services	Project Manager
Mr. Christino Abugo	Financial department	Output 5

3. SSUWC Juba Station

Name	Position	Roles in the Project
Eng. Hassan Aggrey Yousif	Area Manager	Output 2
Mr. Elfateh Rihan Surur	Manager, Purification Department	Output 1
Mr. Peter Toburo Nigo	Director, Planning and Project	Output 1
Eng. Cieggan Madding	Distribution Department	Output 2
Mr. Philip Christopher	Distribution Department	Output 2
Mr. Mujun Justin	Distribution Department	Output 2
Mr. Johnthana Wiston	Distribution Department	Output 2
Mr. Sebit Lado Silvano	Manager of Water Quality Laboratory, Purification Department	Output 3
Mr. Alison Moboruk Brown	Senior Inspector of Sales Department	Output 4
Mr. Kenneth Gideon Dakaya	Financial Department	Output 4
Mr. Alexiander Hakim	Financial Department	Output 4
Mr. William Lokuji	Manager of Administration Department	Coordinator

4. Japanese Experts

Name	Position
Mr. Hirotaka Sato	Chief Advisor / Water Utility Management
Mr. Yarai Sato	Water Treatment Plant /Pumping Facilities Operation and Maintenance (1)
Mr. Masashi Kawamura	Transmission and Distribution Facilities Operation and Maintenance
Mr. Moriji Yanagimura	Water Quality Management

5. Development Partners

Name	Position
Mr. Christoph Hagenbruch	GIZ Technical Advisor
Mr. Abdoulaye Barro	USAID SUWASA Team Leader

Annex 3: Inputs

Annex 3-1: Input by the Japanese Side

Annex 3-1-1 Assignment of Experts

Field of Expertise	Name	Dispatched period (M/M)				
		Year 1	Year 2	Year 3	Year 4	Total
Chief Advisor/Water Utility Management	Mr. Hirotaka Sato	3.27	4.47	2.83	2.33	12.90
Water Treatment Plant /Pumping Facilities Operation and Maintenance (1)	Mr. Yarai Sato	2.67	3.00	2.00	2.17	9.84
Pumping Facilities Operation and Maintenance (2)	Mr. Yoshiki Sugiyama	0	1.00	0	0	1.00
Transmission and Distribution Facilities Operation and Maintenance	Mr. Masashi Kawamura	3.03	4.50	3.00	2.00	12.53
Water Quality Management	Mr. Moriji Yanagimura	2.50	2.97	2.00	2.00	9.47
Financial Evaluation/Water Tariff	Mr. Atsuo Ohno	2.50	2.77	2.33	2.00	9.60
Community Development (1)	Mr. Mukibi Steven	2.53	2.83	1.00	1.23	7.60
Coordinator/Community Development (2)	Mr. Hayato Nakazono	3.03	4.13	2.34	1.77	11.26
Total	8 Persons	19.53	25.67	15.50	13.50	74.20

Annex 3-1-2 Training in Japan and the Third Country

1. Training in Japan

No.	Name	Unit	Training Title	Period
1	Eng. Chamjok Chung Wiitour	General Manager of SSUWC HQ (HQ)	Administration of Water Supply Management	December 9 - 16, 2011
2	Eng. Santorino Tangun Roben Unkey	Area Manager*, SSUWC Juba Station (Juba)		
3	Eng. Albert Eluzai Moni	Rural Water Supply, MWRI		
4	Mr. Peter Toburo Nigo	Purification department	O&M of urban water supply system (WTP and water quality)	June 18 – July 12, 2012
5	Mr. Jonathana Winston	Distribution department		June 18 – July 19, 2012
6	Mr. Ciengan Mading	Distribution department	O&M of Urban Water Supply System (Water Distribution and Service)	June 3 – July 6 , 2013

* The title is the one at the time of the training.

2. Third Country Training in Kenya

No.	Name	Unit	Training Title	Period
1	Mr. Philip Christopher	Juba	Installation of service Connections, Leak Repairs and Pipe jointing of Asbestos, Steel, PVC and DCIP	15 – 21 January, 2012
2	Mr. Lazarus Anania	Juba		
3	Mr. Yanga Modi	Juba		
4	Mr. Justin Mujun	Juba		
5	Mr. Johntuno Wiston	Juba		
6	Mr. John Brown	Juba	Repair and Maintenance Works for Pumps, Generators and Blowers	22 – 28 January, 2012
7	Mr. Cosmas Pitia	Juba		
8	Mr. Martin Andrea	Juba		
9	Mr. Martin Rume	Juba		
10	Mr. Hillary Laku Loro	Juba	On the Job Training of Water Treatment (Purification Plant)	15 – 28 January, 2012
11	Mr. George Wani	Juba		
12	Mr. John Sebit	Juba		
13	Mr. Peter Gatluak Deng	HQ	Administration& Human Resource Management	29 July- 4 August, 2012
14	Mr. Biel Nyuot Nhial	HQ		
15	Mr. Veronica Suleiman	Wau		
16	Mr. Francisca James Abiel	Malakal		
17	Mr. Robert Wani Mario	Juba		
18	Mr. Duku David Inyacio.	Juba		
19	Mr. Morris Lado Tongun	Juba		
20	Mr. Christine Moyo Benjamin	Juba		
21	Mr. Daniel Henry Kun	Wau	O&M of Water Distribution	29 July- 4 August, 2012
22	Mr. Natali Albert	Malakal		
23	Mr. Taban Phillip	Juba		
24	Mr. Repent Monday	Juba		
25	Mr. Luica Keji	Juba		
26	Mr. Anjelo Appolo	Juba		
27	Mr. John Garang	Juba		
28	Eng. Samuel Taban Longa	HQ	Customer Care and Public Relation	5 - 11 August, 2012
29	Mr. Peter Pisa Joseph	HQ		
30	Mr. Joseph Alfred	Wau		
31	Mr. Morris Emmanuel Sebit	Juba		
32	Mr. Phillip Martin	Juba		
33	Mr. Kenneth Gideon	Juba		

No.	Name	Unit	Training Title	Period
34	Mr. Augustino Manut Atak	Wau	Customer Meter Management	5 - 11 August, 2012
35	Mr. Tor Douth Dup	Malakal		
36	Mr. Peter Loro	Juba		
37	Mr. Evelino Loro David	Juba		
38	Mr. Casca Lado Simon	Juba		
39	Mr. Gabriel Marko Mangu	Wau	Ware House and Inventory	5 - 11 August, 2012
40	Mr. Khor Yuat Wal	Malakal		
41	Mr. Fredrick Wani Lado	Juba		
42	Mr. Robert Michael	Juba		
43	Mr. Lou Joseph Jamba	Juba	Operation and Maintenance Electro-Mechanical system in Water Utilities	18 – 24 November, 2012
44	Mr. Cosmas Tandrupasi	Juba		
45	Mr. Fahim Khafif Madriu	Juba		
46	Mr. Manash Lokule Wani	Juba		
47	Mr. Peter Karbino Ore	Juba		

Annex 3-1-3 Provision of Equipment and Materials

	Year of procurement	Item	Description	Unit	Amount		
					USD	JPY	SSP
Water Quality							
1	2011	Water Conditioning Laboratory	CEL/850	1	4,387		
2	2011	Pocket Colorimeter	Chlorine Free + Total	3	1,875		
3	2011	Pocket Colorimeter	Iron	1	653		
4	2011	Pocket Colorimeter	Manganese	1	653		
5	2011	Pocket Colorimeter	Ammonia	1	653		
6	2011	Pocket Colorimeter	Nitrate	1	653		
7	2011	Pocket Colorimeter	Fluoride	1	645		
8	2011	Pocket Colorimeter	Dissolved Oxygen	1	653		
9	2011	Conductivity Starter Kit	Conductivity Starter Kit	1	1,413		
10	2011	Portable Turbidimeter	2100Q	1	1,736		
11	2011	Turbidity/Colormeter	2100AN	1	5,882		
12	2011	Still Water Automatic	Still Water Automatic	1	6,178		
13	2011	Handbook	Standard Method	2	539	22,682	
14	2011	Beakers	Glass 1000ml, 6/pk	2	156		
15	2011	Beakers	Glass 250ml	12	60		
16	2011	Flask Erlenmeyer Wide Mouth	Glass 250ml	12	144		
17	2011	Bottle Amber Glass	Amber 237ml, 6/pk	2	38		
18	2011	Bottle Amber Polyethylene	Amber 500ml, 6/pk	1	50		
19	2011	Bottle Amber Polyethylene	Amber 1L, 3/pk	1	38		
20	2011	Cylinder Glass	100ml	10	250		
21	2011	Cylinder Glass	250ml	10	444		
22	2011	Polyethylene Bucket	10L Handle	3	228		
23	2011	Sampler Dipper	500ml 12ft handle	2	348		
24	2011	Jar Tester	Six paddle lab stir, 220V 50Hz	1	5,636		
25	2011	Microscope	Ultra compact handy inverted type (synophthalmia: 10×) (objective : 4×、10×、40×)	1		83,633	
26	2012	Hydrochloric acid (HCL) Analytical grade	2.5 litres	2	44		
27	2012	Sulphuric acid (H2SO4) Analytical grade	2.5 litres	4	62		
28	2012	Sodium thiosulfate	500 grams	4	60		
29	2012	Sodium hydroxide pellets	500 grams	1	16		
30	2012	Residual Chlorine		3	105		
31	2012	Alkalinity		1	104		
32	2012	Dissolved Oxygen		4	180		
33	2012	Ammonium		1	165		
34	2012	Nitrate		1	120		
35	2012	Hardness	Low Range	1	25		
36	2012		High Range	1	25		
37	2012	Iron		1	31		
38	2012	Manganese		1	83		
39	2012	Zink		1	90		
40	2012	Copper		1	68		
41	2013	Residua Chlorine		20	760		
42	2013	Dissolved Oxygen		4	184		
43	2013	Ammonium		1	162		
44	2013	Nitrate		1	120		

	Year of procurement	Item	Description	Unit	Amount		
					USD	JPY	SSP
45	2013	Iron (Low Range)		2	70		
46	2013	Manganese		2	166		
47	2013	Zink		1	92		
48	2013	Copper		1	69		
Operauin and Maintenance Toolsand Materials							
49	2011	Pressure gauge		20		87,000	
50	2011	Welding machine	DC60A-140A, 2.0-3.2mm	1	840		
51	2011	Electrode	3.2mm, 10kg	10	24		
52	2011	Electrode holder		1	12		
53	2011	Earth grip		1	22		
54	2011	Welding cable	20-30m	2	600		
55	2011	Welding goggles		2	24		
56	2011	Welding globes		2	24		
57	2011	Blade for pipe cutting by grinder		10	30		
58	2011	Code reel		3	360		
59	2011	Slide calipers		3	360		
60	2011	Claw bar		3	45		
61	2011	Tapping machine		1	6,800		
62	2011	Vice		3	360		
63	2011	Working platform	to install vice	1	156		
64	2011	Circuit tester		1	120		
65	2011	insulation resistance tester	500/1000V, double range	1	480		
66	2011	Clamp tester/meter	power voltage, electric flow, frequency, resistance	1	120		
67	2011	Jamper cable	for 5A	5	175		
68	2011	Rotating meter		1	220		
69	2011	Vibration gauge		1	850		
70	2011	Noise level meter		1	350		
71	2011	Bar thermometer		1	50		
72	2011	Metal Box		10			1,500
Office Equipment							
73	2011	Projector	VPL-EX100, SONY, Standard Resolution: XGA	1	975		
74	2011	PC (Desktop)	HP S2031a(Monitor), HP500B MT(CPU), OS:Windows 7 Professional Office:Microsoft Office 2010 Professional CPU: Core 2 Duo or more than 2.0GHz HDD: 150GB, Memory 2GB 17 inch screen, Internal DVD-RW, CD-RW Keyboard, Mouse, including Anti-Virus Software	20	24,056		
75	2011	PC (Laptop)	HP G62, hp OS:Windows 7 Professional Office:Microsoft Office 2010 Professional CPU: Core 2 Duo or more than 2.0GHz HDD: 150GB, Memory 2GB Internal DVD-RW, CD-RW Keyboard, Mouse, including Anti-Virus Software, software	2	4,983		
76	2011	UPS	Back-UPS CS 650, APC	20	3,590		
77	2011	Equipmentfor Intranet	iBOOK 1110, WD External HDD 1TB DIR615, D-Link Hub with 4 channels DES-1008D, D-Link Hub with 8 channels	1	3,048		
78	2011	Printer (A4 laser)	HP Color Laserjet CP2025 Laser printer, color	6	4,428		
79	2011	Toner (A4 laser)	for laser printer (No.11), color	18	9,684		
80	2011	Printer (A4 laser)	HP Laserjet P2055dn Laser printer, black and white	6	4,440		

	Year of procurement	Item	Description	Unit	Amount		
					USD	JPY	SSP
81	2011	Toner (A4 laser)	for laser printer (No.13), black and white	18	1,746		
82	2011	Printer (A3 inkjet)	HP Officejet 7000 Inkjet printer, color	1	560		
83	2011	Ink Cartridge (A3 inkjet)	for inkjet printer (No.15), a set of all colors	3	621		
84	2011	Drum Cartridge	Canon Laser Base MF8180C	1	1,550		
85	2011	USB memory stick	imation, Memory 2GB	13	1,040		
86	2011	Plotter	HP Designjet T1200&T770 printer series, Maximum size A0, color	1	6,700		
87	2011	Copy Machine	Kyocera TASKalfa 250ci, Black and white & color, A3, A4, letter size	1	7,900		
88	2011	Photocopy machine table	For Kyocera TASKalfa 250ci	1	2,000		
89	2011	Digital Camera	DSC-W310	1	250		
90	2011	Video Camera	DCR-SR68E LCD-display, Zoom&Focus fuction,	1	5,000		
91	2011	GPS (Global Positioning System)	Mobile Mapper 6, ashtech With Arc Pad 10 OS: Microsoft Windows Mobile,GPS receiver with GPS antenna, Bluetooth Wireless Technology,	1	2,950		
92	2011	Book Shelf	Wooden with 1/2 cabinet	5	6,800		
93	2011		Open bookshelf	5	3,600		
94	2011	Desk	Computer desk	2	1,664		
95	2011	Chair	Computer chair	18	2,592		
96	2011	Files	Record filing for data management	60	720		
97	2011	Drainage Pump	Automatic Water Pump, BLT30CX including 10m pipes	1			1,500
98	2011	Air conditioner	LG Model: HS-C1865SA4	1	1,070		
Flow meters and Pipe Materials							
99	2012	Electromagnetic flow meter	ELECTROMAGNET. FLOW METER KROH NE IP57 DIAM.300 230V OBTIFLUX2000	1	3,330		
100	2011	Flow Meter	Turbine type (diameter 8 inch)	5	7,250		
101	2011	Flow Meter	Turbine type (diameter 6 inch)	1	893		
102	2011	Flow Meter	Turbine type (diameter 4 inch)	1	560		
103	2011	Flow Meter	Turbine type (diameter 2 inch)	1	411		
104	2011	Pipes and Fittings	PVC pipe 225mm x 5000mm	4	628		
105	2011	Pipes and Fittings	PVC pipe 160mm x 5001mm	2	188		
106	2011	Pipes and Fittings	Flange valve 200mm	5	3,875		
107	2011	Pipes and Fittings	Flange valve 150mm	1	460		
108	2011	Pipes and Fittings	Flange valve 100mm	1	307		
109	2011	Pipes and Fittings	Flange valve 50mm	1	225		
110	2011	Flange adapter for GI	8 inch, GIXF, PN16, with bolts and nuts	4	480		
111	2011	Flange adapter for PVC	8 inch, PVCXF, PN16, with bolts and nuts	16	2,240		
112	2011	Flange adapter for PVC	6 inch, GIXF, PN16, with bolts and nuts	4	380		
113	2011	Flange adapter for PVC	6 inch, PVCXF, PN16, with bolts and nuts	4	380		
114	2011	Flange adapter for PVC	4 inch, PVCXF, PN16, with bolts and nuts	4	240		
115	2011	Flange adapter for PE	2 inch, PEXF, PN16, with bolts and nuts	4	180		
116	2011	Coupling	6 inch	4	380		
117	2011	Coupling	4 inch	8	480		
118	2011	Rubber gascket	for 8 inch	20	136		
119	2011	Rubber gascket	for 6 inch	4	22		
120	2011	Rubber gascket	for 4 inch	4	15		

	Year of procurement	Item	Description	Unit	Amount		
					USD	JPY	SSP
121	2011	Rubber gascket	for 2 inch	4	12		
122	2011	Bolts & nuts	M20	144	172		
123	2011	Bolts & nuts	M16	32	22		
124	2011	Washers	for M20	144	19		
125	2011	Washers	for M16	32	3		
126	2012	Turbine flow meter	FLANGED WATER METER WOLTMANN PN 10/16 EPOXY COATED DIAM. 150	3	1,511		
127	2012	Turbine flow meter	FLANGED WATER METER WOLTMANN PN 10/16 EPOXY COATED DIAM. 100	1	322		
128	2012	Sluice Valve	CI FLANGED HAND WHEEL GATE VALVE ND 150 CLOCKWISE CL.PN10-16	3	674		
129	2012	Sluice Valve	CI FLANGED HAND WHEEL GATE VALVE ND 100 CLOCKWISE CL.PN10-16	1	127		
130	2012	Level Gauge	Water level gauge piezometter, submerged type, Monitor model NANODAC, Control panel for setting of monitor and Warning tone for high level of water	1	4,005		
131	2012	Chlorine injection by gravity	GRAVITY DOSING SYSTEM OD 25mm scale 10-100L/H	2	3,750		
132	2012	Bolts & nuts	for flange DN100	4	46		
133	2012	Bolts & nuts	for flange DN150	12	229		
134	2012	Bolts & nuts	for flange DN200	2	52		
135	2012	Female Adaptor in brass for HDPE OD 20 threaded 1/2" BSP		60	385		
136	2012	Female Adaptor in brass for HDPE OD 25 threaded 3/4" BSP		90	608		
137	2012	Female Adaptor in brass for HDPE OD 20 threaded 1" BSP		30	292		
138	2012	Flange Adaptor for PVC	6 inch	7	623		
139	2012	Flange Adaptor for PVC	4 inch	2	120		
140	2012	Gasket	12"	2	45		
141	2012	Gasket	6"	10	55		
142	2012	Gasket	4"	3	11		
143	2012	Coupling	6 inch	3	233		
144	2012	Coupling	4 inch	1	60		
145	2012	Saddle for Asbestos	Main pipe: Asbestos 4", Outlet pipe PE 1/2"	2	120		
146	2012	Saddle for Asbestos	Main pipe: Asbestos 4", Outlet pipe PE 3/4"	3	180		
147	2012	Saddle for Asbestos	Main pipe: Asbestos 4", Outlet pipe PE 1"	1	60		
148	2012	Saddle for Asbestos	Main pipe: Asbestos 6", Outlet pipe PE 1/2"	2	161		
149	2012	Saddle for Asbestos	Main pipe: Asbestos 6", Outlet pipe PE 3/4"	3	241		
150	2012	Saddle for Asbestos	Main pipe: Asbestos 6", Outlet pipe PE 1"	1	80		
151	2012	Combines Ferrulle Saddle for PVC	Main pipe: PVC 3", Outlet pipe: PE 1/2"	2	37		
152	2012	Combines Ferrulle Saddle for PVC	Main pipe: PVC 3", Outlet pipe: PE 3/4"	3	56		
153	2012	Combines Ferrulle Saddle for PVC	Main pipe: PVC 3", Outlet pipe: PE 1"	1	19		
154	2012	Combines Ferrulle Saddle for PVC	Main pipe: PVC 4", Outlet pipe: PE 1/2"	2	45		
155	2012	Combines Ferrulle Saddle for PVC	Main pipe: PVC 4", Outlet pipe: PE 3/4"	3	67		
156	2012	Combines Ferrulle Saddle for PVC	Main pipe: PVC 4", Outlet pipe: PE 1"	1	22		

	Year of procurement	Item	Description	Unit	Amount		
					USD	JPY	SSP
157	2012	Combines Ferrulle Saddle for PVC	Main pipe: PVC 6", Outlet pipe: PE 1/2"	2	54		
158	2012	Combines Ferrulle Saddle for PVC	Main pipe: PVC 6", Outlet pipe: PE 3/4"	3	82		
159	2012	Combines Ferrulle Saddle for PVC	Main pipe: PVC 6", Outlet pipe: PE 1"	1	27		
160	2012	Ball Valve	1/2"	20	99		
161	2012	Ball Valve	3/4"	30	297		
162	2012	Ball Valve	1"	10	155		
163	2012	Valve Box	φ75, H=500-600mm	20	2,346		
164	2012	Valve Box	φ75, H=700-900mm	10	1,544		
165	2012	Elbow for PE Pipes 90 degree	1/2"	40	100		
166	2012	Elbow for PE Pipes 90 degree	3/4"	60	189		
167	2012	Elbow for PE Pipes 90 degree	1"	20	78		
168	2012	Male Socket	1/2"	20	30		
169	2012	Male Socket	3/4"	30	56		
170	2012	Male Socket	1"	10	23		
171	2012	Female Socket	1/2"	20	37		
172	2012	Female Socket	3/4"	30	71		
173	2012	Female Socket	1"	10	31		
174	2012	Socket	1/2"	10	26		
175	2012	Socket	3/4"	15	51		
176	2012	Socket	1"	5	28		
177	2012	PVC insert machine		2		101,178	
178	2013	Wall mounted converter and display model IFC 100W from Krohne		1	968		
179	2013	Conversion KIT from Compact model to separate display mode		1	228		
180	2013	Cable for flowmeter alimentation 400V		1	1,010		
181	2013	Cable for Display information from flowmeter to IFC 100 (4-20mA)		1	701		
182	2013	Waterproofing kit for flowmeter OPTISONIC 2100 C		1	92		
Manuals and textbooks							
183	2011	Water Distribution System Operator Training Handbook; Third Ed.	AWWA	1	80		
184	2011	Water Distribution System Operation and Maintenance: A Field Study Training Program, Fifth Edition	AWWA	1	65		
185	2011	Water Treatment Plant Operation Volume I	AWWA	1	65		
186	2011	Water Treatment Plant Operation Volume II	AWWA	1	65		
187	2011	Water Supply Operations: Textbook Set: AWWA Water Operator Training Textbooks (5 books)	5.1 Water sources (No. 1955)	1	498		
188	2011		5.2 Water Treatment (No. 1956)	1			
189	2011		5.3 Water Transmission and Distri	1			
190	2011		5.4 Water Quality (No. 1958)	1			
191	2011		5.5 Basic Science Concepts and Ap	1			
192	2011	1. Making Public Enterprises Work: From Despair to Promise: A Turn Around Account		1		9,675	
193	2011	2. Water Rates, Fees, and the Legal Environment, 2nd Edition		1		10,498	
194	2011	3. M1 Principles of Water Rates, Fees and Charges, 5th Edition		1		13,815	

	Year of procurement	Item	Description	Unit	Amount		
					USD	JPY	SSP
195	2011	4. M6 Water Meters-selection, Installation, Testing, and Maintenance, 4th Edition		1		10,281	
196	2011	5. M5 Water Utility Management, 2nd Edition		1		12,897	
197	2011	6. M20 Water Chlorination and Chlorination Practices and Principles, 2nd Edition		1		11,138	
198	2011	7. M22 Sizing Water Service Lines and Meters, 2nd Edition		1		10,281	
199	2011	8. M23 PVC Pipe—Design and Installation, 2nd Edition		1		12,102	
200	2011	9. M37 Operational Control of Coagulation and Filtration Processes, 3rd Edition		1		4,957	
201	2011	10.Teach Yourself VISUALLY Access 2010		1		2,865	
Communication/Transportation							
202	2012	Motor bike	SENKE CG 125cc	6			22,800
203	2013	Motor bike	SENKE CG 125cc	2	2,200		
204	2013	Wakie-talkies	Base station	1	1,526		
205	2013	Wakie-talkies	Radia	6	4,080		
206	2013	Wakie-talkies	Amprifier	1	3,599		
207	2011	Storage yard		1			3,365
Sub Total					208,123	393,002	29,165
						USD 3,907	USD 9,845
Grand Total					USD 221,875		

USD1.00= JPY 100.6 (2013.0530)

USD1.00= SSP 2.9623 (2013.04)

Annex 3-1-4 Operational Expenses by Japanese Side

Item	Amount (JPY)
Secretary	2,814,506
Technical Staff	335,250
Local Consultant (Juba University)	562,413
Computer Training (Juba University)	503,000
Inspection of Water Supply Facility in Malakal	291,794
Inspection of Water Supply Facility in Wau	255,414
Seminar (2nd JCC, progress seminar, 201104)	520,102
Seminar (3rd JCC, tariff seminar, 201111)	222,439
Seminar (4th JCC, progress seminar,201202)	190,516
Seminar (5th JCC, progress seminar,201211)	181,687
Training in Kenya	5,107,695
Equipments from recipient country	10,258,886
Transportation for Equipments	823,000
TOTAL	22,066,702

Annex 3-2: Input by the South Sudanese Side

Annex 3-2-1 Assignment of South Sudanese C/Ps

Role in the Project	Main C/Ps	Position/Organization
Chair	Eng. Isaac Liabwel C. Yol	Under secretary, MWRI
Project Director	Eng. Chamjok Chung Wiitour	Managing Director, SSUWC HQ (HQ)
Project Manager	Eng. Santurino Tongun	Director, Commercial and Customer Services (HQ)
Output 1	Mr. Elfateh Rihan Mr. Peter Toburo Nigo	Manager, Purification Department, Juba Station (Juba) Director, Department of Planning and Projects (Juba)
Output 2	Eng. Cieggan Mading	Manager, Distribution Department (Juba)
Output 3	Mr. Sebit Lado Silvano	Manager, Water Quality Laboratory (Juba)
Output 4	Mr. Alexander Dalson Hakim Mr. Simon Boss Yoasa Mr. Alison Moboruk Brown	Manager, Financial Department (Juba) Financial Department (Juba) Financial Department (Juba)
Output 5	Eng. Samuel Taban Mr. Simon Koak Eng. Olwac Mugo	Director General, Administration and Finance (HQ) Office Manager (HQ) SSUWC HQ
Overall Coordination	Eng. Hassan Aggery Yousif Mr. William Lokuji	Area Manager, Juba Station Director, Administration Department, Juba Station

Annex 3-2-2 Operational Expenses by South Sudan

Category	Items	Cost (SSP)
Direct power line from power station	Power line, pole, and registration fee (for the Juba Station and Konyokonyo)	195,000
Remodeling of room	Repair of a computer room (HQ)	5,000
Motor bicycle	Registration fee (8 numbers)	6,400
Walkie Talkie	Registration fee	4,830
Pipe accessories	Fitting and protection	5,000*
Water Meter	14 meters	2,000*
	Total	218,230

* The cost is an estimate since these items were provided in kind.

Annex 4: Evaluation Grid (Results of the Evaluation)

SECTION I: Project Achievements

Evaluation Questions		Results
Main Questions	Sub Questions	
Prospect for Achieving the Overall Goals	To what degree have the Overall Goals been achieved? **Overall Goals:** 1. The quality of the water supply service extended by SSUWC-Juba is improved. 2. The management capacity of SSUWC HQ is improved.	**OVI 1. The customer satisfaction on water supply service of SSUWC-Juba station is enhanced.** • According to the Social Condition Survey for Water Supply Service conducted by the Project, the rate of customer satisfaction on UWC's water supply service has been increased from 22.4% percent in 2010 to 36.4% in 2013. Staff of the Juba station were informed by customers that the water quality has been improved. Reasons for dissatisfaction of UWC's water supply service include irregular water supply, short service hours, insufficient water supply and low water pressure. **OVI 2. All essential performance indicators are further improved from the final date of the Project.** • PIs, except those linked with the power supply situations, have been greatly improved since the Project started. • Some PIs such as "Ratio of actual sampling days to required total weekly sampling days" and "Ratio of actual samples to required total weekly samples" have been reached 100% and it is likely that sampling will be carried out as regular routine of lab staff unless external factors affect the sampling activities. **OVI 3. All reports and plans submitted from area stations are assessed and guidance is given back to them.** • According to "The Roles of SSUWC Headquarters and Reporting and Planning system" formulated by the Project based on the Provisional SSUQC Order, SSUWC HQ has been evaluating and providing feedback on reports and plans submitted by the Juba station. SSUWC HQ utilizes the evaluation checklist developed by the Project and follows procedures of review and evaluation. Since SSUWC HQ has carried out the reviewing process for a couple of times, it is likely that SSUWC HQ is able to assess reports and plans from other area stations. • As for the proper guidance, SSUWC HQ is in the process of surveying and understanding the status of O&M in each of the area stations. Since reviewing reports and providing guidance to area stations is the newly established role for SSUWC HQ, it is still unclear if SSUWC HQ can provide detailed analysis and appropriate guidance to each respective area station.
Prospect for Achieving the Project Purpose	To what degree has the Project Purpose been achieved?	**Project Purpose:** The management capacity of SSUWC-Juba station is enhanced through capacity development on operation and maintenance of water supply facilities. **OVI 1. 80% of 25 essential performance indicators set in the annual plan which are measurable at the SSUWC Juba station is improved compared to the 2011 average. (Essential performance indicators is attached with baseline data of average value in 2011)** • Except for the PIs that are determined by situations of power supply and accessibility to fuels, all the PIs has been improved. • Some of the 25 PIs overlap. When one PI is met, other PI automatically fulfilled.
Achievement levels of the Outputs	To what degree has Output 1 been achieved? **Output 1:** Capacity of SSUWC-Juba station with respect to operation and maintenance of water intake and treatment facilities is improved.	**OVI 1-1. Monthly reports and annual reports in which O&M data is compiled.** • SSUWC staff daily collect data on operation of WTP and intake pumping station including the volume of treated water, chlorine consumption, and operation of generators, which are recorded on the data format prepared by the Project. In the end of the month, a staff compiles data and develops monthly reports. In the purification department, while only one staff is able to develop monthly reports, he is training other staff of the department in inputting data into an excel sheet, analyzing the data, and preparing reports. **OVI 1-2. Annual plan on water treatment plant.** • With support by the JICA Expert Team, main C/P developed the annual plan in 2011 and 2012. The annual plan include performance targets in water quality, water production, and pump operation, foreseeable problems, activities for addressing problems, and required resources. the JICA Expert Team have provided practical training in the development of annual plan as well as in proper O&M in WTP including determining appropriate chlorine dosing rate and operating WTP according to schedule. The format of annual plan has been revised and improved so that staff can develop plans on their own after the completion of the Project.

Evaluation Questions		Results
Main Questions	Sub-Questions	
		OVI 1-3. The number of staff who acquired adequate O&M skills for WTP increases from 0 to 11 persons. • According to the results of the oral and writing examination on O&M of WTP in March 2013, the number of staff who acquired adequate O&M skills for WTP was eight out of six managers and 15 shift operators. the JICA Expert Team provided supplementary training for those who did not meet the minimum scores on the examination so that staff understand proper O&M procedures. After the supplementary training, the number of staff with adequate O&M skills increased to eleven. **OVI 1-4. Plant average operating hour per day increases from 17.9 hours (2011 average) to 22 hours/day** • Staff of each department calculate possible operation hours of WTP and pump stations based on the income amount from collected water tariff, revise the operation plans, and manage the operation of the facilities accordingly. Although it is difficult to achieve target operation hours defined in the PDM until the end of the Project period without stable power supply, staff operate water supply facilities according to the plans using acquired knowledge and skills. • SSUWC currently purchases fuel using the income from water tariff. The current average plant operating hour per day is 13.7 hours per day on average, which is expected to be increased as the income from water tariff increased. • When the baseline data was collected, SSUWC was receiving relatively stable supply of electric power, which allowed WTP to be in operation at 17.9 hours per day on average. The target plant operating hour (22 hours/day) of OVI 1-4 was determined based on the assumption on the stable power supply from the city at the time of the baseline survey. Although the direct line from the city power was connected in January 2012, the power supply was unstable. Furthermore, border disputes over oil caused an interruption of the power supply to SSUWC in January 2013. Under the fiscal austerity, there is no provision of fuel from the government. **OVI 1-5. The monthly average ratio that the quality of treated water with respect to turbidity is below 5 NTU increases from 90% to 100%.** • The turbidity stays below 5 NTU for 100% of the day of the month compared to 79% in 2001. • The turbidity of raw water during rainy season tends to be high and fluctuate greatly. the JICA Expert Team trained staff on operation of WTP upon the high turbidity. As a result, the turbidity is under control. **OVI 1-6. The monthly average ratio that the quality of treated water with respect to residual chlorine falls in the range between 0.7 mg/l and 1.2 mg/l increases from 10% to 80 %.** • The ratio of residual chlorine falls in the target range (0.7 – 1.2 mg/l) has been improved from 31% in 2011on average to 85% in February 2013. • The Project replaced the chlorine injectors and the JICA Expert Team provided training in chlorine injection. The fluctuation of the treated water volume due to power cuts poses difficulties in determining the appropriate amount of chlorine. The purification department checks the residual chlorine at each shift and is trying to maintain the residual chlorine in the target range at all times.
Achievement levels of the Outputs	To what degree has Output 2 been achieved?	OVI 2-1. **Monthly reports and annual reports in which O&M data is compiled.** • SSUWC staff daily collect data on operation of transmission and distribution facilities including the volume of transmission water flow, cases of water leakage and repairs, and the number of installation or replacement of pipes, which are recorded on the data format prepared by the Project. In the end of the month, a staff compiles data and develops monthly reports. OVI 2-2. **Annual operation and maintenance plan on O&M of water transmission and distribution facilities.** • With support by the JICA Expert Team, main C/P developed the annual operation and maintenance plan in 2011 and 2012. The annual plan include performance targets in transmission water flow and repairs of water leakages, foreseeable problems, activities for addressing problems, and required resources. the JICA Expert Team have provided practical training in the development of annual plan as well as in proper O&M in water transmission and distribution including repair of flow meter and pipe and the use of GPS/GIS for recording water leakage and newly installed distribution pipes. The format of annual plan has been revised and improved so that staff can develop plans on their own after the completion of the Project.

Evaluation Questions		
Main Questions	Sub Questions	Results
Achievement levels of the Outputs	**Output 2:** Capacity of SSUWC-Juba station with respect to operation and maintenance of water transmission and distribution facilities is improved.	OVI 2-3. **The number of staff who acquired adequate O&M skills for transmission and distribution increases from 0 to 10 persons.** • According to the results of the oral and writing examination on O&M skills for transmission and distribution in March 2013, the number of staff who acquired adequate O&M skills for transmission and distribution facilities was ten out of 13 staff of the distribution department. the JICA Expert Team provided supplementary training for all the staff who took the examination so that staff achieve better understanding on proper O&M procedures on water transmission and distribution. OVI 2-4. **Application of a formulated Pump Operation Plan by the Project is started in 2012.** • While the first version of the Pump Operation Plan was developed in the middle of 2012, it was difficult to treat and distribute water according to the plan due to the unstable power supply. Since January 2013 when the city power was completely interrupted, SSUWC has been operating pumps using generators according to the Pump Operation Plan which has been revised and updated by SSUWC staff.
	To what degree has Output 3 been achieved? **Output 3:** Capacity of water quality management of SSUWC-Juba station is improved.	OVI 3-1. **Water quality management report (monthly and annual) in which water quality monitoring data is compiled.** • Water testing lab staff collect samples daily from WTP and weekly from pump stations and public taps, and conduct water test on turbidity, residual chlorine, pH, conductivity, Total Dissolved Solid (TDS) and color. Staff input the results of the water test in the data format prepared by the Project. In the end of the month, a staff compiles data and develops monthly reports. OVI 3-2. **The number of staff who acquired adequate water quality test skills increases from 0 persons to 2 persons.** • According to the results of the examination on water quality test in March 2013, the number of staff who acquired adequate water quality test skills was two. The examination evaluated the staff' understanding on the water quality test method of each parameter and calibration of equipment as well as skills on sampling, water test, and data input and organization.
	To what degree has Output 4 been achieved? **Output 4:** Understanding of financial conditions of SSUWC-Juba station is enhanced.	OVI 4-1 **Revenue collection reports are prepared monthly.** • In the beginning of the month, a staff compiles data collected in the previous month and develops monthly reports. Staff have been preparing monthly reports since September 2011 and the routine of compiling information to develop reports is well established. Through the activities of surveying the baseline data, SSUWC Juba station has gained better understanding on financial conditions, status of installed water meter, and the level of customer satisfaction. OVI 4-2 **Recommendations on revenue collection improvement are made.** • Based on the analysis of the baseline survey on financial conditions of the Juba station, recommendations on revenue collection improvements were put forth in the budget plan and the annual plan of the Juba station. • In particular, the Project developed customer ledger database to organize customers' information and issue bills, which improved efficiency of tariff collection. In the financial department, 5 staff can manage customer ledger and issue bills. • The financial department started to update and reorganize customer ledger, and install meters for introducing the metered system as opposed to the current flat rate system. OVI 4-3 **Management method of public water tap stands is established.** • Based on the pilot operation and studies on management methods of public water tap stands, the Project recommended that the public water stands be managed by individual operator based on a three-month or six-month contract. Each operator is required to log daily sales in the form developed by the Project, which are checked by SSUWC staff every month. From the sales of the public taps, SSP 4 per cubic meter is to be collected by SSUWC. • In regards to management method of tanker filling stations, due to the large volume of daily sales, tanker filling stations are managed by private companies. The operators are required to report to SSUWC daily and settle the payment to SSUWC.

Evaluation Questions		Results
Main Questions	Sub Questions	
Achievement levels of the Outputs	To what degree has Output 5 been achieved? **Output 5:** Capacity of SSUWC-HQ to support SSUWC-Juba station is enhanced.	OVI 5-1. **SSUWC HQ examines the monthly reports submitted by SSUWC Juba station every other month.** • According to "The Roles of SSUWC Headquarters and Reporting and Planning System" formulated by the Project, SSUWC HQ organizes the review meeting with the management staff of the Juba station, examines monthly reports submitted by the Juba station, and provides feedback every month. OVI 5-2. **The number of annual reports and plans that SSUWC HQ examined becomes 2 each.** • SSUWC HQ reviewed and assessed annual report and plan of Juba station in 2011 and 2012. The Juba station is in the process of preparing the annual report of the year 2012/13 and the annual plan for the year 2013/14. OVI 5-3. **The existing water supply facilities and services are inputted in to the established database.** • The Project conducted a study on the Wau and Malakal station to collect information on their facilities and status of service delivery. Along with the information on the Juba station, the data was compiled in a report. The Project did not conduct survey in other area stations due to safety concerns.
Achievement of Inputs	Have the Japanese side's inputs been allocated as planned?	• **Personnel (Japanese the JICA Expert Team):** The Japanese side has assigned eight the JICA Expert Team to the Project in the fields of: Chief Advisor/Water Utility Management, Water Treatment Plant /Pumping Facilities Operation and Maintenance (1), Pumping Facilities Operation and Maintenance (2), Transmission and Distribution Facilities Operation and Maintenance, Water Quality Management, Financial Evaluation/Water Tariff, Community Development (1), Coordinator/Community Development (2) (See Annex 3-1-1 Assignment of the JICA Expert Team). • **Training in Japan and Kenya:** The Japanese side has provided overseas training to 50 staff members (3 people in Japan, and 47 people in Kenya) from MWRI, SSUWC HQ, Juba station, Wau station and Malakal station (See Annex 3-1-3 Training in Japan and Kenya). • **Provision of equipment and materials:** The Japanese side has provided equipment necessary for O&M of facilities (e.g. water quality test kit, chlorine injector, and flow meters), motor bikes, office supplies and equipment (e.g. a photocopier, desktop computers, and printers), and other machinery and equipment necessary for the implementation of the Project, which amounted to Japanese Yen (JPY) USD 220,829 (See Annex 3-1-4 Provision of Machinery and Equipment). • **Construction of Public Water Tap Stands and Flow Meter Chambers** The Japanese side has constructed three public tap stands and 11 chambers for flow meters, which amounted to USD 124,899. • **Operational Expenses:** The Japanese side has allocated the total amount of JPY 22,066,702 (Approximately USD 168,578.59) for the operational costs of project activities (See Annex 3-1-5 Japanese Side's Operational Costs).
	Have the South Sudanese side's inputs been allocated as planned?	• **Counterpart personnel:** The South Sudanese side has assigned one Chair, one Project Director, one Project Manager, and 12 SSUWC members from SSUWC HQ and the Juba station as C/Ps to the Project (See Annex 3-2-1 Assignment of C/P Personnel). • **Facilities:** The South Sudanese side has provided a room in SSUWC Juba station for Japanese the JICA Expert Team. • **Local cost:** The South Sudanese side has allocated the total amount of SSP 218,230 for the operational costs of project activities (See Annex 3-2-2 South Sudanese Side's Local Costs).

SECTION II. Implementation Process

Evaluation Questions		Results
Main Questions	Sub Questions	
Implementation of Activities	To what degree have project activities been implemented as planned?	• The Project activities have been implemented mostly as planned. • Some activities of the Project have been interrupted due to the political and fiscal situations around the Independence in July 2011. The plan of activities were rescheduled and resumed in September 2011. • The Project hired a university processor to provide basic English training for staff of the Juba station.
Project management	Are there any issues with the project management? Has there been an effective communication and information sharing among CP (MWRI, SSUWC HQ, and Juba station) and between CP and the JICA Expert Team?	• Project monitoring: The Joint Coordination Committee (JCC) was held annually to monitor the overall progress of the Project. • Communication: The Project has been conducted with an effective and open communication between the JICA Expert Team, SSUWC HQ and the Juba station staff members. C/Ps and the JICA Expert Team have organized weekly meetings and seminars to share and discuss the results of completed activities, foreseeable issues and countermeasures that should be taken by SSUWC HQ and the Juba station, through which C/Ps' strong ownership of and commitment to supplying safe water have been developed. Despite their short-term assignment, the JICA Expert Team arranged their fieldwork schedule to minimize the absence from SSUWC Juba station and encouraged C/Ps to attend weekly meeting, which resulted in establishing routine of organizing weekly meetings by all the department heads of the Juba station without fail. • Method of Capacity Development: the JICA Expert Team made various efforts for effective technology transfer in order to maintain motivation among C/Ps and promote capacity enhancement which resulted in establishing routine of organizing weekly meeting among staff with limited English proficiency and basic arithmetic skills, which was pointed out in the Mid-Term Review as a contributing factor to low participation of C/Ps in training sessions. In order to promote understanding of subject matters among Arabic speaking staff, the JICA Expert Team gave specific examples and cases as to which actions to be taken in a case of given situations, and provided visual aids including tables and simple figures demonstrating proper O&M of facilities. The Project assistant staff and SSUWC's English speaking staff helped the JICA Expert Team in interpreting the training sessions for staff with limited English comprehension. After multiple revisions based on discussions with C/Ps, SOPs and manuals were prepared with the focus on simplicity and user-friendliness. Working together with the JICA Expert Team who have a high level of diligence and persistence, C/Ps learned O&M techniques in implementation as well as time management, problem solving and the importance of neatness of facilities and offices. In order to enhance C/Ps' motivation, the JICA Expert Team occasionally provided incentives for C/Ps, for example, giving an award to the staff who scored high on the test after training and adjusting the timing of the Third Country Training and provision of equipment.
	Have SSUWC-HQ and SSUWC-Juba demonstrated an adequate level of ownership to enhance their management capacity?	• Both SSUWC-HQ and the Juba station demonstrate a high level of ownership to enhance their management capacity. Weekly meetings organized every week among HQ and the management staff of the Juba station are considered to be a platform for discussions and information sharing. At weekly meetings, each department understands activities and issues of other departments, draws recommendations, and comes up with next plans. According to the questionnaires and interviews with C/Ps, weekly meetings function effectively to determine the direction of SSUWC and develop collective understanding on SSUWC's objectives and priority. • Through training of the Project, managers of each department have acquired an adequate level of O&M skills for WTP, pumping station, water transmission and distribution facilities. Managers are highly motivated that they voluntarily train staff in their departments on proper O&M.
Follow-ups of Recommended Actions by the Mid-Term Review	To what extent have the **five actions recommended to be taken by the end of the project period in the Mid-term review** been taken by the Project?	**(1) Strengthening public relations** • The Project conducted several PR activities. The Project hired a local musician and developed an awareness-raising song called "Water is Life." The Juba station invited 60 students from local elementary and middle schools for observation of WTP. Staff of the Juba station created posters to describe the function of water supply facilities. The local TV station covered the visit of students to the Juba station, which was broadcasted locally. The Project organized a picture contest and spoke the importance of preserving water to the public.

Evaluation Questions		Results
Main Questions	Sub Questions	
		(2) Regularly participating in training/ meetings (CP), offering additional classes to fill the capacity gap (the JICA Expert Team), and conducting a capacity assessment of trained SSUWC staff • As suggested, South Sudanese side participated in the Project activities more regularly and proactively than before the Mid-Term Review. Using the Project assistants as translators, the JICA Expert Team provided training to improve basic skills of staff so that proper O&M is carried out by staff of Juba station even after the completion of the Project. The capacity assessments of trained staff have been implemented to confirm the level of their skills and knowledge in respective field. **(3) Providing additional equipment** • Additional equipment including chlorine injectors and electromagnetic flow meters have been provided to enhance the effectiveness of O&M activities. **(4) Securing budget for O&M activities** • Securing budget for continuous O&M activities seems to be the most difficult element. Neither the expenditures for reagent and the domestic travel for staff of area stations outside Juba City (as pointed out by the recommendation of the Mid-Term Review), nor the in-kind provision of chemicals and fuel for generators have been made under the fiscal austerity. • In exchange, the Juba Station has been allowed to retain the full amount of the revenue from fee collection and use it for O&M. • With a view to achieving the goal of 24 hour pump operation by January 2014, the Juba Station is in the midst of taking a number of measures in increasing fee collection including charging fees according to the revised water tariff, adopting efficient billing strategy, and installing the water meters. **(5) Recruiting sufficient number of qualified staff** • Related to the fiscal status, the staff in the water test laboratory in the Juba station and the Director-level management staff in the HQ have not been appointed.

SECTION III: Evaluation by the Five Criteria

	Evaluation Questions		Results
	Main Questions	Sub Questions	
Relevance	Relevance with the Government policy of South Sudan	Has the Project been in line with the priority of development policies of the Government of South Sudan?	• Given the above-mentioned situation, the Republic of South Sudan (ROSS) sets the provision of urban water and sanitation as one of the priority areas for the nation's socioeconomic development in its "National Water Policy" (2007). In the Policy, the Government aims to promote efficient, equitable and sustainable development and use of available water resources, and effective delivery of water and sanitation services. In particular, ROSS is committed to ensuring rapidly growing urban populations benefit from access to safe, affordable and reliable water supply and sanitation services. The specific objectives in the Policy include: to promote technical and management training of staff working at all levels in urban water and sanitation services; and to improve the financial sustainability of urban water systems through the introduction of efficient management practices.
	Relevance with the needs of beneficiaries	Has the Project Purpose been in line with the needs of the target group? Have the needs of the target group been high? **Target Group:** SSUWC Headquarters and Juba station staff	• SSUWC operates and maintains water supply facilities that consist of water treatment, transmission and distribution facilities and also collects water tariff. However, it has become difficult to distribute safe water in an efficient manner due to lack of knowledge and skills about the operation and maintenance of water supply facilities, ad-hoc measures taken as a result of insufficient planning of operation and maintenance, lack of inspection and confirmation process of supplied water quality, lack of understanding of the water supply status in the Juba city, lack of water distribution management for equal water distribution, and lack of necessary maintenance materials and budget, in addition to the degraded facilities. Moreover, the revenue collection system with handwritten ledgers is very inefficient and there is no adequate budget or annual plan for operation maintenance. The Project which aims to strengthen the management capacity of SSUWC Juba station is in line with the needs of South Sudan.

	Evaluation Questions		Results
	Main Questions	Sub Questions	
Relevance	Relevance with the needs of beneficiaries	Has the Project been in line with the needs of the end beneficiaries, i.e. people living in the water supply service areas of SSUWC-Juba station (Approximately 400,000)?	• The Project is in line with the needs of the end beneficiaries since urban water supply had not been adequately provided in Juba due to the absolute lack of purified water and inappropriate O&M of water distribution system. The Juba station with the water treatment capacity of 7,200 m^3 per day supplies treated water primarily to businesses and factories in the city, resulting in the water supply coverage of approximately 8% of population in the service areas. People rely their drinking water on untreated river water distributed by water tankers and water with high level of salt from shallow well. With the rapid increase in population of Juba, it was the urgent needs for the Government to provide adequate and reliable water services to people living in the water supply service areas.
	Relevance with the Japan's ODA Policy	Has the Project been in line with the Japanese Government's assistance policies for South Sudan?	The Project is in line with the Japan's assistance policies for South Sudan. • Japan's assistance policy for South Sudan sets "Assistance for Basic Human Needs (BHN)" as one of the three priority areas for its development assistance towards South Sudan, which constitutes part of the Japan's assistance policy to Sudan in the consolidation of peace adopted at the first Sudan consortium in 2005 in Oslo. As part of the assistance for BHN, the aid policy for South Sudan aims at the enhancement of public service delivery including the improvement of water supply systems. Japan is committed to providing safe water to 6.5 million people in South Sudan, which was expressed at the Fourth Tokyo International Conference on Africa Development (TICAD IV) in 2008.
	Comparative empirical and technological advantage of Japan's cooperation	Does Japan have technological and empirical advantages in operation and maintenance of water supply facilities in South Sudan?	• Japan has sufficient empirical and technical advantages for strengthening O&M of water supply facilities in Africa. • Japan has been providing technical assistance in improving water supply services since pre-independence of South Sudan. • This Project is built on findings and analysis from the Emergency Study on the Planning and Support for Basic Physical and Social Infrastructure in Juba Town and the Surrounding Areas (2006-2008) and the Juba Urban Water Supply and Capacity Development Study (2007-2009).
Effectiveness	Achievement of the Project Purpose **Project Purpose:** The management capacity of SSUWC-Juba station is enhanced through capacity development on operation and maintenance of water supply facilities.	To what degree has the Project Purpose's OVI been achieved?	See Section 1: Project Achievement
		What is the prospect of achieving the Project Purpose by the end of the Project period?	• The prospect of the Project Purpose being achieved by the end of the project is relatively high based on the achievement levels of the Project Purpose's indicators. • The preparation of monthly report based on regular data collection became a part of routine activities of each department.
		To what degree was the achievement of the Project Purpose attributable to the successful achievement of the Outputs?	• The five Outputs cover all the components (O&M of water intake and treatment facilities [Output 1], O&M of water transmission and distribution facilities [Output 2], water quality management [Output 3], financial management [Output 4] and SSUWC HQ's support system to the Juba station [Output 5]) that are necessary to enhance the management capacity of SSUWC. • The successful production of the five Outputs is directly linked to the achievement of the Project Purpose. As discussed in the "3-1-2 Achievement of the Outputs" section, the most of the expected Outputs have been either achieved or mostly achieved, it is evaluated that capacity in operation and management of SSUWC Juba station and a support system by SSUWC HQ have been improved.

	Evaluation Questions		Results
	Main Questions	Sub Questions	
Effectiveness		Have the Important Assumptions for achieving the Project Purpose been fulfilled?	**Important Assumptions:** (1) Any significant damage to water supply facilities is not caused. (2) Raw water quality is not deteriorated significantly. (3) Raw water flow is not decreased significantly. • At the time of the Terminal Evaluation, no significant damage to water supply facilities or changes of raw water in quality and quantity have been reported. • According to questionnaires and interviews, it was confirmed that two generators, the power source of the Juba station, are getting decrepit and require replacement. The generators are for an emergency purpose as a back-up for the regular electric supply; however, the Juba station is currently using the generators as the regular power source, which accelerates deterioration.
Efficiency	Contributing factors	To what degree has each Output been produced?	See Section 1: Project Achievement
		Have there been any other factors that contributed to the achievement of the Project Purpose?	• Urban Water Working Group (UWWG) was established in SSUWC HQ in June 2011 upon the recommendation by the JICA Expert Team. UWWG holds monthly meeting with MWRI, SSUWC HQ, the Juba station, and relevant donors and NGOs to share information and discuss issues in the urban water sector.
	Hindering factors to Effectiveness	Have there been any other factors that impeded the achievement of the Project Purpose?	• The unstable and insufficient power supply impeded the achievement of the Project Purpose.
	Causality of Inputs and Outputs	Have Project activities been appropriately conducted in terms of their timing, duration, and quality to produce planned Outputs?	• Despite the unstable power supply, most Project activities have been appropriately conducted in terms of their timing, duration and quality.
	Achievement of Outputs	Have the Important Assumptions for achieving the Outputs been fulfilled?	**Important Assumptions:** (1) The current budget of SSUWC-Juba station is not decreased. (2) Counterparts do not resign from training course and do not get transferred. (3) Custom clearance process does not significantly delay import of equipment from overseas. (4) The power supply condition to water supply facilities is not worsened from the current level. (5) The roles of SSUWC are not changed. • No significant delay of custom clearance process or changes in the SSUWC's role have been reported. • Since the fiscal year 2012/13, the budget for the Juba station has been greatly decreased, which caused the reduction of the operation hour of WTP and pump stations. • Personnel transfer occurred quite frequently throughout the Project period. While the JICA Expert Team train staff of each department in groups and prepared simple and clear SOP for all the staff to understand and follow, managers of respective department tried to continuously develop staff's skills and knowledge in order to continue proper O&M in the face of personnel transfer. • As discussed in the Achievement Level of Output 1 above, the power supply has been completely interrupted since January 2013. The Project has changed operation plans to adjust the operation hours of WTP and pump stations.

	Evaluation Questions		Results
	Main Questions	Sub Questions	
	Appropriateness of Inputs by Japan	How appropriate has the assignment of the JICA Expert Team been in terms of the number, their expertise and capabilities, and the dispatched periods and timings?	• The assignment of the JICA Expert Team has been appropriate in terms of the number, expertise, and dispatched periods and timings. • In spite of limited dispatched periods, the JICA Expert Team adjusted the timing of dispatches to minimize the absence of the JICA Expert Team from SSUWC Juba station throughout the Project period.
Efficiency	Appropriateness of Inputs by Japan	How appropriate has CP training in Japan and Kenya been in terms of the number of participants, training contents, and the dispatched period and its timing?	• C/P training in Japan and Kenya have been appropriate and effective in terms of the number of participants, training contents, and the dispatched period and its timing. • C/P training in Kenya was organized three separate occasions as incentives for active involvement in the Project activities. • The participants in the C/P training in Japan and Kenya prepared a report and gave a presentation to share their experience with staff in SSUWC HQ and the Juba station upon their return. • Inspired by the practices of the Kenya Water Institute (KEWI), SSUWC has recently established the customer service department as a structure to keep the record of customers' feedback and provide proper appropriate services.
		How appropriate has the provision of machinery and equipment by the Japanese side been in terms of its quality, quantity and timing?	• The provision of machinery and equipment by the Japanese side has been appropriate in terms of its quality, quantity and timing. • The Japanese side provided eight motorcycles for improving monitoring, water sampling, and meter reading activities, which greatly improved the level of record keeping as well as the motivation of staff.
	Appropriateness of Inputs by South Sudan	How appropriate has the assignment of CP been in terms of the number, placement ownership and level of participation?	• The assignment of C/Ps has been appropriate since manager from each concerned department and HQ were selected as the main C/Ps. As leaders of each department, C/Ps discussed with the JICA Expert Team to plan and implement the Project activities and encouraged their staff to participate in capacity development training. • Despite their regular work responsibilities, C/Ps adequately allocated their time for the Project.
		How appropriate has the provision of facilities and equipment by the South Sudanese side been?	• Office space for the JICA Expert Team and training venues were appropriately provided by the South Sudanese side.
		Has the South Sudanese budget for the Project been appropriate in scale?	• Due to the budget constraints, travel expenses for area stations to attend meetings in monthly meeting with SSUWC HQ and MWRI were not provided. • The Japanese side covered transportation costs and visa administration fees for staff of the Wau and Malakal station, which were originally planned to be covered by the South Sudanese side.
	Cooperation with other organizations/ projects	Has there been any effective cooperation with other organizations or projects that increased the efficiency of the Project?	• The Project effectively cooperated with GIZ and USAID on information sharing and collaboration. The donors including GIZ and USAID meet monthly at the Urban Water Working Group organized by SSUWC HQ. Project officers of GIZ and USAID were invited to seminars in which the Project progress and planned activities were presented. The study report on the existing water supply facilities and services of the Juba and Malakal stations was shared with GIZ, which is in the process of developing a comprehensive database on SSUWC area stations. USAID is currently developing a GIS map compiling customers' information in the Juba station by building on the GIS map of distribution network developed by the Project.
	Contributing or hindering factors to Efficiency	Are there any other factors that increased or decreased the efficiency of the Project?	• There are no other factors that increased or decreased the efficiency of the Project Purposehow.

	Evaluation Questions		Results
	Main Questions	Sub Questions	
Impact	Prospects of achieving the Overall Goals	To what degree has the Overall Goal been achieved?	See Section 1: Project Achievement
	Prospects of achieving the Overall Goals	Will the Overall Goal be achieved in 3 to 5 years after the completion of the Project? (Are the Overall Goal and verifiable indicators still valid?)	• According to the baseline and impact surveys, the customer satisfaction on water supply service of the Juba station has been improved since the beginning of the Project. Since staff of the Juba station have acquired skills to control the turbidity and residual chlorine, it is likely that the water quality will be maintained. The water supply volume is dependent on the provision of power supply. • Capacity of O&M of water supply facilities and financial management has been improved since the outset of the Project. As long as the Juba station can maintain the skills and knowledge of O&M and conduct proper implementation, essential PIs are expected to be further improved. • As far as the Juba station is concerned, assessment of its monthly reports and proper guidance in response are likely to be provided since SSUWC HQ has followed the procedure during the Project period. At the time of the Terminal Evaluation, it is still unclear whether SSUWC HQ are able to assess reports and plans submitted by other area stations since SSUWC HQ has had no opportunity to do it during the Project period.
		Have the Important Assumptions for achieving the Overall Goals been fulfilled?	**Important Assumptions:** (1) Adequate budget of SSUWC is disbursed. (2) The trainees completing the courses do not leave SSUWC. (3) SSUWC HQ starts to extend support to other SSUWC stations as it extends to SSUWC-Juba. • As discussed in the Achievement of the Output above, budget of SSUWC has been greatly reduced and personnel transfer has been occurred quite frequently. • As discussed in the Prospects of achieving the Overall Goals, it is highly likely that SSUWC HQ will provide support to the Juba station according to the reporting system formulated by the Project; however, it is still unclear if SSUWC HQ can provide support to other area stations unless they submit reports since the current support structure is to provide guidance and feedback on the reports submitted by area stations.
	Other aspects	Are there any unexpected positive and negative impacts?	• No unexpected impacts have been identified at the time of the Terminal Evaluation.
Sustainability	Institutional aspect	Have roles and responsibilities of SSUWC-HQ and Juba station have been clearly defined and understood by CP?	• The Project formulated "The Roles of SSUWC Headquarters and Reporting and Planning System" which defined the roles and functions of SSUWC HQ based on the Provisional SSUWC Order. The main functions of SSUWC HQ include, but not limited to, developing guidelines for stations' activities, enforcing rules, and monitoring the performance of stations. • Roles and responsibilities of the Juba station are to operate and manage water supply facilities to provide safe water.
	Organizational aspect	Has an organizational mechanism for continuous capacity development of SSUWC-Juba in its operation and management been established?	• Internal capacity development has been started in each department on a voluntary basis. Managers and core staff of each department acquired an adequate level of O&M methodologies or financial record keeping. In the purification department, the O&M manager is training his staff in daily monitoring, data input and preparation of monthly report. In financial department, while five staff can manage the customer ledger on the digital database, the manager is planning to train all the staff in the department on the newly-established customer database. The managers are going to discuss the plan to organize internal training at the weekly meeting so that training activities are implemented effectively with support and understanding by Area Manager. • There is no internal training system provided for SSUWC area stations.

	Evaluation Questions		Results
	Main Questions	Sub Questions	
Sustainability	Financial aspect	Has SSUWC-Juba been able to secure sufficient budget to conduct its operation and management based on the annual plans and O&M manuals developed by the Project?	• Since the Government has suspended the in-kind provision of fuel for generators, the Juba Station has been purchasing the fuel using the revenue from fee collection and operating the water supply facilities according to its revised plan. • The monthly revenue steadily increased from SSP 102,272 in January 2013 to SSP 166,076 in April 2013 as a result of the efficient billing system introduced by the Project and the revised water tariff applied in February 2013 along with the improved water quality. • According to the revenue forecast created by the Project, the Juba Station is estimated to collect monthly revenues of SSP 202,000 and achieve 24 hours of operation by January 2014.
	Technical aspect	Have core staff of SSUWC-Juba been trained sufficiently in number and knowledge to conduct its operation and management based on the annual plans and O&M manuals developed by the Project?	• Core staff in the purification and distribution department has acquired skills and knowledge to conduct its operation and management based on the plans and manuals. Staff of water quality test laboratory are conducting daily, weekly, and monthly test according to the plan. Staff in the financial department manage customer information and payment status using the database developed by the Project. Information regarding the operation status of water supply facilities and location of water leakages has been well recorded since the Project focused on daily inspection of facilities, keeping maintenance record, and understanding the status of operation. • Staff of different department have started to communicate to each other and work together, which have never been observed before the Project. In weekly meetings, each department reports activities that have been carried out in the previous week and shares any problems for discussions. Through regular communications and discussions, staff developed better understanding about activities and challenges of other department.
		Have core staff of SSUWC-Juba acquired sufficient technical skills to be able to maintain, and upgrade or replace when necessary, the equipment provided by the Project?	• Most of the equipment provided by the Project does not require a high level of skill and knowledge to maintain. Further, the JICA Expert Team provided training on maintenance and replacement of equipment. The contact persons and procedures for procuring spareparts and consumables have been organized and presented to responsible staff. • SSUWC HQ and the Juba station need to outsource the repair and maintenance of computers and printers.
	Other factors that will increase or decrease the sustainability of the Project	Are there any other factors that will increase or decrease the sustainability of the Project?	• The Non-Revenue Water Rate of the Juba Station is estimated to be around 50% due to the water leakages from old pipes and unidentified consumers. Although the amount of water supply is expected to increase, the revenue will not increase as expected without taking appropriate measures for the reduction of NRW. • There is a number of unidentified consumers who are not billed from the SSUWC Juba Station.

Annex 5: Training in South Sudan

No.	Activity	1st Term			2nd term			3rd Term			Total		
		No. of participants	No. of sessions	No. of Participants per session	No. of participants	No. of sessions	No. of Participants per session	No. of participants	No. of sessions	No. of Participants per sessions	No. of participants	No. of sessions	No. of Participants per session
1-1	Analysis and Understanding of the Current Status of O&M of Water Intake and Treatment Facilities	118	14	8							118	14	8
1-2	Collection of O&M Digital Data of Intake Pumping Station and Water Treatment Plant	52	5	10	15	3	5				67	8	8
1-3	Preparation of O&M Plan for Intake Pumping Station and Water Treatment Plant				238	47	5	1	1	1	238	47	5
1-4	Preparation of O&M Manuals for Intake Pumping Station and Water Treatment Plant				56	12	5	27	10	3	56	12	5
2-1	Survey and understanding of the current conditions of water supply service	25	4	6							25	4	6
2-2	Investigation and Understanding of Current Statues of Water Distribution Facilities	22	2	11	10	2	5				32	4	8
2-3	Collection and Compilation of O&M Data of Transmission and Distribution Facilities in Computer				24	4	6	10	5	2	24	4	6
2-4	Preparation of O&M Plan for Transmission and Distribution Facilities				91	19	5	10	5	2	91	19	5
2-5	Preparation of O&M Manuals for Water Transmission and Distribution Facilities				85	15	6	15	5	3	85	15	6
3-1	Preparation of Water Quality Test Plan	40	8	5	5	2	3				45	10	5
3-2	Collection of Digital Data of Water Quality Test Results	59	12	5	179	28	6	55	10	6	238	40	6
4-1	Investigation and Understanding of Current Revenue Collection Conditions	33	9	4				1	1		33	9	4
4-2	Preparation of Digital Customer Ledger Database	43	11	4	1	1	1	2	2	1	44	12	4
4-3	Case Study on Water Tariff and Cost Recovery of Water Utility				5	3	2	25	3	8	5	3	2
4-4	Analysis of Financial Conditions of SSUWC Juba Station				22	15	1	1	1	1	22	15	1
4-5	Recommendations on Improvement of Financial Conditions Including Revenue Collection	6	2	3	5	3	2				11	5	2
4-6	Study on Management Models of Public Water Tap Stands				0						0	0	0
4-7	Study on Management Forms of Water Supply Points for Water Tankers				0						0	0	0
4-8	Study on Tariff Collection from House Connections				12	3	4				12	3	4
5-1	Definition of Roles of SSUWC HQ and SSUWC Juba Station	6	1	6							6	1	6
5-2	Establishing the Rule on Submission of Reports and Plans by SSUWC Stations	21	3	7	5	1	5	8	1	8	26	4	7
5-3	Training on Design and Planning of Water Supply Facilities				22	4	6	52	7	7	22	4	6
5-4	Assistance to Examination of Reports and Plans Submitted by SSUWC Juba Station				9	1	9	23	4	6	9	1	9
5-5	Assistance to SSUWC HQ in Holding Monthly Meeting with Stations and MWRI				9	1	9	3	1	3	9	1	9
5-6	Study on the Existing Water Supply Facilities and Services of 4 Stations by SSUWC HQ				6	1	6				6	1	6
	Regulation of Office Equipments(2/25)	13	1	13							13	1	13
	Computer training (Enplish speaker)	480	40	12							480	40	12
	Computer training (Arabic speaker)	200	20	10							200	20	10
	Weekly Meeting	76	8	10	213	23	9	256	27	9	289	31	9
	JCC	46	2	23	22	1	22	37	1	37	68	3	23
	Progress Seminar	60	1	60							60	1	60
	Rehearsal of Progress Seminar	31	3	10							31	3	10
	Tariff Seminar				37	1	37	25	3	8	37	1	37
	Total	1,331	146		1,071	190		551	87		2,402	336	

Annex 6: List of Reports, Manuals, Database and Training Materials

	Product	Type	Year	Details
1	Baseline Survey Report	Report	2011	Current conditions of operation and maintenance for the existing facilities (i.e. intake, transmission, purification and distribution),
2	Report on Current Status of Management Forms of Public Tap Stands	Report	2010	The result of interviews regarding management forms, tariff structure, collection method, actual usage condition for community management, Payam management and private management, and recommendations.
3	Seminar Materials for Understanding of Financial Situation and Introduction of New Water Tariff	Seminar Material	2010	Current financial situation, Cost recovery Revenue Requirement and Tariff rate design, Current situation of water meter installation and customer satisfaction, Simulation of new water tariff
4	Reporting System and Planning System	Manual	2011	Final version of reporting and planning system
5	Water quality monitoring plan	Plan	2011	Water quality monitoring system including water quality standards, parameters, sampling frequency, sampling points and test method
6	Operation and maintenance of Purification plant	Manual	2011	Manuals and standard operation procedure (SOP) for purification plant
7	Operation and maintenance of transmission and distribution facilities	Manual	2011	Manuals and standard operation procedure (SOP) for distribution and transmission facilities
8	Customer and revenue collection database	Database	2011	Software for managing customer database, billing and revenue collection.
9	Management method for public tap and tanker filling points	Manual	2011	Selection procedure of contractors, recording format of collected fees, contract, management manuals
10	Roles of headquarters, reporting and planning system and database of stations	Manual	2011	Roles of headquarters, organization proposed, reporting and planning system and methodology, performance indicators and database of stations
11	Record format for O&M and database for equipment	Format	2011	Comprehensive data and record format of O&M and equipment
12	GIS water distribution network database	Database	2011	Database of distribution network using GIS base map
13	Monthly Reports of Juba station	Report	2011	First format for monthly report in September 2011 and monthly reports were prepared monthly.
14	Monthly reports evaluation formats	Report	2011	Monthly report submission dates, meeting and evaluation dates, and evaluation format
15	Annual Report (2011) and Action Plan (March to June 2012)	Report/Plan	2011	First format for annual report of existing operation and maintenance and annual action plan
16	Annual budget plan (March to June 2012)	Plan	2011	Format of annual budget plan and calculation sheets.
17	Database of SSUWC stations	Database	2011	Database on management, facilities and equipment of Juba, Malakal and Wau stations.
18	Training materials	Training Material	2011	Materials on water intake and treatment facilities, transmission and distribution facilities, water quality management, management model for public tap stands and tanker filling points, outline of planning and designing of water supply facilities
19	Report on Current Status of Management of Water Supply Points for Water Tankers	Report	2011	Positive or negative social and environmental impacts in communities around the water supply points, and management condition of water supply points constructed by USAID (tariff structure, collection method, management form, the average number of usage tankers per day and waiting hours for water supply)

	Product	Type	Year	Details
20	Report on Current Status of Tariff Collection from House Connections	Report	2011	Survey results including the number of contracts showing current condition of house connection, the average number of people using tap per contract, the average consumption water volume, water tariff structure, payment method of water tariff, willingness to pay, reason of outstanding and satisfaction
21	Revised O&M manuals	Manual	2012	Revised manual and standard operation procedures (SOP) for purification, distribution and transmission facilities.
22	Revised monthly report format	Format	2012	Revised monthly report format
23	Water distribution plan and zoning plan	Plan	2012	Plan for pump operation hours for Juba station and pumping stations
24	Water tariff seminar	Training Material	2012	This materials were used for 3 days tariff seminar to understand tariff structure, tariff level, affordability, cost structure and other countries example.
25	Materials for public awareness activities for school students in Juba Station	PR Material	2012	A series of documents was complied to do the public awareness activities for school students in Juba station (activity schedule, song preparation, painting contest, which is drinkable water?, water quiz, Juba station explanation tour)
26	Monthly Reports of Juba station	Report	2012	Revised format for monthly report and monthly reports were prepared monthly.
27	Evaluation of performance indicators	Report	2012	Evaluation results of performance indicators between March and June 2012.
28	Action Plan	Plan	2012	Action Plan from July 2012 to June 2013
29	Annual budget plan	Plan	2012	Annual budget plan and calculation sheets for Juba station from July 2012 to June 2013
30	Evaluation of the Management Model for the Public Tap Stands and Tanker Filling Points	Report	2012	Evaluation and analysis on the suggested management system and logging form and recommendation
31	Report on Ideal Management Form of Water Supply Points for Water Lorries	Report	2012	Recommendation of the management form of water supply points
32	Revised water distribution plan	Plan	2013	Revised water distribution plan with required fuel and expense estimation
33	Revised customer and billing and collection database	Database	2013	Revised software including metered volumetric charge according to new water tariff
34	Report on Analysis of Water Supply Conditions	Report	2013	Status and improvements of the water supply service since the Project started

Annex 7: Project Design Matrix (PDM) version 3

Name of Project: The Project for Management Capacity Enhancement of South Sudan Urban Water Corporation			Period: November 2010 ～ October 2013
Target Area: Juba, South Sudan	Target Group: South Sudan Urban Water Corporation (SSUWC) Headquarter and Juba Station Staff		
Project Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goals:. 1. The quality of the water supply service extended by SSUWC-Juba is improved 2. The management capacity of SSUWC HQ is improved.	1. The customer satisfaction on water supply service of SSUWC-Juba station is enhanced. 2. All essential performance indicators are further improved from the final date of the Project. 3. All reports and plans submitted from area stations are assessed and guidance is given back to them.	1. Baseline and impact survey (household sample interview survey) 2. Monthly and Annual reports 3.1 Evaluation checklist by SSUWC HQ 3.2 Views from the area stations on the support from SSUWC HQ	
Project Objective The management capacity of SSUWC-Juba station is enhanced through capacity development on operation and maintenance of water supply facilities.	1. 80% of 25 essential performance indicators set in the annual plan which are measurable at the SSUWC Juba station is improved compared to the 2011 average. (Essential performance indicators is attached with baseline data of average value in 2011)	1. Monthly and Annual reports	- Adequate budget of SSUWC is disbursed. - The trainees completing the courses do not leave SSUWC. - SSUWC HQ starts to extend support to other SSUWC stations as it extends to SSUWC-Juba.
Output: 1. Capacity of SSUWC-Juba station with respect to operation and maintenance of water intake and treatment facilities is improved.	1-1 Monthly reports and annual reports in which O&M data is compiled. 1-2 Annual plan on water treatment plant. 1-3 The number of staff who acquired adequate O&M skills for WTP increases from 0 to 11 persons. 1-4 Plant average operating hour per day increases from 17.9 hours (2011 average) to 22 hours/day 1-5 The monthly average ratio that the quality of treated water with respect to turbidity is below 5 NTU increases from 90% to 100%. 1-6 The monthly average ratio that the quality of treated water with respect to residual chlorine falls in the range between 0.7 mg/l and 1.2 mg/l increases from 10% to 80 %.	1-1 Confirmation of monthly and annual reports 1-2 Confirmation of annual O&M plan 1-3 Test results (training report) and evaluation by experts 1-4 Monthly and annual reports 1-5 Water quality management report 1-6 Water quality management report	- Any significant damage to water supply facilities is not caused. - Raw water quality is not deteriorated significantly. - Raw water flow is not decreased significantly.
2. Capacity of SSUWC-Juba station with respect to operation and maintenance of water transmission and distribution facilities is improved.	2-1 Monthly reports and annual reports in which O&M data is compiled. 2-2 Annual operation and maintenance plan on O&M of water transmission and distribution facilities. 2-3 The number of staff who acquired adequate O&M skills for transmission and distribution increases from 0 to 10 persons. 2-4 Application of a formulated Pump Operation Plan by the Project is started in 2012.	2-1 Confirmation of monthly and annual reports 2-2 Confirmation of annual O&M plan 2-3 Test results (training report) and evaluation by experts 2-4.1 Pump Operation Plan 2-4.2 Monthly report	

3. Capacity of water quality management of SSUWC-Juba station is improved. 4. Understanding of financial conditions of SSUWC-Juba station is enhanced. 5. Capability of SSUWC HQ to support SSUWC-Juba station is enhanced.	3-1 Water quality management report (monthly and annual) in which water quality monitoring data is compiled. 3-2 The number of staff who acquired adequate water quality test skills increases from 0 persons to 2 persons. 4-1 Revenue collection reports are prepared monthly. 4-2 Recommendations on revenue collection improvement are made. 4-3 Management method of public water tap stands is established. 5-1 SSUWC HQ examines the monthly reports submitted by SSUWC Juba station every other month. 5-2 The number of annual reports and plans that SSUWC HQ examined becomes 2 each. 5-3 The existing water supply facilities and services are inputted in to the established database.	3-1 Confirmation of monthly and annual water quality management report 3-2 Test results (training report) and evaluation by experts 4-1 Confirmation of revenue collection reports 4-2 Annual plan 4-3 Pilot project report on public water tap stand 5-1 Evaluation checklist by SSUWC HQ 5-2 Evaluation meeting minutes 5-3 Confirmation of database	
Activities	Inputs		
1-1 Analysis and understanding of the current status of O&M of water intake and treatment facilities 1-2 Collection and compilation of O&M data of water treatment plant and intake pumping station in computer 1-2-1 Preparation of digital data format using computer 1-2-2 Installation of measuring equipment (flow and pressure) 1-2-3 Measurement of water flow and pressure data and recording O&M data in database 1-2-4 Training on data compilation and analysis 1-2-5 Data compilation and analysis 1-2-6 Preparation of O&M report (monthly, annual) 1-2-7 Discussion on O&M with SSUWC HQ based on O&M report (monthly and annual) 1-3 Preparation of O&M plan for water treatment plant and pumping station (including procurement plan and budget plan) 1-3-1 Setting of goals for improvement, planning for improvement 1-3-2 Training on preparation for O&M plan 1-3-3 Preparation of O&M plan 1-3-4 Discussion on O&M plan with SSUWC HQ based on O&M plan 1-4 Preparation of O&M manuals for water treatment plant and intake water pump 1-4-1 Preparation of manuals 1-4-2 Training on O&M based on prepared manuals 2-1 Survey and understanding of the current conditions of water supply service (Area covered, water pressure, water quality, duration of water supply, residence water difficulties, etc.)	[Japanese side] Human resources: Experts - Chief Advisor/Water Utility Management - Water Treatment Plant Operation and Maintenance - Transmission and Distribution Facilities Operation and Maintenance - Pumping Facilities Operation and Maintenance - Water Quality Management - Financial Evaluation/Water Tariff - Community Development Local staff - Surveyors Training in Japan and other third countries Equipment and materials: - For training ・Flow meters ・Pressure gauges ・Pipes, valves, fittings and miscellaneous ・Plumbing tools set ・Additional water quality analysis equipment ・Projector ・Computers and software ・Printers + consumables ・Copy machine ・Digital camera, video camera ・GPS ・Vehicles	[South Sudan side] Human resources: - Project Director - Project Manager - Project Staff Facilities: - Training rooms - Office for experts Local costs: - Fuel, consumables, etc. - Reagent for water quality analysis - Water meters - Tax exemption Software: - Pipes, valves, fittings and miscellaneous - GIS arcview: 1 set (has been procured by JICA development study) Travel expenses: - Travel expense and allowance for participants of SSUWC stations other than Juba station in training	- The current budget of SSUWC-Juba station is not decreased. - Counterparts do not resign from training course and do not get transferred. - Custom clearance process does not significantly delay import of equipment from overseas. - The power supply condition to water supply facilities is not worsened from the current level. - The roles of SSUWC is not changed. **Pre-conditions:** - The political situation remains stable. - SSUWC continuously manages urban water supply utilities.

2-2 Investigation and understanding of existing facility conditions of transmission and distribution facilities 2-3 Collection and compilation of O&M data of transmission and distribution facilities in computer 2-3-1 Preparation of digital data format using computer 2-3-2 Installation of measuring equipment (flow and pressure) 2-3-3 Measurement of water flow and pressure data and recording O&M data in database 2-3-4 Training on data compilation and analysis 2-3-5 Data compilation and analysis 2-3-6 Preparation of O&M report (monthly, annual) 2-3-7 Discussion on O&M with SSUWC HQ based on O&M report (monthly and annual) 2-4 Preparation of O&M plan for transmission and distribution facilities (including procurement plan and budget plan) 2-4-1 Setting of goals for improvement, planning for improvement 2-4-2 Training on preparation of O&M plan 2-4-3 Preparation of O&M plan 2-4-4 Discussion on O&M plan with SSUWC HQ based on O&M plan 2-5 Preparation of O&M manuals for water transmission and distribution facilities 2-5-1 Preparation of manuals 2-5-2 Training on O&M based on prepared manuals 3-1 Preparation of water quality test plan (location, date, parameters, etc.) 3-2 Collection of digital data of water quality test results 3-2-1 Procurement of additionally required water quality test equipment 3-2-2 Preparation of digital data format using computer 3-2-3 Training on water quality test 3-2-4 Implementation of water quality test 3-2-5 Training on compilation and analysis of water quality test results 3-2-6 Compilation and analysis of water quality test results 3-2-7 Preparation of water quality management report 3-2-8 Discussion on water quality issues with SSUWC HQ based on water quality management report (monthly and annual) 4-1 Investigation and understanding of current revenue collection conditions 4-2 Preparation of digital customer ledger database 4-2-1 Preparation of digital data format using computer	– For administration ・Computers and software Construction of pilot facilities (public water tap stands) Construction of flow meter pit		

4-2-2 Training on data compilation and analysis 4-2-3 Data compilation and analysis 4-2-4 Preparation of report (monthly, annual) 4-2-5 Discussion on revenue collection with SSUWC HQ based on prepared report 4-3 Analysis of financial conditions of SSUWC-Juba station 4-3-1 Analysis of existing cost structure and identification of problems 4-3-2 Estimation of adequate cost based on prepared O&M plans 4-4 Case study on water tariff and cost recovery of water utility 4-5 Recommendations on improvement of financial conditions including revenue collection 4-6 Study on management models of public water tap stand 4-6-1 Investigation and evaluation of existing management system 4-6-2 Community survey for construction of tap stand 4-6-3 Study and selection of efficient management system for new tap stand 4-6-4 Design and construction of public water tap stand 4-6-5 Implementation, evaluation and improvement of management system 4-7 Study on management models of tanker feeding station 4-7-1 Investigation and evaluation of existing management system 4-7-2 Study and selection of efficient management system for tanker feeding station 4-8 Study on tariff collection from house connections 4-8-1 Investigation of current situation 4-8-2 Examination of existing capacity of water meter installation and reading in test field 5-1 Definition of roles of SSUWC HQ and SSUWC-Juba station 5-2 Establishing the rule on submission of reports and plans by SSUWC stations 5-3 Training on design and planning of water supply facilities 5-4 Examination of reports and plans submitted by SSUWC-Juba station 5-5 Assistance to SSUWC HQ in holding monthly meeting with stations and MWRI 5-6 Study on the existing water supply facilities and services of 4 stations by SSUWC HQ			