No.

パラグアイ共和国
質量分野検定・検査技術向上計画
終了時評価報告書

平成15年3月
（2003年）

国際協力事業団
鉱工業開発協力部

鉱 開 一
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目　　次

序　　文

パラグアイ共和国では、1995年に発足した南米共同市場（MERCOSUR）加盟に伴い、域内の貿易自由化への対応が急務となっています。特に、品質・生産性の向上に加えて、国際的に認められた製品の製造、及び検査技術が求められているのが現状です。そのため、パラグアイ共和国内の企業の技術力の向上とともに、国内における国際的にも整合性のとれた品質検査、及び認証制度の体制整備が急がれています。

しかし、パラグアイ共和国において品質検査、及び認証制度を司る国立技術標準院（INTN）では、体制整備を進めているものの、設備・機材の老朽化、人材、及び技術の不足により、期待どおりには進んでおらず、ほかのMERCOSUR加盟国に比べて著しく遅れをとっています。

パラグアイ共和国政府は、この現状を早急に改善するために、INTNの加工食品（乳製品等）、住宅資材、度量衡部門のなかから質量・長さ・体積の計量の基本分野（度量衡部門）、特に、質量分野の検査体制、及び認証制度の強化を目的として、1995年11月に我が国にプロジェクト方式技術協力を要請してきました。

これを受けて国際協力事業団では、1997年1月に基礎調査、1998年4月に事前調査を実施しました。さらに、1999年3月、同年7月に第1次、及び第2次短期調査団、同年12月に実施協議調査団を派遣し、討議議事録（R／D）の署名・交換を行いました。このR／Dに基づいて、2000年6月1日より3年間の協力を開始しました。

今回派遣いたしました終了時評価では、プロジェクト開始後2年7か月が経過し、プロジェクト終了を2003年5月に控えていることから、過去3年間の協力実績についてR／D、及び技術協力計画等に基づき、評価5項目に照らして総合的に評価を行いました。それとともに、今後の対応策についてパラグアイ共和国側評価チーム、実施機関などと協議し、合同評価報告書、及びミニッツで確認しました。本報告書は、同調査団の調査結果を取りまとめたものです。

ここに、本調査にご協力いただいた外務省、経済産業省、在パラグアイ日本大使館、財団法人日本品質保証機構など、内外関係各機関の方々に深く御礼を申し上げるとともに、併せて今後のご支援をお願いする次第です。

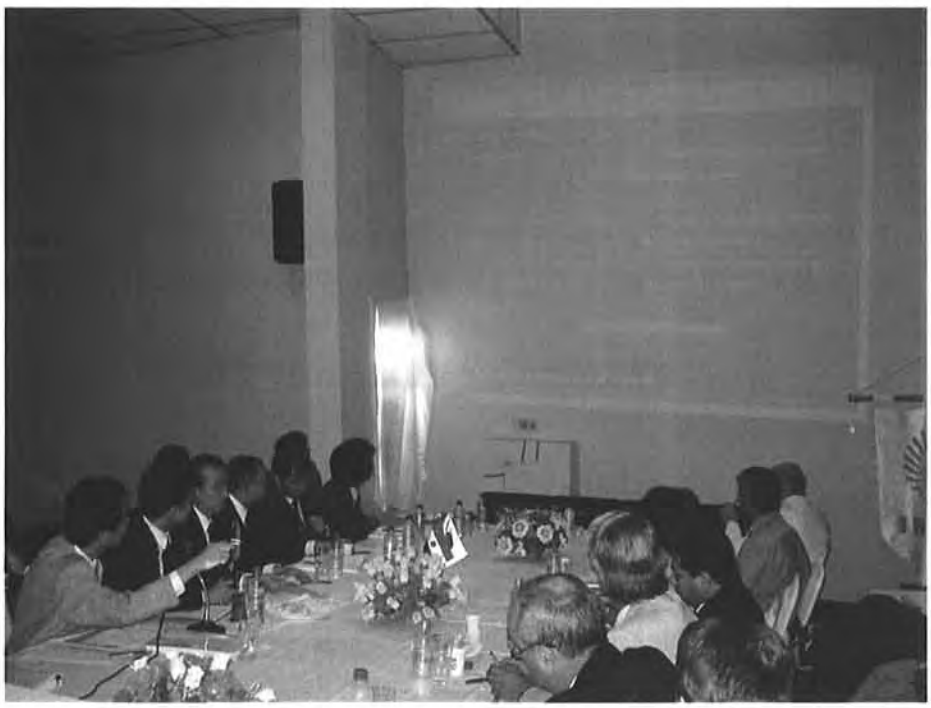
平成15年3月

国際協力事業団

理事　望月　久

プロジェクトサイト位置図

M／M署名



合同調整委員会

評価調査結果要約表

Ⅰ．案件の概要		
国　名：パラグアイ共和国		案件名：質量分野検定・検査技術向上計画
分　野：経済基盤整備		援助形態：プロジェクト方式技術協力
所轄部署：鉱工業開発協力部 第一課		協力金額（評価時点）：約4億7,500万円
協力期間	200年6月　1日～ 2003年5月31日	先方関係機関：国立技術標準院（INTN）
		日本側協力機関：財団法人 日本品質保証機構
		他の関連機関：独立行政法人 産業技術総合研究所

1．協力の背景と概要

パラグアイ共和国（以下、「パラグアイ」と記す）では、1995年に発足した南米共同市場（MERCOSUR）加盟に伴って、域内の貿易自由化への対応が急務になっており、品質・生産性の向上に加えて、国際的に認められた製品の製造、及び検査技術が必要である。パラグアイ企業の技術力向上のために、国際的に整合の取れた品質検査、及び認証制度の体制整備が求められている。

INTNは、パラグアイにおいて品質検査、及び認証制度を司る中心機関であり、現在、そうした体制整備を推進しているところである。しかし、INTNの努力にもかかわらず、機械・設備の老朽化、人材・技術の不足のために、ほかのMERCOSUR諸国に比べ遅れをとっている。

このような状況を克服するために、パラグアイ政府は、検査・認証体制の強化、特に、質量分野における強化のプロジェクトの実施を1995年11月、我が国に要請してきた。国際協力事業団（JICA）では、実施協議調査団を派遣し、1999年12月21日に討議議事録（R／D）を署名・交換した。プロジェクトは、2000年6月1日～2003年5月31日までの3年間にわたり実施してきた。

2．協力内容

(1) 上位目標

質量分野において、INTNの検定・検査機関としての信頼性が向上する。

(2) プロジェクト目標

INTNが実施する質量分野の検定・検査サービスが向上する。

(3) 成　果

・プロジェクトの運営・管理体制が強化される。

・質量分野の検定・検査に必要な機材が調達、据付け、操作され、適切に維持管理される。

・カウンターパート（C／P）の質量の検定・検査に係る技術レベルが向上する。

・INTNが実施する質量分野の検定・検査が体系的に実施される。

(4) 投　入

日本側：

長期専門家派遣　6名（2名が交替）	機材供与	約2億2,600万円
短期専門家派遣　4名（今後2名予定）	ローカルコスト負担	約2,300万円

研修員受入　　6名

パラグアイ側：

C／P配置　　4名　　ローカルコスト負担　　約20億4,900万グアラニ

土地施設、建屋の提供　　（約29万5,000米ドル、約3,500万円）

ローカルコスト負担　　（機材・消耗品購入含む）

既存施設の利用

Ⅱ．評価調査団の概要

調査者	団長／総括	：中島　行男	国際協力事業団 鉱工業開発協力部 部長
	質量標準	：内川　恵三郎	（財）日本品質保証機構 計量計測センター 参与
	検定・検査	：根田　和朗	独立行政法人 産業技術総合研究所 法定計量技術科 科長
	評価監理	：尾崎　菜津子	国際協力事業団 鉱工業開発協力部 鉱工業開発協力第一課 職員
	評価分析	：幸田　成善	ユニコ インターナショナル（株） プロジェクト第一本部 テクノエコノミスト
調査期間	2002年2月8～28日		評価種類：終了時評価

Ⅲ．評価結果の概要

1．評価結果の要約

妥当性：極めて高い

・上位目標は、パラグアイ側の開発政策に一致している。

・INTNは、日本側に技術協力の受入先として妥当である。

・JICA国別事業実施計画において示された、経済競争力強化を目的とした「輸出振興及び消費者保護のための品質検査・認証体制の強化」に合致する。

有効性：高い

・INTNの検定・検査サービスは、サービス受益者のほとんどが満足できるレベルにまで向上している。

・C／Pの転職によって技術移転は遅れたものの、ほぼその遅れは取り戻している。

効率性：高い

・専門家の派遣・機材の供与・研修員の受入れの内容は適切であり、その結果、技術移転がうまく行われた。

インパクト：良好で上位目標は近い将来達成される見込み

・信頼性が向上していることをインタビューの結果が示している。

・上位目標を達成するためには、トレーサビリティの確立・院内校正・広報活動が条件となる。

自立発展性：高い

・INTNは、C／P転職対策の一環として、特別手当を支給する等内部規則の改定の検討に入っている。

・INTNには、検定・検査サービス料徴収に基づく自己予算財源があり、その使用枠を拡大しようと努力している。

2．効果・阻害要因の総合的検証

(1) 計画内容に関するもの

1) 効果発現に貢献した要因

・パラグアイ側の現状を考慮し、計画段階で質量分野に限定し、技術移転の内容が明確かつ適切に設定された。

・機材調達の遅れに対して、座学を実施することで時間を効率的に利用した。また、C／Pの転職や1t分銅に欠損が発見されたことで技術移転に影響が出たが、計画をすぐに変更し、適切に対処した。

2) 問題点及び問題を惹起した要因

・1t分銅の保管場所が保管に適した環境でなかったため、分銅を高い精度で維持するのが難しかった。

・機材供与が遅れ、プロジェクト開始に間に合わなかった。

(2) 実施プロセスに関すること

1) 効果発現に貢献した要因

・日本語能力のある日系人のC／Pを配置したことにより、コミュニケーションがスムーズに行われた。

・INTNがサービス料を自己収入化できることから、オンザジョブ・トレーニング（OJT）を中心にした技術移転を行い、サービスの増加を考慮した。

2) 問題点及び問題を惹起した要因

・技術分野のC／Pの配置人数が各分野2名ずつと少なく、C／Pの転職による技術移転への影響が大きい。新たに配置されたC／Pに対して、始めから技術移転をやり直さなくてはならなくなった。

3．結　論

・プロジェクトはうまく実行され、目標は計画どおりに達成されつつある。

・上位目標は、近い将来達成される見込みである。

4．提　言

(1) C／P転職対策として、技術スタッフがより収入を得るように、特別手当等、給与体系を改善すること。

(2) 技術スタッフが、INTNにとどまるためのインセンティブとして海外研修を実施すること。

(3) C／P転職対策の一環として、技術スタッフは、複数あるいはチームで業務を行うべく、INTNは組織を調整すること。

(4) 積み立て金等、供与した機材や機器の維持のための予算を確保すること。

(5) サービスの向上のために、迅速なサービス運営と技術サービスに係る情報提供を考慮すること。

(6) プロジェクトの意義を考慮した、継続的な広報活動を実施すること。

(7) 自立発展性を考慮し、INTN院内で技術移転を実施する体制を確立すること。

5．教　訓

(1) 技術移転がスムーズにいくように、機材供与の時期等を考え、長期専門家の派遣時期を調整すること。

(2) 機材を供与する場合には、その据え付け、及び保管の環境を考慮すること。

(3) 専門家の派遣については、技術移転に必要なC／Pの技術レベルを考慮して、派遣の順序を検討すること。

(4) 商工省（MIC）以外の官庁への広報にあたっては、担当者のほかにトップにも伝わるように計画すること。

(5) ターゲットグループのニーズについては、プロジェクトの事前と事後が比較できるように詳細に計画し、かつデータを数量化すること。

(6) 短期のプロジェクトを開始する前に、供与機材の仕様、及び供与スケジュールを明確にすること。

第1章　終了時評価調査の概要

1－1　調査団派遣の経緯と目的

パラグアイ共和国（以下、「パラグアイ」と記す）では、1995年に発足した南米共同市場（MERCOSUR）加盟に伴い、域内の貿易自由化への対応が急務となっており、品質・生産性の向上に加えて、国際的に認められた製品の製造、及び検査技術が求められている。そのため、パラグアイ国内の企業の技術力の向上とともに、国内における国際的にも整合性のとれた品質検査、及び認証制度の体制整備が急務となっている。

しかし、現在、パラグアイにおいて品質検査、及び認証制度を司る国立技術標準院（National Institute of Technology and Standardization：INTN）では、そのための体制整備を進めているが、設備・機材の老朽化、人材、及び技術の不足により期待どおりには進んでおらず、ほかのMERCOSUR加盟国に比べて著しく遅れをとっている。

以上のことから、パラグアイ政府は、この現状を早急に改善するためにINTNの加工食品（乳製品等）、住宅資材、度量衡部門のなかから、質量・長さ・体積の計量の基本分野（度量衡部門）、特に、質量分野の検査体制、及び認証制度の強化を目的として、1995年11月に我が国にプロジェクト方式技術協力を要請してきた。

これを受けて国際協力事業団（JICA）では、1997年1月に基礎調査、1998年4月に事前調査を実施した。さらに、1999年3月、同年7月に第1次、及び第2次短期調査団を派遣し、同年12月に実施協議調査団を派遣、討議議事録（R／D）の署名・交換を行った。こののち、2000年6月1日より3年間の協力を開始した。その後、2001年5月に運営指導調査団を派遣し、技術移転の進捗状況を確認、プロジェクトの運営体制に対する助言・改善提案等を行った。

また、2002年3月には、運営指導（中間評価）調査団を派遣し、プロジェクト開始後1年9か月が経過した時点で、カウンターパート（C／P）の転職による技術移転の遅れに対応するため、プロジェクトの技術移転計画（TCP）、活動計画（PO）を改訂した。

プロジェクト開始後2年7か月が経過し、2003年1月現在、長期専門家6名（うち2名が交替）、短期専門家4名を派遣した。また、C／P研修員を延べ6名受入れ、機材供与については、約2億4,700万円の機材を供与した。

今次調査は、プロジェクト終了を本年5月に控え、過去3年間の協力実績についてR／D、及び技術協力計画等に基づき、評価5項目に照らして総合的に評価を行うとともに、今後の対応策について協議し、その結果について両国政府関係機関に報告・提言を行った。

1－2　調査団の構成と調査期間

(1) 調査団員

担当業務	氏　名	所　　属
団長／総括	中島　行男	国際協力事業団 鉱工業開発協力部 部長
質量標準	内川　恵三郎	財団法人 日本品質保証機構 計量計測センター 参与
検定・検査	根田　和朗	独立行政法人 産業技術総合研究所 法定計量技術科 科長
評価監理	尾崎　菜津子	国際協力事業団 鉱工業開発協力部 鉱工業開発協力第一課 職員
評価分析	幸田　成善	ユニコ インターナショナル株式会社 プロジェクト第一本部 テクノエコノミスト

(2) 調査日程

調査期間は、2003年2月8～28日までの21日間である（資料3．調査日程参照)。

1－3　対象プロジェクトの概要

本プロジェクトでは、1999年6月1日にチーフアドバイザー、業務調整員、質量標準、検定・検査の4名を長期専門家として派遣した。また、技術移転に必要な供与機材の納入、及び設置は2000年4月までに完了し、同年5月に開所式が開催された。専門家による技術移転は、供与機材が納入されるまでの間、座学を中心とした講義をとおしてC／Pは知識修得につとめ、供与機材納入後は、オンザジョブ・トレーニング（OJT）を中心とした技術移転が実施された。なお、技術移転分野のうち、検定・検査について先行して技術移転を実施し、その後、質量標準の設定・維持の技術移転を2名のC／Pを中心として実施した。

R／Dに記載されたプロジェクトのマスタープランは、以下のとおりである。

〈上位目標〉

質量分野において、INTNの検定・検査機関としての信頼性が向上する。

〈プロジェクト目標〉

INTNが実施する質量分野の検定・検査サービスが向上する。

〈成　果〉

0：プロジェクトの運営・管理体制が強化される。

1：質量分野の検定・検査に必要な機材が調達、据え付け、操作され、適切に維持管理される。

2：C／Pの質量の検定・検査に係る技術レベルが向上する。

3：INTNが実施する質量分野の検定・検査が体系的に実施される。

2002年1月に質量標準分野のうち、1名のC／Pが転職したことにより、技術移転を一部やり直す結果となった。しかし、INTN側が新たに人員を配置し、中間評価の際にTCPを変更したことにより、遅れはかなり取り戻している。

プロジェクトでの技術移転を通してINTNの質量分野ラボでは、OIML（国際法定計量機関）に準拠した基準に基づいて検定・検査を実施することができるようになり、OJTでの検査数は323件に及んでいる。

第２章　終了時評価の方法

２－１　プロジェクト・デザイン・マトリックス（PDM）

プロジェクトの基本計画は、1999年12月の実施協議調査の際にパラグアイ側と日本側によって確定され、討議議事録（R／D）の添付資料として署名された。

2002年３月に実施された中間評価調査団では、指標の一部を変更し、協議議事録（M／M）に改訂版を添付した。さらに、2002年12月にPDMの指標部分を改訂し、上位目標の指標を「１．国家標準レベルの分銅の国際比較の数」「２．2002～2005年までの検定・検査サービス件数の増加率」「３．校正サービス数」「４．受益者グループからの国立技術標準院（INTN）の信頼度のレベル」という表現に変更した。

また、中間評価の際に、プロジェクト目標の指標である「校正サービスの数」を削減し、検定・検査サービスの向上を直接的に表す指標のみを残した。

２－２　主な調査項目と情報・データ収集方法

２－２－１　主な調査項目

(1) 終了時評価調査

1) 当初計画
2) 協力実績（日本側、相手国側）
3) 管理・運営状況
4) 技術移転状況
5) 評価５項目（妥当性、有効性、効率性、インパクト、自立発展性）
6) 効果発現要因
7) 問題を惹起した原因
8) 今後の協力方針
9) 教訓及び提言

(2) １t分銅にかかる調査

1) 補修の試行状況の確認
2) 補修案の確定

２－２－２　情報・データ収集方法

本調査にあたっては、カウンターパート(C／P)の技術力を実技試験により測定したことが、大きな特徴としてあげられる。

(1) プロジェクト関連資料

R／D、調査団時の会議議事録（M／M)、合同調整委員会での協議議事録（M／D)、プロジェクト管理諸表〔(PDM、活動計画（PO)、技術移転計画（TCP)、暫定実施計画(TSI)〕、日本・パラグアイ双方からの投入記録、プロジェクトの活動記録、成果、及びプロジェクト目標達成度合いを示すデータ、統計。

(2) ローカル・コンサルタントによる調査

ターゲットグループ、サービス受益者、セミナー参加者に対して行ったアンケート調査結果。

(3) アンケート及びインタビュー調査

プロジェクトのC／P、日本人専門家、関連機関の人員にアンケート調査（質問票）を送付し、回収したうえでインタビューによる補足調査を実施した。

(4) 直接観察

INTNの機器・設備の状況確認、研修コース、C／Pや日本人専門家によって作成されたテキスト、及び研修教材の確認

(5) 技能試験

技術分野のC／Pに対して、技術団員による実技試験（検定・検査分野、校正分野）を実施し、十分技術移転なされているのか測定した。

〈検定・検査分野〉

検定・検査分野のC／P４名に対して、国際法定計量機関（OIML）国際勧告に基づく秤の実技試験、及び技術基準に関する知識の理解度に関するインタビューを実施。実技に関する評価方法は、OIML勧告の技術基準に規定している検査項目（ゼロ設定機構の精度試験、繰り返し試験、荷重試験、偏置試験、及び風袋引機構の試験）について行った。また、インタビューの内容は、実際の検定・検査に必要不可欠とされる知識に関するQA方式で行った。

〈質量標準分野〉

質量標準分野のC／P２名に対して実技試験を実施し、また、C／P３名に対して校正技術に関するインタビューを実施。技術試験については、オンザジョブ・トレーニング

（OJT）にて研修した校正方法を用いて、国際的に試験所間比較に用いるISO/IEC43で採択されている判定基準En数が1以下であること、かつ、その際に校正の不確かさが、プロジェクトの目標とするF1クラスの校正不確かさ以下であることにより判断した。また、インタビューでは、校正理論、校正方法、校正の不確かさについてインタビューを行った。

2－2－3　評価の数値化について

各評価項目を次のように数値化した。

(1) 5段階評価

++（2ポイント）、+（1ポイント）、●（0ポイント）、－（－1ポイント）、－－（－2ポイント）

(2) 評価対象のグルーピング

評価は、次の対象に分けて行い、その評価の結果を対象を越えて混合しない。

ローカルコンサルタントによって行われたアンケート調査・インタビュー、関連官庁、C／P管理職、C／Pスタッフ、専門家、関連機関・企業

2－3　パラグアイ側評価チームの構成

パラグアイ側の評価チームは、Pablo Britez Franco氏をリーダーとして以下の7名で構成された。

Mr. Pablo Britez Franco	Industrial Sector, Bureau of the Private Investment Promotion, STP（企画庁 産業部門・私的投資促進局）
Ing. Leopolco Ostert	General Director of Enterprise Promotion, MIC（商工省 企業促進部門長）
Dr. Antonio M. Ferreira Ruiz	Director of the Bureau of Consumer Protection, MIC（商工省 消費者保護局 局長）
Ing. Ubaldo Rojas	Technician, MAG-OFAT（農牧省・ワタ・タバコ局 技師）
Mr. Carlos Terán	Production Manager, UIP（パラグアイ工業連盟 生産部長）
Ing. Saul Hugo Caballero	Person in Charge of the Technical Department, CADELPA（パラグアイ綿花協会 技術担当）
Mr. Victor Costanzo	President, Laboratorio Constanzo（コンスタンソ研究所 所長）

日本・パラグアイ双方の評価チームは、2003年2月18、21、24の3日間にわたり評価について協議を行い、合同評価報告書を作成した。

第３章　調査結果

３－１　投入実績（2001年６月～2003年２月までの実績）

パラグアイ側	日本側
建屋・施設の提供及び維持	施設の改修とラボの新設
・ラボ用地の提供 ・オフィス及び会議室用地の提供 ・オフィス及び会議室用に既存施設を転用・改築	・改修と新設のためにコンサルタントの派遣と10万8,549米ドルの投入
人員の配置	専門家の派遣
・カウンターパート（Ｃ／Ｐ）管理職（Project Director, Project Manager, Project Coordinator） ・Technical Ｃ／Ｐ（Technical Coordinator, Technical Ｃ／Ｐ：４名）、ただしＣ／Ｐ１名転職のため交替 ・必要数の事務職員 ・Supporting Staffs（秘書, Driver, Data Processing Staff）	・長期専門家：延べ６名 ・短期専門家：延べ４名 ・来る５月の閉幕式に短期専門家１名を派遣 ・１t分銅問題解決のために短期専門家を派遣
	Ｃ／Ｐ研修員の日本受入れ
	・延べ６名の研修員受入れを実施
機械・機器及びその他資材の提供と交換	機材の供与
・１億900万グアラニの投入	・２億2,600万円の投入
予算の配分	ローカルコストの負担
・2002年度予算までに20億4,900百万グアラニの支出	・2,300万円の投入
	日本側による投入総額：約400万米ドル

３－２　成果の達成状況

評価すべき成果	評価結果
０：プロジェクトの運営・管理体制が強化される	・必要な人員と予算、多数行った打合せ等により、運営・管理体制が強化された。
１：質量分野の検定・検査に必要な機材が調達、据え付け、操作され、適切に維持管理される	・パラグアイ側は、供与された機材のレベルの高さに満足している。 ・１t分銅の問題は、適切な修理手順の採用と短期専門家を派遣し、解決の見込み。また、この問題への対処によってＣ／Ｐの技術レベルが向上した。
２：Ｃ／Ｐの質量の検定・検査に係る技術レベルが向上する	・Ｃ／Ｐに対する実地試験を実施し、Ｃ／Ｐが業務を遂行するにあたり、必要な技術と知識をもっていることを実証した。 ・顧客のほとんどが検定・検査サービスに満足している。

評価すべき成果	評価結果
3：国立技術標準院（INTN）が実施する、質量分野の検定・検査が体系的に実施される	・検定・検査サービスの実施件数が増えており、その結果、体系的なサービスの実施につながっている。 ・標準分銅の院内校正を行い、良好な結果を示している。 ・イベントの実施・印刷物の配布・TV・新聞報道など、広報活動が多数なされた。

3－3　プロジェクト目標の達成状況

評価すべきプロジェクト目標	評価結果
INTNが実施する質量分野の検定・検査サービスが向上する	・サービス受益者のほとんどが、INTNの検定・検査サービスに満足している。 ・INTNの検定・検査サービスが、顧客にとって多様性を増し、有用なものとなっている。 ・標準分銅の二国間比較が良好な結果を示している。

3－4　上位目標の達成状況

評価すべきプロジェクト目標	評価結果
質量分野において、INTNの検定・検査機関としての信頼性が向上する	・国家標準レベルの分銅の国際比較は、2003年に実施予定。 ・検定・検査サービスの実施件数が大幅に増加した。2005年の設定目標に向け、INTNはサービスを実施していく模様。 ・INTNは、校正サービスを主要活動の１つとして位置づけている。 ・サービス受益者の半数以上から信頼されている。現在のレベルから信頼性は更に向上していく。

第4章　評価結果

4－1　評価5項目の評価結果

4－1－1　妥当性

(＋＋)プロジェクトの妥当性はかなり高い。

上位目標は、JICAが調査した経済開発調査計画（Study Program on the Economic Development of Paraguay：EDEP）に基づいて、2001年に策定されたパラグアイの経済社会戦略計画（Economic and Social Strategic Plan：PEES)に合致している。PEESは、国家認証システムの強化と、国家としての品質管理システムの確立をアクションプランとして掲げている。これらの政策は、輸出競争力・生産能力・品質管理の改善を謳っており、プロジェクトは、質量分野の検定・検査技術を向上することで、品質管理システムの確立に貢献している。

また、パラグアイは、国際法定計量機関（OIML）の準加盟国であり、国立技術標準院（INTN）は、「パラグアイにおける唯一の法定計量機関」であることから、日本からの技術協力の受け手として適切である。

一方、JICA国別事業実施計画のなかでは、「南米共同市場（MERCOSUR）に対応するために競争力を強化し、経済成長を促進する」という課題をパラグアイの重要分野として掲げ、「品質検査、及び認証制度に必要な技術・制度の向上と検査制度・検査体制の確立」を方針として述べている。このことから、JICAの援助方針とも合致している。

4－1－2　有効性

(＋) プロジェクトの有効性は高い。

日本人専門家による技術移転とカウンターパート（C／P）の熱意の結果、質量分野におけるINTNの検定・検査技術のサービスは、かなり向上している。また、受益者へインタビューを行ったところ、受益者はサービスに満足している。

C／Pの転職は、プロジェクトへの障害として考えられるものの、同等の人員をすぐに任命し、技術移転の遅れをほぼ克服している。

4－1－3　効率性

(＋) プロジェクトの効率性は高い。

専門家の派遣、機材供与、研修員受入れの投入量、及び内容は適切であり、その結果、技術移転がうまくなされた。

また、C／Pの転職、機材供与の遅れのため、プロジェクト計画を変更せざるを得なかったが、迅速に計画を変更したことで問題を克服し、影響を最小限に抑えている。

国内支援委員会は、有用な技術情報を提供するとともに、様々な支援を行っており、プロジェクト目標の達成に貢献している。

4－1－4　インパクト

（＋）上位目標は近い将来達成される見込みであり、インパクトは高い。

ターゲットグループへのインタビューによると、INTNの信頼性は、向上しているという返答が多く、INTNの信頼性は向上しているといえる。

上位目標を達成するためには、トレーサビリティを確立し、標準分銅の国際比較を実施することで国際的な信頼度を確立することや、広報活動を継続し、サービス件数の増加を促し、サービスの品質を広く受益者に知らせることが条件となる。

関連企業へインタビューを行った結果、プロジェクトを達成することにより、ターゲットグループは利益を得ているという回答が多く、裨益が大きいことが判明した。

また、関係官庁によれば、法定計量に関する法、及び規則が改訂される見込みであり、プロジェクトは、計量の重要性と制度化を認識させているという点において、重要なインパクトを与えている。

2002年における検定・検査サービス件数は、トラックスケールで68件、1t以上の秤で23件、1t未満の秤で136件であった。さらに、C／Pはプロジェクト後、更にサービスに時間を費やすことができるようになるため、2002年以降のサービス件数は、今まで以上の増加を見込むことができ（付属資料2．合同評価報告書Annex 26参照）、より裨益者を拡大することでプロジェクトの更なるインパクトが期待できる。

以上の点から本プロジェクトは、現時点でもインパクトがあり、プロジェクト終了後には更にインパクトが広範囲にわたって広がると考えられる。

4－1－5　自立発展性

（＋）プロジェクトの自立発展性は高い。

財政的な自立発展性で特筆すべきことは、INTNは、サービス料徴収による自己予算財源をもっていることである。自己予算財源の使用限度は、現在70%に制限されているが、INTNはこれを更に拡大しようと努力している。

自立発展性の点において、プロジェクトにおいて研修を受けた人材のINTNは、C／P転職対策の一環として、技術分野のC／Pへの特別手当を支払うなど、内部規定を改定しようとしている。さらに、商工省（MIC）は、INTNが他の機関を計量機関として認定することで技術スタッフを増強し、INTNを強化する計画を検討している。

4－2　貢献・阻害要因の総合的検証

4－2－1　計画内容に関すること

(1) 効果発現に貢献した要因

・INTNがサービス料徴収による自己予算財源をもっていること。

・供与した機材の内容が、パラグアイ側のニーズに合致していたこと。

(2) 問題点及び問題を惹起した要因

・技術分野のC／Pが複数の体制でなかったため、C／P１名の転職により、技術移転に遅れが生じた。

・１t分銅の保管場所が保管に適した環境ではなかったため、１t分銅を精度の高い状態で保管するのが難しかった。

・質量標準と検定・検査に対して同じような技術移転を計画した結果、C／Pの転職もあり、質量標準の技術移転に遅れが生じた。

・機材供与に遅れが生じ、その結果、専門家による技術移転に影響が生じた。

・広報活動が対象組織を考えておらず、農牧省（MAG）など有力な関係機関のトップに広報活動が行き届かなかった。

4－2－2　実施プロセスに関すること

(1) 効果発現に貢献した要因

・C／Pに適切な人材をパラグアイ側が配置したこと。

・プロジェクトの実行にあたり、バイリンガル能力をもつC／Pを活用したこと。

・技術移転の内容が明確であり、適当であったこと。

(2) 問題点及び問題を惹起した要因

・他のスタッフへの技術移転は、INTNの組織からサポートされていないため、C／Pの自発性に頼った。

4－3　結　論

プロジェクトは、うまく実施されており、計画どおり達成される見込みである。加えて上位目標は、近い将来達成される見込みである。プロジェクトは、様々なプラス効果を有しており、なかでも、消費者は、正しい計量の下に公平な支払いを行うようになるという効果は、特筆すべきである。

現在の技術協力の終了後、INTNが上位機関であるMIC、及び企画庁（STP）、MAGなどの関

連省庁、関連企業などと連絡を密にして、上述した対策を実施することが目下の急務である。その結果が、質量分野におけるINTNの検定・検査機関としての信頼性を向上させることになる。

第5章　提言と教訓

5－1　提　言

以上をかんがみ、プロジェクトによって得られた利益、及び成果を更に強固なものにするために、評価チームは、パラグアイ側に以下の提言を行うものである。

(1) カウンターパート（C／P）転職対策として、技術スタッフがもっと収入を得るように特別手当等、給与体系を改善すること。

(2) 技術スタッフが国立技術標準院（INTN）にとどまるように、インセンティブの一環として海外研修を実施すること。

(3) C／P転職対策の一環として、技術スタッフは、複数あるいはチームで業務を行うべく、INTNは組織を検討すること。

(4) 積み立て金等も含め、供与した機材の保守のための予算を確保すること。

(5) 検定・検査サービスにあたって、サービスを迅速にするために業務管理を行い、必要な情報提供に心がけること。

(6) プロジェクトの意義を考えて広報活動を継続すること。

(7) INTN院内で技術移転を実施する体制を確立すること。

5－2　教　訓

(1) 技術移転がスムーズにいくように機材供与の時期等を考え、長期専門家の派遣時期を調整すること。

(2) 精密な機材を供与する場合には、その据え付け、及び保管の環境を考慮すること。

(3) 専門家の派遣については、技術移転に必要なC／Pの技術レベルを考慮して、その内容を検討すること。

(4) 商工省（MIC）以外の官庁への広報にあたっては、担当者のほかにトップにも伝わるように計画すること。

(5) ターゲットグループのニーズについては、プロジェクトの事前と事後が比較できるように詳細に計画し、かつデータを数量化すること。

(6) 短期プロジェクトを開始する前に、供与機材の仕様、及び供与スケジュールを明確にすること。

付　属　資　料

1．ミニッツ

2．合同評価報告書

3．調査日程

4．評価グリッド

5．調査団員報告

(団長総括・所感、質量標準分野の終了時評価の概要報告、質量分野検定・検査技術向上プロジェクト終了時評価報告)

1．ミニッツ

MINUTES OF MEETING
BETWEEN THE JAPANESE EVALUATION TEAM
AND THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE REPUBLIC OF PARAGUAY
ON THE JAPANESE TECHNICAL COOPERATION
FOR THE PROJECT ON UPGRADING VERIFICATION AND INSPECTION TECHNOLOGY IN THE AREA OF MASS

The Japanese Evaluation Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Yukio Nakajima visited the Republic of Paraguay from 9 to 26 February, 2003 for the purpose of monitoring and reviewing the activities and of formulating further operational plans of the Project on Upgrading Verification and Inspection Technology in the Area of Mass (hereinafter referred to as "the Project").

During its stay in the Republic of Paraguay, the Team had a series of discussions and exchanged views with the authorities concerned of the Government of the Republic of Paraguay on the matters for the successful implementation of the Project.

As a result of the discussions, both sides agreed upon the matters referred to in the documents attached hereto.

Asuncion, February 25, 2003

Mr. Yukio Nakajima
Leader
Evaluation Team
Japan International Cooperation Agency
Japan

Dr. Lilian Martínez de Alonso
General Director
National Institute of Technology and Standardization
Republic of Paraguay

Dr. Roberto Santiago Fernández
Minister
Ministry of Industry and Commerce
Republic of Paraguay

Attached Documents

1 Completion of the Project

The Project would be completed on May 31, 2003 as stipulated in the R/D.

2 Further Input to the Project until May 31, 2003

Further inputs until the end of the Project would be as follows;

(1) Japanese Sides

a. Experts

Japanese side continues the technical transfer of four (4) long-term experts and one (1) short-term expert in the following fields;

a) Chief Advisor (until May 31, 2003) *returning to Japan on June 4, 2003
b) Project Coordinator (until May 31, 2003) *returning to Japan on June 4, 2003
c) Testing and Verification (until May 31, 2003) *returning to Japan on June 4, 2003
d) Mass Standard (until May 31, 2003) *returning to Japan on June 4, 2003
e) Experimental Repair of 1-ton Weights (one month from March or April, 2003)
f) Seminar Lecturer (one week in the end of April 2003)

(2) Paraguayan Sides

The Paraguayan side provides all the provisions as agreed upon in the R/D.

3 Repair of 1-ton Weights

(1) The Way of Experimental Repair of 1-ton Weights

The way of repairing by WILKO has already started, and the above short-term expert on Experimental Repair of 1-ton Weights will be dispatched to decide the way and the work schedule of experimental repair as following terms of reference;

a. To determine the way of repairing 1 ton-weights by Japanese Domestic Supporting Committee
   a) To identify the problems of 1-ton weights in technical points of view in detail.
   b) To arrange and determine the work schedule of the repairing
b. To check the way of repairing by WILKO through MICRONAL
   Annex I: Process and Schedule of Repairing
c. To check the situation of storing the 1 ton-weights and to teach the way of storing.

(2) Cost for Repairing 1-ton weights

Japanese side bears the cost of repairing all 1-ton weights to recover the quality of F2 class.

(3) The Way of Maintenance

a. After the repair, those weights require the calibration regularly (e.g., every 3 months) and after any occasions causing errors to change the precise weights to follow F2 class.
b. If the above calibration is hardly to be implemented, the weights should be used as M1 or M2 class weights.

4 Cooperation after the Project

Dispatching Short-term expert

a. Repair of 1-ton Weights :one month
   Terms of reference of this short-term expert will judge the result of the experimental repair and will arrange and determine the way and the work schedule before starting the repair of all 1-ton weights.
b. Mass Standard
   The Project is going to implement the technology transfer as planned. The report of the final report of technology transfer drafted both by C/Ps and the Japanese experts should be submitted in Joint Coordinating Committee (JCC) in May 2003. The Japanese Side will decide the dispatch of short-term expert in the field of Mass Standard with considering these reports.

5 Attendants of the Meeting

Attendants of the meeting is listed in Annex II

<List of Annexes>

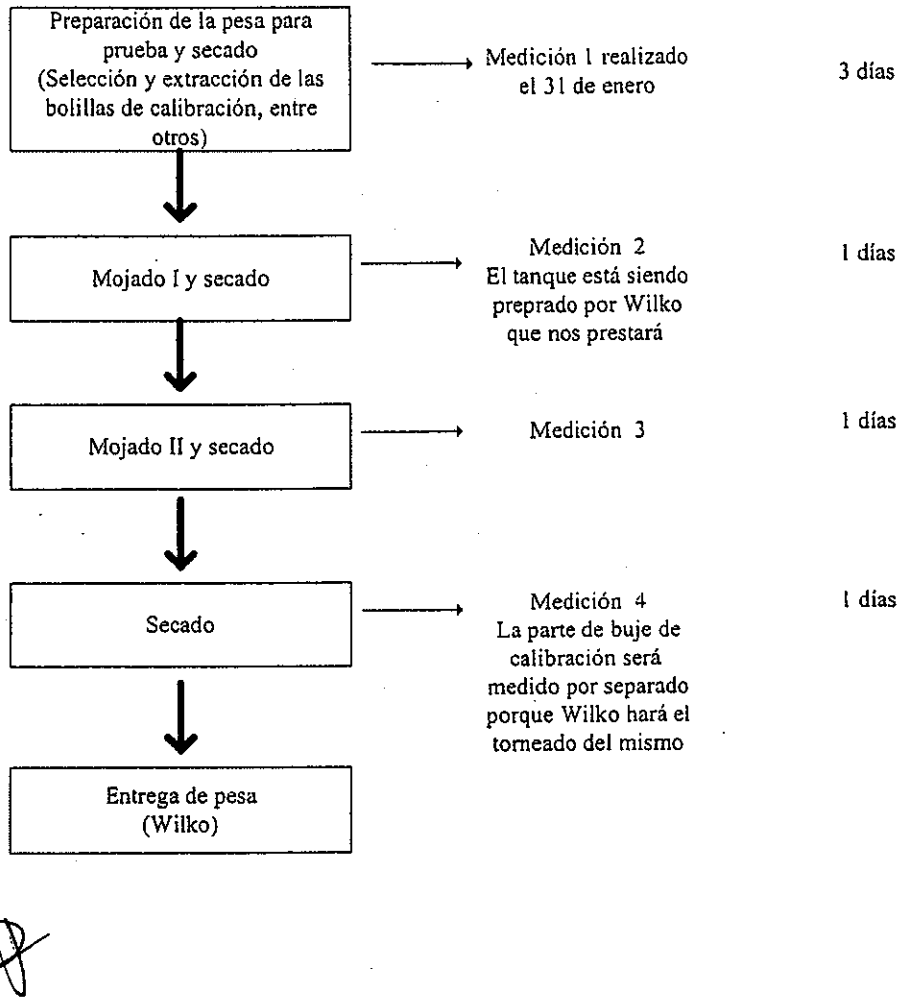
Annex I: Process and Schedule of Repairing. *Spanish version is the original.
Annex II: Attendants of the Meeting

ANNEX I Flujograma sobre el resumen de la reparación y verificación de los resultados

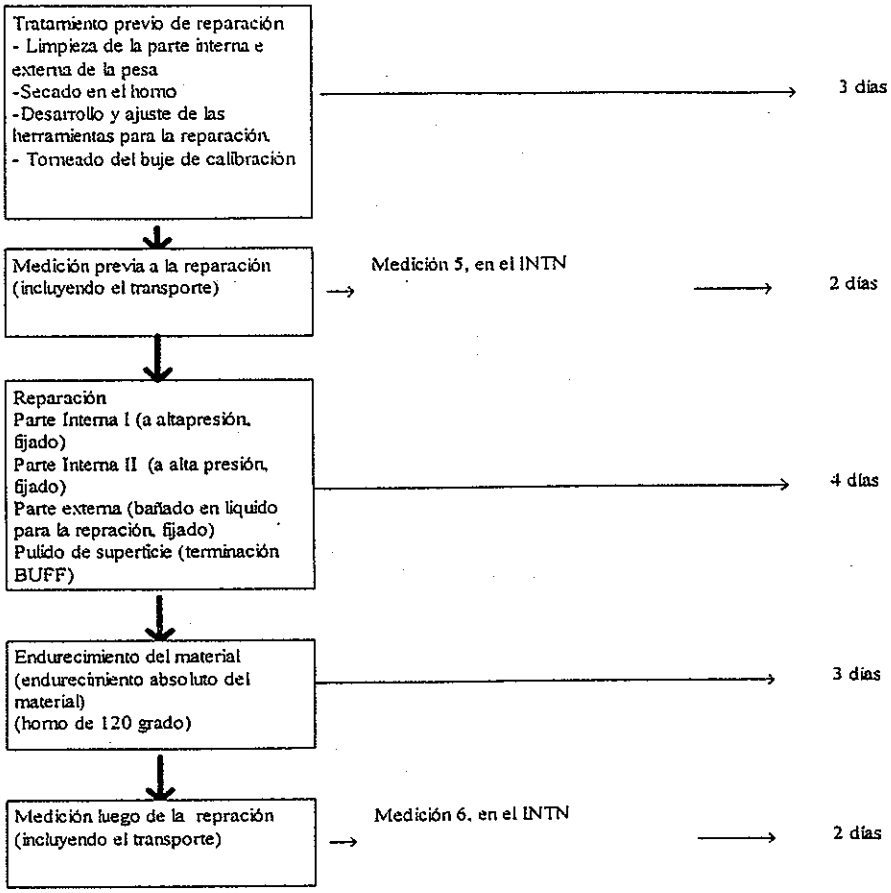
Feb/24/2003

1/3

1. Tratamiento previo (Proyecto, INTN): 6 días. Hasta la fecha de 4 de febrero, terminado la medición ①.

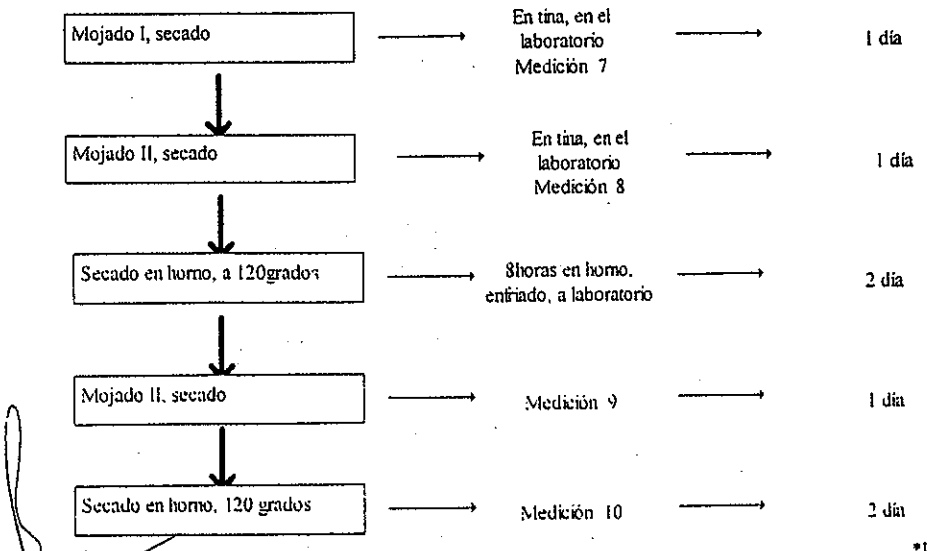


2. Reparación (Wilko): 10 días, medición intermedia en INTN: 4 días.



3. Verificación y prueba acelerada (Proyecto, INTN): 7 días

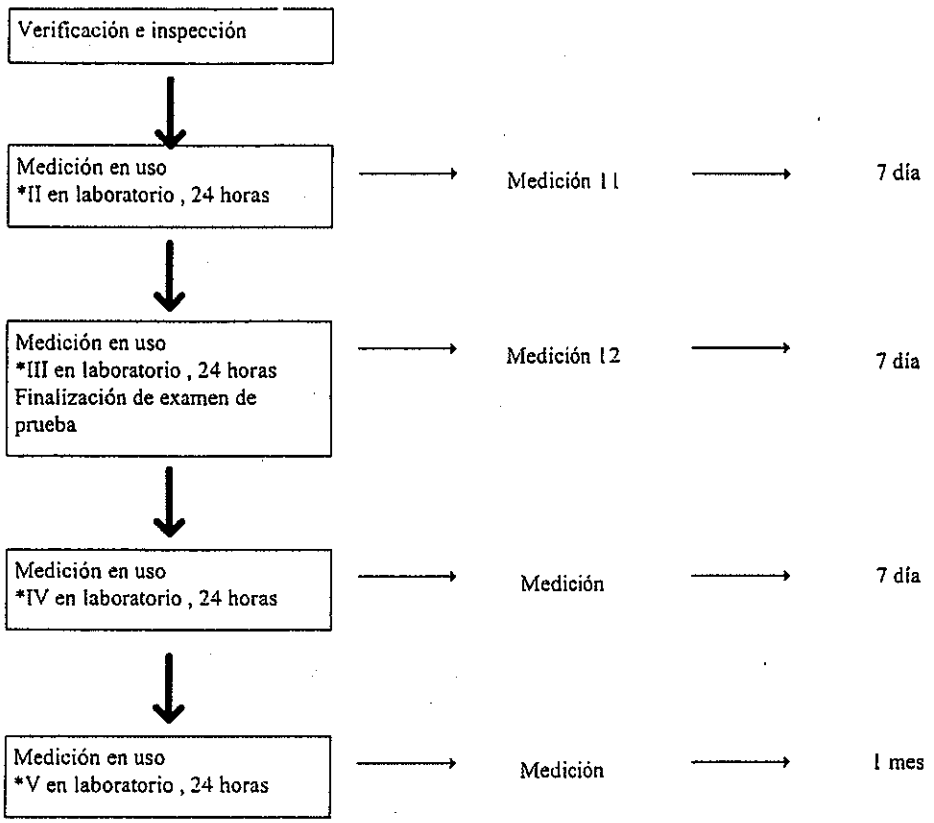
* I: 1ra determinación preliminar de los efectos de la reparación



ANNEX I Flujograma sobre el resumen de la reparación y verificación de los resultados

4. Prueba posterior al uso, uso real (Proyecto, INTN): 7 día a 14 día después de semanas, meses.

*X: Determinación del efecto



5. Observación (determinación y reparación posterior)

En el caso que haya una diferencia superior a la "incertidumbre" entre cada una de las mediciones de prueba, se indagará la causa, y se determinará el reinicio de la reparación, reparación posterior, o la suspención de la prueba (en conversación entre las personas vinculadas).

ANNEX I Process and Schedule of Repairing

補修と効果検証　概要 流れ図　　2003/02/04

1　前処理（ﾌﾟﾛｼﾞｪｸﾄ・INTN）：6day　2月4日現在、測定①まで終了

3day　1day　1day　1day

試料分銅準備・乾燥⇒○降水Ⅰ→払拭　⇒○降水Ⅱ→払拭　⇒○乾燥　⇒◎分銅貸与（WILKO）

（選定・調整玉取出等）※

↓　↓　↓　↓

測定①1/31 済み　測定②　測定③　測定④※調整筒ﾈｼﾞ部は分離測定

※水槽 WILKO 借出　（WILKO 機械加工のため）

（槽は製作中）

2　補修（WILKO）：10day　区切りの測定 INTN：4day

3day　2day　4day　3day　2day

◎補修前処理　⇒○補修前測定　⇒◎補修実施　⇒◎補修剤養生　⇒○補修後測定

［分銅内外部の清浄］　（搬送含む）　内部Ⅰ［高圧→定着］　［補修剤の完全硬化］（搬送含む）

［気温槽による乾燥］　↓　内部Ⅱ［高圧→定着］　（120℃気温槽）　↓

［治具等の開発調整］　測定⑤　外部［補修剤槽濆込→定着］　測定⑥

［筒ﾈｼﾞ部機械加工］　INTN　表面研磨［(Buff)仕上げ］　INTN

3　検証・加速試験（ﾌﾟﾛｼﾞｪｸﾄ・INTN）：7day　☆Ⅰ：補修効果第1次仮判断

1day　1day　2day　1day　2day

⇒○降水Ⅰ→払拭　⇒○降水Ⅱ→払拭　⇒○加熱乾燥⇒　降水Ⅱ→払拭　⇒○加熱乾燥　☆Ⅰ

（炉気温 120℃）　（炉気温 120℃）

［水浴→ﾗﾎﾞ］　［水浴→ﾗﾎﾞ］　［温浴 8h→空冷→ﾗﾎﾞ］

↓　↓　↓　↓

測定⑦　測定⑧　測定⑨　測定⑩

4　事後試験―実使用（ﾌﾟﾛｼﾞｪｸﾄ・INTN）：7day―14day ～week ～month ～　☆x：効果判断

7day　7day　7day　1month

《検定検査》⇒○使用中測定　⇒○使用中測定　⇒○使用中測定　⇒⇒○使用中測定 ⇒⇒⇒

☆Ⅱ［ﾗﾎﾞ→24h］　☆Ⅲ［ﾗﾎﾞ→24h］☆Ⅳ［ﾗﾎﾞ→24h］　☆Ⅴ［ﾗﾎﾞ→24h］

試行試験｜終了

↓　↓　↓　↓

測定⑪　測定⑫　測定　測定

5　備考（判断・追加補修）

試験の各測定間において「不確かさ」以上の値の差異があったときは、原因を究明し、補修のやり直し、追加補修、または試験の中止等を決める（関係者協議）。

Japanese Side

Member of Japanese Evaluation Team

Mr. Yukio Nakajima, Leader
Mr. Keizaburo Uchikawa, Mass Standard
Mr. Kazuo Neda, Verification and Inspection
Ms. Natsuko Ozaki, Evaluation and Monitoring
Mr. Shigeyoshi Koda, Evaluation Analysis

JICA Paraguay Office

Mr. Hiroyuki Takeda, Assistant Resident Representative
Mr. Takeo Ishikawa
Mr. Takafumi Hirai

Japanese Experts of JICA

Mr. Kiyofumi Nakauchi, STP
Mr. Kazuo Sato, MIC

Experts of the Project

Mr. Shinya Aoki, Leader
Mr. Sadanobu Ueno, Project Coordinator
Mr. Shozo Yano, Expert on Mass Standard
Mr. Toshio Yamada, Expert on Verification and Inspection

2．合同評価報告書

JOINT EVALUATION REPORT
ON
JAPANESE TECHNICAL COOPERATION
FOR
THE PROJECT ON
UPGRADING VERIFICATION AND INSPECTION TECHNOLOGY
IN THE AREA OF MASS

February 24, 2003

Asuncion, Paraguay

MUTUALLY ATTESTED AND SUBMITTED TO ALL CONCERNED

February 24, 2003

Asuncion, Paraguay

Mr. Yukio Nakajima
Leader
Japanese Evaluation Team
Japan International Cooperation Agency
Japan

Mr. Pablo Britez Franco
Leader
Paraguayan Evaluation Team
Technical Secretariat of Planning
The Republic of Paraguay

CONTENTS

I INTRODUCTION

1 Background of the Final Evaluation of the Project

The Japanese Evaluation Team (hereinafter referred to as "the Japanese Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Yukio NAKAJIMA visited the Republic of Paraguay from February 17 to February 28, 2003 for the purpose of the joint final evaluation with the Paraguayan Evaluation Team (hereinafter referred to as "the Paraguayan Team") on the Japanese technical cooperation for the Project on Upgrading Verification and Inspection Technology in the Area of Mass in the Republic of Paraguay (hereinafter referred to as "the Project"). The Project has been implemented according to the Project Design Matrix (hereinafter referred to as "PDM") agreed upon by the Paraguayan side and the Japanese side in the Record of Discussions signed on December 21, 1999 (hereinafter referred to as "the R/D").

Performance of the Project was studied by collecting data on the verifiable indicators identified in the PDM and other relevant information.

Both teams conducted evaluation on the five (5) evaluation components, namely Relevance, Effectiveness, Efficiency, Impact and Sustainability and future prospects of the Project in accordance with the Project Cycle Management (hereinafter referred to as "PCM") method.

1-1 Criteria of Evaluation

The evaluation was conducted based on the following five (5) evaluation components, which are the major points of assessing the process and the result of the Project.

1) Relevance
   Evaluation of whether the outputs, project purpose and overall goal are still in compliance with the national and regional priority needs and concerns at the time of evaluation.
2) Effectiveness
   The extent to which the project purpose has been achieved, or is expected to be achieved, in relation to the outputs produced by the Project.
3) Efficiency
   Evaluation of how efficiently the efforts and resources in the Project were achieved by other better methods.
4) Impact
   Foreseeable or unforeseeable, and favorable or adverse effect of the Project upon the target groups and persons possibly affected by the Project.
5) Sustainability
   The perspective whether the positive effects as a result of the Project are likely to continue after the external assistance comes to the end.

1-2 Sources of Information

The following sources of information were used in this evaluation;

1) Documents agreed by both sides prior to and/ or the course of the project implementation including;

— R/D
— Minutes of Discussions (M/D) and Minutes of Meeting (M/M)
— PDM
— Plan of Operations (PO)
— Technical Cooperation Program (TCP)
— Tentative Schedule of Implementation (TSI)
— Others

2) Record of inputs from both sides and activities of the Project
3) Data and statistics which indicate the degree of achievement of the Outputs and the Project Purpose
4) Results of questionnaires and interviews by the Local Consultant to the target group, the service beneficiaries, and the participants in the seminars.
5) Interviews with and questionnaires to the Project's counterpart personnel (hereinafter referred to as "C/P"), Japanese experts, and personnel in related organizations.
6) Observations of equipment and facilities of National Institute of Technology and Standardization (hereinafter referred to as "INTN"), demonstration of training courses and textbooks/ training materials produced by C/P and Japanese experts.
7) The practice test to the technical C/P by the Evaluation Team

1-3 Grading of Evaluation

Evaluation of each item is calculated as follows;

1) Five grade system ;

++ (2 points), + (1 point), ● (0 point), - (-1 point), -- (-2 points)

2) Evaluation is categorized as follows and their answers are not mixed across these categories.

Questionnaire or interview by Local Consultant, Relative ministries, C/P managers, C/P staffs, Experts, Relative organizations and enterprises.

2 Members of the Evaluation Teams

2-1 The Japanese Team

Mr. Yukio NAKAJIMA
Leader
Managing Director,
Mining and Industrial Development Cooperation Dept., JICA

Mr. Keisaburo UCHIKAWA
Mass Standard
Advisor,
Measurement and calibration center, Japan Quality Assurance Organization

Mr. Kazuo NEDA
Testing and Verification
Head,
Legal Metrology Division,
National Institute of Advanced Industrial Science and Technology

Ms. Natsuko OZAKI
Evaluation & Monitoring
Staff, First Tech. Cooperation Div.,
Mining and Industrial Development Cooperation Dept., JICA

Mr. Shigeyoshi KODA
Evaluation Analysis
Techno Economist, First Project Division,
Unico International Corporation

2-2 The Paraguayan Team

Mr. Pablo Britez Franco
Industrial Sector, Bureau of the Private Investment Promotion
STP

Ing. Leopoldo Ostertag
General Director of Enterprise Promotion
MIC

Dr. Antonio M. Ferreira Ruiz
Director of the Bureau of Consumer Protection
MIC

Ing. Ubaldo Rojas
Technician
MAG-OFAT

Sr. Carlos Terán
Production Manager
UIP

Ing. Saul Hugo Caballero
Person in Charge of the Technical Department
CADELPA

Sr. Victor Costanzo
President,
Laboratorio Constanzo

3 Schedule of Joint Evaluation

(February 9 – February 26, 2003)

Date & Schedule	
February 9 (Sun)	Arrival at Asuncion (Consultant)
February 10 (Mon)	Interviews with relative ministries and Japanese experts
February 11 (Tue)	Interviews with Paraguayan counterparts
February 12 (Wed)	Interview with relative ministries and organizations
February 13 (Thu)	Interview with relative enterprises and organization
February 14 (Fri)	Interview with relative enterprises and the ministry
February 15 (Sat)	Data Analysis
February 16 (Sun)	Ditto
February 17 (Mon)	Arriving at Asuncion (The Japanese Team) Meeting with Embassy of Japan in the Republic of Paraguay
February 18 (Tue)	Meeting with INTN and Paraguayan Evaluation Team
February 19 (Wed)	Interview with Japanese Experts
February 20 (Thu)	Interview with Paraguayan Counterparts
February 21 (Fri)	Discussion on the Joint Evaluation Report with Paraguayan Evaluation Team
February 22 (Sat)	Drafting the Joint Evaluation Report and the Minutes of Meeting
February 23 (Sun)	Ditto
February 24 (Mon)	Final discussion on the Joint Evaluation Report with Paraguayan Evaluation Team Signing and exchanging of the Joint Evaluation Report Final discussion on the Minutes of Meeting with INTN
February 25 (Tue)	Joint Coordinating Committee Signing and exchanging the Minutes of Meeting
February 26 (Wed)	Reporting to the Embassy of Japan and the JICA Paraguay Office Leave Asuncion

II OUTLINE OF THE PROJECT

1 Background of the Project

MERCOSUR organized in 1995 urged the Republic of Paraguay to deal with the liberalization of trading within the South American region, and the improvement of quality and productivity for internationally recognized products and the testing technology are necessary for Paraguay. The institutionalisation of the quality inspection and accreditation system conforming to international system are required for upgrading of the ability of the technologies in Paraguayan enterprises.

INTN, which is the central organization for quality testing and certification system in Paraguay currently promotes their institutionalization. This effort is delayed comparing to other countries in MERCOSUR, due to the machinery and equipment become too old for use and the lack of human resources and technology.

In order to overcome this situation, the Paraguayan government requested to Japan to implement the Project for strengthening the testing and certification system especially in the area of mass in November 1995. JICA dispatched Implementation Study Team and signed and exchanged the Record of Discussions on December 21, 1999. The Project has been implemented from June 1, 2000 to May 31, 2003 for three (3) years.

2 Master Plan of the Project

The original master plan of the Project was attached to the R/D, which was signed by both Paraguayan and Japanese sides on December 21, 1999. During the discussions with the Mid-term Evaluation Team in March 2002, the master plan was confirmed and presented in a form of PDM, which was revised in December 2002, attached as Annex 1. The Overall Goal, Project Purpose and Outputs of the Project are as follows:

1) Overall Goal
   Credibility of INTN, as a verification and inspection institute, is increased in the area of Mass.

2) Project Purpose
   Verification and inspection services provided by INTN are upgraded in the area of Mass.

3) Outputs
   Output 0: The Project operation unit is enhanced.
   Output 1: The necessary machinery and equipment are provided, installed, operated and maintained properly.
   Output 2: Technical level of C/P are upgraded.
   Output 3: Verification and inspection services are performed systematically by INTN.

3 Charts for the Project Management

1) Plan of Operation
The Plan of Operations (PO / APO) is shown in Annex 2.

2) Technical Cooperation Program
The Technical Cooperation Program (TCP / ATCP) is shown in Annex 3.

3) Tentative Schedule of Implementation
The Tentative Schedule of Implementation (TSI / ATSI) is shown in Annex 4.

4 Performance of the Project

The overall performance of the Project was found to be satisfactory. Details of the project performance are described in the Evaluation Grid with the Result attached in Annex 5.

4-1 Achievement of Inputs

(•) Inputs by both the Paraguayan and the Japanese sides were implemented, as planned.

The details of both inputs are described in Annex 6, the Flow Chart of Inputs to the Project.

1) Inputs by the Paraguayan Side

— Provision and maintenance of building and facilities

Provided Land area of 120m^2 and 160m^2 are provided for the Laboratories and for Office and Meeting Room through converting the existing facilities, respectively.

— Allocation of the C/P and administrative personnel

INTN has allocated the Administrative C/P, the Technical C/P, and the Administrative Staffs. The Administrative C/P is consisting of Project Director, Project Manager and Project Coordinator. Technical C/P is including one Technical Coordinator and four Technical staffs.

One C/P in the field of calibration was resigned in February 2002, after the training in Japan and replaced by new one to recover the delay of technology transfer.

The Administrative Staffs in the area of budget, procurement, P.R., protocol, etc. have cooperated on the Project as the need arises.

— Provision of machinery, equipment and their maintenance

Necessary machinery and equipment to execute project activities have been provided and maintained as planned. The list of machinery and equipment provided by the Paraguayan side is shown in Annex 7, List of Equipment Supplied by INTN.

— Allocation of Budget

A total of Gs.2,049 million was allocated to execute project activities as shown in Annex 6 and 8.

2) Inputs by the Japanese Side

A total of JPY 475 million has been borne by the Japanese side for the implementation of the Project as attached in Annex 9.

— Renovation and refurbishment of the laboratories

A total of US$ 108,549 was borne as Supervisor Fee and Construction Cost and a Japanese consultant was dispatched twice as shown in Annex 6 and 10.

— Dispatch of Japanese Experts

A total of six (6) long-term experts were dispatched for 142½MM (man-month) in total and a total of four (4) short-term experts were dispatched for 3 1/2 MM. The list of Dispatched Japanese Experts are attached in Annex 10. In addition, one (1) short-term expert to provide a lecture in the seminar of the closing ceremony will be dispatched in May 2003..

— Paraguayan C/P training in Japan

Six (6) C/Ps were trained in Japan for 9½ MM in total as described in Annex 11, List of Counterpart Personnel Trained in Japan.

— Provision of machinery and equipment

Provided equipment and the accompanied equipment reached JPY 223 million and JPY 3.4 million in the actual expenditures, respectively. Provided machinery and equipment is listed in Annex 12.

— Provision of supporting local cost

The Japanese side provided JPY 23 million to support the local cost for the Project as listed in Annex 13.

4-2 Achievement of Outputs

(++) The Outputs were satisfactorily achieved as verified by the set indicators.

All of the four (4) Outputs were successfully produced as verified by the indicators stated in the PDM.

1) Output 0

The Project operation unit has been enhanced in the employee number, the budget, the meetings, etc.

The number of employees in Department of Legal Metrology including the C/Ps in the Project is increased and contributed to strengthen the Project operation unit.

The Project budget provided by the Paraguayan side could sufficiently cover the Project activities, although the budget plan including the cost for extension of the Metrology Laboratory in M/D in December 1999, was not executed and decreased the total budget.

JCC and Joint Liaison Meetings were held 4 times and 48 times, respectively and the periodical meetings are systemized to enhance the operation of the Project (Annex 14 and 15).

The publicity of the Project was activated during the Project with the support of the Japanese experts (Annex 16).

2) Output 1

The necessary machinery and equipment were provided, installed, operated and maintained properly.

The Paraguayan sides are absolutely satisfied with the newly provided machinery and equipment.

The routes of material suppliers for repairing machinery and equipment are identified, as all machinery and equipment could be procured in Paraguay as attached in Annex 17. The problem, declining the quality of the 1-ton weights, needs to be overcome by the end of the Project. The way of repairing and the materials needed for the repair will be secured before the termination of the Project. Although the problem reduced the time for technology transfer, the calibration of one-ton weights to identify the problem contributed to improve the technology transfer in the field of calibration.

3) Output 2
Technical levels of C/P were upgraded.

Most of the customers of the services are satisfied with the service levels of INTN.

The technical levels are tested by Japanese Evaluation Team, based on the evaluation sheet for technology transfer attached in Annex 18. The result of the test is described in Annex 19. The interviews to the C/P technical staffs in the mass standardization area reveal that they have the knowledge and experience enough to perform the works required. It is proved from the test of the verification and inspection that the C/P technical staffs have the skill level enough to achieve the services as expected.

4) Output 3
The verification and inspection services are performed systematically by INTN.

Number of the services by the department of Metrology reached 323 weighing instruments, 229 weights by December 2002 as shown in Annex 20. Service users state their impression on the service that was improved systematically through accumulating the service experience.

The in-house calibrations of the weights implemented 6 times in INTN. The performance of the calibration skills is upgraded comparing to the first in-house calibration implemented in June 2002. The Proficiency Test is proved that the technical levels of C/Ps are above the requirements for sustain the activities as attached in Annex 19. The system of calibration is nearly established, as calibration certificate for the calibration of December 2002 is going to be issued in March 2003 as attached in Annex 21.

In order to inform the service contents, the project has a system to perform the publicity activities many times and variously in forms of holding an event, preparing printings, a video tape, reporting newspapers and TV, etc. (Annex 16)

INTN has just started its service and needs to establish the system to be continued after the Project.

4-3 Achievement of the Project Purpose

(+) The Project Purpose is achieved, as verified by set indicators.

Verification and inspection services provide by INTN are upgraded in the area of Mass.

The Project Purpose was successfully achieved, as proved by following results.

Firstly, level of satisfaction of the present and former services beneficiaries are relatively high. In the interviews and questionnaires to the present and former services beneficiaries, 94% of the answerers are satisfied with the services provided by the INTN (Annex 22).

Secondly, the items in verification and inspection are varied by the Project as listed in Annex 23.

Thirdly, the evaluation of equivalency was made twice to F1- and F2-class weights through the bilateral comparison in May and December 2002, which shows good results (Annex 24) .

These results proves the improvement of verification and inspection services provided by INTN.

4-4 Achievement of the Overall Goal

(•) Overall Goal is going to be achieved in near future as verified by the set indicators.

1) Number and results of the international comparison of the weights on national standard level

INTN has not implemented the international comparison yet, but INTN has a plan to carry out the international comparison once a year from 2003 (Annex 25).

2) Rate of increase of number of the verification and inspection services from 2002 to 2005

Number of the services by the Project in 2002 was a total of 269 units of weighing instrument and 106 weights as shown in Annex 20 and the further increase is expected to reach in 2005 is attached in Annex 26.

3) Number of the calibration services

The service was provided once in November 2002 experimentally for the strong request by a company. INTN has placed the calibration service regarded as one of the main activities and will continue to provide the services. (Annex 25).

4) Level of the credibility of INTN from the target group

The questionnaire aimed at the weighing instrument / weight users reveals that 52% of the answerers recognize INTN as a trustworthy organization, but 22% regards them as an untrustworthy laboratory. In the area of Mass of the Metrology Department, 57 % of the answerers evaluated as reliable, and 17% of them evaluated as not reliable as shown in Annex 22.

5 Implementation Process of the Project

(+) The Project activities were implemented according to the PDM and the Plan of Operations, which are attached as Annex 1 and Annex 2, respectively.

The Project has been implemented as shown in Annex 27, Flow Chart of Main Activities.

The progress of the project implementation was properly monitored under close communication between the C/P and Japanese experts as attached in Annex 28.

Technology transfer was carried out in accordance with the Technical Cooperation Plan as attached in Annex 3. To produce the expected Outputs effectively and efficiently, the Project elaborated and applied various approaches of technology transfer, such as regular meetings held every two weeks; rescheduling the Project plan after the problem promptly. Details of these approaches and their effects are described in the Evaluation Grid with the Result, as attached in Annex 5.

6 Results of Evaluation by Five Criteria

6-1 Relevance

(++) Relevance of the project is significantly high.

Overall goal corresponds to the Paraguayan development policy, Economic and Social Strategic Plan (PEES) issued in 2001, and Study Program on the Economic Development of Paraguay (EDEP) studied by JICA and the basis of Development Implementation Plan in Paraguay for JICA, expresses as an action program strengthening of a national accreditation system and establishment of a national quality-control system. These policies stresses that the importance of the improvement of export competitiveness, productive capability, and quality control and the Project contributes to them.

INTN is a proper receiver of the technical assistance by Japan, as Paraguay is an associate member nation of OIML and INTN is the sole legal organization in Paraguay for the metrology.

6-2 Effectiveness

(+) Effectiveness of the project is high.

Technical services of INTN in the area of mass is significantly upgraded, as the result of the technology transfer by Japanese experts and eagerness of C/Ps. The beneficiaries also showed their satisfaction in the interviews.

Although the resignation of the C/P would be regarded as the obstruction of the Project, the delay of technology transfer has been almost overcome, since an equivalent person was immediately assigned.

6-3 Efficiency

(+) Efficiency of the project implementation is high.

Dispatch of the Experts, provision of the machinery and equipment, and training of the C/Ps in Japan were appropriate in their contents so that the technology transfer was

performed well.
Japanese Domestic Advisory Committee has provided useful technological information and various supports to contribute to the achievement of the Project Purpose.

The resignation of the C/P and the delay of providing machinery and equipment were forced to change the Project plan. Immediate change of the plan leads to overcome and minimize their effects.

6-4 Impact

(+) The Impact of the Project is high, as Overall Goal is going to achieve in the near future.

Interview data on the level of credibility of INTN from the target group expresses the increase of the credibility of INTN.

Establishment of the traceability system, in-house calibration of the standard weights, and the publicity activities are also factors to achieve the Overall Goal.

According to the interview with relative enterprises, the target group answered that has been gained its advantages through the achievement of the Project.
As relative ministries described that law sand regulations regarding legal metrology will be expected to be revised, the Project leads them to recognize the importance of metrology and its necessary institutionalization.

Numbers of the verification and inspection services are 68 truck scales, 23 weighing instruments ($\geqq$ 1 ton), and 136 weighing instruments ($<$ 1 ton) in 2002. The larger rate of the number increase is expected after 2002 because the C/P can allocate longer time to the services after the project period.

6-5 Sustainability

(+)The Sustainability of the Project is high.

With regard to sustainability of human resources trained in the Project, INTN is in the process of revising the internal regulations to pay a special allowance to the technical C/Ps as a countermeasure against the C/P resignation. Furthermore, MIC has a plan to increase the human resources in INTN will certify as the agency to increase the technical staffs in metrology department.

Regarding financial sustainability, INTN has the self-standing financial resources collected from the service fee. INTN will make efforts to enlarge the allowable usage of these resources, as it is currently restricted to spend less than 70%.

III Conclusion

As the evaluation result, the Project has been successfully implemented and would be completed as planned. In addition, the Overall Goal is going to achieve in the near future. The project has various positive effects, out of which the consumer activities for fair payment on a correct metrology should be emphasized.

After the completion of the present cooperation, it is keenly anticipated for INTN to positively deal with every possible measure in close liaison with the rank higher bodies of MIC and STP, related bodies such as MAG, private enterprises and so forth, thus increasing the credibility of INTN as a verification and inspection institute in the area of Mass.

IV Recommendations

Taking the above into consideration, the Evaluation Teams recommend the following to the Paraguayan side for further enhancement of the benefits and effects that have been produced by the Project:

1) To improve the wage system of INTN where the technical C/P could gain more advantages, such as special allowance, as the countermeasure against the resignation of C/P.

2) To conduct the overseas training to function as the incentive of the technical staffs to stay in INTN.

3) To arrange the INTN organization for the technical staffs to work in the plural number or a team as a countermeasure against their resignation.

4) To secure the budget for maintenance of the machinery and equipment; for example, in a form of the installment saving.

5) The quick management and the providing the information regarding the technical services should be considered in order to improve the services.

6) To perform continuously the publicity activities in consideration of the significance of the Project.

7) To establish the system where the technology transfer would be internally performed in view of the sustainability.

V Lessons Learned

1) The timing of dispatching long-term experts should be adjusted for smooth technology transfer, considering the delivery of the machinery and equipment.

2) When precision machinery and equipment is provided, the situations of their storage and installation should be considered.

3) The contents of dispatching experts should be considered its order of technology transfer regarding the level of skills.

4) The publicity activities to the government authorities other than MIC should involve the head and the person in charge.

5) Basic study should consider the needs of the target groups in detail and quantify the data, in order to be able to compare the situations in the starting of the Project and the end of the Project.

6) As for projects of a short period, they should start after clarifying the specifications and providing schedule of the machinery and equipment.

List of Annexes

1		Project Design Matrix (PDM)
2	-1	Plan of Operations (PO)
2	-2	Annual Plan of Operations (APO)
3	-1	Technical Cooperation Program (TCP)
3	-2	Annual Technical Cooperation Program (ATCP)
4	-1	Tentative Schedule of Implementation (TSI)
4	-2	Annual Tentative Schedule of Implementation (ATSI)
5		Evaluation Grid with the Result
6		Flow Chart of Inputs
7		List of Equipment Supplied by INTN
8		Budget Allocation for the Project
9		Total Investment Provided by the Japanese Side
10		List of Dispatched Japanese Experts
11		List of Counterpart Personnel Trained in Japan
12	-1	List of Machinery and Equipment Provided by the Japanese Side
12	-2	List of Other Equipment Provided by the Japanese Side
13		Supporting Local Cost Provided by the Japanese Side
14		List of Joint Coordinating Committee
15		List of Joint Liaison Meeting
16		List of Publicity for the Project
17		List of Supplier
18	-1	Evaluation Sheet of Technology Transfer - Mass Standard -
18	-2	Evaluation Sheet of Technology Transfer - Verification and Inspection -
19		The Result of the Proficiency Test
20	-1	Table of Inspection Data of Weighing Instruments (Summary)
20	-2	Table of Inspection Data of Weighing Instrument (OJT)
20	-3	Table of Inspection Data of Weights (OJT)
21	-1-1~5	In-house Calibration Certificate
21	-2	Calibration Certificate for Entrusted Service
22		Results of Questionnarire Survey Through Local Consultant
23		Comparison Chart of Verification and Inspection Services Beween Before the Project and the Present
24		Evaluation of Equivalency for Result of Bilateral Comparison
25		Plan of Activities in the Remaining Term of the Project and after the Project
26		The Overall Goal of the Number of Services by 2005
27		Flow Chart of Main Activities
28		Monitoring and Evaluation Plan

Additional List of Annexes for Evaluation Grid with the Result

EG- 1	Organization Chart of INTN
EG- 2	Organization Chart of the Metrology Dept. (after restructuring)
EG- 3	Organization Chart for the Project
EG- 4	Number of Employees of INTN & Metrology Department (1999-2002)
EG- 5	List of Staff for the Project
EG- 6	Allocation Chart of Counterpart Personnel
EG- 7	Budget Allocation of INTN (1996-2003)
EG- 8	Budget Allocation of the Metrology Dept. (1996-2003)
EG- 9	INTN Budget Plan 2003 PFY
EG- 10	Calibration Data of 1t/F2 Weight
EG- 11	Evaluation of Change of Mass Value by Lapse of Time
EG- 12	Register of Equipment with Maintenance Record (Sample 1 and 2)
EG- 13-1	List of Actual Products by the Project (Mass Standard)
EG- 13-2	List of Actual Products by the Project (Verification and Inspection)
EG- 14	Cronological Review of the Project
EG 15	Number of Services of Metrology Department

Abbreviation used by the Project

1 Special Terms on the Project

PCM	Project Cycle Management
PDM	Project Design Matrix
(A)TSI	(Annual) Tentative Schedule of Implementation
(A)TCP	(Annual) Technical Cooperation Program
(A)PO	(Annual) Plan of Operations
T/T	Technology Transfer
JCC	Joint Coordinating Committee
JFY	Japanese Fiscal Year
PFY	Paraguayan Fiscal Year
OJT	On the job training
HOT	Hands-on training
V/I	Verification and Inspection
MM	Man and Month
R/D	Record of Discussions
M/M	Minutes of Meeting

2 Personnel of the Project

<Japanese Side>

CA	Chief Advisor
JPC	Project Coordinator
LE	Long-term Expert
SE	Short-term Expert
IS	Implementation Study Team
JC	Japanese Consultant

<Paraguayan Side>

PD	Project Director
PM	Project Manager
PPC	Project Coordinator
TC	Technical Coordinator
C/P	Counterpart Personnel

<Others>

PLC	Paraguayan Local Consultant contracted by JICA

3 Organization

JDSC	Japanese Domestic Supporting Committee
OIML	International Organization of Legal Metrology
STP	Technical Secretariat of Planning
MIC	Ministry of Industry and Commerce
MAG-OFAT	Ministry of Agriculture - Office of Cotton and Tabaco
MOPC	Ministry of Public Works & Communication
SGT3	Sub Working Group 3 (Technical Regulations) of Mercosur
SIM	Interamerian System of Metrology
ONA	National Organization of Acreditation
CONACYT	Council of National Science and Technology
PTB	Physikalisch-Technische Bundesanstalt
LATU	Technological Laboratory of Uruguay
INMETRO	National Institute of Metrology, Standardization & Industrial Quality (Brazil)
INTI	National Institute of Industrial Technology (Argentine)
UIP	Paraguayan Industry Union
CAPECO	Paraguayan Chamber of Grain and Oil Crop Exporters
CADELPA	Cotton Chamber of Paraguay
CEMIT	Multidisciplinary Center of Technological Research
CIE	Electromechanic Engeneering Consortium
CEPPRO	Paraguayan Center for Promotion of Economic Freedom and Social Justice
ASOQUIMFA	Manufacturers Association of Chemicals Products

4 Paraguayan Departments

DC	Metropolitan District (Acunción)
I	Dept. of Concepción (Concepción)
II	Dept. of San Pedro (San Pedro de Ycuamandyyú)
III	Dept. of Cordillera (Caacupé)
IV	Dept. of Guairá (Villarrica)
V	Dept. of Caaguazú (Coronel Oviedo)
VI	Dept. of Caazapá (Caazapá)
VII	Dept. of Itapúa (Encarnación)
VIII	Dept. of Las Missiones (San Juan Bautista)
IX	Dept. of Paraguari (Paraguari)
X	Dept. of Alto Paraná (Ciudad del Este)
XI	Dept. of Central (Areguá)
XII	Dept. of Ñeembucú (Pilar)
XIII	Dept. of Amambay (Pedro Juan Caballero)
XIV	Dept. of Canindeyú (Salto del Guairá)
XV	Dept. of Pte. Hayes (Pozo Colorado)
XVI	Dept. of Boquerón (Filadelfia)
XVII	Dept. of Alto Paraguay (Fuerte Olimpo)

5 Countries

JP	Japan
PY	Paraguay
BR	Brazil
AR	Argentine
UY	Uruguay
CL	Chile
SP	Spain

6 Others

EDEP	Study Program on the Economic Development of Paraguay
PEES	Economic and Social Strategic Plan

ANNEX 1 PDM (Ver.3)

Project on Upgrading Verification and Inspection Technology in the Area de Mass
Means of framing: Framed by Japanese side and approved by Paraguayan side
Japanese Executing Institution: JICA
Objective area: All over Paraguay

Period: June 01, 2000 - May 31, 2003

Paraguayan Executing Institution: INTN – National Institute of Technology and Standardization 1/2
Target Group: Users, makers, importers and repairers of weighing instruments and weights Date: Dec. 09, 2002

Narrative Summary of the Project	Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Credibility of INTN, as a verification and inspection institute, is increased in the area of Mass.	1. Number and results of international comparison of weights on national standard level 2. Rate of increase of number of verification and inspection services from 2002 to 2005 3. Number of calibration service 4. Level of credibility of INTN from the target group	1. INTN's record 2. INTN's record 3. INTN's record 4. Questionnaire to and interview with the Paraguayan people and enterprises	a. There is no drastic change in political and economic situation in the Republic of Paraguay. b. INTN continues to be regarded as a sole national metrology laboratory in the Republic of Paraguay. c. Importance of Metrology continues to be promoted through continuous policy support in the Republic of Paraguay as well as the other MERCOSUR member.
Project Purpose Verification and inspection services provided by INTN are upgraded in the area of Mass.	1. Level of satisfaction of present and former services beneficiaries 2. Varieties of the items verified and inspected by INTN and their incomes 3. Results of bilateral comparison of standard weight (Class F1)	1. Questionnaire to and interview with present and former service beneficiaries 2. Project record 3. Project record	a. Linkage with related metrology laboratories in the other countries is enhanced. b. Legal system regarding the metrology is well established and observed by the Republic of Paraguay.
Outputs 0. The Project operation unit is enhanced. 1. The necessary machinery and equipment are provided, installed, operated and maintained properly. 2. Technical level of C/P are upgraded. 3. Verification and inspection services are performed systematically by INTN.	0-1. Number of staff 0-2. Budget and settlement account 0-3. Number of JCC and meeting 0-4. Number of publicity 1-1. Contents and condition of machinery and equipment 1-2. Operation and maintenance manuals 1-3. Route to repair machinery and equipment 2-1. Assessment by the Japanese experts 2-2. Manuals and textbooks developed 3-1. Number of implemented verification and inspection services 3-2. Number and results of in-house calibration of standard weights 3-3. Number of seminars, brochures, explanation meetings and so on	0-1. Organization chart and Project record 0-2. Accounting record and Project record 0-3. Project record 0-4. Project record 1-1. Property record and maintenance record 1-2. List of manuals 1-3. List of suppliers 2-1. Evaluation sheet of technology transfer 2-2. Manuals and textbooks developed 3-1. Project record 3-2. Project record 3-3. Project record	a. Trained C/P remain at Legal Metrology Department in INTN. b. Trained C/P transfer their knowledge and technology obtained from the Japanese experts to the other staff of the Legal Metrology Department in INTN.

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ANNEX 1 PDM (Ver.3)

Project on Upgrading Verification and Inspection Technology in the Area de Mass
Means of framing : Framed by Japanese side and approved by Paraguayan side
Japanese Executing Institution : JICA
Objective area : All over Paraguay

Period : June 01, 2000 - May 31, 2003

Paraguayan Executing Institution : INTN – National Institute of Technology and Standardization 2/2
Target Group : Users, makers, importers and repairers of weighing instruments and weights Date : Dec. 09, 2002

Activities	Inputs		
	[Paraguayan Side]	**[Japanese Side]**	a. C/P remain at Legal Metrology Department b. Custom clearance of the machinery and equipment provided by the Japanese side is implemented smoothly. c. Utilities to the Project site are provided regularly.
0-1. To allocate necessary personnel as planned. 0-2. To formulate plans of activities. 0-3. To make budget plan and execute properly. 0-4. To establish management system and operate the Project with it. 0-5. To publicize the Project. 1-1. To make facility refurbishment plan and implement as planned. 1-2. To provide and install necessary machinery and equipment. 1-3. To operate and maintain necessary machinery and equipment properly. 2-1. To make Technical Cooperation Program. 2-2. To implement technology transfer to the C/P. 2-3. To monitor and evaluate the result of technology transfer to the C/P. 3-1. To provide information regarding the metrology to the public through seminars, brochures, etc. 3-2. To make plan of verification and inspection services. 3-3. To implement verification and inspection services. 3-4. To monitor and evaluate verification and inspection services. 3-5. To implement in-house calibration of standard weights.	1. Provision and maintenance of building and facilities 2. Allocation of the C/P and administrative personnel (1) Administrative C/P - Project Director - Project Manager - Project Coordinator (2)Technical C/P - Technical Coordinator - Technical C/P (3) Administrative staff (4) Supporting staff - Secretary - Drivers - Other staff upon request by the Japanese experts 3. Supply and replacement of machinery, equipment and other materials 4. Provision of running expenses	1. Renovation and refurbishment of laboratories 2. Dispatch of Japanese experts (1) Long-term experts - Chief Advisor - Project Coordinator - Expert on Mass Standard - Expert on Verification and Inspection (2) Short-term experts 3. Paraguayan C/P training in Japan 0-2 C/P per year 4. Provision of machinery and equipment 5. Provision of supporting local cost	**Preconditions** a. The basic role of INTN in the national legal metrology remains unchanged. b. The Paraguayan authorities concerned are supportive of the Project.

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ANNEX 2-1 Plan of Operations (PO)

Feb/24/2003

Calendar Year (Paraguay Fiscal Year)	1999				2000				2001				2002				2003
Japanese Fiscal Year	98	1999				2000				2001				2002				03
	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I
Term of Technical Cooperation				Signing of the R/D ▼														
0. The Project operation unit is enhanced.																		
0-1. Allocate necessary personnel as planned.	■		■															
0-2. Formulate plans of activities.			■	■														
0-3. Make budget plan and execute properly.			■	■														
0-4. Establish and operate management system.																		
1. The necessary machinery and equipment are provided, installed, operated, and maintained properly.																		
1-1. Make facility refurbishment plan and implement as planned.	■		■															
1-2. Provide and install necessary machinery and equipment.	■		■															
1-3. Operate and maintain necessary machinery and equipment properly.																		
2. Technical level of the C/P are upgraded.																		
2-1. Make Technical Cooperation Program.			■	■														
2-2. Implement technology transfer to the C/P																		
2-3. Monitor and evaluate the result of technology transfer to the C/P.																		
3. Verification and inspection services are performed systematically by INTN.																		
3-1. Information regarding the metrology are provided to the public through seminars, brochures and etc.																		
3-2. Make plan of verification and inspection services.																		
3-3. Implement verification and inspection services.																		
3-4. Monitor and evaluate verification and inspection services.																		
3-5. Implement in-house calibration of standard weight.																		

Note: The Japanese fiscal year starts in April ends in March.

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ANNEX 2-2 Annual Plan of Operations (APO) for the Project

Feb/24/2003

Calendar Year (Paraguay Fiscal Year)	99	2000	2001	2002	2003	Responsible Person in the Project*	Input*	Remarks
Japan Fiscal Year	1999	2000	2001	2002	03			
	10 11 12 1 2 3	4 5 6 7 8 9 10 11 12 1 2 3	4 5 6 7 8 9 10 11 12 1 2 3	4 5 6 7 8 9 10 11 12 1 2 3	4 5			
Term of Technical Cooperation	Signing of R/D on Dec/21	1st JCC on Dec/05	2nd JCC on Jun/07	4th JCC on Jun/28				
			Mid-term Evaluation & 3rd JCC on Mar/12	Final Evaluation & 5th JCC				
Output 0: The Project operation unit is enhanced.								
0-1. To allocate necessary personnel as planned.								
0-1-1. Allocation of C/P and other staff on the PY side								
1) To make personnel allocation plan.						(IS), PD		
2) To allocate personnel as planned.						PM	C/P and other staff	
3) To review personnel allocation, if necessary.						PD		
0-1-2. Dispatch of experts on the JP side								
1) To make plan of dispatch of experts.						(IS), PD, CA		
2) To make A1 form and request to the JP side by it.						PD		
3) To dispatch experts as planned.						CA	Dispatch of experts	
0-2. To formulate plans of activities.								
0-2-1. To formulate plans of activities for the Project.						(IS), PD, CA		
0-2-2. To review plans of activities, if necessary.						PD, CA		
0-3. To make budget plan and execute properly.								
0-3-1. Running expenses for the Project on the PY side								
1) To make budget plan.						PD		
2) To approve budget plan.						PD		
3) To execute budget plan.						PM		
0-3-2. Supporting local cost on the JP side								
1) To make budget plan.						CA, JPC, LE		
2) To approve budget plan.						CA		
3) To execute budget plan.						CA, JPC		
0-4. To establish management system and operate it.								
0-4-1. To review existing management system.						(IS), PD, CA		
0-4-2. To make plan of management system.						(IS), PD, CA		
0-4-3. To establish management system.						PM, CA,		
0-4-4. To operate management system.						PM, CA,		
0-4-5. To monitor and review management system, if necessary.						PD, CA		
0-5. To publicize the Project.								
0-5-1. To make leaflet of the Project.						JPC, TC	JP Budget	
0-5-2. To make poster of the Project concept.						JPC, TC	JP Budget	
0-5-2. To make P.R. video of the Project.						JPC, TC	JP Budget	

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ANNEX 2-2 Annual Plan of Operations (APO) for the Project

Feb/24/2003

Calendar Year (Paraguay Fiscal Year)	99	2000	2001	2002	2003	Responsible Person in the Project*	Input*	Remarks
Japan Fiscal Year	1999	2000	2001	2002	03			
	10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5			
0-5-4. To make WEB page for P.R. of the Project.						JPC, TC		
Output 1: The necessary machinery and equipment are provided, installed, operated and maintenanced properly.								
1-1. To make facility refurbishment plan and implement as planned.								
1-1-1. To make facility refurbishment plan.						(IS), CA, PM		
1-1-2. To make basic design of refurbishment .						(IS)		
1-1-3. To exchange of Note.						Emb. of Japan		
1-1-4. To make Detail design of refurbishment .						JLC	Dispatch of JLC	
1-1-5. To contract with local company.						JICA, PD, PM	JP Budget	
1-1-6. To implement as planned.						CA, PM		
1-1-7. To inspect the construction work.						JLC	Dispatch of JLC	
1-2. To provide and install necessary machinery and equipment.								
1-2-1. Provision of machinery and equipment on the JP side								
1) To identify specifications of necessary machinery and equipment.						(IS), PM		
2) To make A4 form and request to the JP side by it.								
3) To implement tenders and select traders.						(IS), PM		
4) To procure and transport the machinery and equipment to the Project site.						CA, PM	Donation equip.	
5) To install the machinery and equipment.						CA, PM		
1-2-2. Supply and replacement of machinery, equipment and other materials on the PY side								
1) To identify specifications of necessary machinery and equipment.						(IS), PM		
2) To procure and install the equipment and materials.						PM	PY Budget	
1-3. To operate and maintain the machinery and equipment properly.								
1-3-1. To make maintenance plan of the machinery and equipment.						LE, TC		
1-3-2. To prepare or develop operation and maintenance manual.						LE, TC		
1-3-3. To operate and maintain the machinery and equipment as planned.						LE, TC		
1-3-4. To provide fundamental training on operation and maintenance of machinery and equipment.						LE, TC		
Output 2: Technical level of the C/P is upgraded.								
2-1. To make Technical Cooperation Program.								
2-1-1. To evaluate technical capability of the C/P through interviews, factory visit and so on						(IS), CA, PM		
2-1-2. To make TCP.						(IS), CA, PD		
2-1-3. To make ATCP.						(IS), CA, PD		
2-1-4. To review TCP & ATCP.						CA, PD		
2-1-5. To make plan of C/P training in Japan.						(IS), CA, PD		
2-1-6. To make A2/3 form and request to the JP side by it.						PD, CA		
2-2. To implement technology transfer to the C/P.								
2-2-1. To prepare teaching material (Textbooks).						LE, TC		

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ANNEX 2-2 Annual Plan of Operations (APO) for the Project

Feb/24/2003

Calendar Year (Paraguay Fiscal Year)	99	2000	2001	2002	2003	Responsible Person in the Project*	Input*	Remarks
Japan Fiscal Year	1999	2000	2001	2002	03			
	10 11 12 1 2 3	4 5 6 7 8 9 10 11 12 1 2 3	4 5 6 7 8 9 10 11 12 1 2 3	4 5 6 7 8 9 10 11 12 1 2 3	4 5			
2-2-2. To implement T/T by JP experts.						LE, TC		
2-2-3. To implement T/T by C/P training in Japan.						CA, PM	C/P training in JP	
2-2-3. To compile textbooks.						LE, TC	JP Budget	
2-2-4. To to deepen knowledge and technique through exchange of technologies with similar foreign institutions.						LE, TC	JP Budget	
2-3. To monitor and evaluate the result of technology transfer to the C/P.								
2-3-1. To make monitoring and evaluation system.						(IS), CA, PD		
2-3-2. To establish monitoring and evaluation plan.						CA, PM		
2-3-3. To monitor the progress of technology transfer to the C/P.						CA, PM		
2-3-4. To evaluate the result of T/T to the C/P.						CA, PD		
Output 3: Verification and inspection services are performed systematically by INTN.								
3-1. To provide information regarding the metrology to the public through seminars, brochures, and etc..								
3-1-1. To prepare and implement seminars.						CA, PM		
3-1-2. To prepare and implement explanation meetings.						CA, PM		
3-1-3. To create and distribute brochures, video, pamphlet, etc..						LE, TC		
3-1-4. To examine opinion of participants in seminars and explanation meetings						PLC	JP Budget	
3-2. To make plan of the verification and inspection services.								
3-2-1. To review present services of the verification and inspection.						LE, TC		
3-2-2. To make plan of improvement of the verification and inspection services						CA, PD		
3-3. To implement the verification and inspection services.								
3-3-1. To prepare necessary manual of the verification and inspection services						CA, PM	JP Budget	
3-3-2. To implement improvement plan of the verification and inspection services.						LE, TC		
3-3-3. To revise the manuals of the verification and inspection services.						LE, TC		
3-4. To monitor and evaluate verification and inspection services.								
3-4-1. To make monitoring and evaluation plan.						(IS), CA, PD		
3-4-2. To implement monitoring and evaluation plan.						CA, PM		
3-4-3. To monitor and evaluate the result of the services.						CA, PM		
3-4-4. To examine level of satisfaction of beneficiaries of services.						PLC	JP Budget	
3-5. To implement in-house calibration of standard weight.								
3-5-1. To prepare manuals and other documents.						CA, PM		
3-5-2. To make plan of in-house calibration of standard weight.						LE, TC		
3-5-3. To implement in-house calibration of standard weight.						LE, TC		
3-5-4. To monitor and evaluate in-house calibration of standard weight.						CA, PM		
3-5-5. To revise the manuals and other documents.						LE, TC		

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ANNEX 3-1 Technical Cooperation Program (TCP)

Feb/24/2003

Calendar Year (Paraguay Fiscal year)	99	2000				2001				2002				2003
Japanese Fiscal year	1999		2000				2001				2002				03
	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I
Term of Technical Cooperation	Signing of R/D on Dec/21 ▼														
PO 2-2: Implement technology transfer to the C/P.															
1. Establishment of Traceability System															
(1) Traceability System for Mass Standards and Weights															
(2) Installation, Adjustment and Operation of Equipment and Apparatus															
(3) Preservation and Set-up for Mass Standard Weights															
(4) Calibration Theories for Mass Standards															
a. Direct Comparison Method															
b. Combination Comparison Methods															
(5) Calibration Methods for Standard Weights															
a. Direct Comparison Methods															
b. Volume (Density) and Susceptibility Measurements															
c. Combination Comparison Methods															
(6) Uncertainty Evaluation for Measurements															
a. Direct Comparison Method															
b. Combination Comparison Methods															
(7) Methods of Maintenance of Equipment and Apparatus															
a. Maintenance of Standard Weights															
b. Maintenance of Electronic Weighing Instruments															
c. Maintenance of Auxiliary Instruments															
d. Maintenance of Air Conditioning System of Calibration Room															
2. Verification and Inspection															
(1) Outline for Weighing Instrument and Weight															
a. Fundamental Theory															
b. Weight															
c. Weighing Instrument															
(2) Verification and Inspection Method for Weight															
a. Uncertainties in case of Inspection															
b. Method of inspection (Depends on Electronic Weighing Instrument)															
c. Collection of Data of the Electronic Weighing Instruments															
(3) Verification and Inspection Method for Weighing Instruments															
a. Maximum Capacities below 1t															
b. Maximum Capacities exceeding 1t															
(4) Metrological Control															
a. Weighing Instrument (OIML R76-1)															
b. Weight (OIML R111:Uncertainty)															
(5) Method of Maintenance of Equipment and Apparatus															
a. Maintenance of Weights															
b. Maintenance of Electronic Weighing Insutruments															
c. Maintenance of Measuring Mobile, Forklift, etc.															
d. Maintenance of Air Conditioning Systems of Verification and Inspection Room															

Note: The Japanese fiscal year starts in April and ends in March.

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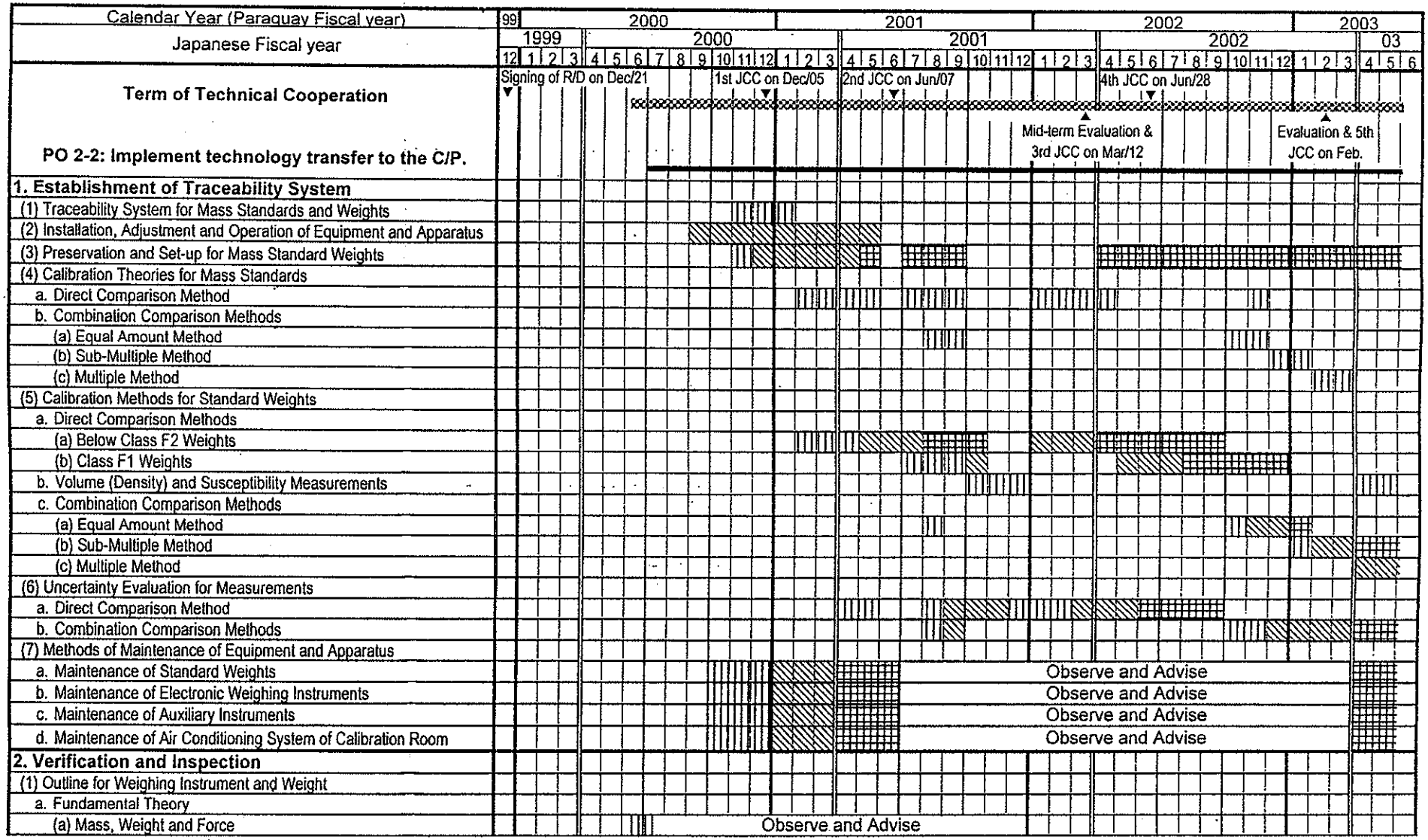
ANNX 3-2 Annual Technical Co operation Program (ATCP)

Feb/24/2003



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ANNX 3-2 Annual Technical Cooperation Program (ATCP)

Feb/24/2003

Calendar Year (Paraguay Fiscal year)	99	2000												2001												2002												2003		
Japanese Fiscal year		1999				2000								2001												2002												03		
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
(b) Mechanical Mass Detection Mechanism									Observe and Advise																																	
(c) Electric Mass Detection Mechanism									Observe and Advise																																		
b. Weight																																										
(a) Weight for Weighing Instrument									Observe and Advise																																		
(b) OIML R111										Observe and Advise																																	
c. Weighing Instrument																																										
(a) Mechanical Weighing Instrument										Observe and Advise																																		
(b) Electric Weighing Instrument										Observe and Advise																																		
(2) Verification and Inspection Method for Weight																																										
a. Uncertainties in case of Inspection																																										
b. Method of inspection (Depends on Electronic Weighing Instrument)																																										
c. Collection of Data of the Electronic Weighing Instruments																																										
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a. Maximum Capacities below 1t																																										
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(a) OIML R76-1																																										
(b) Depends on Measuring Mobile																																										
(4) Metrological Control																																										
a. Weighing Instrument (OIML R76-1)																																										
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(5) Method of Maintenance of Equipment and Apparatus																																										
a. Maintenance of Weights													Observe and Advise																													
b. Maintenance of Electronic Weighing Insutruments													Observe and Advise																													
c. Maintenance of Measuring Mobile, Forklift, etc.													Observe and Advise																													
d. Maintenance of Air Conditioning Systems of Verification and Inspection Room													Observe and Advise																													

Note:

1) The Japanese fiscal year starts in April and ends in March.
2) In the period of "Observe and Advice", Japanese Long-term Expert (LE) will observe the daily activity of C/P and will advise depending on its necessity.

: Lecture
: Hands-on Training
: On the Job Training
: Dispatch of SE

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ANNEX 4-1 Tentative Schedule of Implementation (TSI)

Revised on Feb/24/2003

Calendar Year (Paraguayan Fiscal Year)	1998				1999				2000				2001				2002				2003
Japanese Fiscal Year	1998				1999				2000				2001				2002				03
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I
Term of Technical Cooperation							▼ Singning of R/D														
Japanese Side																					
I. Dispatch of Mission																					
(0) Basic Study																					
(1) Preliminary Study	▬																				
(2) Supplementary Study				▬																	
(3) Second Supplementary Study						▬															
(4) Implementation Study							▬														
(5) Management Consultation													▬								
(6) Mid-term Evaluation																▬					
(7) Evaluation																				▬	
II. Dispatch of Long-term Experts																					
(1) Chief Advisor									▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
(2) Coordinator									▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
(3) Mass									▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
(4) Mass										▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
III. Dispatch of Short-term Experts									Short-term experts on specific fields will be dispatched, if necessary.												
IV. Training of Counterpart Personnel in Japan									A certain number of C/P will be accepted in Japan annually.												
V. Provision of Machinery and Equipment							▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬		
Paraguayan Side																					
I. Building and Facilities							▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
II. Machinery and Equipment							▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
III. Allocation of Counterpart Personnel and Necessary Staff							▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	
IV. Allocation of Budget							▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	

Note:

1) Japanese fiscal Year starts in April and ends in March.
2) This schedule is subject to change in accordance with the progress of the Project.

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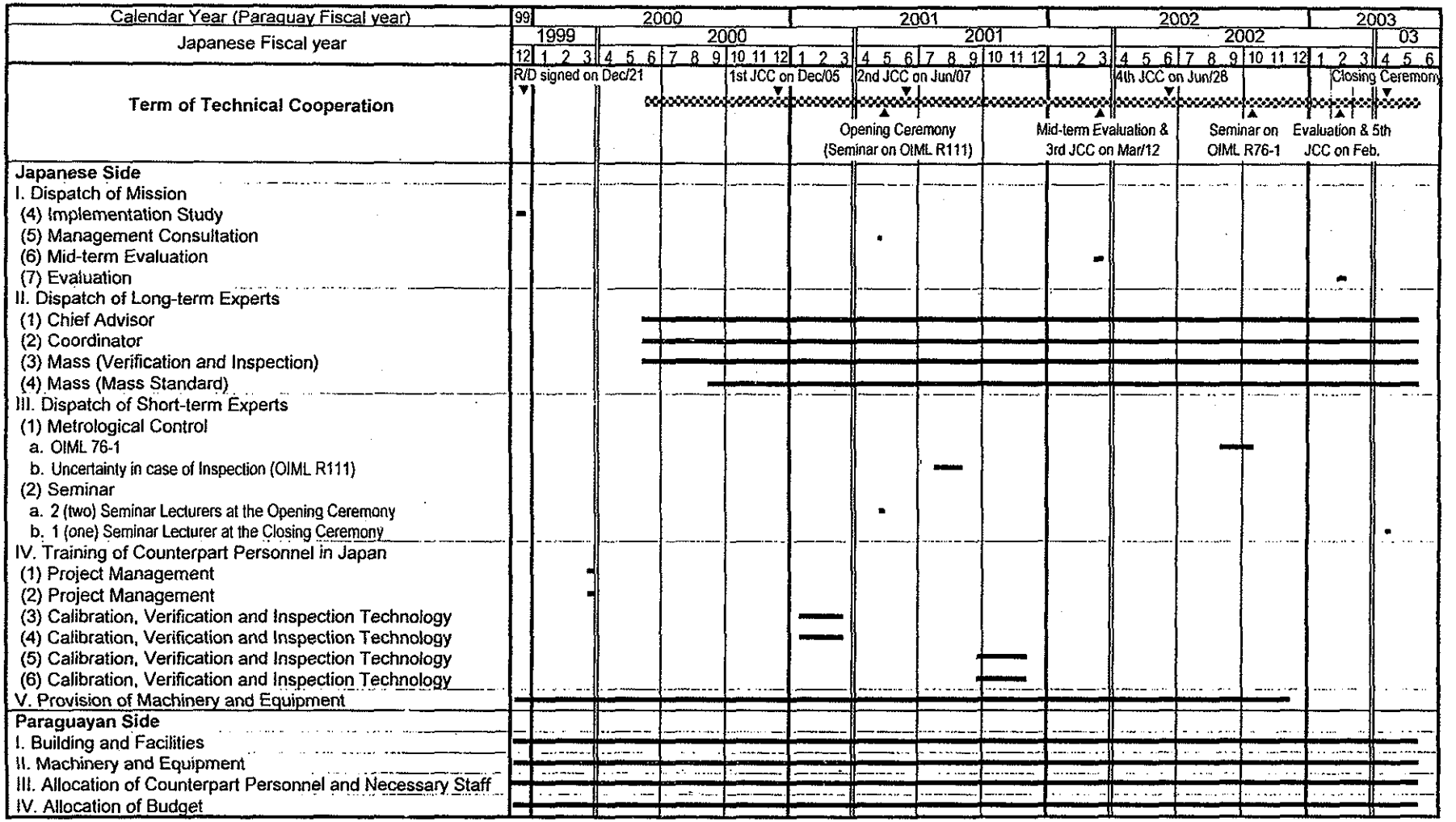
ANNX 4-2 Annual Tentative Schedule of Implementation (ATSI)

Revised on Feb/24/2003



Note:

1) The Japanese fiscal year starts in April and ends in March.
2) This schedule is subject to change in accordance with the progress of the Proyect.

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Annex 5: Evaluation Grid with the Result

Note CICNP = Cámara de Ind. Y Com. Nipo-Paraguava; C/P = Interview / Questionnaire results to C/P; C/P Mgrs = Interview / Questionnaire results to C/P management; Experts = Interview results to Japanese Experts; FGE = 5-grade evaluation (5: excellent, 4: good, 3: so-so, 2: not good, 1: bad); JDAC = Interview / Questionnaire results to a member of Japanese Domestic Advisory Committee; LC Interview = Interview results to the service customers made by the local consultant; MIC $_{C. Defense}$ = Consumer Defense Division of MIC; MTE = Mid-term evaluation; Qtn = Questionnaire results made by the local consultant

I. Achievement of the Project

Narrative Summary	Performance of Objectively Verifiable Indicators	Reference
1 Overall Goal Credibility of INTN, as a verification and inspection institute, is increased in the area of Mass.	1.1 Number and results of the international comparison of the weights on national standard level (+) + INTN has not implemented the international comparison yet, but INTN has a plan to carry out the international comparison in the period from 2004 to March 2005. + INTN is going to implement the international comparison test of the F1 class weights of 4 types, that is planned as the joint project between EU and MERCOSUR countries.	 Annex 25 C/P Mgrs
	1.2 Rate of increase of number of the verification and inspection services from 2002 to 2005 (+) + Number of the services by the Project reached 323 weighing instruments, 229 weights in 2002. + Similar increase of the service number is expected in 2005 because the technical C/P can allocate the longer work time.	 Annex 20
	1.3 Number of the calibration services (+) + The service was provided once in November 2002 experimentally to respond the strong request by a company, which had been limited to the internal service within INTN. + INTN has placed the calibration service regarded as one of the main activities by INTN.	 C/P Mgrs, Annex 21-2 Annex 25

Narrative Summary	Performance of Objectively Verifiable Indicators	Reference
	1.4 Level of the credibility of INTN from the target group (+) ++ 71% of the answerers learn the existence of INTN, and 25% recognize that INTN is related to the quality control. + 52% of the answerers recognize INTN as a trustworthy organization, but 22% regard as an untrustworthy one. - 23% of the answerers learn the existence of INTN Metrology Department, and 35% do the section of Mass and Weighing Area. + 57% of the answerers consider the verification and inspection services by INTN as trustworthy, but 17% do as untrustworthy.	Annex 22
2 Project Purpose Verification and inspection services provided by INTN are upgraded in the area of Mass.	2.1 Level of satisfaction of the present and former services beneficiaries (+) The answerers feel the services provided by the INTN Mass and Weighing Area as follows; + Both correspondence and rapidity of the services are good (4.3 and 4.0 in FGE) - Service fee is a little high (2.3 in FGE) ++ 94% are satisfied with the services.	Annex 22
	2.2 Varieties of the items verified and inspected by INTN and their incomes (++) ++ Measuring ranges of the INTN verification and inspection have been largely widened. + INTN revised the service fee table in 2003 January in the background where a ministerial ordinance will be issued in order that mass instruments should comply with the international standards.	Annex 23 Experts, Annex 23
	2.3 Results of the bilateral comparison of the standard weight (Class F1) (+) + Twice of the evaluation of equivalency were made to F1- and F2-class weights through the bilateral comparison in use of Mettler ones in May and December 2002, which shows good results in the value of En.	Annex 24

Narrative Summary	Performance of Objectively Verifiable Indicators	Reference
	++ Opening ceremony of the project was held inviting the president and VIPs, which informed many Paraguayans of the significance of the project through broadcasting by the media such as TV, radio and newspaper.	Experts
	++ Three kinds of pamphlets, a poster, a videotape created as part of the publicity are effective as the tool for deepening the project understanding.	Experts
3.1 The necessary machinery and equipment are provided, installed, operated and maintained properly.	3.1 The necessary machinery and equipment are provided, installed, operated and maintained properly? (+)	
	• 3.3 points in FGE to the state of the machinery and equipment. Most of the materials could show the necessary functions. 1-ton weights have some trouble to maintain F2 class, yet they are available for the services. The project system is weak in maintaining the materials. ++ 5.0 points in FGE to the state of the machinery and equipment because the machinery and equipment state is achieved as expected.	Experts Experts Experts Experts C/P Mgrs
	3.1-1 Contents and condition of machinery and equipment (-) (1) Property ledger to register the materials with the maintenance records (•) • INTN will register the machinery and equipment to the inventory after the end of Project.	Experts
	(2) Plan of Activities in Future Main Activities to perform are shown in the Plan of Activities.	Annex 25
	(3) Calibration Data of 1 ton / F2 weights (--) -- The calibration test that was made in June 2002 revealed that some of the 1 ton / F2 weights had En values much larger than the allowable of F2 class, which the water penetrating may have caused.	Annex EG-10
	(4) Evaluation of Change of Mass Value by Lapse of Time (+) + It was evaluated that the changes were smaller than the allowable value of 1 of En.	Annex EG-11
	(5) Register of Equipment with Maintenance Records (•) • Register of all the equipment will be completed by March 2003.	Annex EG-12 / Experts
	(6) Site Survey (•) • Weights are confirmed at site together with the Experts. + Machinery and equipment provided by the Japanese side are maintained properly.	Site Survey

Narrative Summary	Performance of Objectively Verifiable Indicators		Reference
	4.2-2 Dispatch of Japanese Experts	4.2-2 Dispatch of Japanese Experts (●)	
	(1) Long-term experts	(1) Long-term experts (●) ● 6 experts are dispatched with 142½MM in total.	Annex 6
	1) Chief Advisor	1) Chief Advisor (●) ● Mr. Shinya Aoki	Annex 6
	2) Coordinator	2) Project Coordinator (●) ● Ms. Yumiko Ishihara ● Mr. Sadanobu Ueno	Annex 6
	3) Expert on Mass Standard	3) Expert on Mass Standard (●) ● Mr. Shozo Yano	Annex 6
	4) Expert on Verification and Inspection	4) Expert on Verification and Inspection (●) ● Mr. Masakuni Ishii ● Mr. Toshio Yamada	Annex 6
	(2) Short-term experts Appropriate number of short-term experts will be dispatched as necessary arises.	(2) Short-term experts (+) + 3.5 in FGE + 4.0 in FGE Four experts were dispatched for 3 1/2 MM in total. Mr. Yano of Expert handled the advisory tasks of "prior evaluation of weighing instruments", "traceability system", and "volume measurement" that had been planned as the scope of the short-term experts, due to the delay in the delivery of equipments, and difficulties regarding the recruitment	Experts C/P Staffs Annex 6 Quarterly Report
	4.2-3 Paraguayan C/P training in Japan A certain number (0-2) of the C/P yearly	4.2-3 Paraguayan C/P training in Japan (●) ● 6 persons were trained in Japan with 9½ MM in total.	Annex 6

Narrative Summary	Performance of Objectively Verifiable Indicators		Reference
	4.2-4 Provision of machinery and equipment	4.2-4 Provision of machinery and equipment (●) ● The provision of equipment reached ¥ 223 million in the actual expenditures. ● The accompanied equipment reached ¥ 3.4 million in the actual expenditures.	 Annex 6 Annex 6
	4.2-5 Provision of supporting local cost	4.2-5 Allocation of supporting local cost (●) ● Expenditure amounts to ¥ 23 million.	 Annex 6