バングラデシュ国
チッタゴン上下水道公社
無収水削減推進プロジェクト
中間レビュー調査
報告書

平成23年3月
（2011年）

独立行政法人 国際協力機構
バングラデシュ事務所

バン事
JR
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序　　文

バングラデシュ国（以下、バ国）最大の商工業都市であるチッタゴン市では、都市の拡大に上・下水道をはじめとする基礎インフラの整備が追いついていません。現状では市内のほとんどで制限給水が行われており、多くの住民は給水が行われる時間中に受水槽あるいは容器に水を貯めて使用している状況です。

このような状況に対して JICA はバ国政府の要請に基づき実施した開発調査「チッタゴン市モハラ浄水場拡張計画調査」（1999 年）の中で 2010 年を目標年次としたマスタープラン（M/P）およびフィージビリティースタディ（F/S）を作成し、上記の事業計画の実現を支援するため、円借款「カルナフリ浄水場整備事業」を実施しています。これらに加えチッタゴン市における適切な水・衛生サービスの提供を担当・管轄するチッタゴン上下水道公社（CWASA）は、債務削減相当資金による「モハラ及びカルルガット既存浄水場リハビリ事業」（2011 年完工）、世界銀行支援による「モデナガット上水道整備事業」「モハラ上水道整備事業（拡張）」を進めています。

同市では、上記 3 つの新規浄水場の完成による給水量の増加が見込まれる一方で、浄水場以降のポンプ場や配水網にいたる送配水システムには課題が残っています。布設から 40 年が経過し既に耐用年数を超過した既存送配水管は、老朽化による漏水増加の可能性が認識されていますが、適切な漏水対策を実施するための技術を CWASA は有していません。このため、今後適切に施設を運転し財務的にも健全な上水道事業を進めていく上で重要な、漏水対策を含めた無収水対策及び上水道事業の技術改善にかかる技術協力プロジェクトの要請がバ国政府からなされ、2006 年 7 月のプロジェクト形成調査の実施を経て採択されました。2008 年 1 月から 2 月にかけて事前評価調査を実施し、2009 年 3 月の討議議事録（Record of Discussion（R/D））の署名を経て、同年 7 月よりプロジェクトが開始されました。

今般 JICA は、これまでの活動実績を整理し現時点までの進捗状況について評価を行うため、バングラデシュ事務所次長富田 洋行を日本側の総括とし、バングラデシュ人民共和国側関係機関との協同作業により中間レビューを 2011 年 1 月 16 日から 2 月 3 日まで実施しました。同調査団での協議内容は合同評価報告書にまとめられ、合同評価報告書を添付した協議議事録（Minute of Meeting（M/M））を CWASA と署名交換しました。

本報告書は、同調査団の調査結果を取りまとめたものであり、今後の技術協力実施にあたって多くの関係者に広く活用されることを願うものです。ここに調査団の各位をはじめ、調査にご協力いただいた外務省、在バングラデシュ人民共和国日本国大使館など、内外関係各機関のかたがたに深く謝意を表するとともに、引き続き一層のご支援をお願いする次第です。

2011 年 3 月

独立行政法人 国際協力機構
バングラデシュ事務所長　戸田　隆夫

評価要約表

1. 案件の概要		
国名：バングラデシュ人民共和国		案件名： チッタゴン上下水道公社無収水削減推進プロジェクト
分野：上水道		援助形態：技術協力プロジェクト
所轄部署：バングラデシュ事務所		協力金額（評価時点）：3 億 5,000 万円
協力期間	R/D 締結：2006 年 12 月 11 日 2009 年 7 月～2012 年 7 月	先方関係機関：ダッカ上下水道公社（CWASA）
		日本側協力機関：

1-1 協力の背景と概要

バングラデシュ国（以下、バ国）最大の商工業都市であるチッタゴン市（人口約 270 万人）では、都市の拡大に水道をはじめとする基礎インフラの整備が追いついていない。同市の水道事業はチッタゴン上下水道公社（Chittagong Water Supply and Sewage、以下「CWASA」）が実施しているが、現時点での CWASA の給水可能量は現在の給水地域の需要（328,000m^3/日（2005 年））に対し、約 48%にあたる 168,000 m^3/日にとどまっている。また、将来的には給水地域の拡大、需要拡大に伴い 566,000m^3/日（2010 年）、839,000 m^3/日（2020 年）まで需要量が増加すると予測されており、給水量の拡大は同市の水道事業にとって急務となっている。現状では市内のほとんどで制限給水が行われており、富裕層は自己の井戸を使用している例もあるが、多くの住民は給水が行われる時間中に受水槽あるいは容器に水を貯めて使用している。中流層は共同住宅が多く、それらの住宅では給水管を一本引き込み、受水槽から屋上の水槽に揚水し棟内の住宅に供給しているが、貧困層では飲料水のみ CWASA の公共水栓から入水し、浅井戸や池の水等を、飲用を除く日常生活用水に使用している。

JICA はバ国政府の要請に基づき実施した開発調査「チッタゴン市モハラ浄水場拡張計画調査」（1999 年）の中で 2010 年を目標年次としたマスタープラン（M/P）およびフィージビリティースタディ（F/S）を作成し、CWASA は M/P で提案された事業計画に応じ、2010 年までに給水量を 432,000m^3/day まで増加させる計画である。わが国は、上記の事業計画に基づく CWASA からの要望に応える形で、円借款「カルナフリ浄水場整備事業」を実施中である（2013 年完工予定）。これらに加え CWASA は、債務削減相当資金による「モハラ及びカルルガット既存浄水場リハビリ事業」（2011 年完工予定）、世銀支援による「モデナガット上水道整備事業」「モハラ上水道整備事業（拡張）」を進めており、カルナフリ浄水場と合わせ、3 つの新規浄水場が 2011 年に完成する予定である。

同市では、上記 3 つの新規浄水場の完成による給水量の増加が見込まれる一方で、浄水場以降のポンプ場や配水網にいたる送配水システムには課題が残っている。布設から 40 年が経過し既に耐用年数を超過した既存送配水管は、老朽化による漏水増加の可能性が認識されているが、適切な漏水対策を実施するための技術を CWASA は有していない。このため、今後適切に施設を運転し財務的にも健全な上水道事業を進めていく上で重要な、漏水対策を含めた無収水対策及び上水道事業の日常技術改善にかかる技術協力プロジェクトの要請がバ国政府からなされ、2006 年 7 月のプロジェクト形成調査の実施を経て、2007 年 4 月に採択に至った。JICA は 2008 年 1 月から 2 月にかけて事前評価調査を実施、2009 年 3 月の実施協議議事録（R/D）の署名を経て、同年 7 月よりプロジェクトが開始された。

1-2 協力内容

本プロジェクトはCWASAをカウンターパート（C/P）機関とし、チッタゴン市での無収水対策の強化を通じ、C/P の持続可能な水供給・管理実施能力向上を支援することを目的として、2009 年 7 月より年間の予定で実施されている。

（1）上位目標

チッタゴン市の無収水率が削減される

（2）プロジェクト目標

CWASA の無収水削減能力が強化される

（3）成果

① 無収水削減計画策定能力が開発される

② パイロット･プロジェクトを通して無収水削減対策技術と実施マネジメント能力が強化される

（4）投入（評価時点）

日本側：専門家派遣 5 名、機材供与 約 1,700 万円、プロジェクト経常経費：約 1 億 1000 万円

バングラデシュ側：C/P 配置 4 名、施設：専門家執務スペース、ローカルコスト負担：約 5 万タカ（2009/10 年度）、約 1,000 万タカ（2010/11 年度（見込））

2. 評価調査団の概要

調査者：	総括	富田 洋行	JICA バングラデシュ事務所次長
	都市給水	讃良 貞信	JICA 国際協力専門員
	協力企画	廣澤 仁	JICA バングラデシュ事務所所員
	評価分析	黒田 康之	国際開発センター
調査期間：	2011 年 1 月 16 日～2 月 3 日		評価種類：中間レビュー

3. 評価結果の概要

3-1 実績の確認（各成果の達成度）

成果 1：無収水削減計画策定能力が強化される

PDM で定められている 6 つの活動の中で、「1-1 管理チームが形成される」及び「1-2 無収水削減に係る CWASA の既存の活動をレビューする」は（チームに実際に配置された人員の不足という課題はあるものの）、概ね計画通りに実施された。一方で CWASA 側の適切な人員配置の遅れ等により他の活動については当初計画からの遅れが見られた。プロジェクト終了時までの残りの期間と現在の進捗状況を考慮すると、無収水対策全体計画及び実施計画の策定はプロジェクト期間内に実施できる見込みがあるものの、両計画に基づいた無収水対策の実施のモニタリング及び計画のレビュー（「1-5 Monitor the annual implementation plans」、「1-6 Review the provisional overall action plan based on feedback from the pilot projects」）についてはプロジェクト期間内の実施が困難であることから、CWASA 側と協議・合意の上でプロジェクトの活動対象から外すこととした。

成果 2：パイロット・プロジェクトを通して無収水削減技術及び実施マネジメント能力が強化される

PDM で定められている 9 つの活動の中で、「2-1 パイロット・プロジェクト対象地域の選定」及び（チームに実際に配置された人員の不足という課題はあるものの）「2-2 アクションチーム（Action

Team）の設置」は当初計画通りに実施された。また、「2-5 無収水削減活動計画策定」、「2-7　On the Job Training（OJT）の実施」、「2-8　住民啓発活動の実施」 についても概ね計画通りに実施されている。一方でパイロット・プロジェクトの実施等実際の無収水削減実施に係る各活動については、当初計画からの遅れが見られ、今後実施予定の活動の進捗にも影響を与えることが見込まれる。プロジェクト終了時までの各指標及び成果の達成には、成果1同様CWASAの適切な人員配置等が求められる。

3-2 評価結果の要約

（1）妥当性

バ国政府が 2004 年に策定した National Water Management Plan は 8 分野を優先課題としており、大都市給水はこのうちのひとつである。同 Plan は、チッタゴンを含む四大都市について、2010 年までに人口カバー率 75%、2025 年までに同 90%を目標に掲げている。

また、対バングラデシュ国別援助計画（2006 年 5 月）において、水分野を含む環境分野は「社会開発と人間の安全保障」の重点支援セクターの一つに位置づけられており、本プロジェクトの妥当性は高い。

（2）有効性

特に成果 1 の進捗状況を鑑みると有効性は中程度と評価される。

（3）効率性

人員配置の遅れやプロジェクトのマネジメント層の頻繁な交代等が円滑なプロジェクト実施を妨げておりプロジェクトが十分効率的に実施されているとは評価されない。

（4）インパクト

プロジェクトはチッタゴン市と水供給に大きなインパクトを持っている。プロジェクトから得られる無収水対策の技術・知見・経験をチッタゴン市全域の水供給サービスにおいて活用することによってより少ないコストで質の高いサービスをプロジェクト対象地域以外にも展開できる。

（5）自立発展性

CWASA 組織全体で無収水対策に対する重要性が未だ十分に認識されているとは言えない状況であり、自立発展性を高めるために適切な人員配置及び無収水対策に取り組むことへのインセンティブ制度の導入等を実施することにより、プロジェクト終了後も自立発展的に無収水対策が実施される状況を作り出していくことが重要である。

3-3　結論

R/D 締結時に CWASA が約束していた人員配置が遅れた等の要因により、当初計画通りに進捗していない活動が一部見られる。一方で、成果 2 を中心に成果が発現している部分もある。プロジェクト目標の達成のためには早期の人員配置等の対策等が求められる。

3-4 提言（当該プロジェクトに関する具体的な措置、提案、助言）

（1） CWASA で無収水削減業務に従事している職員が、当該業務実施へのインセンティブを持てる仕組みを構築する

（2） 量水器の技術標準と、その CWASA が調達する量水器が一定程度の水準を保てるような検定制度を確立する

(3) 量水器と給水管の所有権に係る現行の条例及び規則を見直し、量水器と給水管の一定区間（量水器から蛇口まで）を CWASA の所有とするために必要な改定を確認する
(4) CWASA 職員の新規雇用を早期に実現すること
(5) プロジェクト下における無収水削減のためのマネジメントシステムの再構築
(6) プロジェクト終了までに導入される GIS システムを用いた配水管網及び顧客情報に係るデータベースの有効活用

写　　真

管路調査

漏水調査にかかるトレーニング

量水器交換 1

量水器交換 2

漏水調査 1

漏水調査 2

目　　次

付属資料

1. Minutes of Meeting（合同評価報告書含む）
2. 質問表（対バ国側実施・関係機関）
3. 収集文献・資料一覧

略　語　集

AE	Assistant Engineer
BDT	Bangladesh Taka
C/P	Counterpart
CWASA	Chittagong Water Supply and Sewerage Authority
CWSISP	Chittagong Water Supply Improvement and Sanitation Project
EE	Executive Engineer
ERD	Economic Relations Division
GIS	Geographic Information System
GOB	Government of Bangladesh
GOJ	Government of Japan
IDCS	Institutional Development Consultancy Services
JET	JICA Expert Team
JFY	Japanese Fiscal Year
JPY	Japanese Yen
JICA	Japan International Cooperation Agency
KWSP	Karnaphuli Water Supply Project
LGD	Local Government Division
MD	Managing Director
MIS	Management Information Systems
M/M	Minutes of Meeting
MOD	Maintenance, Operation & Distribution
NRW	Non Revenue Water
OJT	On the Job Training
PANI	Project for Advancing NRW Reduction Initiative
PD	Project Director
PDM	Project Design Matrix
PO	Plan of Operation
R/D	Record of Discussion
SAE	Sub Assistant Engineer
TPP	Technical Project Proposal
WB	World Bank

第1章　評価調査の概要

1-1　対象プロジェクトの概要

バングラデシュ国（以下、バ国）最大の商工業都市であるチッタゴン市（人口約 270 万人）では、都市の拡大に水道をはじめとする基礎インフラの整備が追いついていない。同市の水道事業はチッタゴン上下水道公社（Chittagong Water Supply and Sewage、以下「CWASA」）が実施しているが、現時点での CWASA の給水可能量は現在の給水地域の需要（328,000m^3/日（2005 年））に対し、約 48％にあたる 168,000m^3/日にとどまっている。また、将来的には給水地域の拡大、需要拡大に伴い 566,000 m^3/日（2010 年）、839,000$m^{3/}$日（2020 年）まで需要量が増加すると予測されており、給水量の拡大は同市の水道事業にとって急務となっている。現状では市内のほとんどで制限給水が行われており、富裕層は自己の井戸を使用している例もあるが、多くの住民は給水が行われる時間中に受水槽あるいは容器に水を貯めて使用している。中流層は共同住宅が多く、それらの住宅では給水管を一本引き込み、受水槽から屋上の水槽に揚水し棟内の住宅に供給しているが、貧困層では飲料水のみ CWASA の公共水栓から入水し、浅井戸や池の水等を、飲用を除く日常生活用水に使用している。

JICA はバ国政府の要請に基づき実施した開発調査「チッタゴン市モハラ浄水場拡張計画調査」（1999 年）の中で 2010 年を目標年次としたマスタープラン（M/P）およびフィージビリティースタディ（F/S）を作成し、CWASA は M/P で提案された事業計画に応じ、2010 年までに給水量を 432,000 m^3/day まで増加させる計画である。わが国は、上記の事業計画に基づく CWASA からの要望に応える形で、円借款「カルナフリ浄水場整備事業」を実施中である（2013 年完工予定）。これらに加え CWASA は、債務削減相当資金による「モハラ及びカルルガット既存浄水場リハビリ事業」（2011 年完工予定）、世界銀行支援による「モデナガット上水道整備事業」「モハラ上水道整備事業（拡張）」を進めており、カルナフリ浄水場と合わせ、3 つの新規浄水場が完成する予定である。

同市では、上記 3 つの新規浄水場の完成による給水量の増加が見込まれる一方で、浄水場以降のポンプ場や配水網にいたる送配水システムには課題が残っている。布設から 40 年が経過し既に耐用年数を超過した既存送配水管は、老朽化による漏水増加の可能性が認識されているが、適切な漏水対策を実施するための技術を CWASA は有していない。このため、今後適切に施設を運転し財務的にも健全な上水道事業を進めていく上で重要な、漏水対策を含めた無収水対策及び上水道事業の日常技術改善にかかる技術協力プロジェクトの要請がバ国政府からなされ、2006 年 7 月のプロジェクト形成調査の実施を経て、2007 年 4 月に採択に至った。JICA は 2008 年 1 月から 2 月にかけて事前評価調査を実施、2009 年 3 月の実施協議議事録（R/D）に署名を経て、同年 7 月よりプロジェクトが開始された。

協力開始から約 1 年 5 ヶ月を迎えた今般、2012 年 7 月の活動期間終了に向けて、これまでの活動実績を評価するとともに、プロジェクト目標を達成するために必要な提言を抽出することを目的に中間レビューを実施した。

1-2 調査団派遣の目的

（1） プロジェクトの進捗（投入実績、活動実績、計画達成度等）を、プロジェクトの内容について定めた Record of Discussion（R/D）及びプロジェクト・デザイン・マトリックス（Project Design Matrix）に基づき確認するとともに、課題と問題点の整理を行う。

（2） JICA 事業評価ガイドラインに基づき、5 項目（妥当性、有効性、効率性、インパクト、自立発展性）の観点から評価を実施し、プロジェクトが順調に成果発現に向けて実施されているかを検証する。

（3） （1）及び（2）の検討結果及びバ国側との協議に基づき必要に応じ PDM の修正を行う。

（4） 上記の調査結果に基づき、今後の活動計画に関する提言を行う。

1-3 合同レビューチームの構成

[日本側]

Name	Title in Relation to the Project	Occupation
Mr. Hiroyuki TOMITA	Leader of the Japanese Mid-term Review Team	Senior Representative, JICA Bangladesh Office
Mr. Sadanobu SAWARA	Urban Water Supply	Senior Advisor,
Mr. Jin HIROSAWA	Cooperation Planning	Representative, JICA Bangladesh Office
Mr. Yasuyuki KURODA	Evaluation and Analysis	Private Consultant

[バ国側]

Name	Title in Relation to the Project	Occupation
Ms. Khadiza Begum	Steering Committee Member	Deputy Secretary, Economic Relation Division, Ministry of Finance
Mr. Shamsuddin Ahmed	Steering Committee Member	Deputy Secretary, Local Government Division, Ministry of Local Government, Rural Development and Cooperatives
Mr. A.K.M. Nazrul Haque	Counterpart	Executive Engineer and Project Director of PANI Project, CWASA

1-4　調査日程

	Date		Items	Venue
1	16th, Jan	Sun	Internal meeting of Japanese side Courtesy Call to LGD	JICA LGD
2	17th, Jan	Mon	Travel from Dhaka to Chittagong Courtesy Call to CWASA	 CWASA
3	18th, Jan	Wed	Interview with counterpart personnel and Data collection	CWASA
4	19th, Jan	Wed	ditto	ditto
5	20th, Jan	Thu	ditto	ditto
6	21st, Jan	Fri	Drafting Joint review report, Data arrangement	
7	22nd, Jan	Sat	ditto	
8	23rd, Jan	Sun	Discussion and Revising Joint review report (Additional Interview and Data collection)	CWASA
9	24th, Jan	Mon	ditto	ditto
10	25th, Jan	Tue	ditto	ditto
11	26th, Jan	Wed	Internal meeting of Japanese side Courtesy Call to ERD Courtesy Call to LGD Travel from Dhaka to Chittagong	JICA ERD LGD
12	27th, Jan	Thu	Courtesy Call to CWASA Review meeting (Discussion on Joint review report)	CWASA
13	28th, Jan	Fri	Drafting Joint review report, Data arrangement	
14	29th, Jan	Sat	ditto	
15	30th, Jan	Sun	Review meeting (Discussion on Joint review report)	CWASA
16	31st, Jan	Mon	Review meeting (Summarizing Joint review report in CWASA) Travel from Chittagong to Dhaka	CWASA
17	1st, Feb	Tue	Review meeting (Discussion on Joint review report)	LGD
18	2nd, Feb	Wed	Discussion with JET	JICA
19	3rd, Feb	Thu	Documentation	-

第2章　評価手法

本レビューは、「JICA 事業評価ガイドライン（2004 年 1 月：改訂版、以下「ガイドライン」）」に基づき、PDM を用いた評価手法に則って実施された。ガイドラインによる評価は、①PDM に基く評価のデザイン、②プロジェクトの実績・投入を中心とした必要情報・データの収集、③プロジェクトの実績と現状及び「妥当性」「有効性」「効率性」「インパクト」「自立発展性」の「評価 5 項目」の観点からの収集情報・データの分析・評価、④PDM の修正、⑤分析結果からの提言･教訓の導出及び報告という流れからなっている。なお､本レビューで活用した評価 5 項目の定義は以下の通りである。

（1）妥当性：

プロジェクトの目指している効果（プロジェクト目標や上位目標）が、受益者（ダッカ市民）のニーズに合致しているか、問題や課題の解決策として適切か、相手国と日本側の政策との整合性はあるか、「援助プロジェクトの正当性・必要性」を問う視点。

（2）有効性：

プロジェクトの実施により、受益者もしくは社会への便益がもたらされているのか（あるいは、もたらされるのか)を問う視点。成果の達成がプロジェクト目標の達成につながるか等を分析する。

（3）効率性：

主にプロジェクトのコストと効果の関係に着目し、資源が有効に活用されているか（あるいはされるか）を問う視点。成果とインプットの関係をタイミング、質、量の視点から分析する。

（4）インパクト：

プロジェクト実施によりもたらされる、より長期的、間接的効果や波及効果を見る視点。予期していなかった正・負の効果・影響を含む。

（5）自立発展性：

援助が終了しても、プロジェクトで発現した効果が持続しているか（あるいは持続の見込みはあるか）を組織、制度、政治、財政、技術等の面から問う視点。

2-1　評価のデザイン

評価のデザインを確定するにあたり、R/D、PDM、事前評価報告書、インセプションレポート、プロジェクト事業進捗報告書、業務完了報告書等に基づき、評価項目案を調査団内で検討し確定した。なお評価項目の詳細は評価グリッド（付属資料 2）を参照されたい。

2-2　情報・データ収集方法

定量的及び定性的なデータが収集され、評価のための分析に用いられた。データ収集に用いた方法を以下に示す。

- 報告書、文献等のレビュー
- 質問票調査及び集計結果に基づくグループ・インタビュー
- 現場視察

2-3　評価結果の取りまとめ

本評価調査の分析結果を基に、日本側及びバ国側の合同評価メンバーが協議を行い、その結果を英文の Minutes of Meeting（M/M）（付属資料 1、Joint Evaluation Report「合同評価報告書」が添付されたもの）を取りまとめ、署名・交換した。

第3章　評価結果

3-1　プロジェクトへの投入（日本側、バングラデシュ側）

プロジェクト開始時点より現在まで、以下の投入が実施された。

3-1-1　日本側の投入

（1） 専門家派遣

本プロジェクトはこれまでの 5 名の専門家が 5 つの分野で派遣されている。年度ごとの全専門家の派遣期間の合計を以下に示す。詳細については、付属資料 1 の Annex 3 の A3-1 を参照。

FY2009（Japanese Fiscal Year）	18.80 MM
FY2010 （– Oct 2010: up to Mid-term Evaluation	21.02 MM
合計	39.82MM

（2） 機材の供与

本調査時点までに約 1,700 万円相当の機材を供与した。詳細については、付属資料 1 の Annex 3 の A3-3 を参照。

（3） プロジェクト活動費

本調査時点までに約 1 億 1000 万円の経費が日本側より投入された。詳細は付属資料 1 の Annex 3 の A3-4 を参照。

3-1-2　バ国側の投入

（1） C/P の配置

本調査時点までに、4 名の C/P が配置されている。

（2） 施設の貸与

CWASA より CWASA 内に日本人専門家のための執務スペースが提供されている。

（3） プロジェクト活動費

2009/2010 バングラデシュ会計年度では約 5 万タカがプロジェクト経費として支出され、同 2010/2011 年度では約 1,000 万タカがプロジェクト経費として支出される見込である。合わせて GIS ツールが CWASA 側から本プロジェクト用に提供された。

3-2　実績

プロジェクトでは無収水削減対策アクションチーム（Non-Revenue Water（NRW）Action Team）の形成、無収水削減対策活動計画の策定、節水等に関する住民への意識啓発活動等いくつかの成果を当初計画通り達成したが、主に以下の 3 つの要因により当初の計画から大幅な変更を余儀なくされ、それに伴い進捗が遅れた活動等もいくつか見られた。

（1） CWASA による C/P 配置がスタッフ数及びタイミング共に当初計画通り実現しなかったこと
（2）詳細計画策定調査において CWASA は世界銀行の支援により水道管の配置や量水器（水道メーター）等を地図上に示した「管網図」及び顧客情報等を整備し順次その更新を行ってきたと説明していたがプロジェクト開始後専門家チームが改めて詳細を確認したところ 1998 年以降情報が更新されておらず無収水削減対策に用いるためには情報の大幅な更新及びそれらを地理情報システム（Geographic Information System）上でデータとして管理することが必要不可欠であることが明らかになり、追加の活動が必要となったこと
（3） 詳細計画策定調査及びプロジェクト開始当初は無収水の主な発生要因として水道管からの漏水や盗水が想定されていたが、プロジェクトが進む中で顧客情報の不備・不足や料金徴収担当職員の能力及び意欲の不足による効果的な料金徴収体制の未整備や無収水対策の最も基本的なツールの 1 つである量水器（水道メーター）の管理体制の不備といったことが無収水発生の主な要因であることが明らかになったこと

3-2-1 各成果の達成度

（1） 成果 1 ： 無収水削減計画策定能力が強化される

PDM で定められている 6 つの活動の中で、「1-1 管理チームが形成される」及び「1-2 無収水削減に係る CWASA の既存の活動をレビューする」は（チームに実際に配置された人員の不足という課題はあるものの）、概ね計画通りに実施された。一方で上記の主に（1）の理由により、他の活動については当初計画からの遅れが見られた。今回の中間レビューにおいて、Chief Engineer 等を中心とした「管理チーム（Management Team）」に代わり Executive Engineer, Assistant Engineer, Sub Assistant Engineer 等を中心とし、既存の CWASA の部局から独立し Managing Director が直轄する「無収水削減管理機構（NRW reduction Management Body）」の設立を提言している等 CWASA 側に可能な限りプロジェクトを計画通り進捗させる意欲はある。一方でプロジェクト終了時までの残りの期間と現在の進捗状況を考慮すると、無収水対策全体計画及び実施計画の策定はプロジェクト期間内に実施できると見込まれるものの、両計画に基づいた無収水対策の実施のモニタリング及び計画のレビュー（「1-5 Monitor the annual implementation plans」、「1-6 Review the provisional overall action plan based on feedback from the pilot projects」）についてはプロジェクト期間内の実施が困難であることから、CWASA 側と協議・合意の上でプロジェクトの活動対象から外すこととした。

（2） 成果 2 : パイロット・プロジェクトを通して無収水削減技術及び実施マネジメント能力が強化される

PDM で定められている 9 つの活動の中で、「2-1 パイロット・プロジェクト対象地域の選定」及び（チームに実際に配置された人員の不足という課題はあるものの）「2-2 アクションチーム（Action Team）の設置」は当初計画通りに実施された。また、「2-5 無収水削減活動計画策定」、「2-7 On the Job Training（OJT）の実施」、「2-8 住民啓発活動の実施」についても概ね計画通りに実施されている。一方で主に上記（2）及び（3）の要因により当初予定していた活動内容の追加及び活動実施スケジュールの大幅な変更を行わざるを得なかったため、パイロット・プロジェクトの実施等実際の無収水削減実施に係る各活動については、当初計画からの遅れが見られ、今後実施要諦の活動の進捗にも影響を与えることが見込まれる。プロジェクト終了時までの各指標及び成果の達成には、成果 1 同様 CWASA の適切な人員配置等が求められる。

(3) プロジェクト目標（達成見込）:

プロジェクト目標は「①無収水削減に係る包括的なアクションプランが定期的に作成・更新される」及び「②アクションチームの機能・活動が CWASA の通常業務に組み込まれる」、「CWASA 職員が漏水探知、配管、水道管修理に係る技術を適切に活用する」の 3 つの指標がある。

全ての指標について、現時点で CWASA の人員配置に大幅な遅れが見られること、また無収水削減対策を実施するための最も基礎的かつ重要なツールである管網図及び顧客情報整備の活動を新たに実施する必要があること、等の状況を鑑みるとプロジェクト終了時までの達成について非常に厳しい状況にあるといわざるを得ないが、上記の 2 つの要因が速やかに解決・実施され、CWASA がオーナーシップをさらに高め、プロジェクトの活動により積極的に取り組むことで、指標の達成可能性があると見込まれる。

(4) 上位目標：チッタゴン市内における無収水が削減される

上位目標の指標はプロジェクト目標の指標の延長線上にあるものであり、プロジェクト目標達成が、上位目標の達成に大きく関連する。現時点では、プロジェクト目標が確実に達成できるとは必ずしもいえない状況であり上位目標の達成に向けてプロジェクトのインパクトが確実に生じるかについては不確実な状況ではあるが、プロジェクト目標で述べたように、今後の CWASA の取組によって目標達成の可能性がより高くなると考えられる。

3-3 実施プロセス

上記計画変更の要因として挙げた（2）及び（3）に対して管網図調査及び GIS に係る投入（専門家）を追加し、かつ無収水発生の主たる要因に対応して活動を修正する等、状況等の変化に即した対応を行ってきた点については実施プロセスの観点から見ると適切であったと言える。また、専門家チームは C/P 側との日常的なコミュニケーションを積極的に図っており、これらの点から実施プロセスは概ね良好であると評価できるが、CWASA の適切な人員配置も含めた追加的な投入及びプロジェクトへより積極的に参画することでより適切な実施プロセスをとることができると考えられる。

第4章　評価結果（評価５項目の評価結果）

4-1　妥当性

本プロジェクトの内容は、バ国政府の方針に合致すると共に、日本国政府のバ国援助方針に沿ったものであり、妥当性及び重要性は高い。

バ国政府が 2004 年に策定した National Water Management Plan は 8 分野を優先課題としており、大都市給水はこのうちのひとつである。同 Plan は、チッタゴンを含む四大都市について、2010 年までに人口カバー率 75%、2025 年までに同 90%を目標に掲げている。

水分野を含む環境分野は「社会開発と人間の安全保障」の重点支援セクターの一つに位置づけられており、本プロジェクトの妥当性は高い。

4-2　有効性

有効性は中程度である。特に成果 1 の無収水削減計画の策定に早急に取り組む必要がある。

現時点まで、Management team は無収水削減計画の策定を開始できていないが配管網情報と顧客情報に関し、GIS を用いたデータベースの構築は進んでおり、包括的な無収水削減計画を策定する環境が整えられつつある。これらデータベースは、無収水対策だけでなく、今後の体系的な水供給・管理及び CWASA 全体の組織運営・組織改革等にも有用である。

4-3　効率性

人員配置の遅れやプロジェクトのマネジメント層の頻繁な交代等が円滑なプロジェクト実施を妨げており必ずしもプロジェクトは効率的に実施されているとはいえない状況である。

4-4　インパクト

プロジェクトはチッタゴン市と水供給に大きなインパクトを持っている。プロジェクトから得られる無収水対策の技術・知見・経験をチッタゴン市全域の水供給サービスにおいて活用することによってより少ないコストで質の高いサービスをプロジェクト対象地域以外にも展開できる。

またプロジェクトにおいて実施している（地下に埋設された）水道管網の調査では、水道管に加えて、ガス、電話、インターネット等の各ラインの調査も同時に行っており、これらの情報を各関係機関（市役所、ガス会社、電話会社等）と共有し、現在無秩序に埋設されているチッタゴンの地下埋設物の適切な管理に貢献しうる。なお、負のインパクトは確認されなかった。

4-5　自立発展性

現状では政策面での自立発展性は高いといえるが、組織面での自立発展性は必ずしも高いとは言えない。

バ国政府はチッタゴンを含む 4 大都市（ダッカ、チッタゴン、クルナ、ラッシャヒ）における安全な水供給を重点課題の一つとして挙げ、2025 年までに供給率を 90%にまで向上させる目標を立てていることから、政策面での自立発展性は高い。

一方で、CWASA 組織全体で無収水対策に対する重要性が未だ十分に認識されているとは言えない

状況であり、適切な人員配置及び無収水対策に取り組むことへのインセンティブ制度の導入等を実施することにより、プロジェクト終了後も自立発展的に無収水対策が実施される状況を作り出していくことが重要である。

4-6　阻害要因・促進要因

人員配置の遅延以外のプロジェクトの阻害要因として、無収水対策のもっとも基本的なツールの1つである水道メーターの老朽化が激しく故障しているメーターもあったこと、（CWASA にとって初めて本格的に無収水対策に取り組んでいるため）CWASA 全体での無収水対策の重要性に対する認識が十分でなかった点が挙げられる。促進要因としては、（数は十分ではないものの）フルタイムでプロジェクトに配属されたカウンターパート 5 名のモチベーションが高かった点が挙げられる。

第5章　結論

5-1　提言（本プロジェクトに関する具体的な提案、助言等）

プロジェクトの効果的、効率的、自立発展的観点において、合同レビュー団からプロジェクトに対し、以下の点を提言した。

（1） CWASA で無収水削減業務に従事している職員が、当該業務実施へのインセンティブを持てる仕組みを構築する計画（インセンティブプラン）を立て、プロジェクト終了までに MD が承認する。併せて、上位目標達成の外部要因に、「インセンティブプランが CWASA の理事会にてプロジェクト終了後 6 ヶ月以内に承認され､その後直ちにかつ継続的に実施される」を加える。

（2） 量水器の技術標準と、その CWASA が調達する量水器が一定程度の水準を保てるような検定制度を確立し、プロジェクト終了までに MD が承認する。併せて、上位目標達成の外部要因に、「プロジェクトにて確立された量水器の技術標準と検定制度が CWASA の理事会にてプロジェクト終了後 6 ヶ月以内に承認され､その後の量水器の新規調達にあたって直ちに有効化される」を加える。

（3） 量水器と給水管の所有権に係る現行の条例及び規則を見直し、量水器と給水管の一定区間（量水器から蛇口まで）を CWASA の所有とするために必要な改定を確認し、プロジェクト終了までこの改訂を MD が承認する。併せて、上位目標達成の外部要因に、「量水器及び給水管の所有権に関して提案された改定が CWASA の理事会にてプロジェクト終了後 3 ヶ月以内に承認され、同改定が新規接続にあたっては直ちに、既存接続については漸次適用される」を加える。

（4） 150 名のスタッフの新規雇用を加速する。

（5） プロジェクト下における無収水削減のためのマネジメントシステムを、関係部局の責任者からなる現行の「NRW reduction Management Team（無収水削減マネジメントチーム)」を解体し、新たに任命される Executive Engineer、Assistant Engineer、Sub Assistant Engineer からなる、関係機関から独立した、無収水削減の計画、モニタリング、計画実施、及び経営層への成果報告の役割を持つ「NRW reduction Management Body（無収水削減マネジメント体)」に再構築する。

（6） 日本人専門家と協働し、OJT を通じて知識と技術を習得できるよう、「NRW reduction Action Team（無収水削減アクションチーム)」に十分な人数の職員/スタッフ（MOD から 6 名が第一優先、料金課から 1 名が第二優先）を、最大限早期に任命する。

（7） 活動 1-3（包括的な暫定無収水削減アクションプランを策定する)、及び活動 1-4（無収水削減年間計画を策定する）の実施時期を、2009 年 7 月～11 月から、2011 年 7 月～2012 年 6 月に変更する。

（8） 上述提言（1）（2）（3）及び（7）を反映し、PDM 及び PO を改定する。

(9) プロジェクト終了までに導入される GIS システムを用いた配水管網及び顧客情報に係るデータベースに関し、CWASA はそのカバー範囲の拡張及び有効な用途に係るロードマップとアクションプランを作成する。

5-2 所感

5-2-1 団長所感（富田）

バングラデシュ第二の都市チッタゴンは、国内随一の港湾都市、国内流通・海外輸出の拠点として、経済成長を続けるバングラデシュの原動力となっている。このため、近年同市への人・物の集積が進み、現在では実質的には人口 400 万人を抱えるまでになっていると言われている。また、チッタゴン内には、海外直接投資を誘致するための経済特区も設けられ、海外企業の進出も著しい。

一方で、チッタゴンの都市インフラ整備は、加速する人口増加や資本集積に比して貧弱な状況にある。上下水道もその例外ではなく、現在のチッタゴン水道公社（CWASA）のチッタゴン域内での給水能力は、48%に留まり、成長を続ける都市の需要にこたえきれていない。このため、CWASA では、日本や世界銀行の資金協力による新たな浄水場建設や、既設の配管網のリハビリ等、施設の給水能力全体を高める計画を実施中である。

新たな基盤整備に加え、既存施設・設備の運営管理並びにメインテナンスが重要であることはすべてのインフラに共通である。CWASA は、WASA 法適用が 2010 年に政府承認され、組織としての独立性がより高まることを受け、ハード面での整備に加え、施設・設備メインテナンスや、事業の収益性追求等のソフト面での組織力の養成を急いでいる。

日本は、新浄水場建設を円借款で支援しているのに加え、無償資金協力による既設配管網リハビリの要請を受けるなど（「チッタゴン水道網改善計画」、事業計画に十分な既存管網図の不在を理由に、実施が見送られた）、CWASA の施設・設備建設等のハード面を支援しているのに加え、上記円借款事業のソフトコンポーネントとして、組織運営能力向上を支援している。PANI プロジェクトは、これらのハード、ソフト両面の日本の支援の中で、CWASA の技術力及び収益力の具体的な向上に資する活動として、今後の CWASA の公社としての自立的運営に欠かせない無収水対策の能力向上に取り組んでいる。CWASA 側も、PANI プロジェクトの取組内容については、その重要性は認識しており、経営陣は取組の強化を表明している。

その一方で、PANI プロジェクトの実施は当初予定に比べて大幅に遅れ、CWASA 側の対応も、JICA が期待していたような投入が十分行われてきたわけではなかった。その理由としては、要員・予算不足など、途上国一般にみられる傾向はもちろんであるが、大きな理由としては、①既設配管網図が実質的に存在しなかったこと、②無収水の現状認識について CWASA と日本側に大きな隔たりがあったこと、などがあげられる。

前者については、現在の主たる配管網が 1970 年代に整備されて後、正確な配管図が作成・更新されてこなかった、ということが指摘されている。このため、プロジェクト開始直後には完成できると考えられていた無収水対策計画の策定が大幅に遅れる結果になった。後者については、無収水の現状把握について、多くの途上国においてはその実態把握自体が非常に困難であることに起因する。

CWASA 経営陣が認識していた無収水の現状は、日本側の考えているもの（さらには一つのパイロット地区を通して得られた結果）と大きな隔たりがある。このため、CWASA 側の取組姿勢に影響を及ぼした面があることは否めない。今回の中間評価を通じ、CWASA と JICA プロジェクトチーム／JICA の間には、まだ無収水の現状についての共通認識が形成されつつあり、今後 CWASA の取組状況に改善がみられることが期待されている。

最後となるが、チッタゴン都市給排水への支援の在り方について、簡単に述べておきたい。現状では、円借款事業による新浄水場の完成が 2015 年に見込まれており、JDCF によりリハビリ中の Mohara 浄水場及び Kalurughat 浄水場、世銀支援で建設予定の Modunaghat 浄水場による給水と並び CWASA の給水能力は、現在の 168,000m^3 から、432,000m^3 へと増加することが見込まれている。しかしながら、既設配管網はその増加分の給水量を適切にユーザーに届けることが困難であることが指摘されている。日本は無償資金協力により配管網のリハビリの一部を支援することを予定していたが、それがキャンセルされた現状においては、借款事業で建設された浄水場の 100%の能力を引き出すことが困難であることも予想される。日本は上述の通り、ハード面、ソフト面で、CWASA に対して重要な支援を実施してきており、これら既存のプロジェクトの成果を最大限に発現させるためには、チッタゴン都市給排水事業全体に対して、包括的な支援を実施していくことが望ましいと思われる。PANI プロジェクトの成果も、この包括的な支援アプローチの中で、適切に位置づけられ、活用されていくことを期待する。

5-2-2　団員所感（讃良）

<u>パイロット・プロジェクトの重要性</u>

PANI プロジェクトの今後の活動では、以下に述べる理由から、チッタゴン市内 5 箇所で実施が予定されているパイロット・プロジェクトが特に重要になるものと考える。パイロット・プロジェクトの実施にあたっては、CWASA 職員を積極的に巻き込んで実施すること、及び、パイロット・プロジェクトの結果をできるだけ速やかに MD を含む CWASA 幹部と共有することが非常に重要である。彼らをパイロット区画に案内し、実状（水道メーターや違法接続の状況）を自分達の目で確認してもらうことも必要である。

今回の中間レビューでは、MD を含む CWASA の幹部職員の間に PANI プロジェクトに対する「Ownership」意識が十分ではないとの印象を受けた。意識の低さは、マネジメントチーム及びアクションチームに対する CWASA の人員配置のあり様にも如実に表われている。問題は何故意識が低いのかということである。協議の中で見えてきたのは、MD を含め CWASA 全体で現在の無収水率は 25～28%であるとしている点である。MD 自身違和感は感じているものの、一度対外的に公表した数値であることから変更が難しいという側面がある可能性もある。

25～28%の無収水率は、途上国では決して高い値ではない。むしろ低い方である。現状の無収水率がこの程度であるという認識に立つ限り、無収水問題に対する危機感は発生するはずもなく、そのことが CWASA の意識の低さに繋がっているものと推察される。一方、現在の CWASA の水道システムでは、無収水率を正確に求めることは不可能である。日本人専門家によれば、浄水場、配水池、深井戸等の主要施設には、流量計が設置されていない場合が多く、設置されていても故障しているものが多いとのことである。顧客メーターについても未設置の顧客が多く存在しており、故障しているもの

も多い。そのような状況下において無収水率を正確に算定することは困難である。CWASA がどのような方法で現在の無収水率を 25～28%と推定したかは明らかではなく、CWASA の現状からすると、無収水率は少なくとも 40%以上であるものと推定されるが、残念ながらそのことを裏付ける根拠は現時点において存在していない。

PANI プロジェクトでは、チッタゴン市内 5 箇所の地区で無収水削減パイロット・プロジェクトを実施する予定であり、現在その内の二つが進行中である。その一つである Khulshi 地区では、改善実施前の無収水率（ベースライン値）が得られつつある。最終結果は未だ得られていないが、日本人専門家によるこれまでの解析では、同地区の現在の無収水率はおよそ 60%と推定されている。もしこの値が十分な根拠を持って説明可能であり、かつ、他の 4 箇所のパイロット地区においても同様に高い無収水率が確認されれば、MD を含む CWASA 幹部の現状認識を大きく変えることが可能となり、彼らの PANI プロジェクトに対する意識を高めることに繋がるものと考える。

パイロット・プロジェクトの実施に関してもう一つ重要な提案がある。それは、無収水対策の実施効果の評価に当たっては、「料金収入の増加」を評価指標に加えることである。無収水削減の目的は料金収入を増やすことである。パイロット区画内において無収水対策を実施することで、区画内から得られる料金収入を対策実施前と比べて大幅に増やすことが可能であることを具体的に示すことは、CWASA 経営陣の無収水対策意欲の昂進に繋がるものと考える。

上位目標達成へ向けた提言

PDM に記載されている PANI プロジェクトの上位目標は、「チッタゴン市の無収水率が削減される。」ことである。IWA/AWWA の提唱する「Water Balance」で明らかなように、無収水は多くのコンポーネントから構成される。PANI プロジェクトは、その全てのコンポーネントを対象としているわけではない。今回の中間レビューでは、CWASA が上位目標を達成するためには、「インセンティブ・システムの導入」、「水道メーターの品質管理向上」、「給水管の品質管理向上」の 3 項目が不可欠であると判断された。このため、「①プロジェクト期間中に各項目にかかる具体的かつ実施可能な改善計画を策定して MD の承認を得ること」及び「②プロジェクトの終了後一定期間内に CWASA がプロジェクトで提案された改善計画を実施に移すことを上位目標達成の外部条件に追加すること」の二つを提案した。以下に上述した 3 項目の改善が必要と考える理由を述べる。

インセンティブ・システムの導入

無収水削減は、いわば終わりのない戦いである。作業に従事する CWASA 職員に対しては、改善意欲を長期間にわたって高いレベルに保持させることが必要となる。一方、一部の職員にとっては、無収水対策の実施は副収入源を自ら断つことに繋がることになるものと推測される。以上の理由から、CWASA が今後無収水対策を推進していくにあたっては、対策に従事する職員に対してその貢献度に応じた報奨金を支給する制度を導入することを推奨する。CWASA の事業運営に関しては、WASA 法（1996）で定められているがこの WASA 法では、MD が報奨金制度を設ける権限を有していること、及び、理事会（Management Board）の承認があれば同制度を実際に運用することが可能であることが規定されている。

どのような形の報償金制度を導入することが可能かについては、今後日本人専門家により詳細な検討が行われ、MD や他の幹部、ならびに、労働組合代表等との協議を通じて決定されることが望まし

い。報償金制度の導入にあたっては、多くの事項について詳細な検討が必要となるが、その中でも特に重要と思われる「貢献度の評価方法」について、以下に私案を述べる。

貢献度の評価に用いる指標としては、無収水の削減率ではなく、料金収入の増加を基本とすることを提案する。これには二つの理由がある。一つ目の理由は、無収水率を求めるには時間と費用がかかる大変困難な作業を伴うことである。無収水率を求めるためには、対策実施前後に対象区画へ流入する水量を計測しなければならず、そのためには対象区画を水理的に分離独立させる必要が生じる。既存配水管の正確な図面・情報が存在しない途上国では、この作業は大変困難なものとなる。チッタゴン市において、この方法を市全域に適用することには自ずと限界がある。二つ目の理由は、求めた無収水率の精度は粗く、貢献度の評価指標として用いるには客観性が乏しいことである。上述したような水量計測作業を通して無収水率を求めるわけだが、そのプロセスでは多くの仮定条件が設けられる上、種々の判断には主観が入る余地が残されている。結果として求められる無収水率は客観性に乏しく、貢献度を公正に評価するための指標としては不十分である。

一方、料金収入の増加を基本として貢献度を評価する場合には、対象区画を水理的に分離独立させる作業は不要であり、かつ、誰の目からみても明らかな客観性の高い指標を用いた貢献度の評価が可能となる。一つの例として、顧客数が 2,000 の区画を改善対象区画として選定した場合を考えてみる。この区画内に存在する全ての顧客の過去 1 年間の毎月の料金徴収額を調べ、同区画で得られた 1 箇月あたりの平均料金収入額を求める。この値がこの区画のベースライン値（A）となる。仮に（A）＝200,000Tk とする。ベースライン値が確定した後、この区画で、メーターが設置されていない顧客にはメーターを設置する、故障しているメーターは交換する、CWASA の顧客台帳に未登録の者が水道を使用していないか調べ、見つかった場合は登録させた上でメーターを設置する、メーターを正確に読む、料金の請求・徴収を確実に行う、等の無収水対策を実施する。対策が完了した翌月の料金収入額を集計する。その値を（B1）とする。対策が実施されると当然ながら料金収入額は増えることになる。仮に（B1）を 300,000Tk とする。（B1）と（A）の差 100,000Tk が料金収入の増額分である。この増額分の一部、例えば 10%に相当する 10,000Tk をこの区画の対策実施に従事した職員チームに対して支給する。当然のことながら、残りの 90,000Tk は CWASA の収入増である。対策実施後 2 箇月目の料金収入額を（B2）とする。（B2）が 290,000Tk とすると、（B2）と（A）の差 90,000Tk の 10%に相当する 9,000Tk を支給する。これを少なくとも 1 年間は続ける。すなわち、この区画の無収水対策に従事した職員チームは、対策実施後の 1 年間、改善効果の度合いに応じた報奨金の支給を毎月受け取ることになる。実際に対策実施チームは何名程度の職員で構成する必要があるか、対策実施にどの程度の期間が必要か、対策を実施することによりどの程度の増収が期待できるか等に関しては、現在 PANI プロジェクトで実施中の 5 箇所のパイロット・プロジェクトにおいて具体的なデータが得られるであろう。そうしたデータに基づき適切な報償率を決定することが可能である。もし、このような対策実施チームを数多く編成し、チーム毎の担当地域を決めた上で、上述したようなインセンティブ・システムを用いて成果を競わせることができれば、CWASA の無収水対策は一気に加速することが期待される。

水道メーターの品質管理

料金収入は、しばしば水道事業の「血液」に喩えられる。血液が不足して体中に行き渡らなくなると体の末端から壊死が始まり、やがては全身が腐り果てて死に至るというのがその理由である。料金

収入が「血液」だとすると、水道メーターは「心臓」にあたる。心臓が正常に作動しないと血液は全身に回らなくなるからである。水道事業者と顧客を結びつける唯一の接点が水道メーターである。両者の相互信頼関係は、メーターの品質に対する顧客の絶対的な信頼の上に成立していると言っても過言ではない。水道事業者は、そうした顧客の信頼に応えるためにも、水道メーターの品質管理に万全を期さなければならない。

水道メーターは、無収水対策という面においても極めて重要な役割を果たしている。それは、漏水や無収水に関する水道事業者と顧客の管理責任範囲を定める境界（目に見える責任分界点）としての役割である。水道メーターが未設置の場合には、顧客の所有する地下タンクや屋根タンクからの漏水やオーバーフロー、家の中の蛇口からの垂れ流しも水道事業者側の損失となる。責任分界点としての役割を果たすためには、水道メーターが設置されているだけでなく、正常に作動していなければならない。故障した水道メーターは単なる飾りにしか過ぎず、責任分界点としての役割は果たすことはできない。水道メーターには、「顧客の使用水量を正確に記録すること」及び「責任分界点としての機能を果たすこと」の二つの役割が求められているが、そのためには水道メーターが正常に機能していることが大前提となる。

水道メーターの品質管理の重要性にかかる CWASA の認識は必ずしも十分とは言えないように思われる。PANI チームの日本人専門家によれば、CWASA が購入（輸入）している水道メーターの品質は決して良好とは言えず、半年ももたずに故障するものも多いとのことである。現在、Khulshi 地区で実施中のパイロット・プロジェクトでは、設置されている水道メーターのおよそ 30%が正常に機能していないことが判明している。低品質の水道メーターを排除できない原因は、入札評価を含めた CWASA のメーター調達方法の問題であると思われる。PANI プロジェクト期間中に、日本人専門家と CWASA 幹部が現在の調達方法を見直し、改善計画を策定することを提案する。具体的には、港での抜取り検査の厳格化や入札に参加できるメーター製造業者の「事前認証制度」の導入等が考えられる。CWASA の説明では、購入後 5 年以内に発生した故障についてはメーター製造業者が無料で修理することを義務付ける「メーカー保証制度」の導入を検討中とのことだが、こうした制度についても、実際に導入されている他都市の事例を調べ、その長所及び短所を明らかにすべきである。

給水管の品質管理

無収水対策を進める上で水道メーターと同様に重要になるのが給水管の品質管理である。具体的には配水管からの分岐点から水道メーターまでの給水管の品質管理である。我が国の水道事業では、水道システムに発生する漏水の 80～90%がこの部分に集中しているとの統計データがある。この部分の給水管の品質管理の重要性を示している。

「給水管材料」及び「給水管工事」の品質管理は、完成した給水施設の所有権と密接に関連する。我が国の場合、給水管分岐から水道メーターまでの給水施設は、メーターを除いて顧客の資産である。水道メーターは水道事業者の資産で、顧客は賃料を支払って使用している。水道事業者は独自に水道メーターを調達することで品質を担保することが可能となっている。一方、給水管を顧客の資産としているのは、この部分の品質を担保するための仕組みが出来上がっているからである。すなわち、顧客が自由に材料や工事業者を選ぶことができない仕組が存在しているからである。我が国の場合、給水管として使用できる材料は法律・条例で規定されている。それ以外の材料は使用不可である。加えて、給水管工事は、事前に登録された指定工事業者のみが行える仕組になっている。我が国ではこう

した仕組を通じて給水管の品質管理が徹底されているため、この部分を顧客の資産としても品質低下の問題は発生しないわけである。

一方、途上国では上述したような品質管理の仕組みが存在するのは稀である。このため、給水施設を顧客の資産とした場合、顧客は費用を最小限に抑えるため、粗末な材料と未熟な工事業者を用いて給水施設を設置することになる。その背景には、たとえ将来この部分に漏水が発生したとしても、それは水道メーターの手前であることから水道事業者側の損失であり、自分達の損失にはならないという意識が働いている。

CWASA の場合も、水道メーター及び給水管は顧客の資産となっている。CWASA の説明によれば、給水管材料の指定、及び、職員の監督下での工事実施を通じて品質を管理しているとのことだが、そのことが職員と顧客との癒着の温床となっている可能性が高い。PANI 期間中において、日本人専門家と CWASA 幹部が協働で現在の CWASA の品質管理方法を見直し、改善計画を策定することを提案する。その中では、給水管及び水道メーターの両方を CWASA の資産とし、顧客は賃料を CWASA に支払って使用する（毎月の水道料金に賃料を付加する方法で、およそ 2～3 年かけて費用を回収する。）案についても、その実施可能性を検討すべきである。

付属資料

1. Minutes of Meeting（合同評価報告書含む）
2. 質問表（対バ国側実施・関係機関）
3. 収集文献・資料一覧

MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
ON
THE PROJECT FOR ADVANCING NRW REDUCTION INITIATIVE (PANI) OF CHITTAGONG WASA

The Japanese Mid-term Review Team, organized by the Japan International Cooperation Agency and headed by Mr. Hiroyuki Tomita, stayed in the People's Republic of Bangladesh (hereinafter referred to as "Bangladesh") from January 26th to February 3rd, 2011 for the purpose of conducting the joint mid-term review on the "Project for Advancing NRW Reduction Initiative (PANI) of Chittagong WASA" with the Bangladesh Mid-term Review Team, which consists of members from the Economic Relations Division, Ministry of Finance, the Local Government Division, Ministry of Local Government, Rural Development and Co-operatives and Chittagong Water Supply and Sewerage Authority.

After intensive study and discussion on the achievement of the project and its activities by both teams, both parties of the Joint Review Team agreed upon the Joint Mid-term Review Report attached hereto.

Dhaka, June 2011

Mr. Hiroyuki Tomita
Leader
Japanese Mid-term Review Team
Japan International Cooperation Agency
Japan

Ms. Khadiza Begum
Deputy Secretary
Economic Relations Division
Ministry of Finance
Bangladesh

Engr. A.K.M. Fazlullah
Managing Director,
Chittagong Water Supply and Sewerage Authority

Ms. Zuena Aziz
Joint Secretary
Local Government Division,
Ministry of Local Government,
Rural Development and Co-operatives
Bangladesh

Attachment: Joint Mid-term Review Report

付属資料1

JOINT MID-TERM REVIEW REPORT

ON
THE PROJECT FOR ADVANCING NRW REDUCTION INITIATIVE (PANI)

OF
CHITTAGONG WATER SUPPLY AND SEWARAGE AUTHORITY

February 2011

Bangladesh – Japan
Joint Mid-term Review Team

Abbreviation and Acronym

AE	Assistant Engineer
BDT	Bangladesh Taka
C/P	Counterpart
CWASA	Chittagong Water Supply and Sewerage Authority
CWSISP	Chittagong Water Supply Improvement and Sanitation Project
EE	Executive Engineer
ERD	Economic Relations Division
GIS	Geographic Information System
GOB	Government of Bangladesh
GOJ	Government of Japan
IDCS	Institutional Development Consultancy Services
JET	JICA Expert Team
JFY	Japanese Fiscal Year
JPY	Japanese Yen
JICA	Japan International Cooperation Agency
KWSP	Karnaphuli Water Supply Project
LGD	Local Government Division
MD	Managing Director
MIS	Management Information Systems
M/M	Minutes of Meeting
MOD	Maintenance, Operation & Distribution
NRW	Non Revenue Water
OJT	On the Job Training
PANI	Project for Advancing NRW Reduction Initiative
PD	Project Director
PDM	Project Design Matrix
PO	Plan of Operation
R/D	Record of Discussion
SAE	Sub Assistant Engineer
TPP	Technical Project Proposal
WB	World Bank

付属資料1

TABLE OF CONTENTS

ANNEXES

1. Introduction

1-1 Preface

The Japanese Mid-term Review Team, organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Hiroyuki Tomita, stayed in the People's Republic of Bangladesh (hereinafter referred to as "Bangladesh") from January 16th to February 3rd, 2011 for the purpose of conducting the joint mid-term review on the Project for Advancing NRW reduction Initiative (PANI) of Chittagong WASA (hereinafter referred to as "the Project").

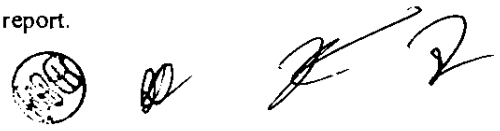
The Bangladesh Mid-term Review Team, which consists of members from the Economic Relations Division, Ministry of Finance (hereinafter referred to as "ERD"), Local Government Division, Ministry of Local Government, Rural Development and Co-operatives (hereinafter referred to as "LGD") and Chittagong Water Supply and Sewerage Authority (hereinafter referred to as "CWASA"), was also assigned for the purpose of conducting this review. Both Japanese and Bangladesh Review Teams organized the Joint Review Team.

This Joint Mid-term Review Report has been prepared through an intensive review study (including document review, questionnaire survey and interviews) and finalized after discussion among the Japanese and Bangladesh Review Team Members. CWASA Counterparts (hereinafter referred to as "C/Ps") and the JICA Expert Team (hereinafter referred to as "JET") were interviewed thoroughly, through individual and group discussions and through questionnaire survey to adequately review the Project.

1-2 Objective of the Joint Mid-term Review

Every JICA's project is reviewed or evaluated at four stages, namely ex-ante, mid-term, terminal and ex-post. This time, one year and five months after the inauguration of the Project, Mid-term Review is being conducted since the Project reached half the way. Specific objective of the Mid-term Review are to:

1) Review the progress of the Project and evaluate the achievement from the viewpoints of the five evaluation criteria which are relevance, effectiveness, efficiency, impact, and sustainability,
2) analyze the factors to promote/impede the effects,
3) itemize necessary actions to be taken and make recommendation for the Project,
4) Revise PDM and PO, if necessary, and
5) Summarize results of the study in a joint evaluation report.



付属資料1

1-3 Members of the Joint Review Team

[Bangladesh Side]

Name	Title in Relation to the Project	Occupation
Ms. Khadiza Begum	Steering Committee Member	Deputy Secretary, ERD
Mr. Shamsuddin Ahmed	Steering Committee Member	Deputy Secretary, LGD
Mr. A.K.M. Nazrul Haque	Steering Committee Member	Executive Engineer and Project Director of PANI Project, CWASA

[Japanese Side]

Name	Title in Relation to the Project	Occupation
Mr. Hiroyuki TOMITA	Leader of the Japanese Mid-term Review Team	Senior Representative, JICA Bangladesh Office
Mr. Sadanobu SAWARA	Urban Water Supply	Senior Advisor,
Mr. Jin HIROSAWA	Cooperation Planning	Representative, JICA Bangladesh Office
Mr. Yasuyuki KURODA	Evaluation and Analysis	Private Consultant

1-4 Schedules of the Joint Review

	Date		Items	Venue
1	16th, Jan	Sun	Internal meeting of Japanese side Courtesy Call to LGD	JICA LGD
2	17th, Jan	Mon	Travel from Dhaka to Chittagong Courtesy Call to CWASA	CWASA
3	18th, Jan	Wed	Interview with counterpart personnel and Data collection	CWASA
4	19th, Jan	Wed	ditto	ditto

5	20th, Jan	Thu	ditto	ditto
6	21st, Jan	Fri	Drafting Joint review report, Data arrangement	
7	22nd, Jan	Sat	ditto	
8	23rd, Jan	Sun	Discussion and Revising Joint review report (Additional Interview and Data collection)	CWASA
9	24th, Jan	Mon	ditto	ditto
10	25th, Jan	Tue	ditto	ditto
11	26th, Jan	Wed	Internal meeting of Japanese side Courtesy Call to ERD Courtesy Call to LGD Travel from Dhaka to Chittagong	JICA ERD LGD
12	27th, Jan	Thu	Courtesy Call to CWASA Review meeting (Discussion on Joint review report)	CWASA
13	28th, Jan	Fri	Drafting Joint review report, Data arrangement	
14	29th, Jan	Sat	ditto	
15	30th, Jan	Sun	Review meeting (Discussion on Joint review report)	CWASA
16	31st, Jan	Mon	Review meeting (Summarizing Joint review report in CWASA) Travel from Chittagong to Dhaka	CWASA
17	1st, Feb	Tue	Review meeting (Discussion on Joint review report)	LGD
18	2nd, Feb	Wed	Discussion with JET	JICA
19	3rd, Feb	Thu	Documentation	-

2. Outline of this Project

2-1 Background of the Project

Chittagong City, the largest commercial city of Bangladesh, has a present total population of 3.5 million with a population growth rate of 3.3% per annum from 1991 to 2001 in the administrative area of about 200 km^2. Due to rapid growth of population corresponding to expansion of economic activities, provision of basic infrastructure has been left behind. Water supply service is tboroughly taken care of by CWASA, but its supply capacity is limited to only 42% of water demand in the existing service area and an immediate action to cater for this water gap is deemed urgent task of CWASA.

Based on the recommendation of the Study on the Chittagong City Mohara Water Treatment Plant Expansion Project (1999), CWASA has been conducting the detailed design study to augment supply capacity of Karnaphuli Water Treatment Plant up to 300,000 m^3/day funded by Japanese ODA Loan. Apart from that CWASA has also initiated to rehabilitate the Mohara Water Treatment Plant under JDCF and another project named Chittagong Water Supply and Sewerage Improvement Project (CWSSIP) under which a water treatment plant with the capacity of 90,000 m^3/day will he constructed at Modunaghat site funded by World Bank. All these 3 projects are expected to be completed from 2011 to 2015.

Although significant increase in water supply capacity is expected in near future, there are several issues yet to be addressed, such as improvement of transmission and distribution system. A large possibility on leakage increase to be caused by superannuated transmission/distribution pipe lines has been pointed out to CWASA. However CWASA does not possess appropriate technology and skilled staffs to implement leakage prevention measures. In addition it was anticipated that the Non Revenue Water (hereinafter referred to as "NRW") ratio would be higher than the available data at that time due to several factors causing a significant toll in CWASA's revenue earnings.

In this connection, the Government of Bangladesh (hereinafter referred to as "GOB") requested the Government of Japan (hereinafter referred to as "GOJ") for the implementation of a technical cooperation project regarding NRW reduction measures. GOJ then decided to engage in this request in April 2007 upon conduction of project formulation study in July 2006. JICA held a series of discussion with GOB from January to February 2008 and exchanged the Minutes of Meeting (hereinafter referred to as "M/M") to formulate the contents of the technical cooperation project and finally both parties signed on Record of Discussion (hereinafter referred to as "R/D") on March 2009.

2-2 Summary of the Project

The Project, which aims to enhance CWASA's capacity to reduce Non-Revenue Water (NRW), has been carried out since July 2009 for the period of three years. The followings are a brief description of the Project, and the review will be carried out based on it. For further information of the Project, please refer to the Project Design Matrix Version (hereinafter referred to as "PDM") 1 shown in Annex 1.

Table: Basic Project Frame (Part of the PDM1)

Overall Goal	To reduce Non-Revenue Water (NRW) in Chittagong City.
Project Purpose	To enhance CWASA's capacity to reduce Non-Revenue Water (NRW)
Outputs	1. To develop capacity to formulate NRW reduction plans 2. To strengthen management and techniques in implementing NRW reduction activities through pilot project.

The Project Director (hereinafter referred to as "PD") is an Executive Engineer (hereinafter referred to as "EE") in CWASA. Bangladesh side's actors are officials/staffs working for NRW reduction in CWASA. The number of JET members involved in the project is five as listed in the Annex 3.

3. Methodology of the Mid-term Review

3-1 Review of Achievement and Implementation Process based on PDM

The Mid-term Review studied a planned schedule and progress of the designated activities for each output up to January 2011, as shown in the Annex 4. The implementation process of the project was also confirmed from various viewpoints like monitoring and interviews.

3-2 Review of Five Criteria

In addition to verification of achievement level and Implementation of the Project, the Mid-term Review appraises the Project from the following five Review criteria.

1) Relevance:	Relevance of the Project is reviewed by the validity of the Project Purpose and Overall Goal in connection with the development policy and the needs of Bangladesh.
2) Effectiveness:	Effectiveness is assessed to what extent the Project has achieved its Project Purpose, clarifying the relationship between the Project Purpose and Outputs.
3) Efficiency:	Efficiency of the Project implementation is analyzed with emphasis on the relationship between Outputs and Inputs in terms of timing, quality and quantity.
4) Impact:	Impact of the Project is assessed in terms of positive/negative and intended/unintended changes taken place as a result of the Project.
5) Sustainability:	Sustainability of the Project is assessed in terms of institutional/political, financial and technical aspects by examining the extent to which the achievement of the Project will be sustained after the Project is completed.

3-3 Viewpoints of Mid-term Review

The Mid-term Review mainly focuses on relevance and efficiency. Regarding relevance, it is important to verify once more whether the project strategy is valid as it is. As for how effectiveness and impacts are showing themselves, the future trends and feasibilities are examined

based on the output performance and the activity status. Sustainability is examined based on prospects. Particularly with respect to effectiveness, studies are required as to whether there are prospects that effectiveness can be achieved in the remaining half-term of the project. If any negative impact starts to show while the project is under way the Project strategy is changed based on analysis of their causes.

3-4 Procedure of Joint Review

The procedure of the Joint Review consists of three stages of interaction among the Joint Review Team, which are 1) Review planning, 2) collection of information and analysis, and 3) joint-discussion, reporting and feedback.

3-4-1 Review Planning

Review planning was done mainly by the Japanese Mid-term Review Team before its dispatch to Bangladesh in consultation with the JICA Headquarters, JICA Bangladesh Office and JET Members by video conference. This stage was completed in Dhaka through the initiation meeting with Bangladesh Review Team where the work plan of the review were shared and confirmed.

3-4-2 Data Collection

Both quantitative and qualitative data were gathered and utilized for analysis. Data collection methods used for the Review were as follows:

- Literature/Documentation Review
- Questionnaires (C/Ps, JET members)
- Interview (C/Ps, JET members)

By the questionnaire, JET members were asked a broad set of questions regarding implementation processes, effectiveness, efficiency, impact and sustainability while the other selected C/Ps were questioned limited to implementation process and effectiveness. The JET members staying in Japan at the time of the Review were also interviewed prior to the dispatch of Japanese Mid-term Review Team.

As a result of direct data collection from JET members and C/Ps, tables showing the lists of inputs and activities implemented by January 2011 are attached in the Annex 3 and 4.

3-4-3 Joint-Discussion, Reporting and Feedback

Joint Review Team has compiled the Final draft of Joint Review Report by incorporating all their findings and analysis gained through the review and joint discussion. And then the contents

of Joint Review Report were presented to high officials of relevant organizations.

4. Result of the Joint Review

4-1 Performance and Implementation Process

4-1-1 Inputs

(1) Inputs from Japanese side

1) Assignment of JICA Expert Team

The actual assignment of JET is as described in the table below. For details, please refer Annex 3.

(Unit: Man-month)

	Original	Actual	Increase
1st Project Year (Jul 2009 – Mar 2010)	14.5	18.8	4.3
2nd Project Year Jun 2010 –Mar 2011 (estimation)	17.5	33.0	15.5
Total	32.0	51.8	19.8

The increased 19.8 Man-month originated from the additional dispatchment of the two (2) experts, GIS system design and Distribution network survey.

One (1) expert on Geographical Information System (hereinafter referred to as "GIS) system design has been dispatched by Japanese side based on JET's view that there were technical problems on the GIS system as platform of basic data such as distribution network and service connections etc. which is indispensable for formulating the NRW reduction plan.

One (1) expert on distribution network survey has been dispatched by Japanese side based on CWASA's request since it is revealed through the research work done by the Project that the distribution network drawings of CWASA were inaccurate. .

2) Machinery and Equipment Provided

The equipment provided by the Japanese side is detailed in Annex 3. In total, Japanese side has allocated the following amount for procuring 28 items: 1,646,861 BDT, 17,710,350 Yen and 72,476 US$.

A part of the equipment, metal pipe locator, leak detector, pressure logger and GIS system,

was to be procured in another Yen-Loan-Project, Karnaphuli Water Supply Project (hereinafter referred to as "KWSP"). However, since the project has not progressed as planned, considering the necessity of early provision for reconstruction of distribution network drawings, JICA decided to procure these equipments in the Project.

3) Operational Cost

Operational Cost borne by the Japanese side is detailed in Annex 3. The original cost planned for Japanese Fiscal Year (hereinafter referred to as "JFY") 1 and 2 was 135 million JPY in total, however, actual expenditure was 250 million JPY by increasing 115 million JPY mainly for the essential additional works for the GIS system reconstruction and distribution network survey.

4) Counterpart Training

Considering CWASA's interest and current level of skills etc., the Project decided to change the venue for C/P training from Japan to third country, prospectively, Philippines. Due to shortage of the number of appropriate trainees the training schedule has been shifted to the third year of the Project instead of second year. The Project also intends to invite eligible trainers from third country to Chittagong to conduct a workshop on NRW reduction later on.

(2) Inputs from Bangladesh side

1) Assignment of Counterpart

The Bangladesh side assigned C/P, as shown in Annex 3. Project Head, Deputy Project Head and PD were assigned but, the Project Head and Deputy Project Head have been changed once and the PD has been changed thrice. These frequent changes effected the smooth implementation of the Project.

For NRW Reduction Management Team (hereinafter referred to as "Management Team"), five (5) officials were nominated by CWASA in September 2009 right after the Project commencement followed by a reshuffle and decreased to four (4) in February 2010. But the system was actually not functional as explained later.

For NRW Reduction Action Team (hereinafter referred to as "Action Team"), Twenty-one (21) officials/staffs were nominated by CWASA in September 2009 followed by a reshuffle and increased to 22. But no one was actually available from July to December 2010, and then one (1) Engineer from Construction division was available in fulltime basis from January to June 2010. From July 2010 to now, one (1) Assistant Engineer (hereinafter referred as to "AE") and three (3) plumbers from Maintenance, Operation & Distribution circle were available for pipeline

maintenance work, and two (2) officials has been available for the GIS system work respectively in fulltime basis. (Two plumbers are not proper staffs under unstable working conditions in employment contract and salary. Among two (2) for GIS, one (1) is CWASA staff and the other one (1) is employed by KWSP as a CAD operator.).

For details, please refer Annex 6.

2) Operational Cost

According to the Technical Project Proposal (hereinafter referred as to "TPP"), GOB and CWASA provides 127.85 lakh taka and 192.5 lakh taka respectively in the total Project period of three (3) years. Actual allocated budget in the Year 2 (July 2010 - June 2011) is 63 and 120 lakh taka respectively but estimated expenditure would be 50 and 100 lakh taka respectively.

4-1-2 Performance

While the Project has generated many outputs, overall performance of the Project has been unsatisfactory.

Following the requirement of the Project, CWASA duely formulated the Management Team and the Action Team. The Project soon selected five (5) pilot areas to conduct the NRW reduction activities. In addition, as some data required to implement the Project were unusable at the time of commencement, the Project has been conducting a survey, verifying and collecting necessary initial data to reconstruct a GIS map and to establish relevant database required for preparation of NRW reduction plan.

Despite of all the actions taken, the overall or annual NRW reduction plans have not been formulated due to unfunctional Management Team. Only five (5) fulltime C/Ps of the Action Team have been trained since June 2010.

Details will be mentioned in the following sections.

(1) Output 1

Output 1:To develop capacity to formulate NRW reduction plans

Six (6) activities are set to achieve the Output 1 as described in the Annex 4. The activity 1-1 "Organize a NRW Reduction Management Team" and 1-2 "Review current activities" have been implemented on schedule. However, the remaining activities involved in the NRW reduction planning, implementing and monitoring, have not progressed, being far behind the schedule. Main reasons are the Management Team has not functioned as stated above and necessary data including distribution network drawings and customer data CWASA possessed were inaccurate.

Indicator 1-1: An overall action plan for NRW reduction is developed.

An overall action plan for NRW reduction has not been developed mainly due to two causes as stated above. Regarding the first cause, it was expected that the Management Team would work for the formulation, implementation, monitoring and revision of a NRW reduction plan. But it seemed to have some systematical difficulty in CWASA to motivate the members of the Management Team and officials/staffs of the relevant sections for the NRW reduction works.

Regarding the second cause, the Project has been reconstructing the distribution network drawings with the survey, nearly completed for the model area and two pilot project areas, and also processed the customer data of GIS. These data compiled in GIS must be a precious and useful tool for efficient management of NRW reduction. And it is expected that other relevant information will also be incorporated to the system in future to develop a Management Information System (hereinafter referred to as "MIS").

Indicator 1-2: A NRW reduction annual implementation plan is prepared every year.

No NRW reduction annual implementation plan has been prepared in the absence of a provisional overall action plan.

Considering the above discussion, it is recommended to reconstruct the management system for NRW reduction works under the Project by dissolving the existing Management Team and forming a "NRW reduction Management Body" consists of EE, AE and Sub Assistant Engineer (hereinafter referred to as "SAE"), being independent from the relevant divisions taking the role of Planning NRW reduction, Monitoring the implementation of the Plan and Reporting the outcome to the top management. The engineers in the Managing Body shall work fulltime, under direct supervision of the Managing Director (hereinafter referred to as "MD") and the PD in cooperation with the JET

Timeline for the implementation of the Activity 1-3 "Prepare a provisional overall action plan for NRW reduction" and 1-4 "Prepare an annual implementation plan for NRW reduction" need to be shifted from "July 2009 to November 2009" to "July 2011 to June 2012". This revision will automatically make the Activity 1-5 and 1-6 ineffective. It is expected that the said NRW reduction plan shall be authorized by the MD as an official work plan and be implemented as regular program of CWASA.

(2) Output 2

Output 2: To strengthen management and techniques in implementing NRW reduction activities through pilot project.

Nine (9) activities are set to achieve the Output 2 as described in the Annex 4. The

activities 2-1 "Select pilot project areas" and 2-2 "Organize NRW Reduction Action Team" have been implemented on schedule. In addition, the Project has prepared a NRW reduction work plan (Activity 2-5), conducted on-the-job training (Activity 2-7) and public awareness activities (Activity 2-8), on schedule. However, implementation of the NRW work plan (Activity 2-6) which is related with the isolation of pilot area have been behind the schedule. As a result, the outcome measurement (Activity 2-9) has been delayed. Main reason is lack of C/Ps in the Action Team As a first priority of C/P increase in the Action Team, at least six (6) fulltime members from Maintenance, Opeartions and Distribution Division (hereinafter referred to as "MOD") must be immediately assigned to form three groups in the Action Team. And as the second priority, one (1) C/P from the Revenue Office should be assigned in the Action Team. These newly assigned officials will work with the previous active three (3) fulltime C/Ps to learn the tasks of NRW reduction activities, as well as to accelerate the pilot project activities.

Those C/Ps will be trained in the Action Team, according to their relevant field, then expected to return, after the Project completion, to their original divisions to disseminate their expertise which they will have mastered in the Project.

Indicator 2-1: the action teams are organized and implement the NRW Reduction work plan as scheduled.

NRW Reduction Action Team were organized on paper basis but the number of officers/staffs actually engaged in the Project activities were limited as stated above. The Project has selected five (5) pilot project areas, developed distribution network drawing, on schedule. In addition, the Project has prepared a NRW reduction work plan and has been conducting On the Job Training (hereinafter referred to as "OJT") and public awareness activities, on schedule. However, isolation and the work plan implementation work have been behind the schedule. As a result, the outcome measurement has been dclayed.

It is thus necessary to increase C/P in the Action Team, assigning some staffs from each relevant division.

Indicator 2-2: a manual for service connection and pipe repairing is developed.

The manual development has gone along, almost with the original schedule mentioned in the Plan of Operation (hereinafter referred to as "PO") from June to September 2010. The Project developed, in July and August 2010, a textbook of service connection and pipe repairing, thereby giving a lecture to the C/Ps. A manual has been developed with the textbook, namely Leakage Detection and NRW Reduction/Leakage Repair. They will conduct a trial implementation of the manual, revising it on a basis of feedback from the implementation, thereby finalizing it by the Project completion.

Indicator 2-3: 22 CWASA officers/staffs are trained on leak detection skills, service connection and pipe repairing.

JET delivered a lecture of leak detection skills, service connection and pipe repairing to the three (3) fulltime staffs in the class room style and conducted an OJT so that they could master and disseminate the expertise to other staffs later on.

Indicator 2-4: NRW ratio is reduced in the pilot project areas.

As the work plan is now being implemented in the Pilot areas 1 and 3, and post survey has not been conducted, the Project has not gained the result yet. So no achievement regarding Indicator 2-4 has not yet been measured.

(3) Forecast of the Project Purpose Achievement

Project purpose: To enhance CWASA's capacity to reduce Non-Revenue Water (NRW)

It is not likely to achieve the Project Purpose, since achievement of the Output 1 and 2 are uncertain as stated above, especially the activities 1-5 and 1-6 under Output 1 must be ineffective. In addition, the Important Assumption for achieving the Project purpose "Officers and staffs trained in the Project do not leave CWASA" is also at risk because the number of officers/staffs actually engaged in the Project as members of the Management Team and the Action Team is too limited.

Indicator 1: The overall action plan for NRW reduction is periodically updated.

The overall action plan for NRW reduction has not been periodically updated in the absence of the plan. This indicator shall be revised due to the cancellation of Activities.

Indicator 2: The functions of the action teams are incorporated into the routine work of CWASA.

No plan for NRW reduction which must show the roadmap of incorporation stated in Indicator 2 exists and all NRW reduction work being conducted by the Action Team is still seems extra one.

Indicator 3: CWASA officers/staffs apply appropriate techniques developed by the project on leak detection, service connection and pipe repairing.

The current members in the Action Team are mastering the appropriated techniques on leak detection, service connection and pipe repairing through the Project. But since the number of members in the Action Team is so limited it is less expected those techniques can be applied properly in whole CWASA's work

(4) Forecast of the Overall Goal Achievement

Overall Goal: To reduce Non-Revenue Water (NRW) in Chittagong City

Since no numerical indicator is set to measure the achievement of the Overall Goal, it is not possible to determine to what extent the Overall Goal can be achieved. But the limitations in the achievement of Project purpose as stated above must affect the achievement of the Overall Goal. In addition, since the coverage of the Project is limited to only some of the NRW related activities, CWASA's effort to cover the other activities are important for the achievement of the Overall Goal. The Important Assumptions mentioned in the PDM for achieving the Overall Goal seems not enough in this context and so should be studied again

The Joint Review Team has analyzed main causes, main counter measures for NRW and the coverage of the Project as shown in Annex 5. After the discussion with the Project based on this analysis, the Joint Review Team concluded that the following two items are the most essential ones and to be added in Important Assumption for achieving the Overall Goal.

1) The water meter technical standard and its accreditation system established in the Project are approved by the CWASA's Board within six (6) months after the completion of the Project, and therefore immediately put into effect for procurement of new water meters.

2) The revisions proposed to be made regarding the ownership of water meters and service lines are approved by the CWASA's Board within three (3) months after the completion of the Project and thereafter immediately applied to new service connections and progressively to all existing connections.

In addition to these, in order to activate and to ensure the sustainability of NRW reduction activities, the importance of creation of incentives for all relevant officers/staffs engaged in, it is concluded that the following item must be added in Important Assumption for achieving the Overall Goal.

"The Incentive Plan is approved by the CWASA's Board within six (6) months after the completion of the Project, and thereafter immediately implemented on a continuous basis."

4-1-3 Implementation process

(Approval of TPP)

Following to the signing R/D on March 2009, TPP was authorized by GOB in June 2009. In this regard, the timing of commencement of the Project in July 2009 can be said as appropriate for both Japanese and Bangladesh side.

(Monitoring of the Project progress)

The additional input, dispatch of two experts were timely done and functioned very well to overcome the difficult situation that the Project faced. But no effective measure was taken against several issues such as Un-functional Management Team, failure in making the plan etc. and these issues remained till this middle stage of the Project period.

It was delayed to hold the first Steering Committee regardless of repeated request from JICA, which was finally held on August 4, 2010, after more than one year since the Project commencement. It delayed the sharing of Project information with the top officials in the Ministry, as a result necessary decisions could not be taken in time. A revision of the PDM-1 was proposed in the committee based on the identification of some delayed activities but not yet authorized.

(Communication)

Communication between the JET and the top management of CWASA, the Project Head (MD), Deputy Project Head (CE) and PD, can be said good since there has been frequent discussions regarding Project management.

On the other hand, as mentioned above, no meeting has been held among the Management Team members though JET had provided explanations individually to the members.

(Ownership)

It is now under process to apply the "WASA Act 1996" to CWASA which would make CWASA more autonomous in terms of several items and may produce more ownership among the CWASA top management. Accordingly MD would have more authority to implement an efficient organizational reform, to increase the number of staffs, and to take countermeasures for improvement of meter accuracy etc..

In a practice level, the fulltime five (5) C/Ps in the Action Team show a high motivation to gain more techniques and knowledge regarding NRW activities through the Project. But as mentioned above, the remaining nineteen (19) members in the Action Team were absent and the Management Team is inactive.

(Employment of 150 new staffs)

Employment of 150 new staffs applied by CWASA in December 2010 has been approved by relevant Ministry, LGD and expected to be realized by this coming May. Accordingly the appointment of the C/Ps for the Project is expected to be fulfilled appropriately.

4-1-4 Environmental Change

(1) CWASA Management autonomy with the WASA Act

As mentioned above, the GOB allows CWASA to conduct management autonomy stipulated in the "WASA Act 1996". The Board of the CWASA shall have the power, including

- To approve creation of posts
- To employ the officials/staffs
- To approve annual budget
- To approve corporate plan and annual/midterm investment plans.

(2) IDCS (Institutional Development Consultancy Service)

KWSP has one soft component, Institutional Development Consultancy Service (hereinafter referred to as "IDCS"), with the main objective to strategically improve CWASA's middle and long term management capacity to assure the operational sustainability of CWASA after completion of the KWSP. One of the recommendations given by IDCS on June 2010 was to establish "Management Services Office" directly under the MD for conducting a corporate planning, internal control, legal, MIS and public relations. In other words, "Management Services Office" is expected to oversee a whole process of the CWASA activities: production, sales, billing and money collection, thereby collecting and summarizing such information. The system related to NRW reduction produced through the implementation of the Project, which is bottom-up and partial approach, must be matched and incorporated in the system recommended in IDCS, which is top-down and comprehensive approach, with good harmonization.

(3) CWSISP (Chittagong Water Supply Improvement Sanitation Project)

A World Bank (hereinafter referred to as "WB") financed Project, Chittagong Water Supply Improvement and Sanitation Project (hereinafter referred to as "CWSISP"), has the component of "Institutional and Operational Development, and Project Management Support". CWASA and relevant organizations have coordinated these projects in good manner to avoid duplication and generating synergy effects.

4-2 Review by Five Criteria

4-2-1. Relevance

The project is highly relevant and valid, because the Project meets the need of a policy of GOB, and is consistent with Japan's Government assistance policy towards Bangladesh.

The National Water Management Plan authorized by the GOB in 2004 sets a target in eight

(8) areas including an area of water supply in large cities. The Plan stated that the four (4) big cities, including Chittagong, should provide water supply to their residents, covering 75% of population by the year 2010, and 90% by 2025. The purpose of the Project is to enhance CWASA's capacity to reduce NRW, contributing to Chittagong resident with expansion in water supply. The Project thus meets the need of a policy of GOB.

The Japan's Country Assistance Program for Bangladesh was revised in May 2006. The priority areas are: poverty reduction through economic growth, social development with human security, and good governance. It is stated in the chapter for "social development with human security" that: "Environmental issues in Bangladesh are conspicuous in urban areas, where the population is rapidly concentrating. As such, there is a need to address challenges including ensuring a safe and stable water supply developing a sewage system, solid waste management, dealing with air pollution and improving unsanitary living environments. Japan will offer assistance an urban infrastructure development, and to supplement this, effort will be made to improve the system and strengthen human resource development in administration" (the Japan's Country Assistance Program for Bangladesh, page 23). The Project would be consistent with this Japan's policy.

4-2-2. Effectiveness

The effectiveness of the Project is thus moderate. It is necessary to accelerate a NRW reduction planning.

The Management Team has not been able to formulate a NRW reduction plan. The Project has, however, been conducting a reconstruction of the Pipeline network drawings with the survey and processing the Customer data to the GIS. With these data, the Project is now ready to prepare an overall action plan for NRW reduction. And in addition, the database is useful for conducting a systematic management too.

Regarding this database in the GIS, it is required for CWASA to increase the area coverage and then to ensure efficient utilization of it by the completion of the Project. It is highly recommend for CWASA to prepare necessary Road map and Action plan for those by the end of the Project.

4-2-3. Efficiency

The Project has not been efficiently implemented.

The frequent change of management level of the Project has affected a smooth implementation of the Project. In addition, because of un-functional Management Team and insufficient active members for Action Team are interrupting efficient implementation.

4-2-4. Impact

The Project would have strong impact on Chittagong City and water supply in whole Bangladesh.

Some anticipated positive impact is as follows. By the incorporation of the expertise of the NRW reduction in whole process of the water supply to whole city, the CWASA will be able to produce more water in smaller cost, therefore provide better service to Chittagong residents.
The experience/knowledge gained through the pilot project in the Project would be expanded to other area than the Project target and contribute to the NRW reduction there, though the achievement level of Overall goal is still uncertain

The capacity building of CWASA to be realized through the Project may have direct impact on the effective usage of water produced in the newly introduced or rehabilitated water treatment plants, therefore the Project has close relationship with all other project under CWASA.
Situation survey on existing pipeline revealed the fact that water/gas/transmission lines/pipes are laid underground without any coordination and proper record. The database of CWASA pipelines in GIS created by the Project must be an advanced model for the management of underground properties in future.

No negative impact is anticipated so far.

4-2-5. Sustainability

The sustainability is ensured in policy aspects, but being inadequate in organizational aspects.

The GOB will continue the national water management policy: increasing water supply in four-big-city-residents, covering 75% by the year 2010, and 90% by 2025. In addition, the GOB will allow CWASA to conduct management autonomy. The Project will thus achieve sustainability in policy and system aspects.

The NRW related activities have not been incorporated into the routine work of CWASA. It is thus difficult for the CWASA to achieve sustainability in organizational aspects.

Summing up, the Project is highly relevant. The effectiveness of the Project is thus moderate. The Project has not been efficiently implemented because of the un-functional "Management Team" and insufficient members for "Action Team". The sustainability of the Project would be achieved in policy aspect, however, being inadequate in organizational aspects. The Project

would be more valid with solution of these issues.

4-3 Contributing and Constraining factors

Contributing factors are:

1) The five (5) fulltime C/Ps are highly motivated to learn the NRW technologies or GIS mapping expertise.

Constraining factors are:

1) Many water meters are low quality.

2) Weak motivational system

5. Conclusion

Recognizing the importance of the Project the top management of CWASA intends to promote prioritizing the NRW reduction Activities. However due to lack of manpower and lack of motivations the progress of the Project activities has always been delayed. Though CWASA formulated the Management Team and the Action Team immediately after the commencement of the Project but there has been little pragmatic outcome from the Teams. The Management Team failed to hold the coordination meetings among themselves consequently failing to develop the overall action plan for NRW reduction. As a result the capacity of CWASA officials to formulate NRW reductions plans may not be developed as expected. Apart form that, the present Management Team members are not also motivated enough for the activities of the NRW reduction activities. Considering the present situation it is clear that the present Management Team is not working well and it requires immediate amendment in the formation of the Management Team. To keep the motivational level high CWASA also needs to adopt new motivational tools and implement a system to continuously motivate the officials who will be working for NRW reduction initiatives. Even if CWASA manage to reform the Management Team in a more effective way, yet it will not be able to develop the overall action plan for NRW reduction without maximum effort from the JET. CWASA should seriously consider assigning efficient staffs for the reformed Management Team so that they could comply with the hard task of the JET to at least prepare the overall plan by the end of the Project period.

On the contrary, though the Project has been able to select the Pilot Areas and develop the work plan for the pilot project on schedule, the isolation of the pilot areas and implementation of

work plan was delayed due to insufficient number of active members in the Action Team. The quality level and ability to disseminate the knowledge/techniques of the members in the Action Team must be also consderd. In these circumstances CWASA needs to employ more appropriate C/Ps who will work with the present C/Ps along with the JET to learn the NRW reduction activities to master those and to gain the ability to disseminate the knowledge in future.

CWASA is now going through a transition period. Inclusion in the WASA Act-1996 will offer more autonomy to the management body. The Government has already approved CWASA's request to appoint 150 new staffs which should be realized soon. During this ongoing shuffle, if CWASA could conduct an efficient organizational reform, and include the NRW reduction activities into the mainstream of their regular tasks, they would realize an increase of water supply capacity and NRW reduction, thereby achieving an organizational and financial sustainability.

6. Recommendation

(1) To develop a plan which elaborates a mechanism for providing incentives to CWASA employees who contribute to the reduction of NRW; to have the plan approved by the Managing Director by the end of the Project; and to add the following as one of the Important Assumptions for achieving the Overall Goal of the Project, "The Incentive Plan is approved by the CWASA's Board within six (6) months after the completion of the Project, and thereafter immediately implemented on a continuous basis."

(2) To establish a water meter technical standard and its accreditation system which are necessary to ensure that water meters procured by CWASA always satisfy a certain required level of quality; to have the system approved by the Managing Director by the end of the Project; and to add the following as one of the Important Assumptions for achieving the Overall Goal of the a Project, "The water meter technical standard and its accreditation system established in the Project are approved by the CWASA's Board within six (6) months after the completion of the Project, and therefore immediately put into effect for procurement of new water meters."

(3) To review existing by-laws and regulations on the ownership of water meters and service lines; to identify revisions necessary to make a water meter and section of service line from the tapping point to water meter being the property of CWASA; to have such revisions approved by the Managing Director by the end of the Project; and to add the following as one of the Important Assumptions for

achieving the Overall Goal of the Project, "The revisions proposed to be made regarding the ownership of water meters and service lines are approved by the CWASA's Board within three (3) months after the completion of the Project and thereafter immediately applied to new service connections and progressively to all existing connections."

(4) To accelerate the employment of the new 150 staffs.

(5) To restructure the management system for NRW reduction works under the Project by dissolving existing NRW reduction Management Team which consists of top level officers of the relevant divisions and forming a NRW reduction Management Body consists of newly assigned Executive Engineer, Assistant Engineers and Sub Assistant Engineers, being independent from the relevant divisions, taking the role of Planning the NRW reduction, Monitoring the implementation of the plan and Reporting the outcome to the top management level. (A schematic depiction is shown in Annex 7)

(6) To assign required number of officials/staffs on the NRW reduction Action Team in the earliest possible time to co-work with Japanese expert in order to acquire the knowledge and techniques through the on/off the job training; six (6) from MOD as first priority, and one (1) from Revenue office as second priority.

(7) To shift the timeline for implementation of the Activity 1-3 "Prepare a provisional overall action plan for NRW reduction" and 1-4 "Prepare an annual implementation plan for NRW reduction" from "July 2009 to November 2009" to "July 2011 to June 2012". This revision will automatically make the Activity 1-5 and 1-6 ineffective.

(8) To revise the PDM and PO reflecting the above mentioned recommendations (1) (2) (3) and (7).

(9) CWASA should prepare necessary Road map and Action plan to increase the area coverage and to ensure efficient utilization of the database of Pipeline network and Customer data that is being produced by the Project in the GIS system by the completion of the Project.

END

ANNEX 1

Project Design Matrix

Project title: Project for Advancing NRW reduction Initiative (PANI) of Chittagong WASA

Duration: 2009 - 2012

Target Area: Chittagong City, Bangladesh

Target Group: Officers and staff of CWASA

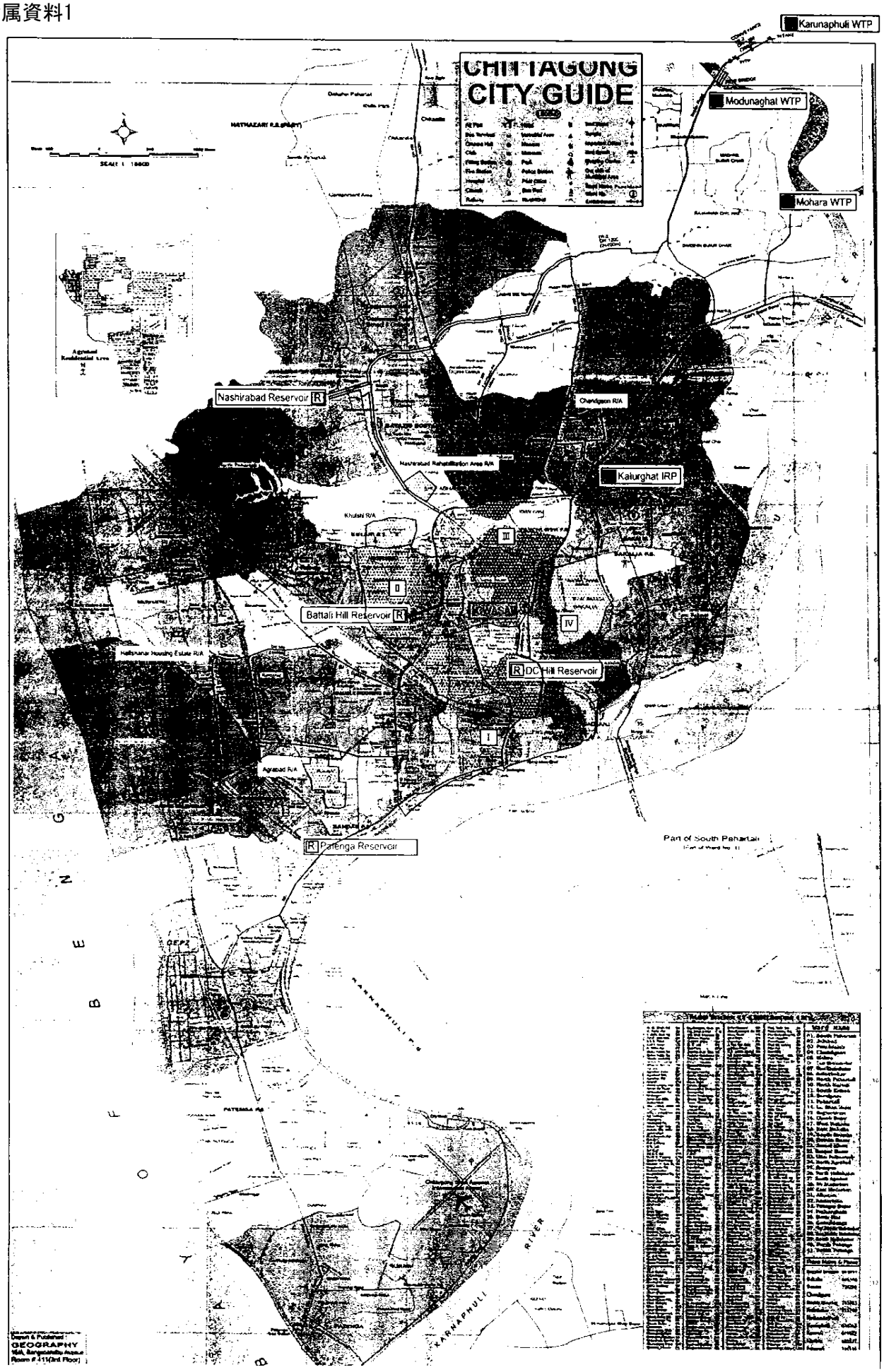
Version 1

Narative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal			
To reduce Non-Revenue Water (NRW) in Chittagong City	By 2016, NRW ratio is reduced compared to the level at the Project completion in 2011	CWASA monthly operation reports	
Project Purpose			
To enhance CWASA's capacity to reduce Non-Revenue Water (NRW)	1. The overall action plan for NRW reduction is periodically updated. 2. The functions of the action teams are incorporated into the routine work of CWASA 3. CWASA officers/staff apply appropriate techniques developed by the project on leak detection, service connection and pipe reparing.	1. Project records 2. Project final evaluation report 3. Project records	1. CWASA secures the budget for the expansion of the NRW activities. 2. Pipes, saddles and meters are provided to customers by CWASA. 3. Devastating natural disaster does not occur.
Outputs			
1 To develop capacity to formulate NRW reduction plans	1-1. An overall action plan for NRW reduction is developed. 1-2. A NRW reduction annual implementation plan is prepared every year	1-1. Project records 1-2. Project records	Officers and staff trained in the Project do not leave CWASA
2 To strengthen management and techniques in implementing NRW reduction activities through pilot project	2-1. The action teams are organized and implement the NRW reduction work plan as scheduled. 2-2. A manual for service connection and pipe reparing is developed. 2-3. 22 CWASA officers/staff are trained on leak detection skills, service connection and pipe reparing.. 2-4. NRW ratio is reduced in the pilot project areas.	2-1. Project records 2-2. Project records 2-3. Project records 2-4. Project records	
Activities	**Inputs**		
1-1 Organize a NRW reduction management team.	Japan	Bangladesh	
1-2 Review current activities of CWASA for NRW reduction.	1. Personnel Expert on NRW reduction planning (Team Leader) Expert on Leak DetectionTechniques Expert on Service Connection Techniques	1. Personnel Project Head Deputy Project Head Project Director NRW Reduction Management Team members NRW Reduction Action Team members	
1-3 Prepare a provisional overall action plan for NRW reduction			
1-4 Prepare an annual implementation plan for NRW reduction			
1-5 Monitor the annual implementation plans			
1-6 Review the provisional overall action plan based on feedback from the pilot projects			
2-1 Select pilot project areas	2. Equipment Leak detection equipment Portable ultla-sonic flow meter Vehicle for experts	2. Facilities Office space, furniture and faicility.	
2-2 Organize NRW reduction action teams at the operational level			
2-3 Develop pipeline network drawings of the pilot project areas using GIS			
2-4 Isolate the pilot project areas and conduct a survey on actual conditions of NRW in the pilot project areas including NRW ratio		3. Local cost Cost for the isolation of pilot project areas Pipe-reparing cost Project management cost	**Pre-conditions**
2-5 Prepare a NRW reduction work plan for the pilot project areas incorporating leak detection, pipe-reparing, service connection, and activities for the reduction of non-physical losses*			CWASA secures the budget for pilot project activities.
2-6 Implement the NRW reduction work plan			
2-7 Conduct on-the-job training on leak detection skills, service connection and pipe repairing for CWASA officers & staff, and prepare a manual on service connection and pipe reparing	3. Overseas Training Overseas Training for CWASA counterpart personnel	4. Others GIS settings	
2-8 Conduct public awareness activities for water conservation and reduction of illegal activities related to water-use.			
2-9 Measure the outcome of the pilot projects and provide feedback to the provisional overall action plan			

*Activities for non-physical losses reduction include measures against illegal connections and bypass conections, and replacement of defective meters.

付属資料1

付属資料1


Karunaphuli WTP
CHITTAGONG
CITY GUIDE
Modunaghat WTP
Mohara WTP
Nashirabad Reservoir R
Chandgaon R/A
Kalurghat IRP
Nasirabad Rehabilitation Area R/A
Khulshi R/A
III
II
Battali Hill Reservoir R
IV
DC Hill Reservoir R
I
Patenga Reservoir R
Part of South Pahartali
KARNAPHULI RIVER
BAY OF BENGAL
GEOGRAPHY

ANNEX 3

Table of Inputs

1. Inputs of Japanese Side

(1) Assignment of JICA Expert Team

1st Project Year (Jul 2009 – Mar 2010)

Name	Expertise	Duration	Man/ month
Masuomi Hiroyama	Team Leader/ NRW Reduction Planning	7/18 - 10/10, 11/15 - 3/29	7.33
Masami Tsuyuki	Leak Detection/ Service Connection-1	7/18 - 8/16, 9/30 – 11/23, 1/14 – 2/22	4.17
Isao Sakaoka	Leak Detection/ Service Connection-2	------	0.00
Kazumi Suwabe	GIS	8/7 – 10/5, 11/1 – 12/19, 2/11 – 3/29	4.80
Yuki Oba	Distribution Network Survey	1/14 – 3/29	2.50
		Total	**18.80**

2nd Project Year (Jun 2010 – Oct 2010: up to Mid-term Evaluation)

Name	Expertise	Duration (Cut Off: Oct. 31)	Man/ month
Masuomi Hiroyama	Team Leader/ NRW Reduction Planning	5/31 – 10/15, 11/22 – 12/31 (Cont'd)	5.93
Masami Tsuyuki	Leak Detection/ Service Connection-1	5/31 – 7/8, 9/22 – 11/5,	2.80
Isao Sakaoka	Leak Detection/ Service Connection-2	6/2 – 8/6, 10/20 – 12/31 (Cont'd)	4.63
Kazumi Suwabe	GIS	5/31 – 7/2, 9/27 – 11/13	2.63
Yuki Oba	Distribution Network Survey	5/31 – 7/2, 7/31 – 9/28, 11/4 – 12/31 (Cont'd)	5.03
		Total	**21.02**

(2) Equipment and Materials

1) List of Equipment and Materials

1st Project Year (Jul 2009 – Mar 2010)

Procured in Bangladesh

No.	Arrival Date	Name of Equipment	Unit Cost (BDT)	Quantity	Total Cost (BDT)	Setting Place	Procure-ment Place	Purpose	Status/ Condition
1	9/10	Desktop PC (1)	56,375	1	56,375	PANI Office	Chittagong	Facilitate activities of technical cooperation	Functioning
2		Desktop PC (2)	59,450	1	59,450				
3		Laser Printer	33,300	1	33,300				
4		Ink Jet Printer (1)	38,321	1	38,321				
5		Ink Jet Printer (2)	29,700	1	29,700				
6		LCD Projector	88,900	1	88,900				
7		Screen	11,679	1	11,679				
8		Copy Machine	177,136	1	177,136				
				Total	**494,861**				

Procured in Japan

No.	Arrival Date	Name of Equipment	Unit Cost (YEN)	Quantity	Total Cost (YEN)	Setting Place	Procure-ment Place	Purpose	Status/ Condition
1	2010.02	Measuring Pole, extendable	2,310	4	9,240	PANI Office	Japan	Facilitate activities of technical cooperation	Functioning
2	2010.02	Spot Marker, Pen Type	1,680	12	20,160				
3	2010.02	Digital Camera	12,075	3	36,225				
4	2010.02	Google Earth Pro.	54,600	1	54,600				
5	2010.02	High Resolution Satellite Image	911,400	1	911,400				
2	2010.02	GPS Receiver (High Accuracy)	409,500	3	1,228,500				
3	2010.02	GPS Receiver (Medium Accuracy)	78,750	1	78,750				
4	2010.02	Metal Detector	183,750	2	367,500				
5	2010.02	Distance Meter	9,660	2	19,320				
6	2010.02	Listening Rod	21,735	8	173,880				
8	2010.02	Co-relater (Leak Detection)	2,785,650	2	5,571,300				
9	2010.02	Portable Ultrasonic Flow Meter	1,134,000	8	9,072,000				
				Total	**17,542,875**				

付属資料1

2nd Project Year (Jun 2010 – Dec. 2010: up to Mid-term Evaluation)

Procured in Bangladesh

No.	Arrival Date	Name of Equipment	Unit Cost (BDT)	Quantity	Total Cost (BDT)	Setting Place	Procure-ment Place	Purpose	Status/ Condition
1	2010.09	GIS Mapping Workstation	181,000	2	362,000	PANI Office	Chittagong	Facilitate activities of technical cooperation	Functioning
2	2010.09	External LCD Monitor, 20"	13,500	4	54,000				
3	2010.09	Desktop PC	51,000	3	153,000				
4	2010.09	Laptop PC	55,000	3	165,000				
5	2010.09	Windows 7 OS	13,500	3	40,500				
6	2010.09	Plotter, 42" w/Add'l memory	307,500	1	307,500				
7	2010.10	Portable Generator	70,000	1	70,000				
				Total	**1,152,000**				

No.	Arrival Date	Name of Equipment	Unit Cost (US$)	Quantity	Total Cost (US$)	Setting Place	Procure-ment Place	Purpose	Status/ Condition
1	2010.10	GIS Software	43,676	1	43,676	PANI Office	Chittagong	Facilitate activities of technical cooperation	Functioning
2	2010.12	Van,	28,800	1	28,800				
				Total	**72,476**				

Procured in Japan

No.	Arrival Date	Name of Equipment	Unit Cost (YEN)	Quantity	Total Cost (YEN)	Setting Place	Procure-ment Place	Purpose	Status/ Condition
1	2010.09	Pipe Threader	121,800	1	121,800	PANI Office	Japan	Facilitate activities of technical cooperation	Functioning
2	2010.09	Chained Vice Stand	45,675	1	45,675				
				Total	**167,475**				

Grand Total: **BDT 1,646,861** **YEN 17,710,350** **US$ 72,476**

2) List of Equipment not in Operation

Name of Equipment	Estimated Expenses	Period of Use	Current Condition	Reason
None				

(3) Operational Costs by Japanese Side

Items	1st Project Year (JPY) (Actual Expense)	2nd Project Year (JPY) (Project Budget)	Total Cost (JPY)
International Airfare, Per Diem	13,428,000	20,276,000	33,704,000
Salary of Local Employee	1,093,423	5,504,000	6,597,423
Equipment Maintenance	42,807	202,000	244,807
Local Travel, Rent a Car	1,711,338	5,862,000	7,573,338
Communication	96,950	515,000	611,950
Documentation	275,863	219,000	494,863
Consumables	1,063,183	843,000	1,906,183
Equipment Procurement	20,174,000	11,917,000	32,091,000
Local Consultants	5,666,000	22,225,000	27,891,000
Total	43,551,564	67,563,000	111,114,564

2. Inputs of Bangladesh Side

(1) Assignment of Bangladesh Counterpart

Name of C/P	Designation	Duration of Assignment	Duration of Employment	Remarks
Nurul Abser	Asisstant Plumbing Mechanic (MOD-2)	21 Jun 2010～	21 Jun 2010 (Cont'd)	CWASA Official Staff
Jabed Khan	Master Rule Plumber (MOD-1)	21 Jun 2010～	21 Jun 2010 (Cont'd)	CWASA Temporaly Staff
Jewel Barua	Master Rule Plumber (MOD-1)	21 Jun 20101～	21 Jun 2010 (Cont'd)	CWASA Temporaly Staff
Nurul Kabir	Plumbing (MOD-2)	21 Jun 20101～	Two days (22and23 Jun)	CWASA Official Staff

(2) Costs Paid by Bangladesh Side

1) Local Cost by GOB and CWASA

unit: lakh taka

Economic code	Economic code	Code description	budget for Year 1, 2, 3	actual Year-1 (July 2009-June 2010)	estimation Year-2 (July 2010-Jun. 2011)	remarks
GOB	4951	Pay of Construction	62.50	0.00	0.00	
	7201	CDVAT	65.35	0.00	50.00	
Total			127.85	0.00	50.00	The budget for the year 2 is 63 lakh taka.
CWASA	4951	Pay of Conducting public awareness activities	4.00	0.00	0.00	
	4951	Pay of materials (valves, boxes, meters, pipe and fittings)	187.50	0.00	100.00	Budget for the year 2 is 120 lakh taka, including 1) Replacement of water meters and meter boxes in pilot areas 2) Replacement of old pipeline in pilot areas 3) Replacement of leaking service connections 4) Procurement of plumbing hand tools
	4951	Pay of miscellaneous (stationary, printing etc.)	1.00	0.50	0.00	
Total	total		192.50	0.50	100.00	

2) Facilities (Office space, furniture and facilities) Provided by Bangladesh Side

Office Space (Main Office and Sub-Office) including desks and chairs.

3) GIS Setting

Required equipment is installed at PANI Main Office.

3. Results of Training/Workshop/Seminar

Name of Activity	Date	Duration	No. of partici-pants	Participants	Remarks
Lecture of Basic know ridge	21 Jun '10	One week	4	Nurul Abser, Jabed Khan Jewel Barua, Nurul Kabir	
Leak detection	1st July '10	(Cont'd)	3	Nurul Abser, Jabed Khan Jewel Barua	Total 357Connection and 5.3km of Distribution pipe length
Ultrasonic Flow meter operation	1st July '10	One month	3	Nurul Abser, Jabed Khan Jewel Barua	
Flow Measurement on site	1st July '10	(Cont'd)	3	Nurul Abser, Jabed Khan Jewel Barua	
Excavation	1st Nov '10	One week	3	Nurul Abser, Jabed Khan Jewel Barua	
House Hold survey	1st July '10	One Month	3	Nurul Abser, Jabed Khan Jewel Barua	Total 357 House hold
Water Meter Reading	20th Des '10	(Cont'd)	3	Nurul Abser, Jabed Khan Jewel Barua	4 time in Khulshi area
Water Meter replace	9th Jan '11	(cont'd)	3	Nurul Abser, Jabed Khan Jewel Barua	21 Meters Fixed till now
Leakage repair	9th Jan '11	(Cont'd)	3	Nurul Abser, Jabed Khan Jewel Barua	4 leakages repaired till now

4. Results of Output of the Technical Cooperation

(1) List of the Outputs (Reports, Manuals, Guidelines, Newsletter, etc.)

Item	Language	Submission Date
Inception Report	English	July 2009
Progress Report 1	English	Dec. 2009
Leaflet for Public Campaign	English/Bengali	Jan. 2010

付属資料1

ANNEX 4

Table of Activities

Project Title: Project for Advance of NRW Reduction Initiative (PANI) of Chittagong WASA
Duration: [illegible] 2nd Year

Activities		Status	Progress and Achievements	Reasons for the Difference against the Plan
Output 1. To develop capacity to formulate NRW reduction plans				
1-1 Organize a NRW Reduction Management Team	Plan	On Time	Organized	
	Actual			
1-2 Review current activities of CWASA for NRW reduction	Plan	On Time	Implemented	
	Actual			
1-3 Prepare a provisional overall [illegible] plan for NRW reduction (Original PDM: [illegible] current PDM: Focus to model area due to absence of [illegible])	Plan	Delayed	Due to absence of distributed and consumed water volume record, field survey is being carried out including actual measurement of these water flow	NRW reduction plan was originally intended tube prepared to cover whole service area of CWASA. However, due to absence of distributed and consumed water volume, it was
	Actual			
1-4 Prepare an annual implementation plan for NRW reduction (Owing to [illegible] to be prepared from 2nd year operation)	Plan	Delayed		Owing to above mentioned 1-3, annual annual plan will be prepared after preparation of the overall plan
	Actual			
1-5 Monitor the annual [illegible]	Plan	Delayed	In relation to above 1-3, preparation will be carried out to commence actual work from the 3rd year operation	Owing to above mentioned 1-3, monitoring work will be carried out after preparation of the overall plan
	Actual			
1-6 Review the provisional [illegible] from the pilot project	Plan	Delayed	In relation to above 1-3, preparation will be carried out to commence actual work from the 4th year operation	Owing to above mentioned 1-3, review work will be carried out after preparation of the overall plan
	Actual			
Others not planed in the PDM				
Output 2. To strengthen management and techniques in implementing NRW reduction activities through pilot project				
2-1 Select pilot project area	Plan	On Time	Five (5) Pilot Project Areas had been selected	
	Actual			
2-2 Organize NRW Reduction Action Team	Plan	On Time	Organized	
	Actual			
2-3 Develop pipeline network drawings of the pilot project areas using GIS (PANI will reconstruct GIS setting, mapping due to malfunctioning of CWASA's GIS system	Plan	On Time	Drawings are being prepared in parallel to Pilot Project Area and Model Area	
	Actual			
2-4 Isolate the pilot project area and conduct [illegible] conditions of NRW [illegible] NRW ratio	Plan	Delayed	Procurement of materials for isolation work is underway. Isolation work will be started from Dec. 2010. Leakage survey will be commenced from later part of Jan. 2011, due to delay of procurement arrangement by transfer of fund from JICA to Expert Team	
	Actual			
2-5 Prepare a NRW reduction work plan for the pilot project areas incorporating leak detection, pipe repairing, service connection and activities for the [illegible]	Plan	On Time	Review of work plan is carried out for each Pilot Project Area and field operation will be carried out from Dec. 2010	
	Actual			
2-6 Implement the NRW reduction work plan	Plan	Delayed	Started on Sep. 2010	Owing to above mentioned 1-3, annual annual plan will be prepared after preparation of the overall plan.
	Actual			
2-7 Conduct on the job training in leak detection skills, service connection and pipe repairing for CWASA officers & staffs and prepare a manual on service connection and pipe repairing	Plan	On Time	OJT is being carried out by work subject. Field OJT such as leakage survey will be carried out in Pilot Project Area from Dec. 2010	
	Actual			
2-8 Conduct public awareness activities for water conservation and reduction of illegal activities related to water use	Plan	On Time	Following the activities carried out in the 1st year operation, public campaign will be carried out from Dec. 2010	
	Actual			
2-9 Measure the outcome [illegible] to the provisional overall [illegible] plan	Plan	Delayed	Started on Dec. 2010	Owing to above mentioned 1-3, annual annual plan will be prepared after preparation of the overall plan
	Actual			
Others not planed in the PDM				
Activities not [illegible] PDM				
[illegible] Preparation [illegible]	Plan	On Time	[illegible] survey to verify location of customers [illegible] encountered difficulty and delay due to lack of cooperation of customers, such as refusal to show water bill payment receipt	Considerable number of customers are not cooperative to our field survey due to poor water supply service of CWASA to date
	Actual			
[illegible] Preparation of customer [illegible]	Plan	On Time	Customer data of CWASA Sales Division are received and processed to contain in GIS database and location of each customer in Zone 5 of model area is being confirmed through field verification survey	
	Actual			
	Plan			
	Actual			

Scope Analysis

ANNEX 5

Main Cause of NRW	Main Counter measure	Area		
		Pilot Area	Model Area	Whole Area
Unbilled Metered consumption	Development of fee colletion from concerned organization/activity	■	■	■
Unbilled Unmetered consumtion				
Unauthorized Consumption	Establishment of regulation for unauthorized comsumption	■	■	■
	Identifying the point unauthorized connection		■	■
	Cut off unauthorized connection		■	■
Data Handling Error	Arrangement of Customer Data			
	Proper issuing of bill		■	■
	Termination of water supply for no-payer		■	■
Customer Metering Inaccuracies	Identifing the position of meter		Zone 3 only	■
	Replacement of inaccurate meter		■	■
	Quality control of meter			
	Transfer of asset (parto of service line, meter) (Customer → CWASA)			
	Work management/Relocation of meter reader	■	■	■
	Awareness raising			
Leakage on Main lienes	Development of pipeline mapping			■
	Planning of Zoning of distribution system			
	Actual work of Zoning of distribution system		■	■
	Identifying the leakage point		■	■
	Repairing the leakage point		■	■
Leakage and Overflows at Storage	Identifying the leakage point	■	■	■
	Repairing the leakage point	■	■	■
Leakage on Service lines	Quality control of connection work		■	■
	Identifying the leakage point		■	■
	Repairing the leakage point		■	■

Formulation of Overall action plan	
Formulation of Annual implemetation plan	
Developmpment of GIS (Pipeline data/customer data)	Originally planned under KWSP
Development of MIS	■

【Notes】

	Done/will be done under PANI PJ & Within Original scope of PANI PJ
	Done/will be done under PANI PJ & Out of Original scope of PANI PJ
	Recomended in this Mid-term review to be done under PANI PJ
■	Not done/will not be done under PANI PJ & Within Original scope of PANI PJ
■	Not done/will not be done under PANI PJ & Out of Original scope of PANI PJ

Changes of Team member

ANNEX 6

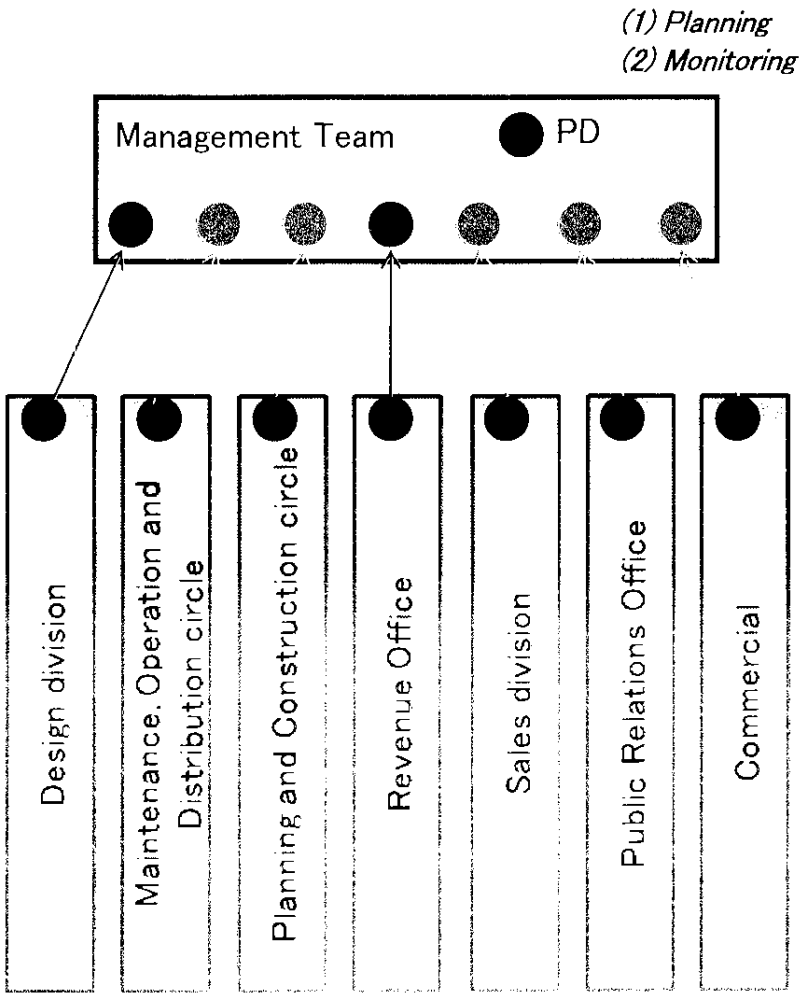
	R/D (31st Mar. 2009)	1st Nomination (13th Sep. 2009)	2nd Nomination (9th Feb. 2010)	Actual ([illegible])
[illegible]			Chief Engineer	Chief Engineer
	Project Director (Leader)		EE (Design division)	Project Director
	SE (Maintenance, Operation and Distribution circle)	SE (Maintenance, Operation and Distribution circle)		
	SE (Planning and Construction circle)	SE (Planning and Construction circle)		
	Chief Revenue Officer	Chief Revenue Officer	Chief Revenue Officer	
	EE (MOD I)			
	EE (MOD II)			
	EE (Sales division)	EE (Sales division)		
	Public Relations Officer	Public Relations Officer		
			Commercial Manager	
	Total No. 8	Total No. 5	Total No. 7	Total No. [illegible]
[illegible]	EE (MOD I)	EE (MOD I)	EE (MOD I)	
	EE (MOD II)	EE (MOD II)	EE (MOD II)	
	AE (MOD I)	AE (MOD I)	AE (MOD I)	AE (MOD II)
	AE (MOD II)	AE (MOD II)	AE (MOD II)	
	SAE ×2	SAE (MOD I)	SAE (MOD I)	
		SAE (MOD II) ×2	SAE (MOD II) ×2	
	Pipeline supervisors ×2	PLS (MOD I)	PLS (MOD I)	
		PLS (MOD II)	PLS (MOD II)	
	Plumbers ×6	PM (MOD I) ×2	PM (MOD I) ×2	
		PM (MOD II)	PM (MOD II)	PM (MOD I) ×2
		APM (MOD II) ×2	APM (MOD II) ×2	
		Pump Operator	Pump Operator	
				AE (GIS section, Design division)
			Chief Revenue Officer	
	Revenue Officer	Revenue Officer	Revenue Officer	
		LDA-Cum-Typist ×4	LDA-Cum-Typist ×4	
		Work Assit.	Work Assit.	
	Public Relations Officer			Public Relations Officer [Not fulltime]
	Total No. 20	Total No. 21	Total No. 22	Total No. [illegible]

Jul. to Dec. 2009: None
Jan. to Jun. 2010: 1 Diploma Engineer, Construction division

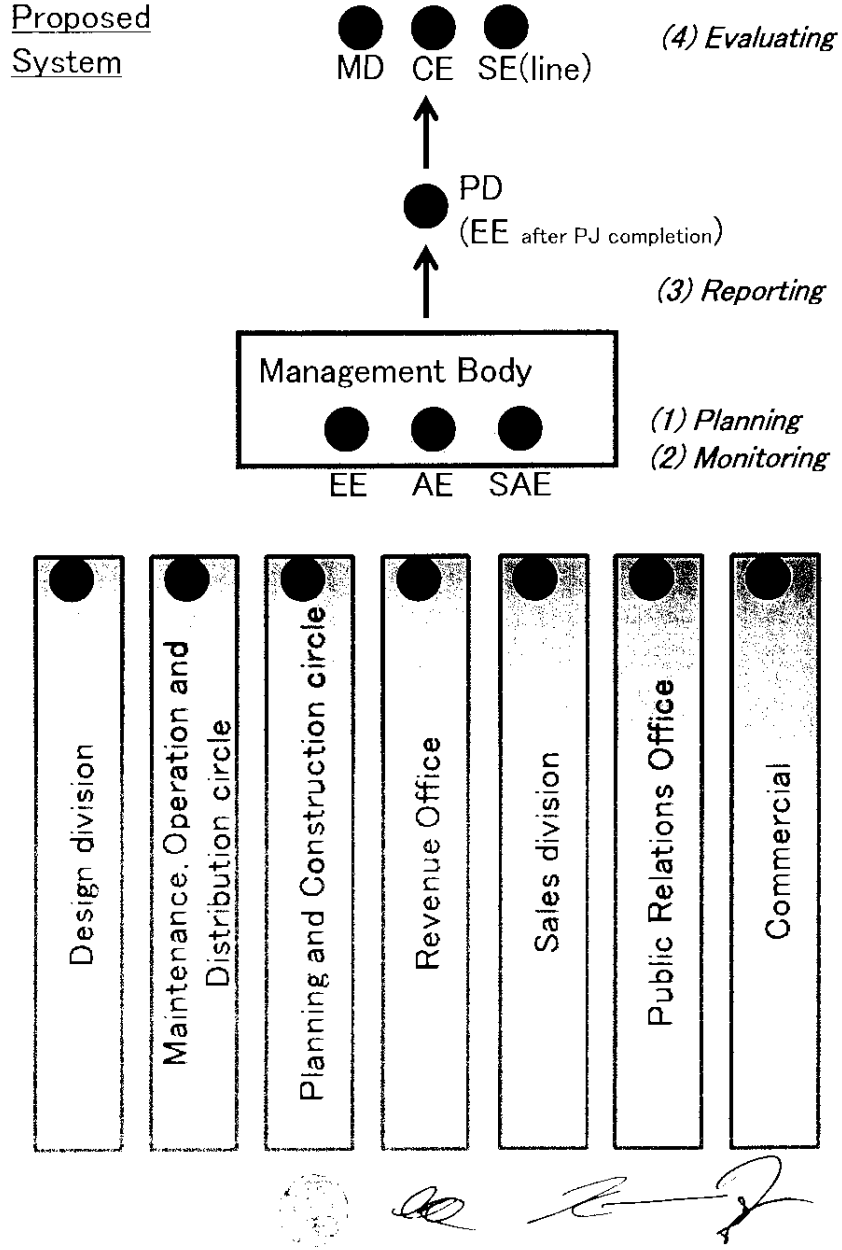
ANNEX 7

Recommendation on Management system for NRW Reduction

Existing System



Newly Proposed System



付属資料1

Questionnaire to Project Head (Managing Director), Deputy Project Head (Chief Engineer), Project Director (Superintending Engineer), Chittagong WASA

Project for Advancing NRW Reduction Initiative (PANI) of Chittagong WASA

1. Actual progress

Review items	Questions	Detailed questions	Answers	Please mention if you have comments.
Achievement degree of the Output	Achievement degree of the Output 1:To develop capacity to formulate NRW reduction plans	**Indicator 1-1: An overall action plan for NRW reduction is developed.**		
		Has a NRW Reduction Management Team been organized and empowered to proceed with a formulation, implementation, monitoring and revision of an overall action plan for NRW reduction ?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Does the NRW Reduction Management Team function as a team?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Has the NRW Reduction Management Team prepared a provisional overall action plan for NRW reduction?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Has the NRW Reduction Management Team implemented the provisional overall action plan for NRW reduction? If not, please mention reasons.	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Has the NRW Reduction Management Team regularly monitored and reviewed the provisional overall action plan for NRW reduction, based on feedback from the pilot projects?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Others: Is there any spinoff output generated by the preparation of a provisional overall action plan for NRW reduction, e.g. customer data preparation, broken water meter replacement?	Not at all ( ) A few ( ) Some ( ) Many ( )	
		Indicator 1-2: A NRW reduction annual implementation plan is prepared every year.		
		Has the NRW Reduction Management Team formulated an annual implementation plan based on the above provisional overall action plan every year?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Has the NRW Reduction Management Team implemented the annual implementation plan? If not, please mention reasons.	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Has the NRW Reduction Management Team monitored and reviewed regularly the annual implementation plan? If not, please mention reasons.	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	

Review items	Questions	Detailed questions	Answers	Please mention if you have comments.
	Achievement degree of the Output 2:To strengthen management and techniques in implementing NRW reduction activities through pilot project	**Indicator 2-1: The NRW Reduction Action Teams are organized and implement the NRW Reduction work plan as scheduled.**		
		Has the CWASA organized NRW Reduction Action Teams?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Do the NRW Reduction Action Teams function as a team?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Have the NRW Reduction Action Teams prepared a NRW Reduction work plan?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Have the NRW Reduction Action Teams implemented the NRW Reduction work plan?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Others: Is there any spinoff output generated by the preparation of a NRW Reduction work plan, e.g. underground line regulation of gas, telephone and others?	Not at all ( ) A few ( ) Some ( ) Many ( )	
		Indicator 2-2: A manual for service connection and pipe repairing is developed.		
		Has a manual for service connection and pipe repairing been developed?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Have the C/Ps been involved in the manual developing?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Indicator 2-3: 22 CWASA officers/staffs are trained on leak detection skills, service connection and pipe repairing.		
		Do you think the trainings will be conducted for leak detection skills, service connection and pipe repairing, to the 22 CWASA officers/ staffs, as planned?	Not at all ( ) A few ( ) Some ( ) All of 22 staffs ( )	
		indicator 2-4: NRW ratio is reduced in the pilot project areas.		
		Do you think the NRW ratio is likely to be reduced in the pilot project areas?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		External conditions		
		Have the officers and staffs trained in the Project left CWASA?	Not at all ( ) A few ( ) Some ( ) Many ( )	
		Is there any other external condition affecting an achievement of the "Outputs"?	Not at all ( ) A few ( ) Some ( ) Many ( )	

Review items	Questions	Detailed questions	Answers	Please mention if you have comments.
Achievement degree of the Project Purpose	Achievement degree of the Project purpose: To enhance CWASA's capacity to reduce Non-Revenue Water (NRW)	**Indicator 1: The overall action plan for NRW reduction is periodically updated.**		
		Do you think the overall action plan for NRW reduction is likely to be periodically updated?	Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
		Indicator 2: The functions of the NRW Reduction Action Teams are incorporated into the routine work of CWASA.		
		Have the CWASA officers/staffs recognized or been informed about NRW Reduction Action Teams' roles, functions as their prospective organizations conducting NRW reduction as well as their relationship with the existing divisions?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Are the functions of the NRW Reduction Action Teams likely to be incorporated into the routine work of CWASA?	Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
		Indicator 3: CWASA officers/staffs apply appropriate techniques developed by the project on leak detection, service connection and pipe repairing.		
		Do you think CWASA officers/staffs are likely to acquire appropriate techniques developed by the project on leak detection, service connection and pipe repairing?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Do you think CWASA officers/staffs are likely to apply the appropriate techniques developed by the project on leak detection, service connection and pipe repairing to other areas than the pilot areas?	Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
Forecast of the Overall goal achievement	Forecast	Is it likely that by 2016, NRW ratio will be reduced compared to the level at the project completion in 2011 (2012)?	Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
	External conditions	Does CWASA secure a budget for the expansion of the NRW activities?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Does CWASA provide pipes, saddles and meters to customers?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Have devastating natural disasters occurred?	Not at all ( ) A few ( ) Some ( ) Many ( )	
		Is there any other external condition affecting an achievement of the overall goal, e.g. water meter inspection system introduction?	Not at all ( ) A few ( ) Some ( ) Many ( )	

Review items	Questions	Detailed questions	Answers	Please mention if you have comments.
	Cooperation with other projects	Is it effective for the Project to cooperate with the Karnaphuli Water Treatment Plant Project?	Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
		Is it effective for the Project to cooperate with the Mohara/ Kalurghat Water Treatment Rehabilitation Projects?	Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
		Is it effective for the Project to cooperate with projects by other donors?	Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	

2. Implementation process

Plan and actual activities	Actual activities vs. plan	Have the project activities been implemented as planned?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		What activities have been added or deleted?	Not added ( ) Not deleted ( ) Some added ( ) Some deleted ( )	
		What activities have been behind the schedule by what reasons? Has the delay affected an achievement of the outputs?	Not at all ( ) A few ( ) Some ( ) Many ( )	
Decision making process	Decision making process of the Bangladesh side	What decision making process does the Bangladesh side have, in order to proceed with the Project activity change, policy modification, staff assignment?		
		When and how does the Bangladesh side change the Project activity plan?		
Monitoring	Monitoring	Does the Steering Committee conduct monitoring the project activities?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
Relationship between the JICA Expert team and C/P	Technology transfer	Have all of the C/Ps spent enough time to acquire technology transferred from the JICA Expert Team?	Not at all ( ) Some C/Ps ( ) Many C/Ps ( ) All C/Ps ( )	
		Do you think the JICA experts are transferring their technology to the C/Ps smoothly?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
	Communication	Is communication good among the JICA experts, the C/P, related divisions at CWASA, the JICA Bangladesh Office and others?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Is communication good between the CWASA Central Office and MOD offices?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	

Review items	Questions	Detailed questions	Answers				Please mention if you have comments.
	Consensus on the PDM	Have the C/Ps agreed with the "activities", "outputs", "project purpose" and "overall goal" in the PDM?	Not at all ( )	Inadequate ( )	Adequate ( )	Excellent ( )	
Ownership		Do you feel you are the main proponent of this project?	Not at all ( )	Inadequate ( )	Somehow ( )	Main proponent ( )	
		Do you think the NRW Reduction Management Team is eager to acquire technology from the JICA Expert Team?	Not at all ( )	Some members ( )	Many members ( )	All members( )	
		Do you think the NRW Reduction Action Teams are eager to acquire technology from the JICA Expert Team?	Not at all ( )	Some members ( )	Many members ( )	All members( )	
		How highly does the Bangladesh government evaluate this project or C/P?	Very low ( )	Low ( )	Somehow high ( )	High ( )	
Other comments		Please mention issues of the implementation process or those solutions if any.					

3. Evaluation by five criteria

Relevance	National Policy	Are the overall goal and the project purpose still in line with the Bangladesh national policies of "National Water Policy" and "National Water Management Plan"?	Not at all ( )	Inadequate ( )	Adequate ( )	Excellent ( )	
	Needs of CWASA	Do the CWASA staffs regard the "NRW reduction activities" as their top priority issues to tackle?	Not at all ( )	Inadequate ( )	Adequate ( )	Excellent ( )	
	Japan's advantages	In which areas, is the Japan's technology used in this project superior to other ones? Please describe briefly.					
	Demarcation with other donor	Is the Project redundant with other donors' projects?	Redundant ( )	Somehow redundant ( )	Not very much ( )	Not at all ( )	
Effectiveness	Forecast of the Project Purpose achievement	Is it enough to conduct the existing activities stipulated by the PDM for achieving the two "Outputs"? If any other one is necessary, please mention.	Not at all ( )	Not likely ( )	Somehow likely ( )	Most likely ( )	
		Is it enough to realize the two "Outputs" for achieving the Project Purpose?	Not at all ( )	Not likely ( )	Somehow likely ( )	Most likely ( )	
		Is it likely to achieve the Project Purpose with influence by other projects, e.g. Karnaphuli Water Treatment Plant Project?	Not at all ( )	Not likely ( )	Somehow likely ( )	Most likely ( )	

Review items	Questions	Detailed questions		Answers	Please mention if you have comments.
		Are the external conditions, mentioned in the PDM, still appropriate to achieve the Project Purpose by realization of the two "Outputs"?		Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
	Contributing factors	What would contribute the "Project Purpose" achievement?			
	Inhibiting factors	What would inhibit the "Project Purpose" achievement?			
Efficiency	Appropriateness of the Japanese inputs	Have the Japanese expert dispatches been appropriate?	a. Number of the experts	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
			b. Timeliness and duration	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
			c. Expertise fields	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Has the provision of equipment been appropriate in terms of timeliness? Has/will the equipment been/be continuously well maintained?	a. Provision Timeliness	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
			b. Maintenance	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
			c. Possibility of Future Maintenance	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Have the CWASA used all of the provided equipment?		Not at all ( ) Some ( ) Most ( ) All ( )	
		Have the trainings of leak detection, service connection and pipe repairing, and if any, been appropriately conducted?		Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
	Appropriateness of the Bangladesh inputs	Has the Bangladesh side assigned necessary C/P and staff? 1) Project Head, Deputy Project Head, and Project Director	a. Number of C/Ps	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
			b. Timeliness and duration	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
			c. Expertise fields	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		2) NRW Reduction Management Team	a. Number of C/Ps	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
			b. Timeliness and duration	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
			c. Expertise fields	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	

Review items	Questions	Detailed questions		Answers	Please mention if you have comments.
		3) NRW Reduction Action Team	a. Number of C/Ps	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
			b. Timeliness and duration	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
			c. Expertise fields	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Has the Bangladesh side provided office space, furniture, and facilities for Japanese experts?		Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Has the Bangladesh side allocated a budget enough to proceed with the Project? Have they executed the budget in accordance with TPP as of March 2009 (your Action Plan)?	Amount	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
			Timeliness of the disbursement	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		How much has the Bangladesh side allocated a budget to proceed with the Project?		Actual budget in 2009 ( ), Actual budget in 2010 ( )	
		If the CWASA has any other budget than the above one for the project, please indicate.			
		Has the Bangladesh side provided an adequate GIS mapping of Chittagong pipeline network and GIS setting to the JICA Expert Team?		Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
	Efficiency of the Outputs achievement	Is there any factor inhibiting the Outputs achievement?		Not at all ( ) A few ( ) Some ( ) Many ( )	
		Are the existing activities enough to achieve the two "Outputs"?		Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
		Are the external conditions appropriate to achieve the two "Outputs" by implementation of the existing activities?		Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
	Efficiency of the activities	Is the Project implementation system efficient?		Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Have the Project activities been timely implemented?		Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		How has the CWASA coped with input delay, e.g. equipment procurement postponement?			

Review items	Questions	Detailed questions	Answers				Please mention if you have comments.
Impact	Positive impact	Is it possible to achieve the "Overall Goal" with realization of the "Project Purpose" and external conditions?	Not at all ( )	Not likely ( )	Somehow likely ( )	Most likely ( )	
		Do you think the technology/techniques related to NRW reduction and management skills transferred from the project are likely to be applied to the areas other than pilot areas?	Not at all ( )	Not likely ( )	Somehow likely ( )	Most likely ( )	
		Would the Project promote a formulation or enforcement of any system, law, regulation involved with non-revenue water reduction?	Not at all ( )	Not likely ( )	Somehow likely ( )	Most likely ( )	
		Would the Project affect any economic body in Bangladesh?	Not at all ( )	Not likely ( )	Somehow likely ( )	Most likely ( )	
		Would the Project promote any human resource development in charge of non-revenue water reduction in neighboring countries?	Not at all ( )	Not likely ( )	Somehow likely ( )	Most likely ( )	
		Would the Project affect any issue of gender, human rights, poverty (including socially-challenged people) ?	Not at all ( )	Not likely ( )	Somehow likely ( )	Most likely ( )	
		Would the Project promote any technology innovation in non-revenue water reduction or water supply sector?	Not at all ( )	Not likely ( )	Somehow likely ( )	Most likely ( )	
		Has this Project generated / will this Project generate expected/unexpected positive impact in addition to the above ones? Please mention if any.	Not at all ( )	A few ( )	Some ( )	Many ( )	
	Negative impact	Has this Project generated / will this Project generate unexpected negative impacts? Please mention if any.	Many ( )	Some ( )	A few ( )	Not at all ( )	
	Impediment s	What would impede the above positive impacts?					
Sustainability	Institutional sustainabilit	Is the Bangladesh government likely to continue to give priority to Chittagong water supply improvement?	Not at all ( )	Not likely ( )	Somehow likely ( )	Most likely ( )	
		Do the Project activities ensure a NRW reduction technology dissemination in all Bangladesh?	Not at all ( )	Not likely ( )	Somehow likely ( )	Most likely ( )	

Review items	Questions	Detailed questions	Answers	Please mention if you have comments.
	Organizational and Financial sustainability	Is it likely that the CWASA will continue/expand to conduct the NRW reduction activities with enough budget after the completion of the project?	Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
		Has CWASA developed a capacity enough to implement effective training after the Project completion, in terms of budget, human resource, decision	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Has CWASA developed a capacity enough to proceed with public awareness increase activities, involved with NRW reduction, after the Project completion, in terms of budget, human resource, decision making process and others?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Is it possible to increase a budget of NRW reduction, with the existing activities of the Project?	Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
	Technical sustainability	Are the NRW reduction technology and mechanism likely to be incorporated in the CWASA management?	Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
		Does the CWASA has a system to incorporate the technology, transferred by the JICA experts, into its management and disseminate it?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Is the CWASA likely to continue to apply the technology transferred from the JICA experts after the Project?	Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
		Do you think the officers and staffs trained in the Project are likely to leave CWASA?	Not at all ( ) Not likely ( ) Somehow likely ( ) Most likely ( )	
		Have the technical manual been prepared with the prospect of assuring the quality of contractors' work?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
		Do the C/Ps conduct an appropriate maintenance of the equipment by themselves?	Not at all ( ) Inadequate ( ) Adequate ( ) Excellent ( )	
	Impediment	What would impede the above sustainability?		

January 2011

Questionnaire to the NRW Reduction Management Team Members for the Midterm Review

Yasuyuki Kuroda, Midterm Review Team

Every JICA's project is reviewed or evaluated at four stages, namely ex-ante, midterm, terminal and ex-post. This time, one year and six months after the inauguration of the Project, midterm review is conducted since the Project reached half the way. The purpose of the Midterm review is:

1) Review the progress of the Project based on the Project Design Matrix (PDM) and evaluate the achievement from the viewpoints of the five review criteria which are relevance, effectiveness, efficiency, impact, and sustainability,
2) Analyze the factors to promote/impede the effects,
3) Itemize necessary actions to be taken and make recommendation for the Project,
4) Revise PDM and PO, if necessary, and
5) Summarize results of the study in a joint review report.

The Project Design Matrix (PDM) stipulates:

Overall Goal: To reduce Non-Revenue Water (NRW) in Chittagong City
Project Purpose: To enhance CWASA's capacity to reduce Non-Revenue Water (NRW)
Outputs: 1) To develop capacity to formulate NRW reduction plans, 2) To strengthen management and techniques in implementing NRW reduction activities through pilot project.

In addition to the Project progress review with the PDM, the Midterm Review appraises the project from the following five Review criteria.

1) Relevance: Relevance of the Project is reviewed by the validity of the Project Purpose and Overall Goal in connection with the development policy and the needs of Bangladesh.

2) Effectiveness: Effectiveness is assessed to what extent the Project has achieved its Project Purpose, clarifying the relationship between the Project Purpose and Outputs.

3) Efficiency: Efficiency of the Project implementation is analyzed with emphasis on the relationship between Outputs and Inputs in terms of timing, quality and quantity.

4) Impact: Impact of the Project is assessed in terms of positive/negative and intended/unintended changes taken place as a result of the Project.

5) Sustainability: Sustainability of the Project is assessed in terms of institutional/political, financial and technical aspects by examining the extent to which the achievement of the Project will be sustained after the Project is completed.

The Midterm review team will collect information from various reports, data, responses to this questionnaire and interviews to review the Project progress, analyze the factors promoting/impeding the effects and make recommendations.

I would highly appreciate if you answer the following questionnaire, then directly sending back to me, Yasuyuki Kuroda, by January 10, 2011.

E-mail address: kuroda.y@idcj.or.jp

1. Project Purpose

1-1. How do you evaluate the NRW Reduction Management Team's roles and responsibilities, as well as their activities so far, in relation with the Project Purpose "to enhance CWASA's capacity to reduce Non-Revenue Water"?

1-2. Do you think NRW Reduction Management Team members have been selected appropriately? Have they actively participated in the activities?

1-3. What are major changes in terms of NRW reduction management?

1-4. Is the NRW ratio likely to be reduced in the pilot project areas?

1-5. Have there been any factor contributing to the achievement of the Project purpose? If yes, please indicate.

1-6. Have there been any factor hampering the achievement of the Project purpose? If yes, please indicate.

2. Development of an overall action plan for NRW reduction

2-1. Do you feel you have been empowered to proceed with formulation, implementation, monitoring and revision of an overall action plan for NRW reduction?
Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )
Comments:

2-2. Do you actively participate in the NRW Reduction Management Team activities? If not, please indicate reasons.
Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )
Comments:

2-3. Have you participated in preparing a provisional overall action plan for NRW reduction? If not, why?
Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )

Comments:

2-4. Have you participated in implementing the provisional overall action plan for NRW reduction? If not, please mention reasons.
Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )
Comments:

2-5. Have you participated in monitoring and reviewing the provisional overall action plan for NRW reduction, based on feedback from the pilot projects?
Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )
Comments:

2-6. What have been difficulties for you to participate in the NRW Reduction Management Team activities?

3. Preparation of a NRW reduction annual implementation plan
3-1. Have you participated in formulating an annual implementation plan based on the above provisional overall action plan for NRW reduction? If not, why?
Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )
Comments:

3-2. Have you participated in implementing the annual implementation plan? If not, please mention reasons.
Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )
Comments:

3-3. Have you participated in monitoring and reviewing regularly the annual implementation plan? If not, please mention reasons.
Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )
Comments:

4. CWASA Organization Reform

4-1. Do you think the NRW Reduction Management Team shall be reorganized

following the CWASA organization reform? If yes, please mention how the team shall be reformed.

5. Communication

5-1. How is your daily communication with JICA Experts?

5-2. Has there been any problem in terms of communication among the project personnel (C/Ps, Experts, other relevant organizations, and beneficiaries)?

6. Efficiency

6-1. Have there been any problem related to the amount, quality and timing of inputs from either Japanese or Bangladesh side. (e.g. Dispatch of Experts, Assignment of C/Ps, Facilities and Equipment, CWASA operational costs, etc.)

7. Impacts

7-1. Has this Project generated or will this Project generate expected/ unexpected positive impacts in addition to the above ones?

7-2. Has this Project generated or will this Project generate unexpected negative impacts?

8. Sustainability

8-1. Do you think the NRW reduction activities and mechanism are likely to be incorporated in the CWASA management?

8-2. Is it possible for CWASA and the NRW Reduction Management Team to further promote NRW reduction with the acquired technologies from JICA Experts after the completion of the Project? Please mention reasons.

9. What would be a critical matter to succeed in the Project?

Thank you very much for your cooperation.

January 2011

Questionnaire to the NRW Reduction Action Team Members for the Midterm Review

Yasuyuki Kuroda, Mid-term Review Team

Every JICA's project is reviewed or evaluated at four stages, namely ex-ante, midterm, terminal and ex-post. This time, one year and six months after the inauguration of the Project, midterm review is conducted since the Project reached half the way. The purpose of the Midterm review is:

1) Review the progress of the Project based on the Project Design Matrix (PDM) and evaluate the achievement from the viewpoints of the five review criteria which are relevance, effectiveness, efficiency, impact, and sustainability,
2) Analyze the factors to promote/impede the effects,
3) Itemize necessary actions to be taken and make recommendation for the Project,
4) Revise PDM and PO, if necessary, and
5) Summarize results of the study in a joint review report.

The Project Design Matrix (PDM) stipulates:

Overall Goal: To reduce Non-Revenue Water (NRW) in Chittagong City
Project Purpose: To enhance CWASA's capacity to reduce Non-Revenue Water (NRW)
Outputs: 1) To develop capacity to formulate NRW reduction plans, 2) To strengthen management and techniques in implementing NRW reduction activities through pilot project.

In addition to the Project progress review with the PDM, the Midterm Review appraises the project from the following five Review criteria.

1) Relevance: Relevance of the Project is reviewed by the validity of the Project Purpose and Overall Goal in connection with the development policy and the needs of Bangladesh.

2) Effectiveness: Effectiveness is assessed to what extent the Project has achieved its Project Purpose, clarifying the relationship between the Project Purpose and Outputs.

3) Efficiency: Efficiency of the Project implementation is analyzed with

emphasis on the relationship between Outputs and Inputs in terms of timing, quality and quantity.

4) Impact: Impact of the Project is assessed in terms of positive/negative and intended/unintended changes taken place as a result of the Project.

5) Sustainability: Sustainability of the Project is assessed in terms of institutional/political, financial and technical aspects by examining the extent to which the achievement of the Project will be sustained after the Project is completed.

The Midterm review team will collect information from various reports, data, responses to this questionnaire and interviews to review the Project progress, analyze the factors promoting/impeding the effects and make recommendations.

I would highly appreciate if you answer the following questionnaire, then directly sending back to me, Yasuyuki Kuroda, by January 10, 2011.

E-mail address: kuroda.y@idcj.or.jp

1. Establishment of NRW Reduction Action Teams

1-1. How do you evaluate Action Plan Teams' roles and responsibilities, as well as their activities so far?

1-2. Do you think NRW Reduction Action Team members have been selected appropriately? Have they actively participated in the activities?

1-3. What are the major changes in terms of NRW reduction activities in CWASA?

2. Implementation of the NRW reduction work plan

2-1. Have you participated in preparing a NRW Reduction work plan? If not, why?

Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )

Comments:

2-2. Have you participated in implementing the NRW Reduction work plan? If not, why?

Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )

Comments:

3. Manual for service connection and pipe repairing

3-1. Has a manual for service connection and pipe repairing been developed?

Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )

Comments:

3-2. Have you been involved in the manual developing?

Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )

Comments:

3-3. Are the manuals easy to follow and useful for you? If not, why?

4. Training of leak detection skills, service connection and pipe repairing

4-1. Do you think the training will be conducted for leak detection skills, service connection and pipe repairing, to the 22 CWASA officers/ staffs, as planned?

Not at all ( ), Inadequate ( ), Adequate ( ), Excellent ( )

Comments:

4-2. How do you evaluate the technology transferred from the JICA Expert Team for leak detection, service connection and pipe repairing? Are they useful? If not, why?

Not at all (　), Inadequate (　), Adequate (　), Excellent (　)

Comments:

5. Functions of the NRW Reduction Action Team

5-1. Do you think the functions of the NRW Reduction Action Teams are likely to be incorporated into the routine work of CWASA?

Not at all (　), Inadequate (　), Adequate (　), Excellent (　)

Comments:

5-2. Have you and other CWASA officers/staffs recognized/ been informed about NRW Reduction Action Teams' roles, functions as their prospective organizations conducting NRW reduction as well as their relationship with the existing divisions?

Not at all (　), Inadequate (　), Adequate (　), Excellent (　)

Comments:

5-3. What have been difficulties for you to participate in the NRW Reduction Action Team activities?

6. Application of the techniques developed by the project

6-1. Do you think CWASA officers/staffs are likely to acquire appropriate techniques developed by the project on leak detection, service connection and pipe repairing?

Not at all (　), Inadequate (　), Adequate (　), Excellent (　)

Comments:

6-2. Do you think CWASA officers/staffs are likely to apply appropriate techniques developed by the project on leak detection, service connection and pipe repairing to other areas than the pilot areas?

Not at all (　), Inadequate (　), Adequate (　), Excellent (　)

Comments:

7. Relationship between the JICA Expert team and C/P

7-2. Have you spent enough time to get a technology transfer from the JICA Expert

Team?
Not at all (　), Inadequate (　), Adequate (　), Excellent (　)
Comments:

7-3. Do you think the JICA experts are transferring their technology to the C/Ps smoothly?
Not at all (　), Inadequate (　), Adequate (　), Excellent (　)
Comments:

7-5. How is daily communication between you and the JICA experts?
Bad (　), Inadequate (　), Adequate (　), Excellent (　)
Comments:

7-6. Has there been any problem in terms of communication among the project personnel (C/Ps, Experts, other relevant organizations, and beneficiaries)?

8. Appropriateness of the Japanese inputs
8-1. Is the Japanese expert dispatch appropriate?
a. Number of the experts
Not at all (　), Inadequate (　), Adequate (　), Excellent (　)
Comments:

b. Timeliness and duration
Not at all (　), Inadequate (　), Adequate (　), Excellent (　)
Comments:

c. Expertise fields
Not at all (　), Inadequate (　), Adequate (　), Excellent (　)
Comments:

8-2. The main equipment supplied by the Japanese side, is, as mentioned in the PDM: Leak Detection Equipment, Portable Ultrasonic Flow Meter, Vehicle for pipe repair, GIS Equipment, GPS equipment and Data Input/Output Equipment. What do you think of these equipment supply, in terms of:

a. Quantity
Not at all (　), Inadequate (　), Adequate (　), Excellent (　)
Comments:

b. Quality
Not at all (　), Inadequate (　), Adequate (　), Excellent (　)
Comments:

c. Provision Timeliness
Not at all (　), Inadequate (　), Adequate (　), Excellent (　)
Comments:

d. Current maintenance
Not at all (　), Inadequate (　), Adequate (　), Excellent (　)
Comments:

e. Possibility of future maintenance
Not at all (　), Inadequate (　), Adequate (　), Excellent (　)
Comments:

8-3 Does the CWASA use all of the equipment?
Not at all (　), Some (　), Most (　), All (　)
Comments:

9. Appropriateness of Bangladesh Inputs
9-1. Have there been any problem related to the amount, quality and timing of inputs from Bangladesh side. (e.g. Assignment of C/Ps, Facilities and Equipment, CWASA operational costs, GIS setting, and etc.)

10. What would be a critical matter to succeed in the Project?

Thank you very much for your cooperation.

January 2011

Project for Advancing NRW Reduction Initiative (PANI) of Chittagong WASA

Questionnaire to the Local Government Division,

Ministry of Local Government Division

Midterm Review Team

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4) Impact: Impact of the Project is assessed in terms of positive/negative and intended/unintended changes taken place as a result of the Project.

5) Sustainability: Sustainability of the Project is assessed in terms of institutional/political, financial and technical aspects by examining the extent to which the achievement of the Project will be sustained after the Project is completed.

The Midterm review team will collect information from various reports, data, responses to this questionnaire and interviews to review the Project progress, analyze the factors promoting/impeding the effects and make recommendations. I would highly appreciate if you answer the attached questionnaire.

1. How important do you regard is the NRW reduction for the CWASA management?

2. How do you use the “Project for Advancing NRW Reduction Initiative (PANI) of Chittagong WASA”, e.g. a model of NRW reduction activities for other WASAs?

3. To what extent would the LGD allow the CWASA to proceed with a management autonomy in its organizational reform, e.g. water charge setting, staff employment, investment planning?

4. Would the LGD promote a formulation or enforcement of any law, regulation involved with Non Revenue Water Reduction, e.g. broken water meter replacement, water theft decrease?

5. Are the Overall Goal and Project Purpose described in the PDM still and will be in line with the Bangladesh government policy (i.e. National Water Policy and National Water Management Plan)?

#"Overall Goal: To reduce Non-Revenue Water (NRW) in Chittagong City"
#"Project Purpose: To enhance CWASA’s capacity to reduce Non-Revenue Water (NRW)"

6. How the Overall Goal and Project Purpose described in the PDM meet needs of the target region and society (Chittagong City)?

7. Is implementation of the Project a good strategy to contribute to solving water supply sector issues in Bangladesh (approach, target area selection, synergy effects in cooperation with other donors’ projects)?

8. Has the Project made an appropriate selection of C/P, target groups and pilot areas? Is it likely that the Project influences other WASAs than the target ones?

9. Has the environment of the Project (politics, economy and society) changed since the Preliminary Survey in 2008?

10. Has the National Water Policy in 1999 been revised? If yes, what are major changes?

11. Has the National Water Management Plan in 2004 been revised? If yes, what are major changes?

12. Please mention any critical matter for this project to succeed, if any.

Thank you very much for your cooperation.

収集資料・文献一覧

Office order for setting NRW Reduction Management Team and Action Team

Map of Pilot project area

Project Appraisal Document for Chittagong water supply improvement and sanitation project

Inception report (June 2010) of Institutional Development consultancy services under Karnaphli water supply project