

ブラジル連邦共和国
東北部半乾燥地（カアチンガ）における
荒廃地域の再植生技術開発
終了時評価報告書

平成 17 年 8 月
（2005 年）

独立行政法人 国際協力機構
地球環境部

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序 文

国際協力機構は、ブラジル連邦共和国政府からの技術協力要請を受け、同国において東北部半乾燥地（カアチンガ）における荒廃地域の再植生技術開発プロジェクトを平成14年9月から3年間の計画で実施してきました。

当機構は、同プロジェクトの協力実績の把握や協力効果の評価を行うとともに、今後、両国がとるべき措置を両国政府に提言することを目的として、平成17年3月6日から3月26日まで、当機構国際協力専門員増子博を団長とする終了時評価調査を実施しました。

調査団は、ブラジル連邦共和国政府関係者と共同で同プロジェクトの現地調査を実施し、成果の確認を行い、合同評価レポートについて両国の合意を得ました。また、調査団は帰国後、国内作業を経て調査結果を本報告書にとりまとめました。

この報告書が今後の協力の更なる発展の指針となるとともに、本プロジェクトにより達成された成果が、同国の一層の発展に資することを期待いたします。

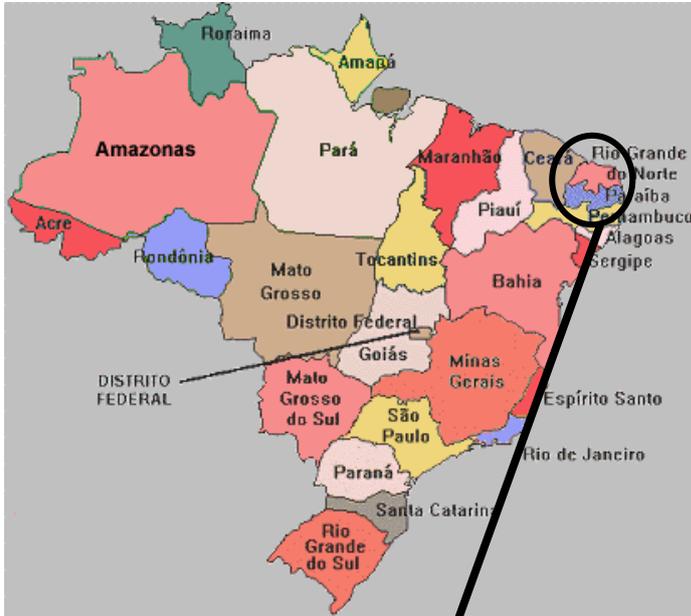
終わりに、本プロジェクトの実施にご協力とご支援をいただいた両国の関係者の皆様に、心から感謝の意を表します。

平成17年8月

独立行政法人国際協力機構
地球環境部長 富本 幾文

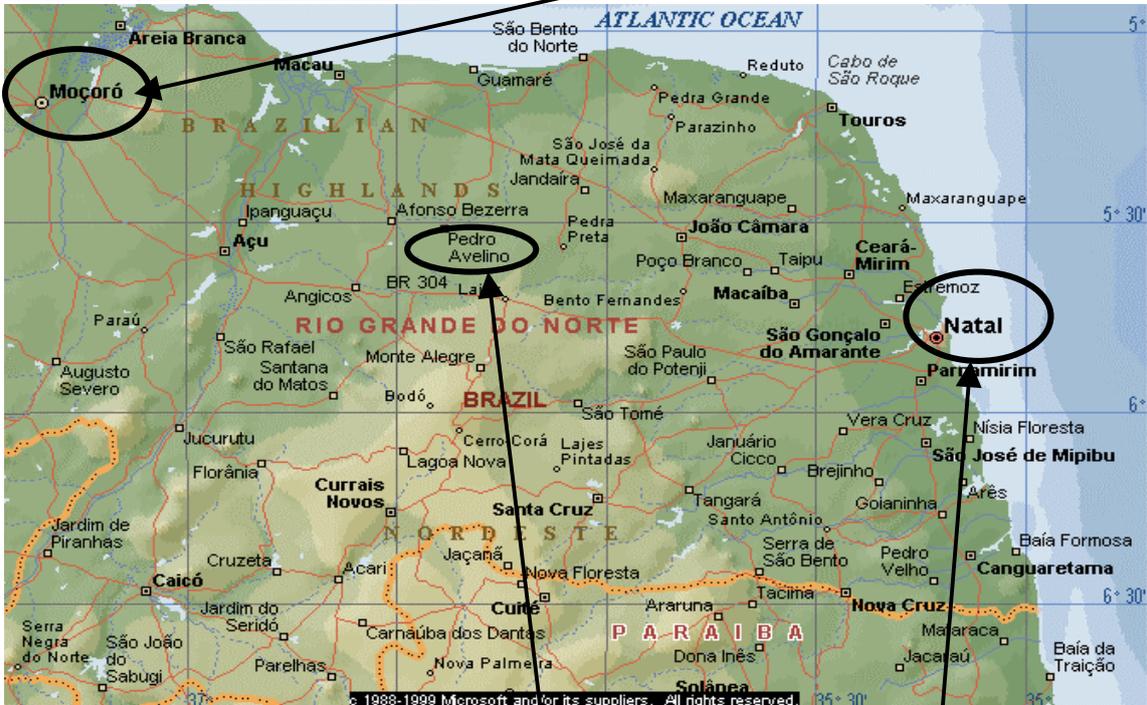
プロジェクト位置図

ブラジル連邦共和国全体図



モソロ市
モソロ高等農院(ESAM)

リオ・グランデ・ド・ノルテ州



※モソロ⇄ナタール間は約 250km

ペドロアベリーノ
パイロットプロット

ナタール市(州都)
RN 州経済開発環境院(IDEMA)

写真

モソロ高等農院 (ESAM)



ESAM での協議風景



カアチンガの大地



パイロットプロット



略語一覧

| | |
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| CNPq: | Conselho Nacional de Desenvolvimento Cientifico e Tecnologico/ National Council for Scientific and Technological Development 国家科学・技術開発評議会 |
| ESAM: | Escola Superior de Agricultura de Mossoro モソロ高等農院 |
| EMATER: | Empresa de Assitencia Tecnica e Extensao Rural 技術支援・農村普及公社 |
| EMATER-RN: | Instituto de Assistencia Technica e Extensao Rural do RN リオ・グランデ・ド・ノルテ州技術支援・農村普及庁 |
| EMBRAPA: | Empresa Brasileira de Pesquisa Agropecuaria ブラジル農牧研究公社 |
| EMPARN: | Empresa de Pesquisa Agropecuária do RN リオ・グランデ・ド・ノルテ州農牧研究公社 |
| FNE: | Fundo Constitucional de Financiamento do Nordeste 東北部法定融資基金 |
| IDEMA: | Instituto de Desenvolvimento Economico e Meio Ambiente do Rio Grande do Norte リオ・グランデ・ド・ノルテ州経済開発・環境院 |
| INSA: | Instituto Nacional do Semi-Arido 国家半乾燥地研究所 |
| PPA: | Plano Plurianual de Investimentos 多年度投資計画 |
| RN: | Rio Grande do Norte リオ・グランデ・ド・ノルテ州 |
| UFERSA: | Universidade Federal Rural do Semi-Arido 連邦半乾燥地農業大学 |

評価調査結果要約表

| | |
|---|---|
| 1. 案件の概要 | |
| 国名：ブラジル連邦共和国 | 案件名：東北部半乾燥地(カアチンガ)における荒廃地域の再植生技術開発 |
| 分野：森林資源管理/植林 | 援助形態：技術協力プロジェクト |
| 所轄部署：地球環境部第1グループ (森林・自然環境) 森林保全第2チーム | 協力金額(評価時点)：80,100千円 |
| 協力期間： 2002年9月1日～2005年8月31日 (R/D締結日：2002年8月22日) | 先方関係機関：モソロ高等農院(ESAM) リオ・グランデ・ド・ノルテ州経済開発環境院 (IDEMA) |
| | 日本側協力機関：鳥取大学 |
| | 他の関連協力：特になし |
| 1-1 協力の背景と概要 | |
| <p>ブラジル連邦共和国(以下「ブ」国)リオ・グランデ・ド・ノルテ州を含む東北部サバンナ地帯はカアチンガと呼ばれ、年平均気温は20～25℃、降水量は著しく地域により異なり、南沿岸部1,500mmから内陸の半乾燥地の400mmにわたる気候帯をなしている。</p> <p>雨量の少ない内陸部には半乾燥地が広がっているが、同地域では煉瓦等の製造が盛んであり、原料となる粘土の採掘や煉瓦等の製造に使う燃料用木材の伐採が長年無計画に続いている。また、同地域において、無計画な家畜の放牧も行われている。そのため、土壌の荒廃が急速に広がっており、植林を含めた荒廃地回復、砂漠化防止の措置が急務であり、土壌に適した家畜用飼料植物の選定も重要課題となっている。</p> <p>このような状況の中、JICAは「ブ」国政府の要請を受け、JICAは2001年11月に事前評価調査団を派遣し、緑化技術の開発及びそれを活用した持続的家畜生産技術を開発することを目標とする3年間のプロジェクトを調査団は提案し、双方合意した(当初はミニプロジェクト-専門家チーム派遣-として合意)。</p> <p>しかしながら、「ブ」国大統領選挙の影響があり、M/M締結は2002年8月末となった(署名されたプロジェクト期間は2002年9月から2005年8月)。加えて両国間の査証問題により、実際に長期専門家の派遣が可能となったのは2003年11月であり、M/Mの上ではプロジェクトが1年2ヵ月経過した後であった。</p> | |
| 1-2 協力内容 | |
| (1) 上位目標 | |
| 東北ブラジル半乾燥地域における植生及び土壌の潜在的な生産力を最大限にかつ持続的に活用する技術が普及される | |
| (2) プロジェクト目標 | |
| 有用樹種・草種による緑化技術及びこれらの植生を活用した持続的家畜生産技術が見出される | |
| (3) アウトプット | |
| 1) リオ・グランデ・ド・ノルテ州の半乾燥地域における土地、樹木の利用状況が把握される | |
| 2) 半乾燥地における家畜の現状を元に改善方策の基本方針が策定される | |
| 3) パイロットプロジェクトエリアの植生と荒廃地の特徴が把握される | |
| 4) 住民のニーズを基にした有用樹種及び草種の定義が定められ、定義に基づき特定樹種・草種が選定される | |
| 5) 有用樹種・草種の苗木生産技術及び植栽・造林方法が確立し、マニュアルにまとめられる。緑化対策地域に終える牧養力が推定される | |
| 6) 既存の植生地域及び緑化地域における持続的家畜生産技術が策定されマニュアルに取りまとめられる | |
| (4) 投入 | |
| 1) 日本側：(評価時点：2005年3月評価時点) | |
| ・長期専門家派遣 1名 | ・機材供与 24,223千円 |
| ・短期専門家派遣 6名 | ・ローコスト負担 4,290千円 |
| | ・研修員受入 3名 |

2) 相手国側：

- ・C/P 等配置 10名 ・土地・施設等 専門家執務室、パイロットプロットなど
- ・ローカルコスト負担 690千円

2. 終了時評価調査団の概要

| | | | |
|-----|-------|--------|--------------------------|
| 調査者 | 団長・総括 | 増子 博 | JICA 国際協力専門員 |
| | 評価分析 | 廣内 靖世 | 株式会社国際開発アソシエイツ 国際開発専門家 |
| | 評価計画 | 笠原 宗一郎 | JICA 地球環境部第1G 森林保全第2T 職員 |

| | | |
|------|------------------------|------------|
| 調査期間 | 2005年3月06日(日)～3月26日(土) | 評価種類：終了時評価 |
|------|------------------------|------------|

3. 評価結果の概要

3-1 実績の確認

(1) プロジェクト目標の実績

長期専門家の派遣が1年2ヶ月遅れたことにより、プロジェクト開始時期も同期間遅れたため、期間中にプロジェクト目標を達成することはできないと想定される。

(2) アウトプットの実績

アウトプット1～4に関しては、活動が完了することが見込まれる。アウトプット5、6の主に技術の実証に関する活動については、完了することはできない見込みであるが、専門家派遣が遅れた分の1年2ヶ月間プロジェクトを延長すれば完了する見込みである。

3-2 評価結果の要約

(1) 妥当性：

プロジェクト目標や上位目標はブラジルの国家政策やニーズに適合したものである。また、C/P 機関である ESAM、IDEMA のニーズや日本の ODA 大綱、対ブラジル国別事業実施計画にも合致している。

(2) 有効性

プロジェクトの開始が遅れたため、プロジェクト目標は終了時時点で一部が達成されない見込みである。しかしながら、スケジュールが遅れてはいるが、全てのアウトプットはプロジェクト目標の達成に貢献しており、1年2ヶ月の協力期間の延長により達成できる見込みである。

(3) 効率性

当プロジェクトは効率的に実施されていたとは言い難い。日本側・ブラジル側双方において投入が計画通りになされず、それが目標達成に影響を与える結果となった。

日本側の投入に関しては、長期・短期専門家の技術レベルや専門性、また、機材、C/P 研修の質・量はおおむね適切であったが、長期専門家の派遣が前述の通り 2003 年 11 月まで遅れ、また、一部機材の納品が遅れたため、その機材を活用する活動については遅延が生じる結果となった。また、「ブ」国側の投入に関しては、M/M で署名されている7分野のカウンターパートのうち、2分野に関しては適切に配置されているが、残りの5分野については2005年3月まで配置されていなかった。

(4) インパクト

上位目標へのインパクトについてはプロジェクト目標が一部しか達成できていないことより、現時点で予測することは困難である。しかしながら、ESAM においては持続的飼料生産により興味を持つようになり、ESAM の敷地内に 5ha の飼料樹種用試験農場を設けることが決まっており、また、今後 10ha まで拡大する計画である。

(5) 自立発展性

上位目標とも関連している「砂漠化防止」はブラジルの国家政策とも合致しており、ブラジル政府からの支援は継続されると思われる。しかしながら、3年間のプロジェクトのうち何も実施することのできなかった1年2ヶ月を除いた1年10ヶ月という短い期間は、ブラジル半乾燥荒廃地域の復旧のための全ての技術移転を行うために十分な期間とは言えない。

3-4 効果発現を阻害した問題点及び問題を引き起こした要因

プロジェクトの実質的な開始が1年2ヶ月遅れたことが効果の発現を阻害した最も大きな要因である。それは前述の通り、日本と「ブ」国間での外交上つまり査証発給の問題があったため、JICAとしては対応できる範囲外であったが、派遣直後に関係者間でプロジェクトの進め方や期間についても再度検討をする余地はあったと思われる。

派遣中の専門家は作成されたPDMにもとづいたプロジェクトの進捗管理を行っておらず、それにより関係者間で進捗状況を把握、確認しあうことが困難であったために、1年2ヶ月の開始の遅れに加えて、プロジェクトの進捗に遅れが生じた。その要因としては、その専門家は派遣前研修においてPCM研修を受けていなかったこと、また、プロジェクト開始当初は専門家チーム派遣のスキームによるプロジェクトであったことにより、PDMによる具体的な進捗管理がなされなかったことがあげられる。

今後、専門家のPCM研修の受講の徹底をはかることはもちろんであるが、それに加えてPDM、POのロジックや、それらを活用した進捗の確認方法など、プロジェクトの進捗確認にあたっての具体的な手法にも焦点をあてて専門家に説明することにより、円滑なプロジェクト運営が期待できる。

また、1年2ヶ月間開始が遅れたことは外部要因によるものであったため、日・伯双方合意の上、同期間の延長が提案されている。また、終了時評価調査団の派遣により、専門家、C/PがPDMに対する認識を強め、その後PDMによる進捗管理がなされている。

3-5 結論

本プロジェクトは長期専門家派遣の遅れ、機材搬入の遅れ、C/Pの配置の不足などにより、プロジェクトは円滑に実施されていなかった。

しかしながら、半乾燥地域において、JICAの技術協力によって植生回復のための技術開発体制を確立することは重要なことであるため、8月末で終了せず、プロジェクト期間を1年2ヶ月延長し、日本側、ブラジル側双方によるモニタリングやサポート体制の強化を通してプロジェクトの管理が改善されれば、PDMで計画された活動全てを完了することができ、プロジェクト目標が達成できると思われる。

3-6 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) 1年2ヶ月間のプロジェクト期間の延長

長期専門家の派遣が1年2ヶ月遅れたことにより、PDMで示されたプロジェクト目標の達成は困難となっている。これらのことから、プロジェクトの活動を達成するために遅延期間分の延長を提言する¹。2002年9月から2006年10月までの暫定PDM（PDM Ver. 3）および同期間の暫定PO（PO Ver. 2）を今後の合同調整委員会での論議および承認のために提案する（提案したPDM及びPOはM/MのAnnex6およびAnnex7に添付されている）。

(2) 合同調整委員会（JCC）

プロジェクト合同調整委員会の組織そのものに関しては2002年8月にサインされたミニッツに記載されているが、これまでのところ構成・開催されてはいない。プロジェクトの効果的、円滑な実施を図るために早急に合同調整委員会を構成し、年1度、プロジェクトの進捗状況の見直しや年間計画の承認、および必要が生じた際に、委員会を開催することを提言する。

(3) モニタリング・システムの確立

POにもとづくモニタリング活動はプロジェクトの進行管理を行うために不可欠である。したがって、POにもとづき、実施体制、責任分担、様式、期間などから構成されるプロジェクト・モニタリング・システムを確立することを提言する。

¹ この提言に基づき、2005年（平成17年）8月9日に延長にかかるミニッツが署名された（付属9参照）。

(4) JICA の支援体制の強化

当該プロジェクトは2005年4月1日にJICA本部からJICAブラジル事務所に引き継がれた。したがって、プロジェクトがその円滑な事業実施のために、より緊密で効果的な支援が行われることを提言する。

(5) 適正なカウンターパート（以下、C/P）およびローカルコストの確保

プロジェクトは諸活動を通じたC/Pの能力向上をねらいとしている。したがって、それらの事業のための適正なC/Pおよびローカルコストの手当てが確保されることを提言する。

3 - 7 教訓（新規案件、現在実施中の他の案件へのフィードバック）

(1) ESAM および IDEMA との共同事業

プロジェクトの上位目標の達成には、適正技術の開発と開発された技術の地域住民への普及という両面からの活動が必要とされる。これらの観点から、当該プロジェクトは技術開発を担当する学術機関（ESAM）と普及開発を担当する行政機関（IDEMA）の共同で実施されているプロジェクトであることから、持続発展性の高い効果的なアウトプットが期待できる。

(2) 林業および畜産分野の合同プロジェクト

半乾燥地の植生回復のためには、自然環境保全における林業分野および小規模農家対策における畜産分野の両面からのアプローチが不可欠である。当該プロジェクトは両分野における活動が同じウエートで計画されている稀なプロジェクトであることから、プロジェクト目標をより効率的に達成することが期待できるため、他の林業分野のプロジェクトに関しても、林業の枠に固執しないプロジェクトの形成を行うことも重要である。

(3) PO にもとづくプロジェクトの進行管理

PO にもとづくモニタリング活動が実施されなかったことがプロジェクトの大幅な遅れの要因となった。これらのことから、プロジェクトの開始前にPOを作成し、それにもとづいたモニタリングを定期的に行うことが重要である。

(4) 季節性のあるプロジェクトにおける特別な配慮

計画通りの専門家派遣を当初行うことができなかつたため、苗畑造成などの雨季前に行う必要のある活動を実施することができず、結果としてプロジェクト活動が遅延する結果となった。プロジェクトの主要な活動が雨期に実行することに制約されているような季節性のあるプロジェクトにおいては、その季節性を常に考慮することが肝要である。

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第1章 終了時評価調査の概要

1-1 プロジェクトの背景・目的

ブラジル連邦共和国（以下「ブ」国）リオ・グランデ・ド・ノルテ州（以下 RN 州）（付属 1）を含む東北部サバンナ地帯はカアチンガと呼ばれ、年平均気温は 20～25℃、降水量は著しく地域により異なり、南沿岸部 1,500mm から内陸の半乾燥地の 400mm にわたる気候帯をなしている。雨量の少ない内陸部には半乾燥地が広がっているが、同地域では煉瓦等の製造が盛んであり、原料となる粘土の採掘や煉瓦等の製造に使う燃料用木材の伐採が長年無計画に続いている。また、同地域において、無計画な家畜の放牧も行われている。そのため、土壌の荒廃が急速に広がっており、植林を含めた荒廃地回復、砂漠化防止の措置が急務であり、土壌に適した家畜用飼料植物の選定も重要課題となっている。

このような状況の中、「ブ」国政府の要請を受け、JICA は 2001 年 11 月に事前評価調査団を派遣し、緑化技術の開発及びそれを活用した持続的家畜生産技術を開発することを目標にする 3 年間のプロジェクトを調査団は提案し、双方合意した（当初はミニプロジェクト - 専門家チーム派遣 - として合意）。

しかしながら、「ブ」国大統領選挙の影響があり、M/M 締結日は 2002 年 8 月末となった（M/M でのプロジェクト期間は 2002 年 9 月から 2005 年 8 月）。加えて、両国間の査証問題が原因で長期専門家が派遣されたのは 2003 年 11 月となり、実質的にプロジェクトが開始できたのは上記理由により当初予定開始時期から 1 年 2 ヶ月が経過した後であった。

1-2 終了時評価調査の目的

上記の通りプロジェクトの開始が 1 年 2 ヶ月遅れたため、プロジェクト終了時までにプロジェクト目標が達せられる見込みがないことが明らかであった。そのため、本調査は終了時評価調査ではあるが、プロジェクト進捗の遅れが、当初の専門家派遣に起因するものか否か、その場合、当初の遅れの相当期間分の延長で、プロジェクト目標が達せられる可能性の確認を中心に調査を行うこととした。

具体的に以下の 3 点を調査目的とする。

- ① これまで実施した協力活動について計画達成度（投入実績、活動実績、プロジェクトアウトプットの達成状況）を把握すると共に、評価 5 項目（妥当性、有効性、効率性、インパクト、自立発展性）の観点からプロジェクトの評価を行う。
- ② 「ブ」国側と 1 年 2 ヶ月の延長を合意する。
- ③ ①の評価結果及び相手国実施機関と協議を通し PDM の修正を行う。

1-3 調査団の構成

- | | | |
|----------|--------|----------------------------|
| (1) 総括 | 増子 博 | JICA 国際協力専門員 |
| (2) 評価分析 | 廣内 靖世 | (株)国際開発アソシエイツ 国際開発専門家 |
| (3) 評価計画 | 笠原 宗一郎 | JICA 地球環境部第 1G 森林保全第 2T 職員 |

1-4 調査期間

2005 年 3 月 6 日（日）～3 月 26 日（土）（付属 1 参照）

1-5 終了時評価の方法

1-5-1 当初 PDM のレビューと PO の作成

2002 年 8 月調印のミニッツに添付された当初 PDM（以後、PDM 1）には、論理性・明瞭性・英語の表現（文法）などに若干不適切な部分があった。また、オリジナルの英文とその和訳（案件概要表）やポルトガル語訳（2004 年 6 月にプロジェクトが独自に作成）には一部意味の不一致があった。また、ミニッツにはアウトプットごとの大まかなスケジュールを示した実施計画（2002 年 9 月開始を想定）が添付されていたが、活動ごとのスケジュール、責任者、必要な投入等を示した PO は作成されなかった。

その結果、PDM の意味することや進捗状況・問題点について、専門家、C/P、JICA 本部・ブラジル事務所、その他の関係者が的確に理解し、共通の認識をもつことが困難な状態が続いていた。このため調査団は、終了時評価を開始する前に、専門家及び C/P と協議しながら、PDM をよりわかりやすく整理するとともに、整理した PDM に基づいて評価時点における PO を作成した（付属参照）。なお、その PDM の修正は、誤りの訂正及び表現をより明確にするための言葉の書き換えが中心で、内容の変更は行わなかった（PDM の主要な修正点は付属 3 の通り）。

1-5-2 評価方法

本評価調査は、日本側調査団、「ブ」国関係者合同で以下の調査・評価を行い、その評価結果についてミニッツとして取りまとめ、日「ブ」両者で署名する。

ブラジル側評価メンバーは以下の通り。

| 評価メンバー | 所属 |
|---------------------------------|------------|
| Mr. Ricardo Jorge Duarte Galvao | ESAM、講師 |
| Mr. Geraldo Magela | IDEMA、技術顧問 |
| Mr. Aldo Medeiros Junior | IDEMA、主任技師 |

- ① プロジェクトの当初計画、日本・「ブ」国双方の投入実績、活動実績、プロジェクトの効果（アウトプットやプロジェクト目標の達成見込み等）、運営管理体制等につき、文献調査、質問票、関係者との協議等を通じて確認する。
- ② 評価グリッドに基づいて評価 5 項目（妥当性、有効性、効率性、インパクト、自立発展性）の観点から日伯合同で評価を行う。

ア. 妥当性

「ブ」国のニーズに合致しているか、開発政策と整合性はあるか、日本の技術に優位性があるかなど

イ. 有効性

実績に照らしてプロジェクト目標達成の見込みはあるか、目標達成の阻害要因はあるか、アウトプットは目標達成のために十分かなど

ウ. 効率性

アウトプットの達成度は適切か、アウトプットを算出するために十分な活動・投入であったか、タイミングよく適切な投入が行われたか、コストとアウトプットは見合っているかなど

エ. インパクト（予測）

上位目標達成が見込まれるか、上位目標とプロジェクト目標が乖離していないか、予期せぬ正負のインパクトはあるかなど

オ. 自立発展性（見込み）

協力終了後も組織、財政、制度面での自立発展は可能か、C/P はプロジェクト終了後も活動を継続できる能力があるか、資機材の維持管理は適切に行われているかなど

第2章 プロジェクトの実績

2-1 プロジェクトの実績⁵

2-1-1 投入の実績

(1)日本側の実績

2002年8月22日調印のミニッツの添付文書による投入計画及び2005年3月23日の実績は以下に示すとおり。

表 2-1: ミニッツの投入計画及び実績

| ミニッツの計画 | 実績 (2005年3月23日現在) | | | | | | | | | | | | | | | | |
|---|---|-----------|------------------------------|------|------|------|--------------|---------|------------------------------|------|----|---------|---------|----|-----------|-----------|------------|
| 1. 専門家 (1)長期専門家 1) 荒廃地緑化技術 (2)短期専門家: 1) 植生 2) 生態学 3) 植物育種 4) 造林 5) 気象学 6) 土壌学 7) 水文学 8) 動物学 | (1)長期専門家: 2003年11月から、荒廃地の長期専門家が1名派遣されている。 (2)短期専門家: 2003年11月以降、以下の5分野においてのべ6名の専門家が派遣された: 生態学 (0.7m/m)、育種 (0.8 m/m)、動物学 (0.7m/m + 4 m/m)、土壌学 (1 m/m)、及び造林 (1 m/m)。プロジェクト終了までに、さらに3名の短期専門家 (気象学、植物生態学、及び動物学) の派遣が計画されている。 表 a: 日本の会計年度 (4月-3月)別の短期専門家派遣状況 *=計画 <table border="1"> <thead> <tr> <th>会計年度</th> <th>2002</th> <th>2003</th> <th>2004</th> <th>2005</th> </tr> </thead> <tbody> <tr> <td>人数</td> <td>0</td> <td>3</td> <td>3</td> <td>3*</td> </tr> </tbody> </table> | 会計年度 | 2002 | 2003 | 2004 | 2005 | 人数 | 0 | 3 | 3 | 3* | | | | | | |
| 会計年度 | 2002 | 2003 | 2004 | 2005 | | | | | | | | | | | | | |
| 人数 | 0 | 3 | 3 | 3* | | | | | | | | | | | | | |
| 2. カウンターパート研修 1) 土壌と森林の復旧 2) 生物多様性保全及び調査 3) 気象学 4) 動物学 5) 土壌学 6) 水文学 | これまでに合計3名のC/P (IDEMA から2名、ESAM から1名) が「半乾燥地再緑化」の分野の1ヶ月の研修を日本で受けた。2005年度のC/P研修の計画はまだ確定していない。 表 b: 日本の会計年度別のC/P研修実施状況 <table border="1"> <thead> <tr> <th>会計年度</th> <th>2002</th> <th>2003</th> <th>2004</th> <th>2005</th> </tr> </thead> <tbody> <tr> <td>人数</td> <td>0</td> <td>0</td> <td>3</td> <td>未定</td> </tr> </tbody> </table> | 会計年度 | 2002 | 2003 | 2004 | 2005 | 人数 | 0 | 0 | 3 | 未定 | | | | | | |
| 会計年度 | 2002 | 2003 | 2004 | 2005 | | | | | | | | | | | | | |
| 人数 | 0 | 0 | 3 | 未定 | | | | | | | | | | | | | |
| 3. プロジェクト活動のための機材 1) 四輪駆動車 2) 電子天秤 3) 強制送風乾燥機 4) 原子吸光計 5) 植生分析用コピー機 6) 自動ポンプ式カロリメーター 7) GPS 8) 携帯用光合成測定装置 | これまでに、合計で約24,223,000円が機材供与のために支出された。プロジェクトカー (四輪駆動車)、電子天秤、GPS、パソコン、プリンター等が供与された。 表 c: 日本の会計年度別の機材供与に関する支出状況 (単位: 円) <table border="1"> <thead> <tr> <th>会計年度</th> <th>2002</th> <th>2003</th> <th>2004</th> </tr> </thead> <tbody> <tr> <td>現地調達</td> <td>3,200,000 *1</td> <td>616,400</td> <td>19,172,500 (17,519,000)*2</td> </tr> <tr> <td>本邦調達</td> <td></td> <td>606,500</td> <td>637,800</td> </tr> <tr> <td>合計</td> <td>3,200,000</td> <td>1,222,900</td> <td>19,800,300</td> </tr> </tbody> </table> *1: 四輪駆動車一台はプロジェクトの開始前に JICA ブラジル事務所によって購入された。 | 会計年度 | 2002 | 2003 | 2004 | 現地調達 | 3,200,000 *1 | 616,400 | 19,172,500 (17,519,000)*2 | 本邦調達 | | 606,500 | 637,800 | 合計 | 3,200,000 | 1,222,900 | 19,800,300 |
| 会計年度 | 2002 | 2003 | 2004 | | | | | | | | | | | | | | |
| 現地調達 | 3,200,000 *1 | 616,400 | 19,172,500 (17,519,000)*2 | | | | | | | | | | | | | | |
| 本邦調達 | | 606,500 | 637,800 | | | | | | | | | | | | | | |
| 合計 | 3,200,000 | 1,222,900 | 19,800,300 | | | | | | | | | | | | | | |

⁵ 原文 (英語) は本調査ミニッツ Annex3 を参照。

| <p>9) C/N コーダー</p> <p>10) ショランダー・ポンプ</p> <p>11) 衛生画像 SPOT</p> <p>12) スキャナー</p> <p>13) 気象観測装置</p> <p>14) 携帯無線</p> <p>15) ポロメーター (細孔径測定器)</p> <p>16) その他、両者が合意する必要な機材、器材、及び資材</p> | <p>*2:2004 年度には現地調達分として約 19,172,500 円が支出されたが、まだ約 17,519,000 円相当の機材がプロジェクトサイトに到着していない。</p> <p>表 d: ミニッツ記載の供与機材のプロジェクトサイト到着状況</p> <table border="1"> <thead> <tr> <th></th> <th>ミニッツに記載された機材</th> <th>PDM の関連活動</th> <th>到着時期</th> <th>備考</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>四輪駆動車 (プロジェクト・カー)</td> <td>ほとんどの活動</td> <td>2004 年 3 月</td> <td>2002 年 3 月に購入</td> </tr> <tr> <td>2</td> <td>電子天秤</td> <td>6-1</td> <td>2004 年 12 月</td> <td></td> </tr> <tr> <td>3</td> <td>強制送風乾燥機</td> <td>6-1</td> <td>2005 年 1 月</td> <td></td> </tr> <tr> <td>4</td> <td>原子吸光計</td> <td>6-1</td> <td>未到着</td> <td></td> </tr> <tr> <td>5</td> <td>(植生分析用コピー機)</td> <td>ほとんどの活動</td> <td>(2004 年 1 月)</td> <td>リース</td> </tr> <tr> <td>6</td> <td>自動ポンプ式カロリメーター</td> <td>6-1</td> <td>未到着</td> <td></td> </tr> <tr> <td>7</td> <td>GPS</td> <td>3-1、3-2</td> <td>2004 年 3 月</td> <td></td> </tr> <tr> <td>8</td> <td>携帯用光合成測定装置</td> <td>5-1</td> <td>未到着</td> <td></td> </tr> <tr> <td>9</td> <td>C/N コーダー</td> <td>6-1</td> <td>未到着</td> <td>未申請</td> </tr> <tr> <td>10</td> <td>(ショランダー・ポンプ)</td> <td>5-1</td> <td>(2004 年 6 月)</td> <td>IDEMA の機材が貸与されている</td> </tr> <tr> <td>11</td> <td>(衛生画像 SPOT)</td> <td>1-1</td> <td>(2004 年 6 月)</td> <td>同上</td> </tr> <tr> <td>12</td> <td>スキャナー</td> <td>ほとんどの活動</td> <td>2004 年 6 月</td> <td></td> </tr> <tr> <td>13</td> <td>(携帯無線)</td> <td></td> <td></td> <td>必要なしと判断</td> </tr> <tr> <td>14</td> <td>気象観測装置</td> <td>3-2</td> <td>未到着</td> <td></td> </tr> <tr> <td>15</td> <td>ポロメーター</td> <td>5-1</td> <td>未到着</td> <td></td> </tr> </tbody> </table> | | ミニッツに記載された機材 | PDM の関連活動 | 到着時期 | 備考 | 1 | 四輪駆動車 (プロジェクト・カー) | ほとんどの活動 | 2004 年 3 月 | 2002 年 3 月に購入 | 2 | 電子天秤 | 6-1 | 2004 年 12 月 | | 3 | 強制送風乾燥機 | 6-1 | 2005 年 1 月 | | 4 | 原子吸光計 | 6-1 | 未到着 | | 5 | (植生分析用コピー機) | ほとんどの活動 | (2004 年 1 月) | リース | 6 | 自動ポンプ式カロリメーター | 6-1 | 未到着 | | 7 | GPS | 3-1、3-2 | 2004 年 3 月 | | 8 | 携帯用光合成測定装置 | 5-1 | 未到着 | | 9 | C/N コーダー | 6-1 | 未到着 | 未申請 | 10 | (ショランダー・ポンプ) | 5-1 | (2004 年 6 月) | IDEMA の機材が貸与されている | 11 | (衛生画像 SPOT) | 1-1 | (2004 年 6 月) | 同上 | 12 | スキャナー | ほとんどの活動 | 2004 年 6 月 | | 13 | (携帯無線) | | | 必要なしと判断 | 14 | 気象観測装置 | 3-2 | 未到着 | | 15 | ポロメーター | 5-1 | 未到着 | |
|---|---|--------------------------------------|---------------------------|--------------------------------------|---------------------------|-----|---|-------------------|---------|------------|---------------|---|------|-----|-------------|--|---|---------|-----|------------|--|---|-------|-----|-----|--|---|-------------|---------|--------------|-----|---|---------------|-----|-----|--|---|-----|---------|------------|--|---|------------|-----|-----|--|---|----------|-----|-----|-----|----|--------------|-----|--------------|-------------------|----|-------------|-----|--------------|----|----|-------|---------|------------|--|----|--------|--|--|---------|----|--------|-----|-----|--|----|--------|-----|-----|--|
| | ミニッツに記載された機材 | PDM の関連活動 | 到着時期 | 備考 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 四輪駆動車 (プロジェクト・カー) | ほとんどの活動 | 2004 年 3 月 | 2002 年 3 月に購入 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 電子天秤 | 6-1 | 2004 年 12 月 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 強制送風乾燥機 | 6-1 | 2005 年 1 月 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 原子吸光計 | 6-1 | 未到着 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | (植生分析用コピー機) | ほとんどの活動 | (2004 年 1 月) | リース | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 自動ポンプ式カロリメーター | 6-1 | 未到着 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | GPS | 3-1、3-2 | 2004 年 3 月 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 携帯用光合成測定装置 | 5-1 | 未到着 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | C/N コーダー | 6-1 | 未到着 | 未申請 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | (ショランダー・ポンプ) | 5-1 | (2004 年 6 月) | IDEMA の機材が貸与されている | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | (衛生画像 SPOT) | 1-1 | (2004 年 6 月) | 同上 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | スキャナー | ほとんどの活動 | 2004 年 6 月 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | (携帯無線) | | | 必要なしと判断 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 気象観測装置 | 3-2 | 未到着 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | ポロメーター | 5-1 | 未到着 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>4. 必要経費</p> | <p>これまでに、約 107,200 レアル (日本円にして約 429 万円) が現地業務費として支出された。</p> <p>表 e: 日本の会計年度別の現地業務費支出状況 (単位: レアル)</p> <table border="1"> <thead> <tr> <th>会計年度</th> <th>2002</th> <th>2003 (2003 年 11 月～ 2004 年 3 月)</th> <th>2004 (2004 年 4 月～12 月)</th> </tr> </thead> <tbody> <tr> <td>支出額</td> <td>0</td> <td>21,405</td> <td>85,843</td> </tr> </tbody> </table> | 会計年度 | 2002 | 2003 (2003 年 11 月～ 2004 年 3 月) | 2004 (2004 年 4 月～12 月) | 支出額 | 0 | 21,405 | 85,843 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 会計年度 | 2002 | 2003 (2003 年 11 月～ 2004 年 3 月) | 2004 (2004 年 4 月～12 月) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 支出額 | 0 | 21,405 | 85,843 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(2) ブラジル側の実績

2002 年 8 月 22 日調印のミニッツの添付文書による投入計画及び 2005 年 3 月 23 日の実績は以下に示すとおり。

表 2-2: ミニッツの投入計画及び実績⁶

| ミニッツの計画 | 実績 (2005 年 3 月 23 日現在) |
|----------------------------|---|
| 1. プロジェクト用の土地、建物、その他の施設の提供 | プロジェクトのためのオフィス・スペースは ESAM の動物技術学科の建物が提供され、ESAM の実験室もプロジェクト活動のために提供された。また、EMPARN の試験地がプロジェクトの観察プロットとして提供されている。 |
| 2. C/P と事務スタッフの配置 | プロジェクト管理及び技術分野の C/P は表 f 及び表 g の通り配置された。 |

⁶ 原文 (英語) は本調査ミニッツ Annex 3 を参照。

| | | | | | |
|---|---|----------------------------|--------------------------------------|--------------------------------|------------------------------|
| (C/P の分野) (1) プロジェクト・マネージャー (2) 植生 (3) 生態学 (4) 植物育種 (5) 造林 (6) 林学 (7) 土壌学 (8) 動物学 注: さらに事務スタッフ 員及び補助スタッフがブラジル側によって配置される | 表 f: プロジェクト管理の人員 | | | | |
| | | 肩書き | 名前 | 配置期間 | |
| | 1 | プロジェクト・ディレクター | Eugênio Cunha | 2003 年 11 月～ | |
| | 2 | アシスタント・プロジェクト・ディレクター | Geraldo Magela | 2003 年 11 月～ | |
| | 3 | プロジェクト・マネージャー | Ricardo Galvao* | 2003 年 11 月～ | |
| | 表 g: 技術分野の C/P ⁷ | | | | |
| | | 技術分野 | PDM/PO の担当活動 | 配置された C/P の名前 | 配置期間 |
| | 1 | 植生 | 1-1a~1-5a | Aldo Medeiros | 2003 年 11 月～ |
| | | | 1-1b~1-5b 3-2c, d 3-4,4-4, 4-5 | -Regina -Antonia Katia | -2005 年 3 月～ -2005 年 3 月～ |
| | 2 | 生態学 | 3-1 | (R. Galvao) | / |
| 5-1, 5-3 | | | -Maria Clarete -Augusto Camara | - 2005 年 3 月～ - 2005 年 3 月～ | |
| 3 | 植物育種 | 4-1, 4-2 | (R. Galvao) | / | |
| 4 | 造林 | 5-4~5-10 | J. Erivaldo | 2004 年 11 月～ | |
| 5 | 林学 | 5-4~5-10 | A. Camara | 2005 年 3 月～ | |
| 6 | 土壌学 | 3-2a,b 3-4 5-5-f | -Gustavo Duda ⁸ | 2004 年 8~9 月 2005 年 3 月～ | |
| 7 | 動物学 | 2-1, 4-3 5-2 6-1~6-4 | -Alexandre Braga -R. Galvao* | -2005 年 1 月～ -2003 年 11 月～ | |
| 8 | 気象学 | 3-3 | -Jose Espinola | 2005 年 3 月～ | |
| 3.必要経費 | これまで合計で約 15,900 レアル (約 6,260 米ドル) がローカルコストとして支出された。 表 h: ブラジルの会計年度 (1 月～12 月)別の支出状況 ⁹ (単位: レアル) | | | | |
| | | 2003 (11~12 月) | 2004 | 2005 (1~3 月) | |
| | プロジェクト車のメンテナンス費 | 0 | 2,800 | NA | |
| | プロジェクト車のディーゼル燃料費 | 0 | 4,800 | NA | |
| | プロジェクト・オフィスの電気、電話、インターネット代 | 4,700 | 3,600 | NA | |

⁷ 表 3-g 中において 2005 年 3 月付けで配置となっている C/P 7 名は、本調査団が ESAM 側と協議した際に任命された C/P で、全員が研究者/教官ある。新規 C/P については、調査団がモソロ滞在中に長期専門家及び JICA ブラジル事務所担当者との三者面談が行われ、活動の内容の確認等が行われた。

⁸ Duda 氏は 2004 年 8~9 月に土壌学の短期専門家の調査を補助したが、正式には C/P として任命されておらず、専門家帰国後は関連活動に携わっていなかった。なお、同氏は ESAM の研究課課長である。

⁹ 表 3-h の項目以外に、ブラジル側は C/P の出張旅費・日当なども負担しているが、積算が困難だという理由で表には含まれていない。

2-1-2 アウトプットの実績

(1)アウトプット 1 の実績

アウトプット 1（「RN 州の半乾燥地の植生と土壌の利用概況が明らかにされる」）の指標に対する実績は表 3-3 に示す通り。

表 3-3:アウトプット 1 の実績

| 指標 | 実績 |
|--|---|
| 1a:RN 州の半乾燥地の土地と植生の利用概況に関する技術レポート-1)土地利用図と分析レポート、2)植生図、及び3)有用樹種・草本種リストから成る-が作成される。 | 1a:RN 州の植生図 (1:2,000,000) 作成は進行中で、2005 年 3 月に完成見込みである。RN 州の土地利用に関する現地調査は進行中で、土地利用図及び分析レポートは 2005 年 6 月までに完成見込みである。RN 州の有用樹種・草本種のリストは既に作成された。上記情報を合わせた技術レポートはプロジェクト終了までにできると見込まれる。 |

(2)アウトプット 2 の実績

アウトプット 2（「RN 州半乾燥地の畜産の概況が明らかにされる」）の指標に対する実績は表 3-4 に示す通り。

表 3-4:アウトプット 2 の実績

| 指標 | 実績 |
|------------------------------|---|
| 2a: RN 州の家畜形態に関するレポートが作成される。 | 2a:RN 州の家畜形態のレポートは既に日本語で作成された。ポルトガル語の翻訳は 2005 年 5 月までに完了する見込みである。 |

(3)アウトプット 3 の実績

アウトプット 3（「試験プロット及び観察プロットの植生と劣化を含む自然的特色が明らかにされる」）の指標に対する実績は表 3-5 に示す通り。

表 3-5:アウトプット 3 の実績

| 指標 | 実績 | | | | | | | | | | | | |
|--|---|-----|------------------|----|----|---|------|----|--|---|------|-----|------------------|
| 3a:試験プロットの土壌・植生図が作成される 3b:研究者用マニュアルが作成される | <p>3a:ペドロ・アベリーノの試験プロットの土壌図(1:4,000)は既に作成された。植生図 (1:4,000) は作成中で 2005 年 5 月までに完成見込み。地形図も作成された。テラス・セカスの観察プロットについては、土壌・植生調査は 2005 年 6 月に実施され、図面は同年 7 月に作成される計画である。</p> <p>3b:植生調査のマニュアルは既に作成された。土壌調査のマニュアルは作成中で、2005 年 8 月までに完成見込みである。</p> <p>表 i: アウトプット 3 のマニュアル作成状況</p> <table border="1"> <thead> <tr> <th></th> <th>タイトル</th> <th>状況</th> <th>備考</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>植生調査</td> <td>完成</td> <td></td> </tr> <tr> <td>2</td> <td>土壌調査</td> <td>進行中</td> <td>-2005 年 8 月までに完成</td> </tr> </tbody> </table> | | タイトル | 状況 | 備考 | 1 | 植生調査 | 完成 | | 2 | 土壌調査 | 進行中 | -2005 年 8 月までに完成 |
| | タイトル | 状況 | 備考 | | | | | | | | | | |
| 1 | 植生調査 | 完成 | | | | | | | | | | | |
| 2 | 土壌調査 | 進行中 | -2005 年 8 月までに完成 | | | | | | | | | | |

(4)アウトプット 4 の実績

アウトプット 4（「試験プロットに関連する地域コミュニティにとって潜在的に有用な樹種・草本種が選定される」）の指標に対する実績は表 3-6 に示す通り。

表 3-6:アウトプット 4 の実績

| 指標 | 実績 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--------------------------------|--------------------|----|--------|---|---------|----------------------------|-----------|---|--------|---------------------------|-----------|---|-----------|-------------------------|-----------|---|-----------|--------------------------------|-----------|---|-------|--------------------------------|--------------------|---|-------------|--------------------------------|----|---|--------------|------------------------|----|---|--------------|----------------------------|----|---|---------|-----------------------------|----|
| <p>4a:地域住民に利用されている樹種・草本種が特定される</p> <p>4b:試験プロットでの研究のために潜在的有用樹種・草本種が選定される</p> | <p>4a:合計で 39 の樹種・草本種が特定された。</p> <p>4b:上記 39 種のうち、9 種が地域コミュニティにとっての潜在的有用種として選定された。</p> <p style="text-align: center;">表 j: 選定種のリスト</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>俗名</th> <th>学名</th> <th>潜在的な用途</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Aroeida</td> <td><i>Astronium urundeuva</i></td> <td>コミュニティの生活</td> </tr> <tr> <td>2</td> <td>Brauna</td> <td><i>Melanoxylon brauna</i></td> <td>コミュニティの生活</td> </tr> <tr> <td>3</td> <td>Caraibera</td> <td><i>Tabebuia caraiba</i></td> <td>コミュニティの生活</td> </tr> <tr> <td>4</td> <td>Catanduba</td> <td><i>Piptadenia moniliformis</i></td> <td>コミュニティの生活</td> </tr> <tr> <td>5</td> <td>Sabia</td> <td><i>Mimosa caesarpiniifolia</i></td> <td>コミュニティの生活 及び 畜産</td> </tr> <tr> <td>6</td> <td>Catingueria</td> <td><i>Caesarpinia gardneriana</i></td> <td>畜産</td> </tr> <tr> <td>7</td> <td>Feijao Bravo</td> <td><i>Erythrina fusca</i></td> <td>畜産</td> </tr> <tr> <td>8</td> <td>Flor de Seda</td> <td><i>Calotropia gigantea</i></td> <td>畜産</td> </tr> <tr> <td>9</td> <td>Leucena</td> <td><i>Leucaena leucosefara</i></td> <td>畜産</td> </tr> </tbody> </table> | | 俗名 | 学名 | 潜在的な用途 | 1 | Aroeida | <i>Astronium urundeuva</i> | コミュニティの生活 | 2 | Brauna | <i>Melanoxylon brauna</i> | コミュニティの生活 | 3 | Caraibera | <i>Tabebuia caraiba</i> | コミュニティの生活 | 4 | Catanduba | <i>Piptadenia moniliformis</i> | コミュニティの生活 | 5 | Sabia | <i>Mimosa caesarpiniifolia</i> | コミュニティの生活 及び 畜産 | 6 | Catingueria | <i>Caesarpinia gardneriana</i> | 畜産 | 7 | Feijao Bravo | <i>Erythrina fusca</i> | 畜産 | 8 | Flor de Seda | <i>Calotropia gigantea</i> | 畜産 | 9 | Leucena | <i>Leucaena leucosefara</i> | 畜産 |
| | 俗名 | 学名 | 潜在的な用途 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Aroeida | <i>Astronium urundeuva</i> | コミュニティの生活 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Brauna | <i>Melanoxylon brauna</i> | コミュニティの生活 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Caraibera | <i>Tabebuia caraiba</i> | コミュニティの生活 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Catanduba | <i>Piptadenia moniliformis</i> | コミュニティの生活 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Sabia | <i>Mimosa caesarpiniifolia</i> | コミュニティの生活 及び 畜産 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Catingueria | <i>Caesarpinia gardneriana</i> | 畜産 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Feijao Bravo | <i>Erythrina fusca</i> | 畜産 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Flor de Seda | <i>Calotropia gigantea</i> | 畜産 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Leucena | <i>Leucaena leucosefara</i> | 畜産 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>4c:潜在的有用樹種・草本種の研究者用植物図鑑が作成される</p> <p>4d:潜在的有用樹種・草本種の地域住民用リーフレットが作成される</p> | <p>4c:植物図鑑のフォーマットが作成された。9つの選ばれた種に関する必要な情報のほとんどは集められたが、(活動 6-1 で得られる)栄養分析に関するデータ及び植物の写真がまだである。図鑑はプロジェクト終了までに完成すると見込まれる。</p> <p>4d:上記カタログの簡易版であるリーフレットは、2005 年 7 月に作成予定である。</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(5)アウトプット 5 の実績

アウトプット 5 (「再植生技術 (選定樹種・草本種の育苗、植栽、及び管理) が試験プロットでの研究を通して開発される」) の指標に対する実績は表 3-7 に示す通り。

表 3-7:アウトプット 5 の実績

| 指標 | 実績 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|------------|------------------------------------|----|----|---|------------|------------|------------------------------------|---|--------|----|--|---|------|------------|-----------------------------------|---|------|------------|-----------------------------------|---|----|------------|-----------------------|---|---------|-------|-------------------|
| <p>5a:試験プロットの周辺地域の再植生に適した有用樹種・草本種が推薦される</p> <p>5b:再植生に関する研究者用マニュアルが作成される</p> | <p>5a:アウトプット 4 で選定された 9 種の発芽試験及び苗木生産が進行中。苗木の植栽は 2005 年 3~4 月に計画されている。半年ごとに行う生存率・成長率のモニタリングは 2005 年 8 月までに 1 回しか行えず、プロジェクト終了までに適正樹種を推薦することは不可能である。</p> <p>5b:ほとんどのマニュアルはプロジェクト終了までに完成する見込みである。</p> <p style="text-align: center;">表 k:アウトプット 5 のマニュアル作成状況</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>タイトル</th> <th>状況</th> <th>備考</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>現存量と生産性の推定</td> <td>まだ開始されていない</td> <td>2005 年 6 月に英語版が 8 月にポルトガル語版が作成される。</td> </tr> <tr> <td>2</td> <td>採食行動調査</td> <td>完成</td> <td></td> </tr> <tr> <td>3</td> <td>発芽試験</td> <td>まだ開始されていない</td> <td>2005 年 7 月に英語版、8 月にポルトガル語版が作成される。</td> </tr> <tr> <td>4</td> <td>苗木生産</td> <td>まだ開始されていない</td> <td>2005 年 5 月に英語版、7 月にポルトガル語版が作成される。</td> </tr> <tr> <td>5</td> <td>植栽</td> <td>まだ開始されていない</td> <td>2005 年 8 月に英語版が作成される。</td> </tr> <tr> <td>6</td> <td>生存率・成長率</td> <td>まだ開始さ</td> <td>英語版・ポルトガル語版が 2005</td> </tr> </tbody> </table> | | タイトル | 状況 | 備考 | 1 | 現存量と生産性の推定 | まだ開始されていない | 2005 年 6 月に英語版が 8 月にポルトガル語版が作成される。 | 2 | 採食行動調査 | 完成 | | 3 | 発芽試験 | まだ開始されていない | 2005 年 7 月に英語版、8 月にポルトガル語版が作成される。 | 4 | 苗木生産 | まだ開始されていない | 2005 年 5 月に英語版、7 月にポルトガル語版が作成される。 | 5 | 植栽 | まだ開始されていない | 2005 年 8 月に英語版が作成される。 | 6 | 生存率・成長率 | まだ開始さ | 英語版・ポルトガル語版が 2005 |
| | タイトル | 状況 | 備考 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 現存量と生産性の推定 | まだ開始されていない | 2005 年 6 月に英語版が 8 月にポルトガル語版が作成される。 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 採食行動調査 | 完成 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 発芽試験 | まだ開始されていない | 2005 年 7 月に英語版、8 月にポルトガル語版が作成される。 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 苗木生産 | まだ開始されていない | 2005 年 5 月に英語版、7 月にポルトガル語版が作成される。 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 植栽 | まだ開始されていない | 2005 年 8 月に英語版が作成される。 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 生存率・成長率 | まだ開始さ | 英語版・ポルトガル語版が 2005 | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | |
|--|--|-------|------------|
| | モニタリング | れていない | 年7月に作成される。 |
| 5c:再植生システムに関する技術レポート-牧養力に関する情報を含む-が作成される | 5c:再植生システムに関する技術レポートは関連技術が確立した後に作成されるものであり、プロジェクト終了までには作成できない。 | | |
| 5d:再植生方法に関する地域住民用リーフレットが作成される | 5d:再植生方法の普及資料は関連技術が確立されてから作成されるので、プロジェクト終了までには作成できない。 | | |

(6)アウトプット6の実績

アウトプット6（「既存植生地及び再植生地双方における持続的飼料生産技術が試験プロットでの研究を通して開発される」）の指標に対する実績は表3-8に示す通り。

表3-8:アウトプット6の実績

| 指標 | 実績 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------------|---|-----------|-----------|-------------------------|------|-----------------|------|--------------|----|----|-------------------------|----|---------------|----|------|------|---|--------|-----------|-----------|-------------------------|---|--------------|----|----|----|---|----------|----|----|----|---|------------|----|----|-------------------------|---|---------------|----|----|----|
| 6a:試験プロットの周辺地域の畜産に適した飼料用樹種/草種が推薦される | <p>6a:潜在的に畜産に適した飼料樹種・草本種の餌やり試験は1年かかり、2005年8月までに完了しないので、プロジェクト終了までに適正種を推薦することは不可能である。</p> <p>表1: 必要な分析と試験のスケジュール</p> <table border="1"> <thead> <tr> <th></th> <th>種の名前</th> <th>消化試験</th> <th>栄養分析</th> <th>試験プロットにおける餌やり試験</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Fejao Brabo*</td> <td>完了</td> <td>完了</td> <td>2005年の雨期の終わり(5~7月)から1年間</td> </tr> <tr> <td>2</td> <td>Flor de Seda*</td> <td>完了</td> <td>完了</td> <td>同上</td> </tr> <tr> <td>3</td> <td>Sabia*</td> <td>2005年7~9月</td> <td>2005年7~9月</td> <td>2006年の雨期の終わり(5~7月)から1年間</td> </tr> <tr> <td>4</td> <td>Catingueria*</td> <td>同上</td> <td>同上</td> <td>同上</td> </tr> <tr> <td>5</td> <td>Leucena*</td> <td>同上</td> <td>同上</td> <td>同上</td> </tr> <tr> <td>6</td> <td>Algaroba**</td> <td>完了</td> <td>完了</td> <td>2005年の雨期の終わり(5~7月)から1年間</td> </tr> <tr> <td>7</td> <td>Dried cashu**</td> <td>完了</td> <td>完了</td> <td>同上</td> </tr> </tbody> </table> <p>*=アウトプット4で選定された種 **=アウトプット6で追加的に選定された種。</p> | | 種の名前 | 消化試験 | 栄養分析 | 試験プロットにおける餌やり試験 | 1 | Fejao Brabo* | 完了 | 完了 | 2005年の雨期の終わり(5~7月)から1年間 | 2 | Flor de Seda* | 完了 | 完了 | 同上 | 3 | Sabia* | 2005年7~9月 | 2005年7~9月 | 2006年の雨期の終わり(5~7月)から1年間 | 4 | Catingueria* | 同上 | 同上 | 同上 | 5 | Leucena* | 同上 | 同上 | 同上 | 6 | Algaroba** | 完了 | 完了 | 2005年の雨期の終わり(5~7月)から1年間 | 7 | Dried cashu** | 完了 | 完了 | 同上 |
| | 種の名前 | 消化試験 | 栄養分析 | 試験プロットにおける餌やり試験 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Fejao Brabo* | 完了 | 完了 | 2005年の雨期の終わり(5~7月)から1年間 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Flor de Seda* | 完了 | 完了 | 同上 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Sabia* | 2005年7~9月 | 2005年7~9月 | 2006年の雨期の終わり(5~7月)から1年間 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Catingueria* | 同上 | 同上 | 同上 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Leucena* | 同上 | 同上 | 同上 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Algaroba** | 完了 | 完了 | 2005年の雨期の終わり(5~7月)から1年間 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Dried cashu** | 完了 | 完了 | 同上 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6b:持続的飼料生産に関する研究者用マニュアルが作成される | <p>6b:ほとんどのマニュアルは既に英語・ポルトガル語で作成された。</p> <p>表 m: アウトプット5のマニュアル作成状況</p> <table border="1"> <thead> <tr> <th></th> <th>タイトル</th> <th>状況</th> <th>備考</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>栄養分析</td> <td>完成</td> <td></td> </tr> <tr> <td>2</td> <td>消化試験</td> <td>完成</td> <td></td> </tr> <tr> <td>3</td> <td>飼料生産</td> <td>一部完成</td> <td></td> </tr> <tr> <td>4</td> <td>餌やり試験</td> <td>完成</td> <td></td> </tr> </tbody> </table> | | タイトル | 状況 | 備考 | 1 | 栄養分析 | 完成 | | 2 | 消化試験 | 完成 | | 3 | 飼料生産 | 一部完成 | | 4 | 餌やり試験 | 完成 | | | | | | | | | | | | | | | | | | | | | |
| | タイトル | 状況 | 備考 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 栄養分析 | 完成 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 消化試験 | 完成 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 飼料生産 | 一部完成 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 餌やり試験 | 完成 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6c:持続的飼料生産に関する技術レポートが作成される | <p>6c:持続的飼料生産に関する技術レポートの作成はプロジェクト終了までに始めることができない。</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

2-1-3 プロジェクト目標の実績

プロジェクト目標（「リオ・グランデ・ノルテ（RN）州の半乾燥地において、有用樹種・草本種を

利用した荒廃地復旧のための適正技術が利用可能となる」)の指標に対する実績は表 3-9 に示す通り。

表 3-9:プロジェクト目標の実績

| 指標 | 実績 |
|---|--|
| 1: ESAM の C/P がプロジェクトを通して移転された技術を活用し、RN 州において関連研究を独自で継続することができる 2: プロジェクトによって作成された地域住民のためのリーフレットが IDEMA 及び他の関連機関に採用される | 1: プロジェクトの活動は 2003 年 11 月に始まったため、ESAM の C/P は RN 州で関連研究を継続するための十分な技術的知識とスキルを習得していない。 2:リーフレットの作成はプロジェクトの終了までに完了しない。 |

2-2 プロジェクトの実施プロセス¹⁰

2-2-1 活動の進捗状況

(1) 全体

ミニッツの上ではプロジェクトは 2002 年 9 月開始だが、実際に活動が始まったのは 2003 年 11 月となった。長期専門家の派遣が日伯間の査証問題の理由で 1 年 2 ヶ月遅れたこと、及び専門家不在の間、ブラジル側が活動を始めなかった事による。

(2) アウトプット 1 の活動

アウトプット 1 の活動の開始は、(1) に書かれた理由により遅れる結果となり、活動の進捗は以下の理由によりさらに遅れている。

- 全体:ESAM において 12 月～2 月は夏季休暇にあたるため、長期専門家の現地到着後ただちに本格的活動を開始することができなかった。
- 活動:1-2,1-3,1-4: プロジェクト車両（四輪駆動車）の現地到着は 2004 年 3 月まで遅れた。また、植生分野の C/P が配置されなかったため、長期専門家は（植生分野の）活動のほとんどを一人で行わねばならなかった。

しかしながら、ほとんどの活動は既に完了しており、すべての活動は 2005 年 8 月までに終了すると見込まれる。

(3) アウトプット 2 の活動

アウトプット 2 の活動の開始は(1)に書かれた理由により遅れる結果となった。しかしながら、ほとんどの活動は既に完了しており、すべての活動は 2005 年 8 月までに終了すると見込まれる。

(4) アウトプット 3 の活動

アウトプット 3 の活動の開始は、(1) に書かれた理由により遅れる結果となり、一部の活動の進捗

¹⁰原文（英語）は本調査ミニッツ Annex 4（実施プロセス）を参照。また、個々の活動の進捗状況の詳細は、本調査ミニッツ Annex 2（PO と進捗状況）を参照。

は以下の理由によりさらに遅れている。

- 活動 3-1: ペドロ・アベリーノの試験プロットは 2003 年 12 月に選ばれたが、試験プロットを柵で囲む作業が 2004 年 9 月まで完了しなかった。
- 活動 3-2: 試験プロットの柵設置が完成していなかったため、植生調査は 2004 年の雨季（1 月～7 月）に行うことができず、調査は 2005 年の雨季に延期された。また、また、植生分野の C/P が配置されなかったため、長期専門家は（植生分野の）活動のほとんどを一人で行わねばならなかった。
- 活動 3-3: 気象観測装置が到着しないため、気象調査が開始できない状況にある。

しかしながら、ほとんどの活動は既に完了しており、すべての活動は 2005 年 8 月までに終了すると見込まれる。

(5) アウトプット 4 の活動

アウトプット 4 の活動の開始は (1) に書かれた理由により遅れる結果となった。しかしながら、ほとんどの活動は既に完了しており、すべての活動は 2005 年 8 月までに終了すると見込まれる。

(6) アウトプット 5 の活動

アウトプット 5 の活動の開始は (1) に書かれた理由により遅れる結果となった。一部の活動は、以下の理由によりさらに遅れている。アウトプット 3 のところで述べたように、2004 年の雨季に試験プロットで行われる予定だった活動は、柵の設置が 2004 年 9 月まで完了しなかったため、行うことができなかった。これらの活動の実施は 2005 年の雨季に延期された。

活動 5-1～5-6 は 2005 年 8 月までに終了する見込みだが、活動 5-7 (植栽技術の実証)、5-8 (研究者マニュアルの作成)、5-9 (技術レポートの作成)、及び 5-10 (地元住民用リーフレットの作成) は終わらない見込みである。しかし、専門家派遣が遅れた 1 年 2 ヶ月間プロジェクトを延長すれば活動は完了する見込みである。

(7) アウトプット 6 の活動

アウトプット 6 の活動の開始は (1) に書かれた理由により遅れる結果となった。活動は以下の理由によりさらに遅れている。

- アウトプット 4 で選ばれた樹種の飼葉は 2004 年の雨季の終り（5 月～7 月）に採集される予定だった。しかしながら、JICA の現地業務費の支出の遅れにより、必要なフィールド活動を行うことができなかった。2 種の飼葉は EMPARN (RN 州農牧研究公社) から入手できた。残りの 3 種については 2005 年の雨季まで採集活動を延期せねばならなかった。

この結果、上記 3 種に関する活動は 2005 年 8 月までに終了することができない見込みである。しかし、専門家派遣が遅れた 1 年 2 ヶ月間プロジェクトを延長すれば活動は完了する見込みである。

2-2-2 モニタリング・プロセス

プロジェクト活動の開始は 1 年 2 ヶ月遅れたにも関わらず、プロジェクトのデザインは再検討されなかった。ミニッツに添付された PDM、実施スケジュール、短期専門家の派遣・C/P 研修計画も修正されなかった。さらに活動のターゲット、担当者、必要な投入、スケジュールなどを特定した PO

もミニッツ署名時から作成されていなかった。また、ミニッツにおいて組織することが規定されていた合同調整委員会も構成されていなかった。

プロジェクトモニタリングのツールとして、プロジェクトは半年ごとのレポートを JICA 本部に、四半期ごとのレポートをブラジル事務所に遅れずに提出してきた。しかし、PDM が再検討されず、PO が作成されていなかったため、関係者すべてにとって、実施プロセスに共通の理解をもち、必要な行動をとることが困難であった。

2-2-3 コミュニケーション

プロジェクト内のコミュニケーションはスムーズであった。ESAM において配置された C/P の人数はこれまでわずか 2 人であり、彼らは専任であった。また、彼らのオフィスは動物技術学科の建物内のプロジェクト・オフィスの隣に位置している。定期的な会合は公的には開催されていないが、協議・打ち合わせは日常的に行われている。ナタールに位置している IDEMA とのコンタクトは必要なときに電話や電子メールを通して行われている。また、長期専門家とプロジェクト・マネージャーは IDEMA 本部を少なくとも月 1 回は訪問し、プロジェクトに関する事項を協議している。

必要分野の C/P が 2005 年 3 月に指名されたが、彼らは様々な専門分野の研究者で、そのオフィスも別の建物にある。定期的会合を開くなどの促進的手段がとられない限り、コミュニケーションは以前のように容易にはいかない可能性がある懸念される。

第3章 評価結果

3-1 評価5項目の評価結果¹¹

3-1-1 妥当性

(1)必要性

1)ブラジルのニーズとの整合性

スーパー・ゴール（「ブラジル東北部（カアチンガ）において、半乾燥地の植生と土壌の潜在的な生産力を利用するための技術が普及される」）及び上位目標（「リオ・グランデ・ノルテ（RN）州の半乾燥地において、有用樹種・草本種を利用した荒廃地復旧のための適正技術が普及される」）はブラジルのニーズに適合している。RN州を含むカアチンガはブラジル国内6箇所の干ばつ地域の一つに指定されており、また、最貧困地域の一つである。特に、半乾燥地では、盛んなレンガ製造用の粘土や燃材の過剰採取、過放牧等のために、森林減少と土壌劣化が急速に進んでおり、既に貧しい地域住民の生活に悪影響を与えている。カアチンガ半乾燥地の荒廃地域を持続的方法で復旧することはブラジル国の緊急ニーズの一つである。

2) ターゲット・グループ (ESAM 及び IDEMA)のニーズとの整合性

- プロジェクト目標（「リオ・グランデ・ノルテ（RN）州の半乾燥地において、有用樹種・草本種を利用した荒廃地復旧のための適正技術が利用可能となる」）は、プロジェクトに技術分野のC/Pのほとんどを提供している主要実施機関のESAMの組織的ニーズに合致している。ESAMは1967年に創設された半乾燥地農業に関する教育と研究を担う連邦機関である。さらに、ESAMには、半乾燥地に関する多様な分野に関するより高度な教育・研究実施のために連邦半乾燥地農業大学に移行する計画がある。計画は既に教育省で承認され、移行に関する法案が今期国会に提出されている。連邦大学になったとしても、プロジェクトの活動にマイナスに作用することはないが、大学全体における予算の増加もまた期待できないらしく、プラスの影響も大きくはない。
- プロジェクト目標は、もう一方の実施機関でありプロジェクト・ディレクター及びアシスタント・プロジェクト・ディレクターを出しているIDEMAの組織ニーズとも一致している。IDEMAは、州政府機関であり、その責務には、(a) RN州に関する技術的統計的情報を産出・普及すること、(b)環境資源の保存・保全・活用・合理的利用・復旧に関する州の政策を策定、調整、実施、監督すること等がある。IDEMAはRN州の砂漠化防止の責任機関である。

(2) 優先度

1) ブラジルの国家政策との適合性

- 上位目標はブラジルの国家政策に適合している。砂漠化防止は、1996年に発効した「国連砂漠化防止条約」の締結国であるブラジルの国家的コミットメントである。1997年には「国家砂漠化防止政策」が承認され、2004年には「砂漠化防止及び干ばつの影響緩和のための

¹¹ 原文（英語）は本調査ミニッツ Annex5 を参照。

国家行動計画」が策定された。また、カアチンガは、優先順位の与えられる六大干ばつ地域の一つに公的に指定されている。

- 砂漠化防止は RN 州政府にとっても、2004 年～2007 年の多年度計画に含まれている重要課題のひとつである。

2) 日本の ODA 政策との適合性

- 上位目標及びプロジェクト目標は対ブラジル国別事業実施計画とも合致している。それによれば、環境保全は 4 つの優先課題のひとつである。同国東北部の砂漠化は地球的規模で影響を与える可能性があり、国際的対処と援助を必要とする環境問題のひとつに挙げられている。また、1998 年 3 月の二国間協議において、地域・所得格差の是正及び貧困軽減のために、日本の援助の重点は、いまだに低開発である同国北部及び東北部に置かれることで合意されている。

(3) 手段としての適切性

1) プロジェクト・デザイン

- 2002 年 8 月に調印されたミニッツに添付されている当初のプロジェクト・デザイン・マトリックス (PDM) の一部の表現はあいまいであり、一部の構成要素の間には論理的関係に問題があった。その結果、専門家、C/P、及び他の関係者は文章が何を意味するのか明確に理解することが困難であった。終了時評価を前に、編集上の修正が行われた。
- 終了時評価時点まで PO が作成されておらず、本プロジェクトのタイムフレームの適切さを判断するのは困難である。

3-1-2 有効性

(1) プロジェクト目標の達成度

プロジェクト目標（「リオ・グランデ・ノルテ (RN) 州の半乾燥地において、有用樹種・草本種を利用した荒廃地復旧のための適正技術が利用可能となる」）の達成の度合いは計画より遅れている。プロジェクトの活動は長期専門家の派遣が 1 年 2 ヶ月遅れたために 2003 年 11 月に始まったばかりである。このこと及び実施プロセスや次項 (3-1-3) の「効率性」に記されるその他の理由により、最も重要なアウトプット (アウトプット 5 及びアウトプット 6) は一部しか達成されないだろう。さらに、ESAM の C/P は任命されたばかりである。従前から配置されていた C/P の技術的能力は着実に向上しているが、2005 年 8 月までに ESAM の C/P が RN 州で関連研究を独自で継続するに十分な技術的知識やスキルを身につけることはないと思われる。プロジェクト目標はプロジェクト終了までに一部しか達成できないだろう。なお、プロジェクト目標にいたる外部条件（「C/P が ESAM と IDEMA に留まる」）に変化はなかった。

(2) アウトプットのプロジェクト目標への貢献

アウトプットの達成度は計画より遅れているが、プロジェクト目標の達成に対して貢献してきた。アウトプットが計画通り達成されていれば、プロジェクト目標は 2005 年 8 月までに達成されていたと思われる。

3-1-3 効率性

(1) アウトプットの達成度

1) アウトプット 1

アウトプット 1（「RN 州の半乾燥地の植生と土壌の利用概況が明らかにされる」）の達成度は計画より遅れている。しかしながら、必要な情報とデータのほとんどは既に収集され、RN 州半乾燥地の土地・植生利用概況のレポートはプロジェクト終了までに完成すると見込まれる。アウトプット 1 はプロジェクト終了までに達成され、プロジェクト目標の達成に貢献すると思われる。

2) アウトプット 2

アウトプット 2（「RN 州の畜産の概況が明らかにされる」）の達成度は計画より遅れている。しかしながら、RN 州の家畜形態のレポートは既に日本語で作成されており、ポルトガル語訳は 2005 年 5 月には完成する見込みである。アウトプット 2 はプロジェクト終了までに達成され、プロジェクト目標の達成につながると思われる。

3) アウトプット 3

アウトプット 3（「試験プロット及び観察プロットの植生と劣化を含む自然的特色が明らかにされる」）の達成度は計画より遅れている。ペドロ・アベリーノの試験プロットについては土壌図・植生図の作成が進行中だが、テラス・セカスの観察プロットの現地調査はまだ開始されておらず、気象観測も始まっていない。しかしながら、すべての活動は 2005 年 8 月までに完了する見込みであり、アウトプット 3 はプロジェクト終了までに達成され、プロジェクト目標の達成につながると思われる。

4) アウトプット 4

アウトプット 4（「試験プロットに関連する地域コミュニティにとって潜在的に有用な樹種・草本種が選定される」）の達成度は計画より遅れている。しかしながら、試験プロットにおける研究のために潜在的な有用樹種・草本種は選定され、選定された種の植物図鑑及びリーフレットの作成は 2005 年 8 月までに完成見込みである。アウトプット 4 はプロジェクト終了までに達成され、プロジェクト目標の達成につながると思われる。

5) アウトプット 5

アウトプット 5（「再植生技術（選定樹種・草本種の育苗、植栽、及び管理）が試験プロットでの研究を通して開発される」）の達成度は計画より遅れている。一部の研究者用マニュアルは既に作成されたが、選定樹種の植栽技術の実証は 2005 年 3 月～4 月にしか始まらず、2005 年 8 月までに地域の再植生に適した樹種を推薦することは不可能である。投入されたインプットは十分に活用されたが、アウトプット 5 はプロジェクト終了までに一部しか達成されない見込みである。しかし、専門家派遣が遅れた 1 年 2 ヶ月間プロジェクトを延長すればアウトプットは達成される見込みである。

6) アウトプット 6

アウトプット 6（「既存植生地及び再植生地双方における持続的飼料生産技術が試験プロットでの研究を通して開発される」）の達成度は計画より遅れている。一部の研究者用マニュアルは作成されたが、潜在的に有用な樹種の家畜への餌やり試験には1年かかり、2005年8月までに完了せず、2005年8月までに地域の畜産に適した飼料用樹種・草本種を推薦することは不可能である。投入されたインプットは十分に活用されたが、アウトプット 6 はプロジェクト終了までに一部しか達成されない見込みである。しかし、専門家派遣が遅れた1年2ヶ月間プロジェクトを延長すればアウトプットは達成される見込みである。

(2) 投入

1) 日本側

(a) 長期専門家

- タイミング: 派遣のタイミングは不適切であった。プロジェクト唯一の長期専門家である荒地緑化技術分野の専門家の派遣が、ビザ発行の遅れを含む手続き上の理由で1年2ヶ月遅れた。このため、専門家がプロジェクトサイトに到着したのは2003年11月であり、このときまでプロジェクトの活動は始められなかった。しかも、12月～2月はESAMの夏季休暇にあたり、本格的な活動を直ちに開始することができなかった。
- 質: 専門家の技術レベル及び専門性は適切であると考えられる。
- 量: プロジェクトは再植生及び飼料生産という2つの技術分野から成るが、一人の長期専門家がこれら異なる2分野をカバーするのは困難である。長期専門家がもう一人計画・派遣されていればより効率的だったと思われる。

(b) 短期専門家

- タイミング: ほとんどの派遣のタイミングは適切であった。ただし、動物学の専門家の場合、2回目の派遣時の最初の1ヶ月はC/Pが日本で研修を受けていたため不在だった。また、派遣期間(10月～2月)は一部ESAMの夏季休暇と重なった。C/Pが休暇を取らなかったため、関連活動にさらなる遅れはなかったが、派遣時期が実際より早ければより効率的だったと思われる。
- 質: 適切な技術レベルと経験をもった専門家が派遣された。
- 量: 量的にはあまり適切ではなかった。ミニッツに記載されている当初計画では、短期専門家は3ヶ月以上派遣されることになっていたが、ほとんどの場合、派遣予定の専門家の都合が主な原因で派遣期間は1ヶ月未満であった。このため、想定されていた活動を短縮された期間で完了することができず、長期専門家がフォローせねばならないケースがままあった。短期専門家の派遣期間がより長ければより効率的だったと思われる。

(c) C/P 研修

- タイミング: 適切であった。これまで、3名のC/Pが2004年10～11月の間に1ヶ月の研修に送られた。この時期は、フィールドでの調査が行われない乾季の中盤にあたる。
- 質: C/P研修の分野と内容は適切であった。

- 量: 研修期間は適切であったと考えられる。
- 活用: C/P は日本で得た知識と技術をプロジェクトの活動に活用している。

(d)機材

- タイミング: 機材供与のタイミングはあまり適切ではなかった。電子天秤や強制送風乾燥機は関連活動の開始前に供与されたが、一方で、車輛及び GPS は 2004 年 3 月まで現地に届かなかった。試験プロットと観察プロットの気象観測（活動 3-3）に必要な気象観測装置、栄養分析（活動 6-1）に必要な原子吸光計は手続きに遅れが生じているため、いまだ到着していない。
- 量: 供与機材の量はおおむね適切である。ただし、供与予定であった「植生分析用コピー機」はこれまでリース契約で活用されていた。コピー機は終了後の活用も考えられることから、新たに調達を行うこととした。
- 質: 供与機材の質はおおむね適切である。しかしながら、リースされたコピー機のスペックは植生分析には不十分であった。
- 活用: すべての供与機材はプロジェクトの活動実施に不可欠であり、十分に活用されている。

(e)必要経費（現地業務費）

- タイミング: 支出のタイミングはおおむね適切であったが、2004 年 4～6 月期の支出が遅れた。この結果、ペドロ・アベリーノの試験プロットの柵設置が 2004 年 9 月まで完成せず、同年の雨季（1 月～7 月）に予定されていた活動は 2005 年の雨季に延期されねばならなかった。
- 量: おおむねプロジェクトの申請した金額が支出された。

2) ブラジル側

(a) 土地、建物、その他の施設

- タイミング: 施設利用に関するタイミングはおおむね適切であった。2003 年 11 月に長期専門家が到着して以来、ESAM の動物技術学科の建物の一室がプロジェクト・オフィスとして提供された。実験室と備品もプロジェクトは必要なときに利用することができた。テラス・セカスの EMPARN の試験地もプロジェクト活動に間に合うように提供された。
- 質: プロジェクト・オフィスについては、エアコン、電話兼ファックス、及び LAN が提供されたが、雨季には停電によりしばしば利用不可能となる。また、国際電話回線がないため、国際電話をかけるときには携帯電話を使っている。国際ファックスを JICA 本部に送るときには、プロジェクトはまず JICA ブラジル事務所にファックスを送り、転送してもらわねばならない。この件については、2005 年 4 月にプロジェクトがブラジル事務所に移管されるので、今後は問題とはならないと思われる。

(b)C/P の配置

- タイミング: ミニッツに記された計画によれば、7 分野の C/P（植生、生態学、植物育種、造林、林学、土壌学、及び動物学）が配置されることになっている。動物学分野の専任の C/P

1名（兼プロジェクト・マネージャー）が2003年11月の長期専門家着任時に配置され、造林に関する活動が始まる2004年11月には、造林分野の専任C/Pが配置された。動物学分野の本格的活動が開始された2005年1月には同分野の別のC/Pが配置された。しかしながら、植生、生態学、植物育種、土壌学及び林学C/Pは2005年3月中旬まで任命されなかった。

- 質: これまで専門家と作業をしてきたESAMのC/Pは、研究者1名及び農業技師2名である。新規に任命されたC/Pは適切な技術分野の研究者である。
- 量: 2005年3月中旬まではC/Pの人数は十分とはいえなかった。多くの技術分野でC/Pが不在だったため、動物学のC/Pが、様々な技術分野の活動実施にあたって、しばしば専門家を補佐してきた。適切な技術分野の必要数のC/Pが2005年3月に任命されたので、状況は改善すると期待される。

(c)必要経費（ローカルコスト）

- タイミング: 支出のタイミングはおおむね適切であった。
- 量: ESAMはプロジェクトオフィスの電気・電話・インターネット代及びプロジェクト車輛のメンテナンス・燃料費を負担した。

3) 外部条件・前提条件

アウトプットにいたる外部条件に変化はない。本プロジェクトのPDMの前提条件として明記されていないが、プロジェクトの進捗に大きな影響を与えたC/Pの配置や長期専門家の到着などの条件が事前に十分検討、協議される必要があった。

4) 他の関連案件との連携

RN州では世銀とGTZが小農支援のプログラムを実施しているが再植生や持続的飼料生産分野で活動しているドナーは存在しない。

3-1-4 インパクト

(1) 上位目標レベルのインパクト

プロジェクト終了までにプロジェクト目標は一部しか達成されず、上位目標の達成度を予測することは困難である。なお、外部条件（「厳しい干ばつが起こるなど気候が激変しない」）に変化はない。

(2) その他のインパクト

1. ESAMが持続的飼料生産により関心をもつようになり、敷地内に5ヘクタールの飼料樹種用試験農場を設けることを決めた。担当研究者は既に任命され、地拵えが進行中である。ESAMは今後この農場を10ヘクタールに拡大する計画がある。
2. ESAMの動物技術学科の動物栄養実験室に、最新の消化試験・栄養分析用機材が設置されたが、プロジェクトが機材を使用しないときには、教官や学生が研究に使うことが許可されている。学生たちのインセンティブは向上し、彼らの研究能力も向上した。
3. 活動3-1でペドロ・アベリーノの試験プロットの土壌調査を補助したESAMの作物学科の2名は、そのときに短期専門家から移転された分析技術及び試験プロットで採集した土壌サン

プルを利用して、土壌特性に関する卒論を書いた。長期専門家は彼らの卒論の共同アドバイザーを務めた。

3-1-5 自立発展性

(1) 組織・制度的側面

1) 政策支援

「妥当性」で記したように、砂漠化防止はブラジルの国家的コミットメントである。プロジェクトに関連する活動への政策的支援は今後も継続すると思われる。

2) C/P の配置

プロジェクトの C/P は公務員であり、雇用は保証されている。ほとんどの C/P は各技術分野の研究に携わり続けると思われるが、ESAM は荒廃地復旧分野の明確な研究計画を立てておらず、プロジェクト終了後に C/P が同分野の技術開発に継続して配置されるかどうかは不確定である。

3) ESAM/IDEMA の管理能力

ESAM 及び IDEMA はプロジェクトを適切に管理してきた。

4) 他機関との連携

ESAM は EMPARN, EMATER、EMBRAPA、及び INSA¹²と良好な関係を構築している。EMPARN と EMATER の連絡事務所が ESAM の構内にある。EMPARN はテラス・セカスの試験地をプロジェクトの試験プロットとして提供し、また、プロジェクトに一部の選定樹種の種を無料で提供してきた。EMBRAPA 半乾燥地支局の一部の研究者は ESAM のポスト・グラジュエートの学生を指導している。また、ESAM は飼料に関する 2 年間の研究プロジェクトを INSA の財政支援を得て行うことを考えており、その合意書は 3 ヶ月以内に調印される見込みである。実現すれば ESAM は研究者と 300 ヘクタールの試験地を提供し、INSA は 5 万米ドルを提供することになる。一方、IDEMA は環境資源の保存・保全・活用・合理的利用・復旧に関する政策の調整を担当する州政府機関であり、関連機関との連携はプロジェクト終了後も継続すると見込まれる。

(2) 財政的側面

ESAM の財政状況は厳しい。プロジェクトのために、ESAM は年間約 11,000 レアルをローカルコストとして支出しているが、プロジェクト専用車の任意保険料のためにさらに約 6,000 レアルを支払う余裕がない。さらに、プロジェクトが終了すれば、現在日本側がもっている試験プロット及び苗畑の維持管理費用は ESAM の負担となる。仮に ESAM の連邦半乾燥地農業大学 (UFERSA) への移行が実現しても、研究・技術開発に関する費用は連邦予算からは支出されない。必要が生じれば、ESAM は、FNE (東北部法定融資基金)、CNPq (国家科学・技術開発評議会)、ブラジル東北銀行、EMBRAPA、INSA 等の国内の資金支援機関から研究資金を得る可能性を探ることが可能である。

(3) 技術的側面

1) C/P の技術的能力

¹² 現政権下の 2003 年 12 月に設立された、科学技術省の組織である。

C/P は再植生・持続的飼料生産の研究にモチベーションがあるとみられる。技術開発の方法は効果的に C/P に移転されており、研究者用マニュアルも一部はすでに完成している。C/P の技術的能力は着実に向上しているように思われる。しかし、1 年 10 ヶ月は関連分野の研究を独自で行うのに十分な技術的知識・スキルを得る期間としては十分ではない。

2) 移転された技術の普及・活用

移転されつつある技術と方法は再植生・持続的飼料生産に関わる技術開発にとって不可欠であり、今後も関連研究に活かされるだろう。ESAM の C/P は、また、得られた知識・スキルを講義や研修コースを通して学生や普及員に伝えることが可能である。プロジェクトによって開発された方法は、EMATER、IDEMA、INSA 等との連携の下、地域住民にリーフレットを通して普及することが考えられている。しかしながら、再植生・持続的飼料生産に関わる技術開発の戦略あるいは研究計画はまだ明確ではない。

3) 供与機材の活用・維持管理

C/P は供与機材を適切に操作し、保守しており、今後もそうであると見込まれる。既に供与された機材及び今後供与される予定の機材は関連研究に必須のものであり、プロジェクト終了後も活用されると期待される。しかしながら、試薬・ビーカー等の消耗品代はこれまで日本側が負担してきた。プロジェクト終了後、これら消耗品の予算が確保されないと、供与機材は十分に活用されない可能性がある。

第4章 提言と教訓

4-1 提言

(1) 1年2ヶ月間のプロジェクト期間の延長¹³

長期専門家の派遣が1年2ヶ月遅れたことにより、PDMで示されたプロジェクト目標の達成は困難となっている。このことから、プロジェクトの活動を達成するために遅延期間分の延長を提言する¹⁴。2002年9月から2006年10月までの暫定PDM（PDMバージョン3）及び同期間の暫定PO（POバージョン2）を今後の合同調整委員会での論議および承認のために提案する（提案したPDM及びPOはAnnex6およびAnnex7に添付されている）。

(2) 合同調整委員会（JCC）

プロジェクト合同調整委員会の組織そのものに関しては2002年8月にサインされたミニッツに記載されているが、これまでのところ構成・開催されてはいない。プロジェクトの効果的、円滑な実施を図るために早急に合同調整委員会を構成し、年1度、プロジェクトの進捗状況の見直しや年間計画の承認、および必要が生じた際に、委員会を開催することを提言する

(3) モニタリング・システムの確立

POにもとづくモニタリング活動はプロジェクトの進行管理を行うために不可欠である。したがって、POにもとづき、実施体制、責任分担、様式、期間などから構成されるプロジェクト・モニタリング・システムを確立することを提言する。

(4) JICAの支援体制の強化

当該プロジェクトは2005年4月1日にJICA本部からJICAブラジル事務所に引き継がれた。したがって、プロジェクトがその円滑な事業実施のために、より緊密で効果的に支援されることを提言する。

(5) 適正なC/P及びローカルコストの確保

プロジェクトは諸活動を通じたカウンターパートの能力向上をねらいとしている。したがって、これらの事業のための適正なC/Pおよびローカルコストの手当てが確保されることを提言する。

¹³ PDM2からの大きな修正点は、(1)EMPARNの試験地は実際には試験プロットではなく、観察プロットとして利用されているので、そのことを明確にした（→アウトプット3及び活動3-1～3-3の表現を微修正）、(2)アウトプット4で作成される植物図鑑及びリーフレットの対象樹種・草本種を、活動4-2及び活動4-3で選定された種（合計9種）から活動4-1で特定された種（合計39種）に拡大したこと（→指標4-c～4-d、及び活動4-4～4-5を微修正）、の二点である。具体的な変更箇所は、PDM3の和文に下線を引いて示した。

¹⁴ この提言に基づき、2005年（平成17年）8月9日に延長にかかるミニッツが署名された（付属9参照）。

4-2 教訓

(1) ESAM および IDEMA との共同事業

プロジェクトの上位目標の達成には、適正技術の開発と開発された技術の地域住民への普及という両面からの活動が必要とされる。これらの観点から、当該プロジェクトは技術開発を担当する学術機関（ESAM）と普及開発を担当する行政機関（IDEMA）の共同で実施されているプロジェクトであることから、持続発展性の高い効果的なアウトプットが期待できる。

(2) 林業および畜産分野の合同プロジェクト

半乾燥地の植生回復のためには、自然環境保全における林業分野および小規模農家対策における畜産分野の両面からのアプローチが不可欠である。当該プロジェクトは両分野における活動が同じウェイトで計画されている稀なプロジェクトであることから、プロジェクト目標をより効率的に達成することが期待できるため、他の林業分野のプロジェクトに関しても、林業の枠に固執しないプロジェクトの形成を行うことも重要である。

(3) PO にもとづくプロジェクトの進行管理

PO にもとづくモニタリング活動が実施されなかったことがプロジェクトの大幅な遅れの要因となった。これらのことから、プロジェクトの開始前に PO を作成し、それにもとづいたモニタリングを定期的に行うことが重要である。

(4) 季節性のあるプロジェクトにおける特別な配慮

計画通りの専門家派遣を当初行うことができなかったため、苗畑造成などの雨季前に行う必要のある活動を実施することができず、結果としてプロジェクト活動が遅延する結果となった。プロジェクトの主要な活動が雨期に実行することに制約されているような季節性のあるプロジェクトにおいては、その季節性を常に考慮することが肝要である。

付属資料

1. 調査日程
2. 本邦派遣専門家、C/P、C/P 研修参加者リスト、
3. PDM の主要修正点
4. M/M (英文・葡文)
5. 評価時点 PDM、PO (和文)
6. 新 PDM、PO (案) (和文)
7. 長期専門家質問票回答
8. カアチンガに関する WEB リスト
9. 延長 M/M (英文)

(技プロ)「東北部半乾燥地(カアチンガ)における荒廃地域の再植生技術開発」
終了時評価調査日程

| 日時 | 担当 | | | 宿泊地 | |
|-----------|--|------------------------|----------------|--|---------------|
| | 評価分析 (廣内団員) | 総括、評価計画 (増子団長、笠原職員) | 現地参団 (駒沢所員) | | |
| 3/6 日 1 | 移動(JL048)[成田発18:45→] | | | 機内 | |
| 3/7 月 2 | 移動(JL048)[→サンパウロ着06:35 (RG3490)発10:45 →ナタール着13:50] 長期専門家と打ち合わせ | | | ナタール | |
| 3/8 火 3 | IDEMA表敬 IDEMA'sC/Pインタビュー 移動[→モソロ(250km)] | | | モソロ | |
| 3/9 水 4 | 質問票の回収、整理、分析 C/P、専門家、関係者への インタビュー 評価グリッド、PDM、PO の改定版作成 | | | モソロ | |
| 3/10 木 5 | | | | モソロ | |
| 3/11 金 6 | | | | モソロ | |
| 3/12 土 7 | | | | モソロ | |
| 3/13 日 8 | | | | 移動(JL048)[成田発18:45→] | モソロ/ 機内 |
| 3/14 月 9 | | | | 移動(JL048)[→サンパウロ着06:35→ (RG2266)発09:00→ブラジリア着10:35] | モソロ/ ブラジリア |
| | | | | 14:30- 調査方針等確認(於:ブラジル事務所) 16:00- 日本大使館表敬 | |
| 3/15 火 10 | 移動(JJ3466)[ブラジリア発10:20→ナタール着13:00] 14:00- IDEMA表敬、C/Pと協議 | | | モソロ/ ナタール | |
| 3/16 水 11 | 移動[→モソロ(3.5時間)] | | | モソロ | |
| | ESAM表敬 団内協議、専門家と協議 | | | | |
| 3/17 木 12 | C/Pと打ち合わせ(調査目的、評価方法、日程など) C/Pによるプロジェクトの進捗状況発表 プロジェクト専門家及びC/Pへのインタビュー | モソロ | | | |
| 3/18 金 13 | 現地調査(試験地、モソロ大学など) | モソロ | | | |
| 3/19 土 14 | 団内協議、M/M作成 | モソロ | | | |
| 3/20 日 15 | 団内協議、M/M作成 | モソロ | | | |
| 3/21 月 16 | M/M作成 | モソロ | | | |
| 3/22 火 17 | 合同評価協議(ESAM、IDEMA、ABC関係者) M/M修正 | モソロ | | | |
| 3/23 水 18 | M/M署名 移動[モソロ→ナタール(3.5時間)] | ナタール | | | |
| 3/24 木 19 | 移動(JJ3575)[ナタール発06:00→ブラジリア着09:45] 11:00- 日本大使館へ報告 14:00- JICAブラジル事務所報告、案件担当者へ業務引き継ぎ | 機内 | | | |
| | 移動(JJ3745)[ブラジリア発18:30→サンパウロ着20:10] (JL047)[サンパウロ発23:35→] | | | | |
| 3/25 金 20 | 移動(JL047)[機内] | 機内 | | | |
| 3/26 土 21 | 移動(JL047)[→13:10成田着] | | | | |

・本邦派遣専門家リスト

| 専門家氏名 | 分野 | 所属 | 派遣期間 |
|--------|---------|--------------|-----------------------------|
| 岸本 司 | 荒廃地緑化技術 | 沖縄国際マングローブ協会 | 2003. 11. 10 - 2005. 08. 31 |
| 玉井 重信 | 生態学 | 鳥取大学 | 2003. 11. 24 - 2003. 12. 17 |
| 野淵 正 | 苗木生産技術 | 京都大学 | 2004. 03. 20 - 2004. 04. 10 |
| 関根 純二郎 | 畜産技術 | 鳥取大学 | 2004. 03. 26 - 2004. 04. 16 |
| 矢部 勝彦 | 土壌学 | 滋賀県立大学 | 2004. 08. 04 - 2004. 09. 02 |
| 関根 純二郎 | 畜産技術 | 鳥取大学 | 2004. 10. 27 - 2005. 02. 27 |
| 玉井 重信 | 植生技術 | 鳥取大学 | 2005. 02. 23 - 2005. 03. 22 |

・C/P リスト

| 技術分野 | PDM/PO の 担当活動 | C/P 名 | 所属先・役職 | 配置期間 |
|------|------------------|---------------------------------|----------------------|----------------------|
| 植生 | 1-1a~1-5a | Aldo Medeiros Junior | IDEMA 主任技師 | 2003年11月~ |
| | 1-1b~1-5b | Regina | ESAM 助教授 | 2005年3月~ |
| | 3-2c, d | Antonia Katia | ESAM 助教授 | 2005年3月~ |
| | 3-4, 4-4, 4-5 | | | |
| 生態学 | 3-1 | R. Galvao | ESAM 講師 | 2003年11月~ |
| | 5-1, 5-3 | Maria Clarete Augusto Camara | ESAM 助教授 ESAM 助教授 | 2005年3月~ 2005年3月~ |
| 植物育種 | 4-1, 4-2 | R. Galvao | ESAM 講師 | 2003年11月~ |
| 造林 | 5-4~5-10 | J. Erivaldo | ESAM 技官 | 2004年11月~ |
| 林学 | 5-4~5-10 | A. Camara | ESAM 助教授 | 2005年3月~ |
| 土壌学 | 3-2a, b 3-4 | Gustavo Duda | ESAM 助教授 | 2004年8月~ |
| | 5-5-f | | | 2005年3月~ |
| 動物学 | 2-1, 4-3 | Alexandre Braga | ESAM 助教授 | 2005年1月~ |
| | 5-2 | R. Galvao | ESAM 講師 | 2003年11月~ |
| | 6-1~6-4 | | | |
| 気象学 | 3-3 | Jose Espinola | ESAM 助教授 | 2005年3月~ |

・C/P 研修参加者リスト

研修期間：2004. 10. 17 - 2004. 11. 21

研修実施機関：鳥取大学乾燥地研究センター

| 研修員氏名 | 役職 |
|-------------------------------|------------|
| Aldo Medeiros Junior | IDEMA 主任技師 |
| Gerald Magela Cabral de Sousa | IDEMA 技術顧問 |
| Ricardo Jorge Duarte Galvao | ESAM 講師 |

PDM の主要修正点¹

(英文中の打ち消し線は当初 PDM の原文の削除箇所、下線部分は追加箇所を示す。)

1. **プロジェクト名**：当初 PDM のプロジェクト名「Technology Development for Recuperation of Degraded Areas with Vegetation in the Semi-Arid Region (Caatinga) of the Northeastern Brazil」が M/M のプロジェクト名が違ったため、M/M に合わせて修正した。
2. **プロジェクト・エリア、ターゲット・グループ**：どちらも書かれていなかったため、プロジェクト・エリアを「The semi-arid region of the State of Rio Grande do Norte」、ターゲット・グループを「ESAM and IDEMA」と明記した。
3. **上位目標**：当初の上位目標はプロジェクト目標との間に隔たりがあった。プロジェクトで開発した技術は、上位目標の対象とするカアチングの前に、まず RN 州に普及されることが期待されている。そこで、合同評価協議の中で提案し承認されたため、当初の上位目標は新たに設置したスーパー・ゴールに移し、上位目標としては前述に基づき「Appropriate technologies for recuperation of degraded areas are disseminated in semi-arid region of the State of Rio Grande do Norte (RGN)」を新たに設定した。
4. **プロジェクト目標**：当初のプロジェクト目標は「revegetation」と「sustainable stock farming」という2分野から成っていた。しかも、「revegetation」技術と「sustainable stock farming」技術が「find out (正しくは found out)」されることはそれぞれアウトプット5・アウトプット6の表現と基本的に同じであり、プロジェクト目標とアウトプットが同じレベルになっていた。そこで、2分野を「recuperation」にまとめるとともに、プロジェクト目標を「アウトプット(技術開発)」によってもたらされる状態となるような表現に微修正し、「Appropriate technologies for ~~revegetation and sustainable stock farming~~ recuperation of degraded areas, utilizing useful trees and grasses species, are ~~find out~~ made available for semi-arid region of the State of ~~Rio Grande Norte~~ (RGN).」とした。(なお、「revegetation」と「sustainable stock farming」をまとめた「recuperation of degraded areas」は、当初 PDM の上部に書かれていたプロジェクト名の中の表現を用いた。
5. **アウトプット1及びその活動**：アウトプット1は、RN州の状況が精査されることが目的ではなく、試験プロット選定のためにRN州の概況が明らかにされることが目的である。このことがより明確となるように、「The ~~general~~ situation of utilization of vegetation and soil in ~~the~~ semi-arid region in ~~the State of~~ RGN is ~~surveyed, made clear~~」と修正した。また、活動が想定されていたのに記載されていなかった活動を PDM に追加し、新活動 1-5「Prepare a report on utilization of lands and vegetation in the semi-arid region in the State of RGN」とした。

¹ 詳細な修正箇所はミニッツ (別添3) の Annex 1 参照。

6. **アウトプット 2 及びその活動**: アウトプット 2 の中には、「Action Plan」という表現があるが、何を指すのか曖昧であった。現地で専門家及び C/P に確認したところ、これは、アウトプット 1、アウトプット 2、アウトプット 4 及びアウトプット 5 の結果を受けて作成される、荒地復旧に関わる地域住民の行動を促すため普及資料（リーフレットのようなもの）であり、「Action Plan」という過大な表現は誤記であるとの見解であった。そこで、まず、作業の時系列がより明確になるように「Action Plan」作成に関わる活動 (2-2) をアウトプット 2 から削除してアウトプット 4 及びアウトプット 5 に移し、新活動 4-5、新活動 5-10 とした。次に、「Action Plan」という表現を、専門家・C/P の理解にあわせて「leaflet」に置き換えた。これに伴い、アウトプット 2 からは「Action Plan (leaflet)」関連の文章を削除した²。また、アウトプット 1 同様、アウトプット 2 は試験プロット選定のために概況を明らかにすることが目的であることから、「~~The actual general situation of stock farming in the semi-arid region in the State of RGN and the Action plan is elaborated.~~ made clear」と微修正した。
7. **アウトプット 3 及びその活動**: 玉井短期専門家から、アウトプット 3 で初出の「pilot project area」という表現は学術的にみて不適切であり、「pilot plot」がより適切であるとの指摘があり、以下、そのように変更した。また、アウトプット 3 では、植生と劣化の状況（土壌）だけでなく地形や気象条件を含んだ自然条件が明らかにされることを目的にしていることから、そのことがより明確になるように「The natural characteristics of, including the vegetation and degradation, in of the pilot plots ~~project areas is are surveyed~~ made clear」と微修正した。

また、活動 3-1 は「Select the pilot ~~project areas~~ plots in degraded and reserved areas (including an experimental field of EMPARN in Terras Secas in reserved area)」と修正した。EMPARN の試験地は保存林地域にあり、3-1 では当初から荒地地域においてプロットを選ぶことになっていたもので、そのことを明確にしたのである。さらに、実際には活動が実施されている（あるいは想定されている）のに PDM には記載されていなかった活動を PDM に追加し、新活動 3-3 「Conduct meteorological observation daily」、及び新活動 3-4 「Prepare researcher's manuals」とした。

8. **アウトプット 4 及びその活動**: 当初のアウトプット 4 は「Usefulness of trees and grasses are defined based on the needs of local community」と「useful ones are selected」という 2 文から成っていた。前者は後者のための手段だが、コミュニティのニーズに基づくという点が重要だと考えられるので、前者を削除せず、後者に含めて 1 文に整理した。また、対象地域が曖昧であったので明確にし、「~~Usefulness of (Trees and grasses species potentially useful for defined based on the needs of local community~~ relevant to the pilot plots ~~ones are selected.~~」と微修正した。

また、当初の活動 4-2 及び 4-3 は「Study」及び「identify」の 2 つの動詞があった。「Study」は「identify」の手段であるので文から削除した。また、活動が想定されていたのに記載され

² 本来ならば、試験プロット選定のために RN 州の概況が明らかにされることを目的とするアウトプット 1 とアウトプット 2 は一つにまとめてもよいところだが、終了時評価でもあり、無用な混乱を避けるために、アウトプット 2 は残した。

ていなかった活動を PDM に追加し、新活動 4-4「Prepare a catalog for researchers about the species selected in 4-2 and 4-3 above」とした。最後に、活動 4-5 として、活動 2-2 を読み直した「Prepare a leaflet for local people about he species selected in 4-2 and 4-3 above」を追加した。

9. **アウトプット 5 及びその活動**：当初のアウトプット 5 は「Techniques to grow seedlings of the selected trees and grasses as well as to plant and manage them are established」、及び「manuals are elaborated」の 2 つの文から成っていた。前者が「主」、後者が「従」であるので、後者を削除して 1 文に整理すると同時に、「established」の表現をより適切な「developed」に置き換えた。さらに、開発対象となる三分野の技術は、「revegetation」のための個々の技術であるため、「Techniques for revegetation」下にまとめた。また、技術開発が試験プロットにおける研究を通して行われることも明確にした。アウトプット 5 は「Techniques for revegetation (i.e. ~~to~~ growing seedlings of the selected trees and grasses species as well as ~~to~~ planting and managing them) are ~~established~~ developed through research in the pilot plots. ~~an their manuals are elaborated, that involves the estimation of a carrying capacity of livestock in the pilot project area.~~」と読み直された。また、アウトプットレベルでは「techniques」が開発対象となっているのに、活動レベルでは「system」が対象となっていて用語が混乱していたが、基本的にアウトプットの「techniques」で統一した。

活動 5-1 では植物の現存量だけでなく生産性も推定されることから、「Estimate the plant biomass and productivity ~~of leaves and grasses~~ for the livestock farming in the pilot plots.」と修正した。活動 5-3「~~Identify the grasses species which can be used for livestock farming in rainy and dry season~~」は活動 6-1 と同じことであるので、アウトプット 5 の活動からは削除した。その代わりに、新活動 5-3 として、活動が想定されていたのに記載されていなかった「Estimate carrying capacity of the pilot plots」を追加した。また、活動 5-4 以降で対象となる樹種・草本種は、当初 PDM では「the useful trees and grasses」とされていたが、(1) 実証を経ねば有用であるかどうかは科学的に確認できないので「the useful」という表現は不適切であること、及び(2)これらは具体的にはアウトプット 4 で選定された樹種・草本種を指すことから、「the selected species」に読み直した。また、活動 5-4~5-5 では動詞が「Study～」となっていたが、これらの活動は、研究のための研究ではなく、技術を提案することを目的としているため、「Propose～」と修正した。同様に、活動 5-6 は活動 5-7 におけるける実証対象となる技術を特定することが目的なので「Study～」を「Identify～」と修正した。さらに、活動 5-7 において活動 5-6 で特定した技術の実証が目的なので、「Carry into effect」を「Test」と修正した。活動 5-8 では、誰のためのマニュアルを作成するのか（研究者なのか、実務者なのか、住民なのか、etc）がわかりづらかったため、研究者用であることを明確にし、「~~Make a researcher's manuals for the techniques which is are elaborated~~ developed by the pProject above」³とした。さらに、活動が想定されていたのに記載されていなかった活動を追加し、活動 5-9「Prepare a technical report on revegetation system for semi-arid areas of the State of RGN, including the information on carrying capacity」とした³。最後に、活動 5-10 として、活動 2-2 を読み直した「Prepare a leaflet for local

³ 活動 5-9 では「system」が使われているが、これは、レポートでは、活動 5-4~5-7 のように個々の技術ではなく、それら個々の技術を体系的に組み合わせたシステムについて書くという意味である。

people about revegetation methods」を追加した。

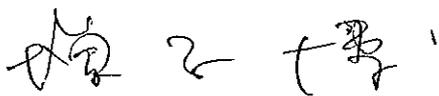
10. **アウトプット 6 及びその活動**：アウトプット 6 で取り扱われる持続的「畜産」技術は具体的には「飼料生産」技術である。このことを明確にし、アウトプットの表現を「Techniques for sustainable fodder production ~~stock management are elaborated~~ for both in the original vegetation area and revegetated areas areas are developed through research in the pilot plots ~~project areas.~~」と読み直した。同様に、活動レベルで「livestock farming system」となっているものも、「sustainable fodder production techniques」と読み直した。また、活動 6-1 の動詞は「Study～」になっているが、活動 6-2 で実証をする技術を特定することが目的なので「Identify～」に、さらに、活動対象地域の「project areas」は「pilot project areas(pilot plots)」の誤りであるのでこれを修正して「Study Identify the sustainable livestock farming system fodder production techniques depending on the livestock farming capacity in the pilot plots ~~project areas.~~」とした。活動 6-3 では、活動 5-8 同様、研究者用マニュアルの作成であることを明確にし、「Make ~~a~~ researcher's manuals for the techniques which ~~is~~ are elaborated developed by the ~~p~~Project above」と微修正した。さらに、活動が想定されていたのに PDM には記載されていなかった活動として、新 6-4「Prepare a technical report on sustainable fodder production」を追加した。
11. **指標**：プロジェクト目標の指標とアウトプットの指標が同じ（同じレベル）であるなど、当初 PDM の指標には混乱がみられたので、これを整理するとともに、達成度がより明確になるように指標を一部修正・追加した。

MINUTES OF MEETING
BETWEEN THE JAPANESE FINAL EVALUATION STUDY TEAM
AND THE AUTHORITIES CONCERNED OF THE GOVERNMENT
OF THE FEDERATIVE REPUBLIC OF BRAZIL
FOR THE PROJECT ON TECHNOLOGY DEVELOPMENT FOR REVEGETATION
AND UTILIZATION OF DEGRATED AREAS IN THE SEMI-ARID REGION
(CAATINGA) OF THE NORTHEASTERN BRAZIL

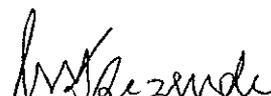
The Japanese Final Evaluation Study Team (hereinafter referred to as “the Japanese Team”), organized by the Japan International Cooperation Agency (hereinafter referred to as “JICA”) and headed by Mr. Hiroshi Masuko, visited The Federative Republic of Brazil (hereinafter referred to as “Brazil”) from March 14th to March 24th, 2005 in order to review and evaluate jointly the activities and outputs being conducted under the Project on Technology Development for Revegetation and Utilization of Degraded Areas in the Semi-Arid Region (Caatinga) of the Northeastern Brazil (hereinafter referred to as “the Project”), by the Institute of Economic Development and Environment (hereinafter referred to as “IDEMA”) and Superior School of Agriculture in Mossoro (hereinafter referred to as “ESAM”) and to propose actions to be taken by the Project.

The Japanese Team exchanged views and had a series of discussions with IDEMA, ESAM, and other pertinent Brazilian authorities concerned (hereinafter referred to as “the Brazilian side”). As a result of the discussion, both sides reached common understandings on the matters described in the documents attached hereto.

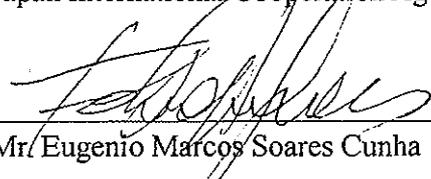
Mossoro, March 23rd, 2005



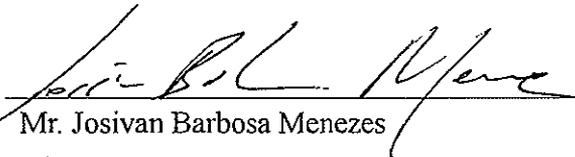
Mr. Hiroshi Masuko
 Leader
 Final Evaluation Study Team
 Japan International Cooperation Agency



Ms. Mariana Tavares Rezende
 Manager of International Technical
 Cooperation
 Brazilian Cooperation Agency



Mr. Eugenio Marcos Soares Cunha
 Director
 Institute of Economic Development and
 Environment (IDEMA)



Mr. Josivan Barbosa Menezes
 Director
 Superior School of Agriculture in Mossoro
 (ESAM)

Fábio Ricardo Silva Góis
 Diretor Técnico Administrativo



ATTACHED DOCUMENT

JOINT EVALUATION REPORT

ON

THE PROJECT ON TECHNOLOGY DEVELOPMENT
FOR REVEGETATION AND UTILIZATION OF DEGRATED AREAS
IN THE SEMI-ARID REGION (CAATINGA)
OF THE NORTHEASTERN BRAZIL

March 23rd, 2005

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REFERENCE

- ANNEX 1 : Project Design Matrix (PDM) ver.2 (PDM at the time of final evaluation)
- ANNEX 2 : Plans of Operations (PO) ver.1 (PO at the time of final evaluation) and the Progress of the Activities
- ANNEX 3 : Accomplishment Grid
- ANNEX 4 : Implementation Process Grid
- ANNEX 5 : Evaluation Grid
- ANNEX 6 : Draft of PDM ver.3 (proposed PDM for the period from September 2002 to October 2006)
- ANNEX 7 : Draft of PO ver.2 (proposed PO for the above mentioned period)




1. Introduction

1.1 Purpose of Evaluation

The purposes of the Joint Final Evaluation on the Project are;

- to verify the accomplishments of the Project compared to those planned (accomplishment of Inputs, Outputs and the Project Purpose);
- to review of the Project to identify obstacles and/or facilitating factors that have affected the implementation process.
- to evaluate the Project based on the five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact and Sustainability); and
- to make recommendations for the actions to be taken in the future.

1.2 Members of Evaluators

The evaluation and the recommendations on the Project were done by the following members, which forms the Joint Evaluation Committee:

(Brazilian side)

| | |
|---------------------------------|------------------------------|
| Mr. Ricardo Jorge Duarte Galvao | Agronomical Engineer of ESAM |
| Mr. Geraldo Magela | Technical Assistant of IDEMA |
| Mr. Aldo Medeiros Junior | Technical Assistant of IDEMA |

(Japanese side)

| | |
|-----------------------|--|
| Mr. Hiroshi Masuko | Leader of the Japanese Team |
| Ms. Yasuyo Hirouchi | Evaluation Analysis of the Japanese Team |
| Mr. Soichiro Kasahara | Evaluation Planning of the Japanese Team |
| Mr. Kazuaki Komazawa | Staff of JICA Brazil Office |

1.3 Schedule of the Study

The meetings of the Joint Evaluation Committee were held from March 17th to 23rd, 2005. During the evaluation process, the Committee members interviewed and discussed with the governmental authorities and institutions, relevant to the execution of the Project.

1.4 Review of the PDM

Prior to the start of the evaluation, the Joint Evaluation Committee reviewed the Project Design Matrix attached to the M/M signed in August 2002 (PDM ver.1). It was found that some of the descriptions of the PDM ver.1 are vague. Relationships among some of the components are not logical. In order for the experts, their C/P, and other people concerned, including the Joint Evaluation Committee, to clearly understand what the original descriptions meant, the evaluation team had agreed to make editorial modifications to the Narrative

Summary. Besides, Verifiable Indicators and Means of Verification were modified to more measurable ones. The modified PDM (PDM ver.2) is as attached in Annex 1. Plan of Operation, which had not been prepared, was prepared through a series of discussion with the expert and the C/P as shown in Annex 2.

1.5 Methodology of Evaluation

1.5.1 Survey

The Joint Evaluation Committee carried out a field survey in the Project sites and also made interviews with the Brazilian C/P engaged in the Project, Japanese experts, and other people concerned to collect information.

1.5.2 Items of the Evaluation

(1) Accomplishment of the Project

Accomplishment of the Project was measured in terms of Inputs, Activities, Outputs and the Project Purpose in comparison with the M/M, PDM ver.2 and PO ver.1.

(2) Implementation Process

Implementation process of the Project was reviewed to see if the Activities have been implemented according to the schedule; and to identify obstacles and/or facilitating factors that have affected the implementation process.

(3) Analysis based on Five Evaluation Criteria

(a) Relevance

Relevance of the Project was reviewed as the validity of the Project purpose and overall goal in connection with the development policies and priorities of the Government of Brail and Japan, as well as the needs of the target group

(b) Effectiveness

Effectiveness was assessed by evaluating the extent to which the Project has achieved the Project Purpose (or not), and whether the Project Purpose is expected to happen on the basis of the Outputs of the Project.

(c) Efficiency

Efficiency of the Project implementation is analyzed focusing on the relationship between outputs and inputs in terms of timing, quality and quantity.

(d) Impacts

Positive and/or negative impacts were assessed from institutional, economic, environmental, social and technical viewpoints.

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(e) Sustainability

Sustainability of the Project was evaluated in organizational, financial and technical aspects by examining the extent to which the achievement of the Project is sustained or expanded after the assistance is completed.

2. Background of the Project

The outline of the Project is described in the PDM and the PO (Annex 1 and Annex 2). The history of the Project is as follows;

- April 1st 1997 to March 31st 2000
The Mini-Project on the Conservation of Sand Dunes and Desertification Control in the Federative Republic of Brazil (the former phase)
- November 12th to November 24th, 2001
The dispatch of the Preliminary Study Team for formulation of this Project
- August 22nd 2002
The signing of the Minutes of Meeting
- September 1st 2002
The date of the Project commencement
- November 10th 2003
The dispatch of long term Japanese Expert (the Project started)
- March 15th to March 24th, 2005
The dispatch of the Final Evaluation Study Team
- August 31st 2005
The date of the Project completion

3. Result of Evaluation

3.1 Accomplishments of the Project

As for the accomplishments of the Inputs, the Outputs, and the Project Purpose, please see in Annex.3.

3.2 Implementation Process

The progress of the Activities of the Project are behind the schedule on the whole because of delay in dispatching the long-term experts for one year and two months, providing the major equipment, and assigning of the C/P in all the required fields, etc.. While the Activities under Output 1 ~ Output 4 are expected to be completed by the end of the Project, some of the Activities under Output 5 and Output 6 would neither start nor finish by the end



of the Project. Communication within the Project has been smooth. As for monitoring, the Project has submitted a report to JICA periodically. However, since neither the PDM has been re-examined nor the PO, which is an essential tool for the project monitoring, has been prepared, it has been difficult for all those concerned to have common understanding of the implementation process and to take necessary actions promptly. In addition, the Joint Coordination Committee¹, a decision making body for the Project, has not been constituted although its organization is delineated in the M/M signed in February 2002. (Details are described in Annex 4)

3.3 Evaluation of the Project

3.3.1 Relevance

The Project Purpose and the Overall Goal of the Project are relevant with national policies and the needs of Brazil. They are also relevant with Japanese ODA policies as well as organizational needs of the target groups (i.e. ESAM and IDEMA). (Details are described in Annex.5-1)

3.3.2 Effectiveness

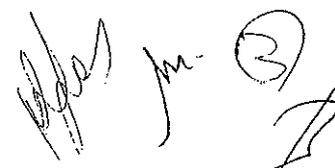
The achievement level of the Project Purpose is behind the schedule. The Project Purpose would be only partly achieved by the end of the Project. The Outputs, although their levels of achievement are also behind the schedule, have contributed to the achievement of the Project Purpose so far. If the Outputs had been achieved as scheduled, the Project Purpose would be achieved by August 2005. (Details are described in Annex.5-2)

3.3.3 Efficiency

The Project has not been implemented efficiently. Some of the Inputs from both sides have not been provided as scheduled, which has affected the achievement level of the Outputs.

Japanese side: The quality of the long-term and short-term experts, provided equipment, and C/P training is appropriate. However, dispatch of the long-term expert was delayed until November 2003. Some of the major equipment, such as meteorological stations, an atomic absorption spectral photometer, have not arrived yet so that relevant activities cannot be started. Disbursement of running expenses has been appropriate on the whole. However, the disbursement for the first quarter of the Japanese fiscal year

¹ For the effective and successful implementation of a project of JICA, a Joint Coordinating Committee (JCC) is established to make decisions relevant to the Project. The primary functions of the committee are (1) to monitor and evaluate the progress of the Project; and (2) to authorize the annual plan and reports of the Project. The committee will be composed of the chair, the members and the observers. The chair may declare closed sessions against the observers. The rules and guidelines for the management of the committee is determined in due course.



2004 was delayed: most of the field activities related to revegetation and fodder production that were envisaged in the rainy season in 2004 had to be postponed till the rainy season in 2005.

Brazilian side: Land, building, and office space for the expert are generally appropriate. The C/P in two technical fields (i.e. Animal Science and Afforestation) with adequate technical background had been assigned in time for the relevant activities. However, the C/P in other technical fields (i.e. Vegetation, Ecology, Forestry, Pedology, and Meteorology) have not been assigned until the middle of March 2005.

(Details are described in Annex.5-3)

3.3.4 Impact

The impact at the Overall Goal level cannot be foreseen since the Project Purpose has been achieved only partly. However, some technical impacts are observed. ESAM, who has become more interested in sustainable fodder production, has begun to establish a 5-hectare experimental farm for fodder tree species in its premises. Up-to-date equipment for nutrition analysis has been made available to researchers and students of ESAM when it is not used by the Project, which has contributed to increase of their research capacity. (Details are described in Annex.5-4)

3.3.5 Sustainability

The theme of the Project has legal and policy supports of the Government of Brazil. Although technical capacity of the C/P has been raised steadily, one-year and nine-month is not long enough to transfer fully the techniques and knowledge related to recuperation of degraded areas in the semi-arid region. Although the techniques transferred by the Project are expected to be utilized and disseminated through lectures and training courses at ESAM, leaflets, etc., the strategy (or a research plan) on technology development of revegetation and sustainable fodder production in the State of RGN is not clear yet. It is unlikely that the positive effects of the Project would be sustained after the termination of the Project. (Details are described in Annex.5-5)

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4. Conclusion and Recommendations

4.1 Conclusion

It is significant to establish technical development system by the JICA's technical corporation for revegetation in the semi-arid region.

The Project activities have not been implemented smoothly due to delay of a long-term expert dispatch, machine and equipment supplies and JICA's financial assistance.

However, it is expected to complete all of the activities planned in the PDM, if the Project term is extended for one year and two months which is an actual delayed period of the Project commencement, and the Project management capability is improved through strengthening of monitoring and supported system by both Japanese and Brazilian side.

4.2 Recommendations

(1) Extension of the Project term for one year and two months

It is impossible to accomplish the Project Purpose planed in the PDM since a dispatch of the long-term expert delayed for one year and two months. Therefore, it is recommendable to extend the delayed period so as to complete the Project activities. A draft PDM for the period from September 2002 to October 2006 (PDM ver.3) as well as a draft PO (PO ver.2) for the same period is proposed for further discussion and approval by the Joint Coordination Committee of the Project. (The proposed PDM and PO are attached as Annex 6 and Annex 7 respectively).

(2) Joint Coordinating Committee (JCC)

The JCC of the Project, organization of which was mentioned in the M/M signed in August 2002, has not been constituted yet. For effective and smooth implementation of the Project, it is recommendable to constitute the JCC as soon as possible and to hold a meeting once a year to review the progress and to approve an annual plan of the Project, and other occasions when necessity arises.

(3) Establishment of the monitoring system

Monitoring activities, based on the PO, are indispensable to management of the project progress. Therefore, it is recommendable to establish the project monitoring system based on the PO which consists of organization, forms, responsible persons, period, and so on.

(4) Strengthening of JICA's supports

It is scheduled that the Project will be handed over from the JICA headquarters to the JICA Brazil Office on April 1st, 2005. Therefore, it is recommended that the Project should be supported even more closely and effectively for the smooth implementation.

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(5) Ensuring appropriate C/Ps and local expenditure

The Project is aiming to improve C/P's capability through the Project activities. Therefore, it is recommended that assignment of appropriate C/P and local expenditure for the implementation be ensured.

4.3 Lessons

(1) Collaboration of ESAM and IDEMA

It is necessary to implement from both faces in development of appropriate techniques and dissemination of the developed techniques to local people in order to achieve overall goal of the Project. From this point of view, the Project could be expected to produce high outputs for the sustainability since the Project are conducting in cooperation with academic organ which is in charge of technical development (ESAM) and administrative organ which is in charge of the dissemination (IDEMA)

(2) Combined project of forestry and live stock sectors

It is indispensable for recovery of vegetation in semi-arid region to be approached from both faces of forestry sector in natural environmental conservation and livestock sector in coping with small-scale farmers. The Project is so unique Project that the activities are given importance to both sectors evenly and it is expected to produce effective outputs for the Project purpose.

(3) Project progress management based on the PO

The Project has been considerably delayed due to insufficiency of the monitoring activities based on the PO. Therefore it learned a lesson that it is important to design the PO before starting of the Project and implemented the monitoring activities regularly according to the PO.

(4) Special consideration for seasonal project

It learned a lesson from that the Project activities was obliged to postpone for one year due to an incompleteness of necessary measures before rainy season. It is important to make sure necessary measures before rainy season in the seasonal Project such that most of the Project activities are restricted to be done in the rainy season.

The Minutes of Meetings as well as the Attached Document are prepared in both English and Portuguese. In case any discrepancy arises in interpretation, the English text shall remain.

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Annex 1: PDM ver.2 PDM at the time of Evaluation)

Project Name: Technology Development for Recuperation Revegetation and Utilization of Degraded Areas with Vegetation in the Semi-Arid Region (Caatinga) of the Northeastern Brazil
 Period of Cooperation: 3 years (2002/9- 2005/8)
 Implementing Agency in Beneficiary Country: ESAM and IDEMA
 Project Area: The semi-arid region of the State of Rio Grande do Norte Target Group: ESAM and IDEMA

| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|--|---|
| <p>Overall Super Goals Technologies to utilize potential productiveness of vegetation and soil in the semi-arid region are disseminated in the Northeastern Brazil (Caatinga)</p> <p>Overall Goals Appropriate technologies for recuperation of degraded areas are disseminated in semi-arid region of the State of Rio Grande do Norte (RGN)</p> <p>Project Purpose Appropriate technologies for revegetation and sustainable <u>recuperation of degraded areas, utilizing useful trees and grasses species, are disseminated</u> made available for semi-arid region of the State of Rio Grande Norte (RGN)</p> | <p>1. Slowing down of desertification process in the project area Caatinga</p> <p>2. Increase of animal production</p> <p>1. <u>Slowing down of desertification process in the State of RGN</u></p> <p>2. <u>Increase of animal production</u></p> <p>1. C/P at ESAM are able to continue relevant research in the State of RGN by themselves, utilizing the techniques transferred through the Project</p> <p>2. Leaflets for local people prepared by the Project are adopted by the IDEMA and the relevant institutes</p> | <p>Observation in the project area-Caatinga - Agriculture statistics of the state government</p> <p>Observation in the project area-RGN - Agriculture statistics of the state government</p> <p>Project Report Questionnaire, Interviews with Japanese experts and Counterpart personnel</p> | <p>Climate does not change drastically such as occurrence of severe draught</p> |
| <p>Outputs 1. The general situation of utilization of vegetation and soil in the semi-arid region in the State of RGN is surveyed <u>made clear</u></p> <p>2. The actual general situation of stock farming in the semi-arid region in the State of RGN and the Action Plan <u>Action Plan</u> is elaborated <u>made clear</u></p> <p>3. The natural characteristics of, including the vegetation and degradation, in the pilot plots, project areas <u>are surveyed</u> made clear</p> <p>4. Usefulness of <u>Trees and grasses species potentially useful for defined</u> based on the needs of local community relevant to the pilot plots <u>ones are selected.</u></p> <p>5. Techniques for revegetation (i.e. to growing seedlings of the selected trees and grasses species as well as to planting and managing them) are established developed through research in the pilot plots. their manuals are elaborated that involves the estimation of a carrying capacity of livestock in the pilot project area</p> <p>6. Techniques for sustainable fodder production stock management <u>are elaborated</u> for both in the original vegetation area and revegetated areas areas are developed through research in the pilot plots project areas.</p> | <p>1a: <u>Elaborated</u> A technical report on general utilization of lands and vegetation in the semi-arid region in RGN elaborated, which includes 1)a land use map and an analytical report; 2)a vegetation map and; 3)a list of useful trees and grass species.</p> <p>2a: <u>Authorization of the improvement plan</u> A report on livestock form in the State of RGN prepared.</p> <p>3a: <u>Elaborated</u> Maps on soil and vegetation in the pilot project areas plots elaborated</p> <p>3b: Meteorological data collected daily</p> <p>3c: Researcher's manuals elaborated</p> <p>4a: Trees and grass species that are used by local people identified.</p> <p>4b: Trees and grasses potentially useful for further research in the pilot plots</p> <p>4c: <u>Elaborated</u> a catalog for researchers on potentially useful grasses and trees tree and grass species elaborated</p> <p>4d A leaflet for local people about potentially useful tree and grass species prepared</p> <p>5a: Useful tree and grass species appropriate for revegetation of the area surrounding the pilot plots recommended</p> <p>5b: <u>Elaborated</u> technical Researcher's manuals for revegetation and manage them and report on carrying capacity of livestock</p> <p>5c: A technical report on revegetation system, including the information on carrying capacity, prepared</p> <p>5d: A leaflet for local people about revegetation methods prepared</p> <p>6a: Fodder species appropriate for stock farming in the area surrounding the pilot plots recommended.</p> <p>6b: <u>Elaborated</u> Technical Researcher's manuals for <u>steak</u>-farming sustainable fodder production elaborated</p> <p>6c: A technical report on sustainable fodder production prepared</p> | <p>1-5 Questionnaire, interviews with Japanese experts and Counterpart personnel Review of the following documents 1. Project RA technical report 2. IDEMA's Action Plan-A technical report 3. Maps of pilot project site and manuals 4. Catalog and manuals 5. Manuals and a technical report 6. Manuals and a technical report</p> | <p>C/P stay with ESAM and IDEMA</p> |

Additions are underlined and deletions are struckthrough.

| Activities | Inputs | Counterparts remain in the Project Pre-conditions: |
|---|--|--|
| <p>1-1 Analyze the actual land utilization using the satellite images in the sState of RGN</p> <p>1-2 Survey the vegetation of the semi-arid region in the sState of RGN</p> <p>1-3 Identify the land utilization in the semi-arid region in the sState of RGN</p> <p>1-4 Survey the utilization of trees and grasses in the semi-arid region in the sState of RGN.</p> <p>1-5 Prepare a report on utilization of lands and vegetation in the semi-arid region in the State of RGN</p> <p>2-1 Identify the livestock form – land extension, types, number and utilization of animals - in the semi-arid region in the sState of RGN</p> <p>2-2 Study the action plan for the improvement of the livestock form → 4-5&5-10</p> <p>3-1 Select the pilot project areas plots in degraded and reserved areas (including an experimental field of EMPARN in Terras Secas in reserved area)</p> <p>3-2 Make the soil and vegetation maps in of the pilot project areas-plots</p> <p>3-3 Conduct meteorological observation daily</p> <p>3-4 Prepare researcher's manuals</p> <p>4-1 Identify the community needs for their life and livestock farming related to the trees and grasses relevant to the pilot plots</p> <p>4-2 Study and identify the Select potentially useful tree and weeds grass species for the community life relevant to the pilot plots</p> <p>4-3 Study and identify the Select potentially useful trees and grasses species for the livestock farming relevant to the pilot plots</p> <p>4-4 Prepare a catalog for researchers about the species selected in 4-2 and 4-3 above</p> <p>4-5 Prepare a leaflet for local people about the species selected in 4-2 and 4-3 above</p> <p>5-1 Estimate the plant biomass and productivity of leaves and grasses for the livestock farming in the pilot plots.</p> <p>5-2 Survey the dietary habits of livestock in the pilot plots.</p> <p>5-3 Identify the grasses species which can be used for livestock farming in rainy and dry seasons (Same as 6-1) Estimate carrying capacity of the pilot plots</p> <p>5-4 Clarify Propose germination system techniques of for the useful trees and grasses selected species</p> <p>5-5 Study Propose the seedling production system techniques for the useful trees and grasses selected species.</p> <p>5-6 Study Identify the afforestation system planting techniques for the useful trees and grasses selected species</p> <p>5-7 Carry into effect Test the afforestation identified planting techniques which is elaborated by the Project in the pilot plots.</p> <p>5-8 Make a researcher's manuals for the techniques which is are elaborated developed by the Project above</p> <p>5-9 Prepare a technical report on revegetation system for semi-arid areas of the State of RGN, including the information on carrying capacity</p> <p>5-10 Prepare a leaflet for local people about revegetation methods</p> <p>6-1 Study Identify the sustainable livestock farming system fodder production techniques depending on the livestock farming capacity in the pilot plots project areas.</p> <p>6-2 Carry into effect Test the identified techniques livestock farming system which is elaborated by the Project in the pilot plots.</p> <p>6-3 Make a researcher's manuals for the techniques which are elaborated developed by the Project above</p> <p>6-4 Prepare a technical report on sustainable fodder production</p> | <p>The Government of Japan:</p> <ol style="list-style-type: none"> 1. Dispatch of Experts 2. Training of Brazilian Counterpart personnel in Japan 3. Provision of equipment 4. Running expenses <p>The Government of Brazil:</p> <ol style="list-style-type: none"> 1. Provision of land, building and other facilities for the Project 2. Assignment of counterpart personnel and administrative staff 3. Running expenses | <p>- Counterparts remain in the Project</p> <p>Pre-conditions:</p> |

Additions are underlined and deletions are struck through.

(2)

Annex 2 Detailed PO ver.1(PO at the time of final evaluation) and the progress of the activities

| Activities | | Target | Responsible persons | 2003 | | | | | 2004 | | | | | 2005 | | | | | Remarks | | | | | | |
|------------|--|--|---|--|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|---------|-----|-----|-------|-----|--|--|
| | | | | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct | Jan | | Apr | Jul | Progr | ESS | | |
| | | <p>Initial Project Implementation Plan (as per M/M)</p> <p>Rescheduled Implementation Plan for the Project starting Nov. 2003</p> <p>Latest schedule</p> | | | | | | | | | | | | | | | | | | | | | | | |
| 1-1 | | The general situation of utilization of vegetation and soil in semi-arid region in the State of RGN is made clear | | J/E<LE>Kishimoto C/P<Vegetation>:Regin a | | | | | | | | | | | | | | | | | | | | | |
| 1-1 | | Analyze the actual land utilization using the satellite images in the State of RGN | J/E<LE>Kishimoto C/P<Vegetation>:Regin a | | | | | | | | | | | | | | | | | | | | | | |
| a | | Obtain satellite images | J/E<LE>Kishimoto C/P<Vegetation>:Medei ros | | | | | | | | | | | | | | | | | | | | | | |
| b | | Analyze the images | J/E<LE>Kishimoto C/P<Vegetation>:Regin a, Katia | | | | | | | | | | | | | | | | | | | | | | |
| 1-2 | | Survey the vegetation of the semi-arid region in the State of RGN. | J/E<LE>Kishimoto C/P<Vegetation>:Regin a | | | | | | | | | | | | | | | | | | | | | | |
| a | | Collect existing information | J/E<LE>Kishimoto C/P<Vegetation>:Medei ros | | | | | | | | | | | | | | | | | | | | | | |
| b | | Conduct field survey | J/E<LE>Kishimoto C/P<Vegetation>:Regin a, Antonia katia | | | | | | | | | | | | | | | | | | | | | | |
| c | | Prepare a vegetation map of the State of RGN | -do- | | | | | | | | | | | | | | | | | | | | | | |
| 1-3 | | Identify the land utilization in the semi-arid region in the State of RGN | J/E<LE>Kishimoto C/P<Vegetation>:Regin a | | | | | | | | | | | | | | | | | | | | | | |
| a | | Collect existing information | J/E<LE>Kishimoto C/P<Vegetation>:Medei ros | | | | | | | | | | | | | | | | | | | | | | |
| b | | Conduct field survey | J/E<LE>Kishimoto C/P<Vegetation>:Regin a, Antonia katia | | | | | | | | | | | | | | | | | | | | | | |
| c | | Prepare a land use map | -do- | | | | | | | | | | | | | | | | | | | | | | |
| d | | Prepare an analytical report | -do- | | | | | | | | | | | | | | | | | | | | | | |

Progress : A=already completed, B1=on schedule/expected to be completed by end of the Project, B2=behind the schedule but expected to be completed, C=not expected to be completed, D=not able to start

Annex 2 Detailed PO ver.1(PO at the time of final evaluation) and the progress of the activities

| Activities | Target | Responsible persons | 02 | | 2003 | | 2004 | | 2005 | | Progress | Remarks |
|---|--|---|-----|-----|------|-----|------|-----|------|-----|----------|--|
| | | | Jul | Dec | Jan | Apr | Jul | Oct | Jan | Apr | | |
| 1-4 Survey the utilization of trees and grasses in the semi-arid region in the State of RGN. | | J/E<LE>Kishimoto C/P<Vegetation>:Regin a | | | | | | | | | A | |
| a Collect existing information | Existing information collected. | J/E<LE>Kishimoto C/P<Vegetation>:Medei | | | | | | | | | A | Existing information available at IDEMA has been collected. |
| b Conduct field survey | Filed surveys in low land and hilly areas conducted. | J/E<LE>Kishimoto C/P<Vegetation>:Regin a, Antonia katia | | | | | | | | | A | |
| c Prepare a survey report | A survey report prepared | -do- | | | | | | | | | A | |
| 1-5 Prepare a report on utilization of lands and vegetation in the semi-arid region in the State of RGN | A technical report prepared | J/E<LE>Kishimoto C/P<Vegetation>:Regin a, Antonia katia | | | | | | | | | B2 | |
| <2. The general situation of stock farming in the semi-arid region in the State of RGN is made clear > | | | | | | | | | | | | |
| 2-1 Identify the livestock form – land extension, types, number and utilization of animals, - in the semi-arid region in the State of RGN | | J/E<SE in Animal Science>:Sekine C/P<Animal Science>:R. Galvao | | | | | | | | | | |
| a Collect existing information | Existing information collected | -do- | | | | | | | | | A | |
| b Conduct field survey | Questionnaire survey to farmers conducted | -do- | | | | | | | | | A | A questionnaire survey to farmers in a hilly area (Angicos) has been conducted. Approximately 40 farmers were interviewed. |
| c Prepare a survey report | A survey report prepared | -do- | | | | | | | | | B2 | Based on the above mentioned survey, three types of livestock form have been identified. A report has been prepared by a short-term expert in Japanese. Portuguese translation is expected to be completed by May 2005 |

(4)

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(4)

Annex 2 Detailed PO ver.1(PO at the time of final evaluation) and the progress of the activities

| Activities | Target | Responsible persons | 02 | | 2003 | | 2004 | | 2005 | | Progress | Remarks |
|---|---|---|-----|-----|------|-----|------|-----|------|-----|----------|--|
| | | | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | | |
| <3.The natural characteristics, including the vegetation and degradation, in the pilot plots are made clear > | | J/E-<LE>Kishimoto C/P-<Ecology>Maria Claret | | | | | | | | | | |
| 3-1 Select the pilot plots (including an experimental field of EMPARN in Terras Secas) | pilot plots selected and fenced. | J/E-<SE in Ecology>Tamai C/P-<R. Galvao | | | | | | | | | | A In December 2003, private land (9 ha in total) in the Municipality of Pedro Avelino was selected for a pilot plot in degraded area . However, due to a delay in disbursement of local cost, fencing was not completed until September 2004, which has caused a delay of the relevant activities. It has been decided that an experimental field of EMPARN in reserved area in Terras Secas, the vegetation of which has not been disturbed for the past 20-30 years, be used as an observation site for a comparison with the pilot plot in Pedro Avelino. In the experimental field of EMPARN, monitoring of growth rate is conducted every year. Due to a delay in arrival of the Project vehicle at ESAM, visit to the pilot plots could not be made very often in the beginning, which has caused a 6-month delay in this activity |
| 3-2 Make the soil and vegetation maps in the pilot plots | | J/E-<LE>Kishimoto C/P-<Pedology & Vegetation>; Duda & Regina | | | | | | | | | | B2 A soil survey in the pilot plot in Pedro Avelino was conducted in August 2004. A soil survey in the observation plot in Terras Secas is planned to be conducted in June 2005. |
| a Conduct soil survey of the pilot plots | A survey report prepared for each plot | J/E-<SE in Pedology>; Yabe C/P-<Pedology>; Duda | | | | | | | | | | B2 A soil map (1:4,000) of the pilot plot has been prepared. A soil map (1:4,000) of the observation plot is planned to be prepared in July 2005. |
| b Prepare soil maps of the pilot plots | A soil map prepared for each plot | -do- | | | | | | | | | | B2 A vegetation survey in the pilot plot in Pedro Avelino was conducted in the beginning of 2005. A vegetation survey in the observation plot is planned to be conducted in June 2005. |
| c Conduct vegetation survey of the pilot plots | A survey report prepared for each plot | J/E-<LE>Kishimoto C/P-<Vegetation>; Regina, Antonio Katia | | | | | | | | | | B2 Preparation of a vegetation map (1:4,000) of the pilot plot is on going and is expected to be finished by the end of May 2005 Preparation of a vegetation map (1:4,000) of the observation plot is planned to be conducted in July 2005. |
| d Prepare vegetation maps of the pilot plots | A vegetation map prepared for each plot | -do- | | | | | | | | | | B2 |
| 3-3 Conduct meteorological observation of the pilot plots daily | | J/E-<SE in Meteorology> C/P-<Meteorology>Jose Espirala | | | | | | | | | | B2 |
| a Conduct observation | Meteorological station established and maintained for each plot | -do- | | | | | | | | | | B2 Meteorological observation were not able to begin, the meteorological stations have not arrived yet. It is expected to arrive in April 2005 |
| b Prepare a monthly report | A monthly report prepared for each plot | -do- | | | | | | | | | | B2 |

(5)

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Annex 2 Detailed PO ver.1(PO at the time of final evaluation) and the progress of the activities

| Activities | Target | Responsible persons | 2005 | | | | | | | | | | | | Progress | Remarks | | |
|--|--|---|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------|---------|--|--|
| | | | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | | | | |
| 3-4 Prepare researcher's manuals | | J/E-<LE>Kishimoto C/P<PM>: Galvao | | | | | | | | | | | | | | B2 | Preparation of a soil survey manual (English version) is ongoing and is expected to be completed by the end of March 2005. It is planned that Portuguese translation will be ready by the end of May 2005. | |
| a Prepare a soil survey manual | A soil survey manual prepared | J/E-<LE>Kishimoto C/P<Pedology>: Duda | | | | | | | | | | | | | | | Preparation of a vegetation survey manual (English version) is ongoing and is expected to be completed by the end of March 2005. It is planned that Portuguese translation will be ready by the end of May 2005. | |
| b Prepare a vegetation survey manual | A vegetation survey manual prepared | J/E-<LE>Kishimoto C/P<Vegetation>: Regina, Antonio Katia | | | | | | | | | | | | | | | Preparation of a vegetation survey manual (English version) is ongoing and is expected to be completed by the end of March 2005. It is planned that Portuguese translation will be ready by the end of May 2005. | |
| <4. Trees and grass species potentially useful for local community relevant to the pilot plots selected. | | | | | | | | | | | | | | | | | | |
| 4-1 Identify the community needs for their life and livestock farming related to the trees and grasses relevant to the pilot plots | | J/E<SE in Plant Breeding> Nobuchi C/P<Plant Breeding>:(Galvao) | | | | | | | | | | | | | | | A | A field survey has been conducted in Angicos Region, in which Municipality of Pedro Avelino is located. Approximately 20 farmers were interviewed and approximately 20 kinds of sample wood were collected in the beginning of 2004. |
| a Conduct field survey | Field survey conducted | -do- | | | | | | | | | | | | | | | A | A report on "Useful trees and grasses in semi arid in R/N" has been prepared by a short-term expert in plant breeding |
| b Prepare a survey report on the community needs | A survey report prepared | -do- | | | | | | | | | | | | | | | A | Based on the above survey, five species (i.e. Aroeira, Brauna, Caralibera, Catanduda, and Sabia) have been selected for further study. |
| 4-2 Select potentially useful tree and wood species for the community life relevant to the pilot plots | Potentially useful tree and grass species for the community life selected. | -do- | | | | | | | | | | | | | | | A | Based on the above survey, five species (i.e. Sabia, Catiguera, Fejao Bravo, Flor de Seda, and Leucena) have been selected for further study |
| 4-3 Select potentially useful tree and grass species for the livestock farming relevant to the pilot plots | Potentially useful tree and grass species for livestock farming selected. | J/E<SE in Animal Science>:Sekine C/P<Animal Science>: Galvao | | | | | | | | | | | | | | | A | A format for a catalog have been already prepared and most of the necessary data have been collected, except for data from nutrition analysis and photos. |
| 4-4 Prepare a catalog for researchers on the species selected in 4-2 and 4-3 above. | A catalog prepared | J/E-<SE in Vegetation> C/P<Vegetation>: Regina, Antonio Katia | | | | | | | | | | | | | | | B2 | |
| 4-5 Prepare a leaflet for local people on the species selected in 4-2 and 4-3 above | A leaflet prepared | -do- | | | | | | | | | | | | | | | B2 | |

Progress : A=already completed, B1=on schedule/expected to be completed by end of the Project, B2=behind the schedule but expected to be completed, C=not expected to be completed D=not able to start

(6)

Annex 2 Detailed PO ver.1(PO at the time of final evaluation) and the progress of the activities

| Activities | Target | Responsible persons | 2005 | | | | | | | | | | | | Progress | Remarks | |
|--|---|--|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------|---------|-----|
| | | | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | | | Jul |
| <5. Techniques for revegetation are developed through research in the pilot plots > | | | | | | | | | | | | | | | | | |
| 5-1 | Estimate biomass and productivity of the plant for the livestock farming in the pilot plots | J/E: <LE>Kishimoto <C/P>Forestry> August <Camara | | | | | | | | | | | | | | | |
| a | Conduct field survey | J/E:<SE in Plant Physiology> <C/P>Ecology>Maria Clarete | | | | | | | | | | | | | | | B2 |
| b | Prepare a report on biomass and productivity | J/E:<SE in Plant Physiology> <C/P>Ecology>Clarete, Camara | | | | | | | | | | | | | | | B2 |
| 5-2 | Survey the dietary habits of livestock in the pilot plots | -do- | | | | | | | | | | | | | | | B2 |
| a | Conduct survey | J/E:<SE in Animal Science>Sekine <C/P>Animal Science>Galvao | | | | | | | | | | | | | | | B2 |
| b | Prepare a survey report | -do- | | | | | | | | | | | | | | | B2 |
| 5-3 | Estimate carrying capacity of the pilot plots | J/E:<SE in Plant Physiology> <C/P>Ecology>Clarete, Camara | | | | | | | | | | | | | | | B2 |
| 5-4 | Propose germination techniques of the selected species | J/E:<LE>Kishimoto, <SE in Afforestation> <C/P>Forestry> Camara, <Afforestation>Erivaldo | | | | | | | | | | | | | | | B2 |
| a | Collect seeds | -do- | | | | | | | | | | | | | | | A |
| b | Conduct germination tests of the selected species as necessary | -do- | | | | | | | | | | | | | | | B2 |
| c | Prepare a report on germination system | -do- | | | | | | | | | | | | | | | B2 |

(7)

Handwritten signatures and initials.

Progress : A=already completed, B I=on schedule/expected to be completed by end of the Project, B2=behind the schedule but expected to be completed, C=not expected to be completed D=not able to start

Annex 2 Detailed PO ver.1(PO at the time of final evaluation) and the progress of the activities

| Activities | Target | Responsible persons | 02 | | 2003 | | 2004 | | 2005 | | Progress | Remarks |
|---|---|---|-----|-----|------|-----|------|-----|------|-----|----------|---|
| | | | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | | |
| 5-5 Propose the seedling production technique for the selected species | Seedling production technique proposed | J/E-<LE>Kishimoto, <SE in Afforestation> C/P-<Forestry> Camara, <Afforestation>Erivaldo | | | | | | | | | B1 | |
| 5-6 Identify planting technique for the selected species | Possible planting techniques identified | -do- | | | | | | | | | B1 | |
| 5-7 Test the planting techniques identified above. | | J/E-<LE>Kishimoto C/P-<Forestry> Camara, <Afforestation>Erivaldo | | | | | | | | | C | |
| a Construct nursery | Nursery constructed | -do- | | | | | | | | | A | Nursery (0.25 ha) was constructed near the pilot plot in Pedro Avellino in December 2004. |
| b Produce seedlings of the selected species | Seedling production report prepared | J/E-<LE>Kishimoto, <SE in Afforestation> C/P-<Forestry> Camara, <Afforestation>Erivaldo | | | | | | | | | B1 | Seedling production of the selected nine species started in December 2004 and will continue until April 2005. |
| c Prepare land in the pilot plots | Trenches prepared | J/E-<LE>Kishimoto C/P | | | | | | | | | A | Construction of trenches in the pilot plot in Pedro Avellino was finished in January 2005. Trenches were constructed in 5 of the 9 subplots (i.e. subplot A-E) of the site. The other four subplots (F-I) are reserved for dietary habit survey |
| d Plant the seedlings | Seedling planted | J/E-<LE>Kishimoto, <SE in Afforestation> C/P-<Forestry> Camara, <Afforestation>Erivaldo | | | | | | | | | B1 | It is planned that the seedlings of the selected nine species will be planted between March and April 2005. |
| e Care saplings | Survival rate | J/E-<LE>Kishimoto C/P-<Forestry> Camara, <Afforestation>Erivaldo | | | | | | | | | C | |
| f Monitor soil moisture and temperature | Monitoring report prepared every 6 months | J/E-<LE>Kishimoto C/P-<Pedology> Duda | | | | | | | | | | |
| g Monitor the survival and growth rates every six months | Monitoring report prepared every 6 months | J/E-<LE>Kishimoto C/P-<Forestry>Camara, <Afforestation>Erivaldo | | | | | | | | | C | It is planned that the first monitoring will be conducted in August 2005. |
| h Recommend useful tree and grass species appropriate for revegetation of the area surrounding the pilot plot recommended | Species | -do- | | | | | | | | | D | |
| 5-8 Make researcher's manuals for the techniques developed above the project | | J/E-<LE>Kishimoto C/P-<Forestry> Camara | | | | | | | | | C | It is impossible to prepare all researcher's manuals by August 2005. |

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M.

(3)

Progress : A=already completed, B=on schedule/expected to be completed, C=not expected to be completed, D=not able to start

(8)

Annex 2 Detailed PO ver.1(PO at the time of final evaluation) and the progress of the activities

| Activities | Target | Responsible persons | 2003 | | | | | | | | | | | | 2004 | | | 2005 | | | Progress | Remarks | | | | | |
|------------|---|--|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|------|-----|-----|----------|---------|--|--|--|----|--|
| | | | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Jul | Oct | Jan | Apr | Jul | | | | | | | |
| a | Prepare a manual for estimation of biomass and plant productivity | J/E:<SE in Plant Physiology> C/P<Ecology> Maria Clarette, A. Camara | | | | | | | | | | | | | | | | | | | | | | | | B2 | It is expected that a manual for estimation of biomass and productivity will be prepared in English by June 2005 and will be translated into Portuguese by August 2005. |
| b | Prepare a manual for dietary habit survey | J/E:<SE in Animal Science>Sekine C/P <Animal Science> Maria Clarite, A. | | | | | | | | | | | | | | | | | | | | | | | | A | A manual for dietary habit survey was prepared in English and was translated into Portuguese in February 2005. |
| c | Prepare a manual for germination test | J/E:<LE>Kishimoto, <SE in Afforestation> C/P<Forestry> Camara, <Afforestation>Erivaldo | | | | | | | | | | | | | | | | | | | | | | | | B2 | Preparation of a manual for germination test (English version) is ongoing and is expected to be finished by March 2005. Portuguese translation is expected to be completed by May 2005. |
| d | Prepare a manual for seedling production | -do- | | | | | | | | | | | | | | | | | | | | | | | | B2 | It is planned that a manual for seedling production will be prepared in English in May 2005 and will be translated into Portuguese in July 2005. |
| e | Prepare a manual for planting | -do- | | | | | | | | | | | | | | | | | | | | | | | | C | It is planned that a manual for planting (including land preparation) will be prepared in English in August 2005. Portuguese translation, which normally takes two months, would not be completed by the end of the Project. |
| f | Prepare a manual for monitoring of survival and growth rates | -do- | | | | | | | | | | | | | | | | | | | | | | | | B2 | It is planned that a manual for monitoring of survival and growth rates will be prepared in English and will be translated into Portuguese in July 2005. |
| 5-9 | Prepare a technical report on revegetation system for semi-arid region of RGN, including the information on carrying capacity | J/E:<LE>Kishimoto, <SE in Afforestation> C/P<Forestry> Camara, <Afforestation>Erivaldo | | | | | | | | | | | | | | | | | | | | | | | | D | It is impossible to prepare a technical report on revegetation system by August 2005 since the first monitoring of the growth rate is conducted in the same month. |
| 5-10 | Prepare a leaflet for local people on revegetation methods | -do- | | | | | | | | | | | | | | | | | | | | | | | | D | |

(19)

Progress : A=already completed, B1=on schedule/expected to be completed by end of the Project, B2=behind the schedule but expected to be completed, C=not expected to be completed D=not able to start (9)

Annex 2 Detailed PO ver.1(PO at the time of final evaluation) and the progress of the activities

| Activities | Target | Responsible persons | 02 | | 2003 | | 2004 | | 2005 | | Remarks | |
|---|--|---|-----|-----|------|-----|------|-----|------|-----|---------|--|
| | | | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | | Jul |
| < 6. Techniques for sustainable fodder production are developed for both in the original v vegetation area and revegetated area in the pilot plot > | | J/E<SE in Animal Science> C/P<Animal Science>R. Galvao, A. | | | | | | | | | | |
| 6-1 Identify sustainable fodder production techniques depending on the livestock farming capacity in the pilot plots. | | -do- | | | | | | | | | C | |
| a Collect fodder of the selected fodder species | Fodder of the selected species collected in time for digestion trials and nutrition analysis | -do- | | | | | | | | | B2 | <ul style="list-style-type: none"> Fodder of the selected five species were supposed to be collected in the end of the rainy season (May-July) in 2004. However, the collection could not be conducted due to a delay in disbursing local cost for the field activities. Fodder of two of the selected species (i.e. Fodder of Fejao Bravo and Flor de Seda) could be obtained from EMPARN. It is planned that the collection of the other three species will be conducted in May/July in 2005. Digestion trials of the selected species, of which fodder was available (i.e. Fejao Bravo and Flor de Seda), have been conducted. In addition, trials of pod of Algaroba and dried cashu fruits were conducted. It is planned that trials for the other three selected species will start after the fodder is collected in May-July 2005. Since it takes one month to complete a trial of one species, it is likely that all trials will not be finished by August 2005. |
| b Conduct digestion trials for the selected fodder species in rainy and dry seasons | Digestion trials of the selected species conducted | -do- | | | | | | | | | C | <ul style="list-style-type: none"> Nutrition analyses of two of the five selected species (i.e. Fejao Bravo, Flor de Seda) as well as Algaroba have been conducted already. An analysis of dried cashu fruits is ongoing and is planned to be completed by the end of March 2005. It is unlikely that analyses of the other three selected species (i.e. Sabia, Catingueira and Leucena), which are to be conducted after the digestion trials, will be completed by August 2005. Of the necessary equipment for nutrition analysis, electronic balance, drying oven and forced oven were provided in time. However, automatic pump calorimeter and carbon/nitrogen analyzer have not arrived yet. |
| c Conduct nutrition analysis of the fodder and excrement of domestic animals | Nutrition analysis of the selected species conducted | -do- | | | | | | | | | C | <ul style="list-style-type: none"> Based on the above trials and analyses, Fejao Bravo, Flor de Seda and Algaroba have been identified as potentially good fodder so far. Production techniques for fodder (hay and silage) of the Fejao Bravo, Flor de Seda, Algaroba and dried cashu fruits have been already proposed. |
| d Identify potentially appropriate fodder species | Possible fodder species identified | -do- | | | | | | | | | C | |
| e Propose fodder production techniques of the species identified above. | Fodder production techniques proposed for the identified species | | | | | | | | | | C | |
| 6-2 Test the identified techniques | | J/E<SE in Animal Science> C/P<Animal Science> | | | | | | | | | C | |

(10)

Progress : A=already completed, B1=on schedule/expected to be completed by end of the Project, B2=behind the schedule but expected to be completed, C=not expected to be completed D=not able to start

Annex 2 Detailed PO ver.1(PO at the time of final evaluation) and the progress of the activities

| Activities | Target | Responsible persons | 2003 | | | | | | | | | | | | 2005 Progress | Remarks | | | |
|------------|--|---|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|---------|-----|---|--|
| | | | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | | | Jul | | |
| a | Produce fodder of the species identified above | -do- | | | | | | | | | | | | | | | | C | -Production of fodder of Feijao Brabo, Flor de Seda and Algaroba (and possibly dried cashu fruits) is scheduled to start in the end of the rainy season (May-July) in 2005. |
| b | Conduct feeding test in the pilot plots in rainy and dry seasons | -do- | | | | | | | | | | | | | | | | C | -Feeding test of Feijao Brabo, Folbra de Seda, Algaroba (and possibly dried cashu fruits) is scheduled to start in the end of the rainy season (May-July) in 2005. A feeding test, which takes one year, will not be completed by August 2005. -Feeding tests of the other potential species cannot start before August 2005. |
| c | Monitor the weight of the animals periodically | -do- | | | | | | | | | | | | | | | | C | |
| d | Recommend fodder species appropriate for stock farming in the area surrounding the pilot plots | -do- | | | | | | | | | | | | | | | | D | -Sustainable fodder species cannot be recommended because the feeding tests will not complete by August 2005 |
| 6-3 | Make researcher's manuals for the techniques which are developed above the project. | J/E<SE in Animal Science> C/P<Animal Science>-R. Galvao, A. | | | | | | | | | | | | | | | | C | |
| a | Prepare a manual for digestion trial | -do- | | | | | | | | | | | | | | | | A | A manual for digestion trial was prepared in English and was translated into Portuguese in February 2005. |
| b | Prepare a manual for nutrition analysis | -do- | | | | | | | | | | | | | | | | A | A manual for nutrition analysis was prepared in English and was translated into Portuguese in February 2005. |
| c | Prepare a manual for fodder production | -do- | | | | | | | | | | | | | | | | C | A manual for production of fodder from Feijao Brabo, Flor de Seda, Algaroba and dried cashu fruits have been prepared both in English and Portuguese already. |
| d | Prepare a manual for feeding test | -do- | | | | | | | | | | | | | | | | A | A research manual for feeding test was prepared in English and was translated into Portuguese in February 2005 |
| 6-4 | Prepare a technical report on sustainable fodder production | J/E<SE in Animal Science> C/P<Animal Science>-R. Galvao, A. | | | | | | | | | | | | | | | | D | |

(11)

Progress : A=already completed, B1=on schedule/expected to be completed by end of the Project, B2=behind the schedule but expected to be completed, C=not expected to be completed D=not able to start (11)

Annex 3: Accomplishment Grid

| PDM code | Indicators as per PDM | Sources | Methods | Results (as of 23 March, 2005) |
|---|---|--|---|--|
| Super Goals Technologies to utilize potential productiveness of vegetation and soil in the semi-arid region are disseminated in the Northern Brazil (Caatinga) | 1. Slowing down of desertification process in Caatinga 2. Increase of animal production | -Field observation -Agriculture statistics of the State Government | Field survey and review of the document | |
| Overall Goals Appropriate technologies for recuperation of degraded areas are disseminated in semi-arid region of the State of Rio Grande do Norte (RGN) | 1. Slowing down of desertification process in RGN 2. Increase of animal production | -Observation in RGN -Agriculture statistics of the state government | -do- | |
| Project Purpose Appropriate technologies for recuperation of degraded areas, utilizing useful trees and grass species, are made available for semi-arid region of the State of RGN | 1. C/P at ESAM are not able to continue relevant research in RGN by themselves, utilizing the techniques transferred through the Project. 2. Leaflets for local people, prepared by the Project are adopted by IDEMA and the relevant institutions | Japanese experts(J/E) and Counterpart personnel (C/P) | Questionnaire to J/E and C/P; interview with J/E and C/P; and review of the documents | 1: Because activities of the Project started in November 2003, C/P at ESAM have not acquired enough technical knowledge and skills to continue relevant research in RGN. 2: Preparation of leaflets would not be finished by the end of the Project. |
| Outputs 1. The general situation of utilization of vegetation and soil in the semi-arid region of RGN is made clear | 1a: A technical report on utilization of lands and vegetation in the semi-arid region in RGN elaborated, which includes 1)a vegetation map ; 2)a land use map and an analytical report; 3) a list of useful trees and grass species. | J/E, C/P a technical report | -do- | 1a:Preparation of a vegetation map of RGN (1:2,000,000) is ongoing: it is expected to be completed in March 2005. A field survey on land use in RGN is ongoing: preparation of a land use map and an analytical report is expected to be finished by June 2005. A list of useful trees and grass species of RGN has been prepared already. It is expected that a technical report , compiling the above information, will be ready by the end of the Project. |
| 2.The general situation of stock farming in the semi-arid region in the state of RGN . | 2a: A report on livestock form in RGN prepared. | J/E, C/P a technical report | -do- | 2a:A report on livestock form in the State of RGN has been prepared in Japanese. Portuguese translation is expected to be completed by May 2005. |
| 3. The natural characteristics, including the vegetation and degradation, in the pilot plots are made clear | 3a: Maps on soil and vegetation in the pilot plots elaborated 3b: Researcher's manuals elaborated | J/E, C/P, maps of pilot project site and manuals | -do- | 3a:A soil map of the pilot plot in Pedro Avelino (1:4,000) has been prepared already. Preparation of a vegetation map of the same plot (1:4,000) is ongoing and is expected to be completed in May 2005. A topographic map has been also prepared. As for the observation plot in Terras Secas, soil and vegetation surveys are planned to be conducted in June 2005 and maps are planned to be prepared in July 2005. 3b:A manual for vegetation survey has been prepared already. Preparation of a manual for soil survey is ongoing and is expected to be completed by August 2005 |

Table A: Status of manual preparation under Output 3

| | Title | Status | Remarks |
|---|-------------------|---------|---------------------------------|
| 1 | Vegetation survey | Ongoing | - |
| 2 | Soil survey | Ongoing | -to be completed by August 2005 |

Annex 3: Accomplishment Grid

| PDM code | Indicators as per PDM | Sources | Methods | Results (as of 23 March, 2005) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---------------------------------|--------------------------------|---|--|-------------|---------------|------------------------|---|---------|---------------------------|----------------|---|--------|---------------------------|----------------|---|-----------|-------------------------|----------------|---|-----------|--------------------------------|----------------|---|-------|--------------------------------|--------------------------------|---|-------------|---------------------------------|---------------|---|--------------|------------------------|---------------|---|--------------|----------------------------|---------------|---|---------|------------------------------|---------------|
| 4. Tree and grass species potentially useful for local community relevant to the pilot plots are selected | <p>4a: Tree and grass species that are used by local people identified.</p> <p>4b: Tree and grass species potentially useful for local people selected for further research in the pilot plots</p> <p>4c: A catalog on potentially useful tree and grass species elaborated</p> <p>4d A leaflet for local people about potentially useful tree and grass species for local people prepared</p> | J/E, C/P, catalog and manuals | -do- | <p>4a:Thirty-nine (39) tree and grass species have been identified.</p> <p>4b:Of the above 39 species, nine (9) have been selected as potentially useful ones for local community:</p> <p style="text-align: center;">Table B: List of the selected species</p> <table border="1"> <thead> <tr> <th></th> <th>Common Name</th> <th>Academic name</th> <th>Potentially useful for</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Aroeida</td> <td><i>Astronium unudcuva</i></td> <td>Community life</td> </tr> <tr> <td>2</td> <td>Brauna</td> <td><i>Melanoxylon brauna</i></td> <td>Community life</td> </tr> <tr> <td>3</td> <td>Caraibera</td> <td><i>Tabebuia caraiba</i></td> <td>Community life</td> </tr> <tr> <td>4</td> <td>Catanduba</td> <td><i>Piptadenia moniliformis</i></td> <td>Community life</td> </tr> <tr> <td>5</td> <td>Sabia</td> <td><i>Mimosa caesarpiniifolia</i></td> <td>Community life & Stock farming</td> </tr> <tr> <td>6</td> <td>Catingueria</td> <td><i>Caesarpinia garchneriana</i></td> <td>Stock farming</td> </tr> <tr> <td>7</td> <td>Feijao Bravo</td> <td><i>Erythrina fusca</i></td> <td>Stock farming</td> </tr> <tr> <td>8</td> <td>Flor de Seda</td> <td><i>Calotropia gigantea</i></td> <td>Stock farming</td> </tr> <tr> <td>9</td> <td>Leucena</td> <td><i>Leucaena leucocephala</i></td> <td>Stock farming</td> </tr> </tbody> </table> <p>4c:A format for a catalog has been prepared. Most of the necessary information regarding the selected nine species have been collected but data related to nutrition analysis (to be obtained from Activity 6-1) and the photos of the plants. It is expected that a catalog will be ready by the end of the Project.</p> <p>4d:A leaflet is a simplified version of the above catalog. It is planned to be prepared in July 2005.</p> | | Common Name | Academic name | Potentially useful for | 1 | Aroeida | <i>Astronium unudcuva</i> | Community life | 2 | Brauna | <i>Melanoxylon brauna</i> | Community life | 3 | Caraibera | <i>Tabebuia caraiba</i> | Community life | 4 | Catanduba | <i>Piptadenia moniliformis</i> | Community life | 5 | Sabia | <i>Mimosa caesarpiniifolia</i> | Community life & Stock farming | 6 | Catingueria | <i>Caesarpinia garchneriana</i> | Stock farming | 7 | Feijao Bravo | <i>Erythrina fusca</i> | Stock farming | 8 | Flor de Seda | <i>Calotropia gigantea</i> | Stock farming | 9 | Leucena | <i>Leucaena leucocephala</i> | Stock farming |
| | Common Name | Academic name | Potentially useful for | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Aroeida | <i>Astronium unudcuva</i> | Community life | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Brauna | <i>Melanoxylon brauna</i> | Community life | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Caraibera | <i>Tabebuia caraiba</i> | Community life | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Catanduba | <i>Piptadenia moniliformis</i> | Community life | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Sabia | <i>Mimosa caesarpiniifolia</i> | Community life & Stock farming | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Catingueria | <i>Caesarpinia garchneriana</i> | Stock farming | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Feijao Bravo | <i>Erythrina fusca</i> | Stock farming | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Flor de Seda | <i>Calotropia gigantea</i> | Stock farming | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Leucena | <i>Leucaena leucocephala</i> | Stock farming | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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Annex 3: Accomplishment Grid

| PDM code | Indicators as per PDM | Sources | Methods | Results (as of 23 March, 2005) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|--|-------|--------|---------|---|--|-----------------|---|---|----------------------|-----------|--|---|------------------|-----------------|---|---|---------------------|-----------------|--|---|----------|-----------------|---|---|---|-----------------|---|
| <p>5 Techniques for revegetation (i.e. growing seedlings of the selected tree and grass species as well as planting and managing them) are developed through research in the pilot plots.</p> | <p>5a: Useful tree and grass species appropriate for revegetation of the area surrounding the pilot plots recommended.</p> <p>5b: Researcher's manuals for revegetation techniques elaborated</p> <p>5c: A technical report on revegetation system, including the information on carrying capacity, prepared</p> <p>5d: A leaflet for local people about revegetation methods prepared.</p> | <p>J/E, C/P, Manuals and technical report</p> | <p>-do-</p> | <p>5a: Germination tests and seedling production of the nine species selected under Output 4 are ongoing. Planting of the seedlings is scheduled in March and April 2005. The semi-annual monitoring of the survival and growth rates would be conducted only once by August 2005; it is not possible to recommend appropriate species for revegetation by the end of the Project</p> <p>5b: Preparation of the most of the manuals is expected to be completed by the end of the Project.</p> <p>Table C: Status of manual preparation under Output 5</p> <table border="1"> <thead> <tr> <th></th> <th>Title</th> <th>Status</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Estimation of biomass and productivity</td> <td>Not started yet</td> <td>-to be prepared in English in Jun. and in Portuguese in Aug. 2005</td> </tr> <tr> <td>2</td> <td>Dietary habit survey</td> <td>Completed</td> <td></td> </tr> <tr> <td>3</td> <td>Germination test</td> <td>Not started yet</td> <td>-to be prepared in English in Jul. and in Portuguese in Aug. 2005</td> </tr> <tr> <td>4</td> <td>Seedling production</td> <td>Not started yet</td> <td>-to be prepared in English in May and in Portuguese in Jul. 2005</td> </tr> <tr> <td>5</td> <td>Planting</td> <td>Not started yet</td> <td>-to be prepared in English in Aug. 2005</td> </tr> <tr> <td>6</td> <td>Monitoring of survival and growth rates</td> <td>Not started yet</td> <td>-to be prepared both in English and Portuguese in Jul. 2005</td> </tr> </tbody> </table> <p>5c: A technical report on revegetation system will be prepared after the relevant techniques are established: it cannot be prepared by the end of the Project.</p> <p>5d: Materials for extension of revegetation methods will be prepared after the relevant techniques are established: it cannot be prepared by the end of the Project.</p> | | Title | Status | Remarks | 1 | Estimation of biomass and productivity | Not started yet | -to be prepared in English in Jun. and in Portuguese in Aug. 2005 | 2 | Dietary habit survey | Completed | | 3 | Germination test | Not started yet | -to be prepared in English in Jul. and in Portuguese in Aug. 2005 | 4 | Seedling production | Not started yet | -to be prepared in English in May and in Portuguese in Jul. 2005 | 5 | Planting | Not started yet | -to be prepared in English in Aug. 2005 | 6 | Monitoring of survival and growth rates | Not started yet | -to be prepared both in English and Portuguese in Jul. 2005 |
| | Title | Status | Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Estimation of biomass and productivity | Not started yet | -to be prepared in English in Jun. and in Portuguese in Aug. 2005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Dietary habit survey | Completed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Germination test | Not started yet | -to be prepared in English in Jul. and in Portuguese in Aug. 2005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Seedling production | Not started yet | -to be prepared in English in May and in Portuguese in Jul. 2005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Planting | Not started yet | -to be prepared in English in Aug. 2005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Monitoring of survival and growth rates | Not started yet | -to be prepared both in English and Portuguese in Jul. 2005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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Annex 3: Accomplishment Grid

| PDM code | Indicators as per PDM | Sources | Methods | Results (as of 23 March, 2005) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|--------------------|--|--|---------------------|------------------|--------------------|--------------------------------|---|--------------|-----------|-----------|---|---|---------------|-----------|-----------|------|---|--------|--------------|---------------|---|---|---------------|------|------|------|---|----------|------|------|------|---|------------|-----------|-----------|---|---|---------------|-----------|-----------|------|--|-------|--------|---------|---|--------------------|-----------|--|---|------------------|-----------|--|---|-------------------|------------------|--|---|--------------|-----------|--|
| <p>6 Techniques for sustainable fodder production for both in the original vegetation and revegetated plots are developed through research in the pilot plots</p> | <p>6a: Fodder species appropriate for stock farming in the area surrounding the pilot plots recommended</p> <p>6b: Researcher's manuals for sustainable fodder production elaborated</p> <p>6c: A technical report on sustainable fodder production prepared</p> | <p>J/E, C/P, manuals and a technical report</p> | <p>-do-</p> | <p>6a: It is impossible to recommend fodder species appropriate for stock farming by August 2005 since feeding tests of the potential species, which takes one year, will not be completed by then.</p> <p>Table D: Schedule of the necessary analyses and test</p> <table border="1"> <thead> <tr> <th></th> <th>Name of the species</th> <th>Digestion Trials</th> <th>Nutrition Analysis</th> <th>Feeding test at the pilot plot</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Fejao Brabo*</td> <td>Completed</td> <td>Completed</td> <td>One year from the end of the rainy season (May-Jul) in 2005</td> </tr> <tr> <td>2</td> <td>Flor de Seda*</td> <td>Completed</td> <td>Completed</td> <td>-do-</td> </tr> <tr> <td>3</td> <td>Sabia*</td> <td>Jul-Sep 2005</td> <td>Jul-Sep. 2005</td> <td>One year from the end of the rainy season (May-Jul) in 2006</td> </tr> <tr> <td>4</td> <td>Catingueria *</td> <td>-do-</td> <td>-do-</td> <td>-do-</td> </tr> <tr> <td>5</td> <td>Leucena*</td> <td>-do-</td> <td>-do-</td> <td>-do-</td> </tr> <tr> <td>6</td> <td>Algaroba**</td> <td>Completed</td> <td>Completed</td> <td>One year from the end of the rainy season (May-Jul) in 2005</td> </tr> <tr> <td>7</td> <td>Dried cashu**</td> <td>Completed</td> <td>Completed</td> <td>-do-</td> </tr> </tbody> </table> <p>*=The species selected under Output 4 **=Additional species selected under Output 6.</p> <p>6b: Most of the manuals have been already prepared both in English and Portuguese</p> <p>Table G: Status of manual preparation under Output 6</p> <table border="1"> <thead> <tr> <th></th> <th>Title</th> <th>Status</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Nutrition analysis</td> <td>Completed</td> <td></td> </tr> <tr> <td>2</td> <td>Digestion trials</td> <td>Completed</td> <td></td> </tr> <tr> <td>3</td> <td>Fodder production</td> <td>Partly completed</td> <td></td> </tr> <tr> <td>4</td> <td>Feeding test</td> <td>Completed</td> <td></td> </tr> </tbody> </table> <p>6c: Preparation of a technical report on sustainable fodder production cannot start before the end of the Project.</p> | | Name of the species | Digestion Trials | Nutrition Analysis | Feeding test at the pilot plot | 1 | Fejao Brabo* | Completed | Completed | One year from the end of the rainy season (May-Jul) in 2005 | 2 | Flor de Seda* | Completed | Completed | -do- | 3 | Sabia* | Jul-Sep 2005 | Jul-Sep. 2005 | One year from the end of the rainy season (May-Jul) in 2006 | 4 | Catingueria * | -do- | -do- | -do- | 5 | Leucena* | -do- | -do- | -do- | 6 | Algaroba** | Completed | Completed | One year from the end of the rainy season (May-Jul) in 2005 | 7 | Dried cashu** | Completed | Completed | -do- | | Title | Status | Remarks | 1 | Nutrition analysis | Completed | | 2 | Digestion trials | Completed | | 3 | Fodder production | Partly completed | | 4 | Feeding test | Completed | |
| | Name of the species | Digestion Trials | Nutrition Analysis | Feeding test at the pilot plot | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Fejao Brabo* | Completed | Completed | One year from the end of the rainy season (May-Jul) in 2005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Flor de Seda* | Completed | Completed | -do- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Sabia* | Jul-Sep 2005 | Jul-Sep. 2005 | One year from the end of the rainy season (May-Jul) in 2006 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Catingueria * | -do- | -do- | -do- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Leucena* | -do- | -do- | -do- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Algaroba** | Completed | Completed | One year from the end of the rainy season (May-Jul) in 2005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Dried cashu** | Completed | Completed | -do- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Title | Status | Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Nutrition analysis | Completed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Digestion trials | Completed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Fodder production | Partly completed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Feeding test | Completed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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Annex 3: Accomplishment Grid

| Items | Plan as per M/M | Sources | Methods | Results (as of 23 March, 2005) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|----------------------------|--|--|-------------|------|------|-------------------|--------------|---------|---------------------------|---------------------------|-----------------|---------|---------|-------|-----------|-----------|------------|--|---|----------------------------|---|---------|---|------------------|------------------------|-----------|------------------------|---|--------------------|-----|-----------|--|---|---------------------|-----|-----------|--|---|---------------------------------------|-----|---------|--|---|---------------------------------------|------------------------|-----------|----------|---|----------------------------|-----|---------|--|---|-------------|----------|-----------|--|---|-------------------------------------|-----|---------|--|---|--------------------------|-----|---------|--|----|-------------------|-----|-------------|--|----|------------------------|-----|-------------|------|----|---------|------------------------|-----------|--|----|---------------|--|--|---------------|----|----------------------|-----|---------|--|----|-----------|-----|---------|--|
| Input | Japanese side 1. Experts (1) Long-term expert: 1) Floral Zoning and Ecology (2) Short-term experts: 1) Vegetation 2) Ecology 3) Plant Breeding 4) Afforestation 5) Meteorology 6) Pedology 7) Hydrology 8) Animal Science | Project reports | Review of the reports | (1) <u>Long-term experts</u> : Since November 2003, one expert in the field of Floral Zoning and Ecology has been dispatched. (2) <u>Short-term experts</u> : Since November 2003, 6 experts in total have been dispatched in the following fields: Ecology (0.7m/m), Plant Breeding (0.8 m/m), Animal Science (0.7m/m + 4 m/m), Pedology (1 m/m), and Afforestation (1 m/m) Three more short-term experts in the fields of Meteorology, Plant Physiology, and Animal Science are planned to be dispatched by the end of the Project. Table H: Dispatch of short-term experts by the Japanese fiscal year (April-March) *=plan <table border="1"> <tr> <th>Fiscal Year</th> <th>2002</th> <th>2003</th> <th>2004</th> <th>2005</th> </tr> <tr> <td>Persons</td> <td>0</td> <td>3</td> <td>3</td> <td>3*</td> </tr> </table> | Fiscal Year | 2002 | 2003 | 2004 | 2005 | Persons | 0 | 3 | 3 | 3* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Fiscal Year | 2002 | 2003 | 2004 | 2005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Persons | 0 | 3 | 3 | 3* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Counterpart training 1) Rehabilitation for soil and forest 2) Biodiversity conservation and study 3) Meteorology 4) Animal Science 5) Pedology 6) Hydrology | -do- | -do- | In total, three counterpart personnel (two from IDEMA and one from ESAM) have been trained in Japan for one month in the field of "Revegetation in Semi-Arid Land." The plan for C/P training for the fiscal year 2005 has not been finalized yet. Table I: C/P training by the Japanese fiscal year (April-March) <table border="1"> <tr> <th>Fiscal Year</th> <th>2002</th> <th>2003</th> <th>2004</th> <th>2005</th> </tr> <tr> <td>Persons</td> <td>0</td> <td>0</td> <td>3</td> <td>Not decided yet</td> </tr> </table> | Fiscal Year | 2002 | 2003 | 2004 | 2005 | Persons | 0 | 0 | 3 | Not decided yet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fiscal Year | 2002 | 2003 | 2004 | 2005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Persons | 0 | 0 | 3 | Not decided yet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Provision of equipment for the Project activities. 1) 4x4-type vehicle 2) Electronic balance 3) Air forced dry oven, 4) Atomic absorption spectral photometer, 5) Copy machine for vegetation analyze 6) Automatic pump calorimeter, 7) GPS station, 8) Portable analyzer of photosynthesis 9) Carbon/nitrogen analyzer 10) Scholander pump 11) Satellite image SPOT 12) Scanner 13) Metrological station 14) Handy radio 15) Porometer 16) Other necessary machinery, equipment, and materials which may be mutually agreed upon. | -do- | -do- | In total, approximately 24,223,000 Japanese yen has been disbursed for procurement of the equipment and machinery. A Project car (4*4 vehicle), electronic balance, GPS station, a personal computer, a printer, etc. has been provided. Table J: Disbursement related to the equipment and machinery by the Japanese fiscal year (April-March) Unit=Japanese yen <table border="1"> <tr> <th>Fiscal Year</th> <th>2002</th> <th>2003</th> <th>2004</th> </tr> <tr> <td>Local Procurement</td> <td>3,200,000 *1</td> <td>616,400</td> <td>19,172,500 (17,519,000)*2</td> </tr> <tr> <td>International Procurement</td> <td></td> <td>606,500</td> <td>637,800</td> </tr> <tr> <td>Total</td> <td>3,200,000</td> <td>1,222,900</td> <td>19,800,300</td> </tr> </table> <p>*1: Prior to the beginning of the Project, a 4X4-type vehicle was purchased by JICA Brazil Office. *2: In the fiscal year 2004, approximately 19,172,500 yen has been disbursed for local procurement. However, the equipment worth approximately 17,519,000 yen has not arrived at the Project site yet.</p> Table K: Arrival of the equipment listed in the M/M at the Project site <table border="1"> <thead> <tr> <th></th> <th>Name of the equipment listed in the M/M</th> <th>Relevant Activities of PDM</th> <th>Time of the arrival at the Project site</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4x4-type vehicle</td> <td>Most of the Activities</td> <td>Mar. 2004</td> <td>Purchased in Mar. 2002</td> </tr> <tr> <td>2</td> <td>Electronic balance</td> <td>6-1</td> <td>Dec. 2004</td> <td></td> </tr> <tr> <td>3</td> <td>Air-forced dry oven</td> <td>6-1</td> <td>Jan. 2005</td> <td></td> </tr> <tr> <td>4</td> <td>Atomic absorption spectral photometer</td> <td>6-1</td> <td>Not yet</td> <td></td> </tr> <tr> <td>5</td> <td>(Copy machine for vegetation analyze)</td> <td>Most of the Activities</td> <td>Jan. 2004</td> <td>On lease</td> </tr> <tr> <td>6</td> <td>Automatic pump calorimeter</td> <td>6-1</td> <td>Not yet</td> <td></td> </tr> <tr> <td>7</td> <td>GPS station</td> <td>3-1, 3-2</td> <td>Mar. 2004</td> <td></td> </tr> <tr> <td>8</td> <td>Portable analyzer of photosynthesis</td> <td>5-1</td> <td>Not yet</td> <td></td> </tr> <tr> <td>9</td> <td>Carbon/nitrogen analyzer</td> <td>6-1</td> <td>Not yet</td> <td></td> </tr> <tr> <td>10</td> <td>(Scholander pump)</td> <td>5-1</td> <td>(Jun. 2004)</td> <td>IDEMA's equipment made available for the Project</td> </tr> <tr> <td>11</td> <td>(Satellite image SPOT)</td> <td>1-1</td> <td>(Jun. 2004)</td> <td>-do-</td> </tr> <tr> <td>12</td> <td>Scanner</td> <td>Most of the Activities</td> <td>Jun. 2004</td> <td></td> </tr> <tr> <td>13</td> <td>(Handy radio)</td> <td></td> <td></td> <td>Not necessary</td> </tr> <tr> <td>14</td> <td>Metrological station</td> <td>3-2</td> <td>Not yet</td> <td></td> </tr> <tr> <td>15</td> <td>Porometer</td> <td>5-1</td> <td>Not yet</td> <td></td> </tr> </tbody> </table> | Fiscal Year | 2002 | 2003 | 2004 | Local Procurement | 3,200,000 *1 | 616,400 | 19,172,500 (17,519,000)*2 | International Procurement | | 606,500 | 637,800 | Total | 3,200,000 | 1,222,900 | 19,800,300 | | Name of the equipment listed in the M/M | Relevant Activities of PDM | Time of the arrival at the Project site | Remarks | 1 | 4x4-type vehicle | Most of the Activities | Mar. 2004 | Purchased in Mar. 2002 | 2 | Electronic balance | 6-1 | Dec. 2004 | | 3 | Air-forced dry oven | 6-1 | Jan. 2005 | | 4 | Atomic absorption spectral photometer | 6-1 | Not yet | | 5 | (Copy machine for vegetation analyze) | Most of the Activities | Jan. 2004 | On lease | 6 | Automatic pump calorimeter | 6-1 | Not yet | | 7 | GPS station | 3-1, 3-2 | Mar. 2004 | | 8 | Portable analyzer of photosynthesis | 5-1 | Not yet | | 9 | Carbon/nitrogen analyzer | 6-1 | Not yet | | 10 | (Scholander pump) | 5-1 | (Jun. 2004) | IDEMA's equipment made available for the Project | 11 | (Satellite image SPOT) | 1-1 | (Jun. 2004) | -do- | 12 | Scanner | Most of the Activities | Jun. 2004 | | 13 | (Handy radio) | | | Not necessary | 14 | Metrological station | 3-2 | Not yet | | 15 | Porometer | 5-1 | Not yet | |
| Fiscal Year | 2002 | 2003 | 2004 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Local Procurement | 3,200,000 *1 | 616,400 | 19,172,500 (17,519,000)*2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| International Procurement | | 606,500 | 637,800 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 3,200,000 | 1,222,900 | 19,800,300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Name of the equipment listed in the M/M | Relevant Activities of PDM | Time of the arrival at the Project site | Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 4x4-type vehicle | Most of the Activities | Mar. 2004 | Purchased in Mar. 2002 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Electronic balance | 6-1 | Dec. 2004 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Air-forced dry oven | 6-1 | Jan. 2005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Atomic absorption spectral photometer | 6-1 | Not yet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | (Copy machine for vegetation analyze) | Most of the Activities | Jan. 2004 | On lease | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Automatic pump calorimeter | 6-1 | Not yet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | GPS station | 3-1, 3-2 | Mar. 2004 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Portable analyzer of photosynthesis | 5-1 | Not yet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Carbon/nitrogen analyzer | 6-1 | Not yet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | (Scholander pump) | 5-1 | (Jun. 2004) | IDEMA's equipment made available for the Project | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | (Satellite image SPOT) | 1-1 | (Jun. 2004) | -do- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Scanner | Most of the Activities | Jun. 2004 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | (Handy radio) | | | Not necessary | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | Metrological station | 3-2 | Not yet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | Porometer | 5-1 | Not yet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Annex 3: Accomplishment Grid

| | | | | | | | | | | | | |
|-------------|---------------------|------------------------------|---------------------|---|-------------|------|------------------------------|---------------------|-----|---|--------|--------|
| | 4. Running expenses | -do- | -do- | <p>Approximately R\$107,200, which is equivalent to approximately 4,290,000 Japanese Yen, has been disbursed as running expenses.</p> <p>Table L: Provision of running expenses by the Japanese fiscal year (April-March)</p> <table border="1"> <tr> <td>Fiscal Year</td> <td>2002</td> <td>2003 (Nov.2003-Mar. 2004)</td> <td>2004 (-Dec 2004)</td> </tr> <tr> <td>R\$</td> <td>0</td> <td>21,405</td> <td>85,843</td> </tr> </table> | Fiscal Year | 2002 | 2003 (Nov.2003-Mar. 2004) | 2004 (-Dec 2004) | R\$ | 0 | 21,405 | 85,843 |
| Fiscal Year | 2002 | 2003 (Nov.2003-Mar. 2004) | 2004 (-Dec 2004) | | | | | | | | | |
| R\$ | 0 | 21,405 | 85,843 | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|---|--|-------|------|-------------------|---|------------------|---------------|-----------|---|----------------------------|----------------|-----------|---|-----------------|-----------------|-----------|--|-----------------|---------------------------------|--------------------------|-------------------|---|------------|-----------|----------------|-------------|-----------|---------|-------------|--------------------------|----------------|------------|---|---------|-----|--------------|--|----------|-----------------------------------|----------------------------|---|----------------|----------|--------------|--|---|---------------|----------|--------------|------------|---|----------|----------|----------------|-------------|---|----------|-------------|---------------|---------------|-------|--|-------------|---|----------------|----------|------------------|-------------|-----|-------------|------------|---------|--|--|---|-------------|-----|----------------|-------------|--|-----------------------|------|--------------------|------------------------------------|---|-------|----|---------------------------------|---|-------|----|--|-------|-------|----|
| | <p>Brazilian side</p> <p>1. Provision of land, building, and other facilities for Project.</p> <p>2. Assignment of counterpart personnel and administrative staff</p> <p>(1) Project Manager (2) Vegetation (3) Ecology (4) Plant Breeding (5) Afforestation (6) Forestry (7) Pedology (8) Animal Science Note: Administrative and supporting staff will be additionally assigned by the Brazilian side.</p> <p>3. Running expenses</p> | <p>Project reports</p> <p>-do-</p> <p>-do-</p> <p>-do-</p> | <p>Review of the reports</p> <p>-do-</p> <p>-do-</p> <p>-do-</p> | <p>(as of 23 March, 2005)</p> <p>Office space for the Project has been provided at the building of Department of Zootechnology of ESAM. Laboratories of ESAM has been made available for the activities of the Project. An experimental field of EMPARN has been provided as an observation plot for the Project. Staff for project management as well as technical C/P have been assigned as shown in Table M and N.</p> <p align="center">Table M: Staff for project management</p> <table border="1"> <tr> <td></td> <td>Title</td> <td>Name</td> <td>Assignment period</td> </tr> <tr> <td>1</td> <td>Project Director</td> <td>Eugênio Cunha</td> <td>Nov.2003~</td> </tr> <tr> <td>2</td> <td>Assistant Project Director</td> <td>Geraldo Magela</td> <td>Nov.2003~</td> </tr> <tr> <td>3</td> <td>Project Manager</td> <td>Ricardo Galvao*</td> <td>Nov.2003~</td> </tr> </table> <p align="center">Table N: Technical C/P</p> <table border="1"> <tr> <td></td> <td>Technical Field</td> <td>Responsible Activities of PDMPO</td> <td>Name of the C/P assigned</td> <td>Assignment Period</td> </tr> <tr> <td rowspan="3">1</td> <td rowspan="3">Vegetation</td> <td>1-1a-1-5a</td> <td>-Aldo Medeiros</td> <td>-Nov. 2003~</td> </tr> <tr> <td>1-1b-1-5b</td> <td>-Regina</td> <td>-Mar. 2005~</td> </tr> <tr> <td>3-2c. d 3-4, 4-4, 4-5</td> <td>-Antonia Katia</td> <td>-Mar.2005~</td> </tr> <tr> <td rowspan="2">2</td> <td rowspan="2">Ecology</td> <td>3-1</td> <td>-(R. Galvao)</td> <td></td> </tr> <tr> <td>5-1, 5-3</td> <td>-Maria Clarete -Augusto Camara</td> <td>-Mar. 2005~ -Mar. 2005~</td> </tr> <tr> <td>3</td> <td>Plant Breeding</td> <td>4-1, 4-2</td> <td>-(R. Galvao)</td> <td></td> </tr> <tr> <td>4</td> <td>Afforestation</td> <td>5-4-5-10</td> <td>-J. Erivaldo</td> <td>-Nov.2004~</td> </tr> <tr> <td>5</td> <td>Forestry</td> <td>5-4-5-10</td> <td>-August Camara</td> <td>-Mar. 2005~</td> </tr> <tr> <td rowspan="2">6</td> <td rowspan="2">Pedology</td> <td>3-2a, b 3-4</td> <td>-Gustavo Duda</td> <td>-Aug-Sep.2004</td> </tr> <tr> <td>5-5-f</td> <td></td> <td>-Mar. 2005~</td> </tr> <tr> <td rowspan="3">7</td> <td rowspan="3">Animal Science</td> <td>2-1, 4-3</td> <td>-Alexandre Braga</td> <td>-Jan. 2005~</td> </tr> <tr> <td>5-2</td> <td>-R. Galvao*</td> <td>-Nov.2003~</td> </tr> <tr> <td>6-1-6-4</td> <td></td> <td></td> </tr> <tr> <td>8</td> <td>Meteorology</td> <td>3-3</td> <td>-Jose Espinola</td> <td>-Mar. 2005~</td> </tr> </table> <p>In total, approximately R\$15,900, which is equivalent to approximately US\$ 6,260, has been disbursed as running expenses.</p> <p>Table N: Provision of running expenses by the Brazilian fiscal year (January-December)</p> <table border="1"> <tr> <td></td> <td>2003 (Nov. - Dec.)</td> <td>2004</td> <td>2005 (Jan.-Mar)</td> </tr> <tr> <td>Maintenance fee of the Project car</td> <td>0</td> <td>2,800</td> <td>NA</td> </tr> <tr> <td>Diesel fuel for the Project car</td> <td>0</td> <td>4,800</td> <td>NA</td> </tr> <tr> <td>Electricity, telephone and internet for the Project Office</td> <td>4,700</td> <td>3,600</td> <td>NA</td> </tr> </table> | | Title | Name | Assignment period | 1 | Project Director | Eugênio Cunha | Nov.2003~ | 2 | Assistant Project Director | Geraldo Magela | Nov.2003~ | 3 | Project Manager | Ricardo Galvao* | Nov.2003~ | | Technical Field | Responsible Activities of PDMPO | Name of the C/P assigned | Assignment Period | 1 | Vegetation | 1-1a-1-5a | -Aldo Medeiros | -Nov. 2003~ | 1-1b-1-5b | -Regina | -Mar. 2005~ | 3-2c. d 3-4, 4-4, 4-5 | -Antonia Katia | -Mar.2005~ | 2 | Ecology | 3-1 | -(R. Galvao) | | 5-1, 5-3 | -Maria Clarete -Augusto Camara | -Mar. 2005~ -Mar. 2005~ | 3 | Plant Breeding | 4-1, 4-2 | -(R. Galvao) | | 4 | Afforestation | 5-4-5-10 | -J. Erivaldo | -Nov.2004~ | 5 | Forestry | 5-4-5-10 | -August Camara | -Mar. 2005~ | 6 | Pedology | 3-2a, b 3-4 | -Gustavo Duda | -Aug-Sep.2004 | 5-5-f | | -Mar. 2005~ | 7 | Animal Science | 2-1, 4-3 | -Alexandre Braga | -Jan. 2005~ | 5-2 | -R. Galvao* | -Nov.2003~ | 6-1-6-4 | | | 8 | Meteorology | 3-3 | -Jose Espinola | -Mar. 2005~ | | 2003 (Nov. - Dec.) | 2004 | 2005 (Jan.-Mar) | Maintenance fee of the Project car | 0 | 2,800 | NA | Diesel fuel for the Project car | 0 | 4,800 | NA | Electricity, telephone and internet for the Project Office | 4,700 | 3,600 | NA |
| | Title | Name | Assignment period | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Project Director | Eugênio Cunha | Nov.2003~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Assistant Project Director | Geraldo Magela | Nov.2003~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Project Manager | Ricardo Galvao* | Nov.2003~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Technical Field | Responsible Activities of PDMPO | Name of the C/P assigned | Assignment Period | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Vegetation | 1-1a-1-5a | -Aldo Medeiros | -Nov. 2003~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1-1b-1-5b | -Regina | -Mar. 2005~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 3-2c. d 3-4, 4-4, 4-5 | -Antonia Katia | -Mar.2005~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Ecology | 3-1 | -(R. Galvao) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5-1, 5-3 | -Maria Clarete -Augusto Camara | -Mar. 2005~ -Mar. 2005~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Plant Breeding | 4-1, 4-2 | -(R. Galvao) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Afforestation | 5-4-5-10 | -J. Erivaldo | -Nov.2004~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Forestry | 5-4-5-10 | -August Camara | -Mar. 2005~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Pedology | 3-2a, b 3-4 | -Gustavo Duda | -Aug-Sep.2004 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5-5-f | | -Mar. 2005~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Animal Science | 2-1, 4-3 | -Alexandre Braga | -Jan. 2005~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5-2 | -R. Galvao* | -Nov.2003~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 6-1-6-4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Meteorology | 3-3 | -Jose Espinola | -Mar. 2005~ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2003 (Nov. - Dec.) | 2004 | 2005 (Jan.-Mar) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maintenance fee of the Project car | 0 | 2,800 | NA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diesel fuel for the Project car | 0 | 4,800 | NA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Electricity, telephone and internet for the Project Office | 4,700 | 3,600 | NA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Mr. Officer

Annex 4: Implementation Process

Abbreviation: C/P-counterpart personnel J/E-Japanese expert

| Item | Source | Method | Evaluation |
|---------------------------------|----------------------------|------------------------------|---|
| 1 Progress of Activities | | | Overall : Although, in the document, the Project started in September 2002, the activities began only in November 2003 because dispatch of the long-term expert was delayed for one year and two months due to procedural reasons; and no activities were initiated by Brazilian side in the absence of the expert. |
| (1)Activities under Output 1 | Progress report, C/P, J/E, | Review of report, interviews | <p>The start of the Activities under Output 1 was delayed because of the reason mentioned in the first row. The Activities have been delayed further for the following reasons:</p> <p>Overall: Time from the end of December to the end of February is summer holidays for ESAM: full-fledged activities were not able to be commenced immediately after the local arrival of the long-term expert.</p> <p>Activities 1-2, 1-3, 1-4: Local arrival of the Project car (4x4 vehicle) was delayed till March 2004. In addition, the long-term experts had to implement the activities mostly by himself, as the C/P in Vegetation had not been appointed.</p> <p>However, most of the activities have been completed already. It is expected that all the activities would be finished by August 2005.</p> |
| (2)Activities under Output 2 | -do- | -do- | <p>The start of the Activities under Output 2 was delayed because of the reason mentioned in the first row. However, most of the Activities have been completed already. It is expected that all the Activities would be finished by August 2005.</p> |
| (3)Activities under Output 3 | -do- | -do- | <p>The start of the Activities under Output 3 was delayed because of the reason mentioned in the first row. Some of the Activities have been delayed further for the following reasons:</p> <p>3-1: The pilot plot in Pedro Avelino had been selected in December 2003, but enclosure of the plot with fences had not been completed until September 2004 due to delay in disbursement of running expenses from JICA.</p> <p>3-2: A vegetation survey could not be conducted in the rainy season in 2004 (i.e. January – July) because the enclosure of the plot had not been completed. The survey has been postponed until the rainy season in 2005. In addition, the long-term experts had to implement the activities mostly by himself, as the C/P in Vegetation had not been appointed.</p> <p>3-3: Meteorological survey has not been able to be taken up because meteorological stations have not arrived yet.</p> <p>However, most of the Activities have been completed already. It is expected that all the Activities would be finished by August 2005.</p> |
| (4)Activities under Output 4 | -do- | -do- | <p>The start of the Activities under Output 4 was delayed because of the reason mentioned in the first row. However, most of the Activities have been completed already. It is expected that all the Activities would be finished by August 2005.</p> |

Annex 4: Implementation Process

| | | | |
|------------------------------|-----------|---------------------------|---|
| (5)Activities under Output 5 | -do- | -do- | <p>The start of the activities under Output 5 was delayed because of the reason mentioned in the first row. Some of the Activities have been delayed further for the following reason:</p> <p>The Activities, which were going to be taken up in the pilot plot during the rainy season in 2004, could not be implemented because construction of fences had not been completed until September 2004 as mentioned in (3) above: they have been postponed for the rainy season in 2005.</p> <p>While Activities 5-1 ~ 5-6 are expected to be finished by August 2005, it is expected that Activities 5-7 (test of the planting techniques) , 5-8 (preparation of researcher's manual), 5-9 (preparation of a technical report), and 5-10 (leaflet for local people) would not be completed by then.</p> |
| (6)Activities under Output 6 | -do- | -do- | <p>The start of the activities under Output 6 were delayed because of the reason mentioned in the first row. The Activities have been delayed further for the following reason:</p> <p>Fodder of the species selected under Output 4 were going to be collected in the end of the rainy season in 2004 (i.e. May –July). However, due to a delay of disbursement of running expenses from JICA, necessary field activities were not able to be conducted. Fodder of two species were obtained from EMPARN (Enterprise for Agricultural Research of RGN / Empresa de Pesquisa Agropecuaria de RGN). As for the other three species, collection had to be postponed till the rainy season in 2005.</p> <p>As a result, activities related to the above three species could neither finish nor start by August 2005.</p> |
| 2 Monitoring process | C/P, J/E, | Questionnaire, interviews | <p>Although the start of the Project activities was delayed for one year and two months, the Project design has not been re-examined: the PDM as well as the Implementation Schedule and plans of dispatch of short-term experts and C/P training, which are also attached to the M/M, were not modified. Furthermore, the Plan of Operations, which specifies target, responsible persons, necessary inputs, and timeframe of each Activity of the PDM has not been prepared. In addition, a Joint Coordination Committee, organization of which is laid down in the M/M, has not been constituted yet.</p> <p>As a tool for the project monitoring, the Project has submitted a semiannual report to JICA headquarters and a quarterly report to JICA Brazil Office in time. However, since the PDM has not been re-examined and the PO has not been prepared, it was difficult for all those concerned to have common understanding of the implementation process and to take necessary actions.</p> |
| 3. Communication | -do- | -do- | <ul style="list-style-type: none"> • Communication within the Project has been smooth. The number of C/P at ESAM, assigned so far, is only two and they work for the Project for full-time. Besides, their office is located next to the Project Office in the building of the Department of Zootechnology. Although a regular meeting is not organized officially, discussions and consultations on the Project are held daily. Contact with IDEMA, located in Natal, is made through telephone and e-mail as necessary. In addition, the long-term expert and the Project Manager visit the IDEMA headquarters at least once a month to discuss the issues related to the Project. • Additional C/P were nominated in March 2005. They are researchers in various fields, who have offices in different buildings. Communication might not be as easy as before unless some facilitating measures, such as organization of a regular meeting, are initiated. |

Handwritten signature and initials, possibly including a circled number '2'.

Annex 5: Evaluation by Five Criteria

Abbreviation: C/P-counterpart personnel J/E-Japanese expert

1. RELEVANCE:

| Item | Source | Method | Evaluation |
|--|--------------------------|---|---|
| 1.1 Necessity | | | |
| (1) Relevance with the needs of Brazil | C/P, J/E policy document | Questionnaire, interviews | The Super Goal "Technologies to utilize potential productiveness of vegetation and soil in semi-arid region are disseminated in the Northeastern Brazil (Caatinga) and the Overall Goal ("Appropriate technologies for recuperation of degraded areas, utilizing useful tree and grass species, are disseminated in semi-arid region of the State of Rio Grande do Norte (RGN)") are relevant with the needs of Brazil. Caatinga, which includes the State of RGN, is officially designated as one of the six drought prone areas in Brazil. It is also one of the poorest regions. In the semi-arid region, in particular, deforestation and degradation of soil have advanced rapidly due to over-extraction of clay and firewood for brick making, which is a thriving local industry, overgrazing, etc.. That has adversely affected the life of local people, who are already poor. Recuperation of degraded area in the semi-arid region of Caatinga in sustainable manner is one of the urgent needs of Brazil. |
| (2) Relevance with the needs of target group (i.e. ESAM and IDEMA) | C/P, J/E policy document | Questionnaire, interviews, review of the document | <ul style="list-style-type: none"> The Project Purpose "Appropriate technologies for recuperation of degraded areas, utilizing useful tree and grass species, are made available for semi-arid region of the State of RGN" is relevant with the organizational needs of ESAM (Superior School of Agriculture of Mossoro), a principal implementing organization which provides most of the technical C/P to the Project. ESAM, which was created in 1967, is a federal institution responsible for education and research in agriculture in the semi-arid region. Moreover, there is a plan to transform ESAM into Federal Rural University of Semi-Arid (Universidade Federal Rural do Semi-Arido) for implementation of higher education and development of research in the diverse areas of knowledge relevant to the semi-arid region. The plan has been already approved by the Ministry of Education and a bill on the transformation has been introduced to the current session of the National Congress. The Project Purpose is also relevant with the organizational needs of IDEMA (Economic Development and Environment Institute of Rio Grande do Norte), the other implementing organization which provides the Project Director and the Assistant Project Director. IDEMA is a state organization which is responsible for, among others, (a) producing and diffusing pertinent technical statistic information regarding RGN and (b) formulating, coordinating, executing and supervising state policies for preservation, conservation, utilization, rational use and recuperation of environmental resources. IDEMA is responsible for control of desertification in the State of RGN. |
| 1.2 Priority | | | |
| (1) Relevance with national policies of Brazil | C/P, J/E | Questionnaire, interviews | <ul style="list-style-type: none"> The Overall Goal is relevant with national policies of Brazil. Control of desertification is a national commitment of Brazil, which is a signatory of the "UN Convention to Combat Desertification", which is entered into force in 1996. The "National Policy on Control of Desertification" was approved in 1997 and the "National Action Programme to Combat Desertification and Mitigate the Effects of Drought (Programma de Acao Nacional de Combate a Desertificacao e Mitigacao dos Efeitos da Seca)" was formulated in 2004. Caatinga has been officially designated as one of the six drought-prone areas in Brazil, to which priority is given. Control of desertification is one of the important issues for the Government of Rio Grande do Norte as well; it is included in its Pluriannual Plan for the period from 2004 to 2007. |

Annex 5: Evaluation by Five Criteria

| | | | |
|--|---------------|---------------------------|--|
| (2) Relevance with ODA policies of Japan | C/P, J/E | Questionnaire, interviews | <ul style="list-style-type: none"> The Overall Goal and the Project Purpose are relevant with overall ODA policies of Japan. According to the "Official Development Assistance Charter" prepared by the Government of Japan, "addressing global issues" is one of the four priority issues. The Overall Goal and the Project Purpose are also relevant with Japanese ODA policies for Brazil. According to ODA country policy towards Brazil, environment is one of the four priority areas: desertification of the northeastern part of the country is listed as one of the environmental problems with global-scale repercussions requiring international countermeasure and assistance. In addition, in bilateral talks in March 1998, it was agreed that, in order to rectify regional and income disparities and alleviate poverty, the emphasis in Japanese assistance will be placed on development of the northern and northeastern parts of Brazil, which remain relatively underdeveloped. |
| 1.3 Adequacy as means | C/P, J/E, PDM | Interviews, review of PDM | |
| (1) Project Design | C/P, J/E | Questionnaire, interviews | <ul style="list-style-type: none"> Some of the descriptions of the original Project Design Matrix (PDM), attached to the M/M signed in August 2002, are vague. Relationships among some of the components are not logical. As a result, the experts, their C/P, and other people concerned have felt difficulty to clearly understand what the original descriptions meant. Editorial modifications had to be made prior to the final evaluation. It is difficult to assess the adequacy of the timeframe of the Project because the Plan of Operation has not been prepared until the final evaluation. |

2. EFFECTIVENESS :

| Items | Source | Methods | Evaluation |
|--|--|--|---|
| 2.1 Achievement level of the Project Purpose | Accomplishment grid, technical reports, C/P, J/E | Review of the documents, questionnaire, interviews | The achievement level of the Project Purpose "Appropriate technologies for recuperation of degraded areas, utilizing useful tree and grass species, are made available for semi-arid region of the State of RGN" is behind the schedule. The Project activities began only in November 2003 due to delay in dispatch of the long-term expert for one year and two months. Because of this and other reasons described in Annex 4 "Implementation Process" as well as Efficiency of this Annex, the most important Outputs (i.e. Output 5 and Output 6) would be only achieved partly. In addition, not a few C/P at ESAM are just assigned. Although the technical capacity of the C/P, assigned before, have increased steadily, it is unlikely that C/P at ESAM will have acquired sufficient technical knowledge and skills to conduct relevant research in the State of RGN for themselves by August 2005. The Project Purpose would be only partly achieved by the end of the Project. |
| 2.2 Important Assumptions | C/P, J/E | Questionnaire, interviews | There has been no change in important assumption ("C/P stay with ESAM and IDEMA"). |
| 2.3 Contribution of the Outputs to the Project Purpose | | | The Outputs, although their level of achievement are behind the schedule, have contributed to the achievement of the Project Purpose. If the Outputs had been achieved as scheduled, the Project Purpose would be achieved by August 2005. |

3. EFFICIENCY:

| Items | Source | Methods | Evaluation |
|----------------------------------|--|--|--|
| 3.1 Achievement level of Outputs | | | |
| (1) Output 1 | Accomplishment grid, technical reports, C/P, J/E | Review of the documents, questionnaire, interviews | The achievement level of Output 1 ("The general situation of utilization of vegetation and soil in the semi-arid region in the State of RGN is made clear") is behind the schedule. However, most of the necessary information and data has been collected; and a report on general utilization of land and vegetation in the semi-arid region in the State of RGN is expected to be ready by the end of the Project. It is expected that Output 1 will be achieved by the end of the Project and will lead to the achievement of the Project Purpose. |
| (2) Output 2 | -do- | -do- | The achievement level of Output 2 ("The general situation of stock farming in the semi-arid region in the State of RGN is made clear") is behind the schedule. However, a report on livestock form in the State of RGN has been already prepared in Japanese and Portuguese translation is likely to be completed by May 2005. It is expected that Output 2 will be achieved by the end of the Project and will lead to the achievement of the Project Purpose. |
| (3) Output 3 | -do- | -do- | The achievement level of Output 3 ("The natural characteristics, including the vegetation and degradation, of the pilot plots are made clear") is behind the schedule. While preparation of soil and vegetation maps for the pilot plot in Pedro Avelino is ongoing, field surveys for the observation plot in Terras Secas have not started yet. Meteorological survey has not been commenced, either. However, all of the activities are expected to be completed by August 2005: it is expected that Output 3 will be achieved by the end of the Project and will lead to the achievement of the Project Purpose. |
| (4) Output 4 | -do- | -do- | The achievement level of Output 4 ("Trees and grass species potentially useful for local community relevant to the pilot plots are selected") is behind the schedule. However, trees and grass species potentially useful trees for further research in the pilot plots have been selected. Preparation of a catalog and a leaflet on the selected species is expected to be completed by August 2005. It is expected that Output 4 will be achieved by the end of the Project and will lead to the achievement of the Project Purpose. |
| (5) Output 5 | -do- | -do- | The achievement level of Output 5 ("Techniques for revegetation are developed through research in the pilot plots") is behind the schedule. Some of the researcher's manuals have been already prepared. However, test of the planting techniques of the selected species is scheduled to start only in March- April 2005: it is not possible to recommend appropriate species for revegetation by August 2005. Although the inputs actually provided have been utilized fully, it is expected that Output 5 will be only partly achieved by the end of the Project. |
| (6) Output 6 | -do- | -do- | The achievement level of Output 6 ("Techniques for sustainable fodder production are developed through research in the pilot plots") is behind the schedule. Some of the researcher's manuals have been already prepared. However, feeding tests of the potential species, which takes one year, will not be completed by August 2005: it is impossible to recommend fodder species appropriate for stock farming by the end of the Project. Although the inputs actually provided have been utilized fully, it is expected that Output 6 will be only partly achieved by the end of the Project. |

Annex 5: Evaluation by Five Criteria

| 3.3 Inputs | | | |
|-----------------------|---|--|--|
| (1) Japanese side | | | |
| (a) Long-term expert | Accomplishment grid, C/P, J/E, field survey | Review of the grid, questionnaire, interviews, observation | <ul style="list-style-type: none"> • <u>Timing</u>: Timing was inappropriate. Dispatch of a long-term expert of Floral Zoning and Ecology, the only long-term expert for the Project, was delayed by one year and two months due to procedural reasons, including issuing a visa: the expert arrived at the Project site only in November 2003, until when the Project activities had not commenced. In addition, the period from December-February is summer holidays of ESAM so that full-scaled activities could not start promptly. • <u>Quality</u>: Technical level and specialty of the expert are considered to be appropriate. • <u>Quantity</u>: The Project consists of two technical fields: revegetation and fodder production. It is difficult for a single long-term expert to cover two different fields. It would have been more efficient if a long-term expert had been planned and dispatched. |
| (b) Short-term expert | -do- | -do- | <ul style="list-style-type: none"> • <u>Timing</u>: Timing of most of dispatch has been adequate. In a case of an expert of Animal Science, however, the C/P was not available for the first one month of his second dispatch because he had gone to Japan for training. Besides, the period of dispatch (i.e. October to February) partly fell on summer holidays of ESAM. Since the C/P did not take a vacation, there was no further delay in the relevant activities. However, it would have been more efficient if the expert had been dispatched earlier. • <u>Quality</u>: The experts with relevant technical level and experiences have been dispatched. • <u>Quantity</u>: Quantity has not been very appropriate. As per an original plan delineated in the M/M, short-term experts are to be dispatched for more than three months. However, in most cases, period of dispatch has been less than one month. In a shorten period, the expert could not often complete the envisaged activities. In order to make up for that, the long-term expert has had to engage in the uncompleted activities often. It would have been more efficient if short-term experts had been dispatched for the longer period. |
| (c) C/P training | -do- | -do- | <ul style="list-style-type: none"> • <u>Timing</u>: Timing is appropriate. So far, three of the C/P were dispatched to Japan for one-month training in October-November 2004. The period fell on the middle of the dry season, when field surveys were not implemented. • <u>Quality</u>: The contents and fields of the C/P training have been adequate. • <u>Quantity</u>: The period is considered to have been adequate. • <u>Utilization</u>: The C/P have utilized the knowledge and techniques they acquired in Japan in the Project activities. |
| (d) Equipment | -do- | -do- | <ul style="list-style-type: none"> • <u>Timing</u>: Timing of provision of the equipment has not been very appropriate. The Project car and a GPS station had not arrived at the Project site until March 2004. Meteorological stations have not arrived yet so that observation of the meteorological conditions in the pilot plot and the observation plot (i.e. Activity 3-3) could not start. An atomic absorption spectral photometer, which is necessary for nutrition analysis already started (i.e. Activity 6-1), has not arrived either. In the meantime, an electronic balance and an air-forced dry oven have been provided in time for the relevant activity. • <u>Quantity</u>: Quantity of the provide equipment is generally adequate. A "copy machine for vegetation analysis" has been made available to the Project on lease so far. Its procurement procedure has just begun. • <u>Quality</u>: Quality of the provided equipment is generally appropriate. Specifications of the leased copy machine, however, are not sufficient for vegetation analysis. • <u>Utilization</u>: All of the provided equipment is essential to carry out the activities of the Project: it has been fully utilized. |
| (e) Running expenses | -do- | -do- | <ul style="list-style-type: none"> • <u>Timing</u>: Timing of disbursement has been mostly adequate. However, during the period from April to June 2004, the disbursement was delayed. As a result, construction of fences at the pilot plot in Pedro Avelino could not be completed by September 2004. The activities that were scheduled for the rainy season in 2004 (i.e. January -July) had to be postponed till the rainy season in 2005. • <u>Quantity</u>: In general, the amount requested by the Project has been disbursed. |

Annex 5: Evaluation by Five Criteria

| | | | |
|--|-------------------------------|---|--|
| (2) Brazilian side | | | |
| (a) Land, building, and other facilities | Accomplishment grid, C/P, J/E | Review of the grid, questionnaire, interviews | <ul style="list-style-type: none"> • Timing: Timing of provision has been generally adequate. A room in the building of the Department of Zootechnology of ESAM has been provided as a space for the Project Office since the arrival of the long-term expert in November 2003. Laboratories and their equipment have been made available for the Project, when needed. An experimental field of EMPARN in Terras Secas has been made available in time for the Project activities. • Quality: Although an air-conditioner, telephone cum fax and LAN facilities have been provided, they often become unavailable during rainy season due to power cuts. In addition, international telephone line is not available: a mobile phone is used in order to make an international call. When it was necessary to send an international fax to JICA headquarters, the Project first had to send it to JICA Brazil Office for transmission to the headquarters. However, this would not be a problem from April 2004, when the Project is handed over from the headquarters to Brazil Office. |
| (b) C/P personnel | -do- | -do- | <ul style="list-style-type: none"> • Timing: According to a plan delineated in the M/M, the C/P for seven technical fields (i.e. Vegetation, Ecology, Plant Breeding, Afforestation, Forestry, Pedology, and Animal Science) were to be assigned. A full-time C/P in the field of Animal Science (cum Project Manager) has been assigned since November 2003, when the long-term expert arrived. A full-time C/P in the field of Afforestation has been assigned since November 2004, in time for the start of the activities related to afforestation. Another C/P in the field of Animal Science has been assigned since January 2005, when full-fledged activities commenced. However, the C/P in the fields of Vegetation, Ecology, Plant Breeding, Pedology and Forestry have not been appointed until the middle of March 2005. It would have been more efficient if all of the C/P had been completed prior to the arrival of the long-term expert. • Quality: The C/P at ESAM, who have worked with the experts so far, are a researcher and agricultural engineers. Newly appointed C/P are researchers with relevant technical background. • Quantity: Up till the middle of March 2005, the number of the C/P had been hardly sufficient. In the absence of the C/P in many of the technical fields, the C/P in Animal Science had often assisted the experts in carrying out the activities in various technical fields. The situation is expected to be improved since necessary C/P with the relevant technical background were appointed in March 2005. |
| (c) Administrative staff | -do- | -do- | Since administrative staff have not been assigned to the Project. The Project Manager (cum the C/P in Animal Science) has engaged in administrative work. It would have been more efficient if a clerk or a secretary had been assigned. |
| (d) Running expenses | -do- | -do- | <ul style="list-style-type: none"> • Timing : Timing of the disbursement has been mostly adequate. • Quantity: Local costs related to electricity, telephone, and internet for the Project office as well as maintenance and fuel of the Project car are borne by ESAM. |
| 3.3 Important Assumptions | C/P, J/E, | questionnaire, interviews | There is no change in important assumptions |
| 3.4 Pre-conditions | -do- | -do- | There are no pre-conditions for the Project. It would have been helpful if conditions such as "C/P are assigned" and "the long-term expert arrives at the site" had been mentioned. |
| 3.5 Coordination with other relevant projects | J/E | Interview | While, the World Bank and GTZ have programmes to assist small farmers in the State of RGN, there are no donors active in the field of revegetation and/or sustainable fodder production. |



Annex 5: Evaluation by Five Criteria

4. IMPACT:

| Items | Source | Methods | Evaluation |
|---|-------------------------------|-------------------------------------|--|
| 4.1 Impact at the Overall Goal level | | | |
| (1) Achievement level of the Overall Goal | Accomplishment grid, C/P, J/E | Review of the documents, interviews | The impact at the Overall Goal level cannot be foreseen since the Project Purpose would be achieved only partly by the end of the Project. |
| (2) Important Assumption | -do- | -do- | There has been no change in important assumption ("Climate does not change drastically such as occurrence of severe drought"). |
| 4.2 Other impacts | C/P, J/E | Questionnaire, interviews | <ol style="list-style-type: none"> ESAM has become more interested in sustainable fodder production. It has decided to establish in the premises of ESAM a 5-hectare experimental farm for fodder tree species. A researcher in charge has been already appointed and land preparation is ongoing. ESAM has a plan to expand the farm to 10 hectares in the future. Up-to-date equipment for digestion trials and nutrition analysis installed in the laboratory for animal nutrition of the Department of Zootechnology at ESAM. When the equipment is not used by the Project, it was made available to professors and students of ESAM for their research. Incentives of the students have been promoted. Their research capacity has increased as well. Two students of Agronomy Department of ESAM, who assisted the soil survey in the pilot plot in Pedro Avelino under Activity 3-1, have written graduation theses regarding characterization of soil profile, utilizing analytical techniques transferred by the short-term expert as well as soil samples collected in the pilot plot. The long-term expert is a co-advisor of their theses. |

5. SUSTAINABILITY:

| Items | Source | Methods | Evaluation |
|---------------------------------------|----------|---------------------------|---|
| 5.1 Institutional Aspects | | | |
| (1) Policy support | C/P, J/E | Questionnaire, interviews | As mentioned in Relevance, control of desertification is a national commitment of Brazil. The policy support for the activities relevant to the Project is likely to continue. |
| (2) Position of C/P personnel | -do- | -do- | The C/P of the Project are public employees, whose employment is guaranteed. It seems that most of the C/P remain to be involved in their technical fields. At this moment, ESAM does not have a specific research plan for recuperation of degraded areas. Whether or not, after the termination of the Project, the C/P will be continuously assigned to technology development is uncertain. |
| (3) Management capacity of ESAM/IDEMA | -do- | -do- | Both ESAM and IDEMA have managed the Project adequately. |

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Annex 5: Evaluation by Five Criteria

| | | | |
|---|-----------------------------|--|---|
| (4) Coordination with other organizations | -do- | -do- | <p>ESAM has a good relationship with EMPARN, EMATER (Institute of Technical Assistance and Rural Extension of Rio Grande do Norte), EMBARAPA (Brazilian Agricultural Research Corporation) and INSA (National Institute for Semi-Arid). A liaison office of EMPARN and EMATER is located at ESAM. EMPARN has already collaborated with the Project through providing its experimental field in Terras Secas as one of the pilot plots (in practice, the observation plot) and the seeds of some of the selected species for free. Some of the researchers of EMBRAPA for Semi Arid teach post-graduate students at ESAM. In addition, ESAM plans to carry out a two-year research project on fodder with financial assistance from INSA. The agreement between ESAM and INSA is likely to be signed in three months. While ESAM would provide researchers and experimental fields of 300 hectares in total, INSA would provide US\$50,000. In the meantime, IDEMA is a state agency which is responsible for coordinating state policies for preservation, conservation, utilization, rational use and recuperation of environmental resources. It is expected that coordination with the relevant organization will continue after the end of the Project.</p> |
| 5.2 Financial Aspects | -do- | -do- | <p>Financial situation of ESAM is severe. For the Project, ESAM has disbursed approximately R\$11,000 annually as running expenses; but it has not been able to afford providing additional R\$6,000 for an optional insurance fee for the Project car. Once the Project is over, expenses necessary for the maintenance of the pilot plot and the nursery established by the Project, which are currently borne by the Japanese side, will come on ESAM. Even if a plan to transform ESAM into Federal Agricultural University for Semi-Arid (UFERSA) is realized, the expenses related to research and technology development would not be financed by the federal budget. When necessity arises, however, ESAM may explore a possibility to obtain research funds from funding agencies, such as FNE (Constitutional Fund to Finance Northeast), CNPQ (National Council for Scientific and Technological Development), Bank of Northeast, EMBRAPA, INSA, etc.,</p> |
| 5.3 Technological Aspects | | | |
| (1) Technical capacity | Technical reports, C/P, J/E | Review of the reports, questionnaire, interviews | <p>It seems that C/P are motivated to engage in research on revegetation and sustainable fodder production. Methods for technology development have been effectively transferred to the C/P. Also, researcher's manuals for some of the methods have been already prepared. It seems that technical capacity of the C/P has been steadily increased. However, one-year and ten-months is not long enough for one to acquire sufficient technical knowledge and skills to conduct the relevant research by oneself.</p> |
| (2) Utilization and dissemination of technologies | Technical reports, C/P, J/E | -do- | <p>The techniques and the methods being transferred are essential for technological development of revegetation and sustainable fodder production: it is likely that they will be utilized in the relevant research. The C/P of ESAM could also transfer the acquired knowledge and skills to students and extension workers through lectures and/or training courses at ESAM. The methods developed by the Project are planned to be disseminated to local people thorough leaflets, involving EMATEL, IDEMA, INSA, etc. However, the strategy or a research plan for technology development of revegetation and sustainable fodder production in the State of RGN is not clear yet.</p> |
| (3) Utilization of machinery and equipment | -do- | -do- | <p>The C/P have operated and maintained the provided equipment properly and are expected to do so. The equipment, which has been provided or is scheduled to be provided, is essential for the relevant research and is expected to be utilized after the termination of the Project. However, expenses for expendables, including reagents, beakers, etc., have been borne by the Japanese side. If the budget for the expendables is not secured after the end of the Project, the provided equipment might not be fully utilized.</p> |

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Annex 6 : PDM ver.3 (Proposed PDM for the period from Sep.2002 to Oct.2006)

Project Name: Technology Development for Revegetation and Utilization of Degraded Areas in the Semi-Arid Region (Caatinga) of the Northeastern Brazil
 Period of Cooperation: Four years and two months (2002/9- 2006/10)
 Implementing Agency in Beneficiary Country: ESAM and IDEMA
 Project Area: The semi-arid region of the State of Rio Grande do Norte Target Group: ESAM and IDEMA

| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|--|---|---|
| <p>Super Goals Technologies to utilize potential productiveness of vegetation and soil in the semi-arid region are disseminated in the Northeastern Brazil (Caatinga)</p> | <p>1. Slowing down of desertification process in Caatinga 2. Increase of animal production</p> | <p>-Observation in Caatinga - Agriculture statistics of the state government</p> | <p>- Climate does not change drastically such as occurrence of severe draught</p> |
| <p>Overall Goals Appropriate technologies for recuperation of degraded areas, utilizing useful tree and grass species, are disseminated in semi-arid region of the State of Rio Grande do Norte (RN)</p> | <p>1. Slowing down of desertification process in the State of RN 2. Increase of animal production</p> | <p>-Observation in RN - Agriculture statistics of the state government</p> | <p>- Climate does not change drastically such as occurrence of severe draught</p> |
| <p>Project Purpose Appropriate technologies for recuperation of degraded areas, utilizing useful tree and grass species, are made available for semi-arid region of the State of RN.</p> | <p>1. C/P at ESAM are able to continue relevant research in the State of RN by themselves, utilizing the techniques transferred through the Project : a) technical levels of C/P ; b) lectures given by the C/P; c) an overall 5-year research plan; d) research proposals submitted to the funding agencies; e) scientific reports, etc 2. Leaflets for local people ,prepared by the Project, are adopted by the IDEMA and the relevant institutes</p> | <p>-Questionnaire, interviews with Japanese experts and Counterpart personnel -review of the documents</p> | <p>- Climate does not change drastically such as occurrence of severe draught</p> |
| <p>Outputs 1. The general situation of utilization of vegetation and soil in the semi-arid region in the State of RN is made clear 2. The general situation of stock farming in the semi-arid region in the State of RN is made clear 3. The natural characteristics, including the vegetation and degradation, of the pilot plot and the observation plot are made clear 4. Tree and grass species potentially useful for local community relevant to the pilot plot are selected. 5. Techniques for revegetation (i.e. growing seedlings of the selected trees and grass species as well as planting and managing them) are developed through research in the pilot plot. 6. Techniques for sustainable fodder production for both the original vegetation and revegetated areas are developed through research in the pilot plot.</p> | <p>1a: A technical report on general utilization of lands and vegetation in the semi-arid region in RN elaborated, which includes 1)a land use map and an analytical report; 2)a vegetation map and; 3) a list of useful trees and grass species. 2a: A report on livestock form in the State of RN prepared. 3a: Maps on soil and vegetation in the pilot plots elaborated 3b: Meteorological data collected daily 3c: Researcher's manuals elaborated 4a: Tree and grass species that are used by local people identified. 4b: Trees and grasses potentially useful for further research in the pilot plot 4c: A catalog for researchers about tree and grass species in the State of RN (i.e. the species identified in 4a) elaborated 4d A leaflet for local people, about tree and grass species in the State of RN (i.e. the species identified in 4a)elaborated 5a: Useful tree and grass species appropriate for revegetation of the area surrounding the pilot plot recommended 5b: Researcher's manuals for revegetation elaborated 5c: A technical report on revegetation system, including the information on carrying capacity, prepared 5d: A leaflet for local people about revegetation methods prepared 6a: Fodder species appropriate for stock farming in the area surrounding the pilot plot recommended. 6b: Researcher's manuals for sustainable fodder production elaborated 6c: A technical report on sustainable fodder production prepared</p> | <p>1-5 - Questionnaire, interviews with Japanese experts and Counterpart personnel - Review of the following documents 1. A technical report 2. A technical report 3. Maps of pilot project site and manuals 4. Catalog and manuals 5. Manuals and a technical report 6. Manuals and a technical report</p> | <p>- C/P stays in ESAM and IDEMA.</p> |

(27)

Annex 6 : PDM ver.3 (Proposed PDM for the period from Sep.2002 to Oct.2006)

| Activities | Inputs | Counterparts remain in the Project |
|--|--|---|
| <p>1-1 Analyze the actual land utilization using the satellite images in the State of RN</p> <p>1-2 Survey the vegetation of the semi-arid region in the State of RN</p> <p>1-3 Identify the land utilization in the semi-arid region in the State of RN</p> <p>1-4 Survey the utilization of trees and grasses in the semi-arid region in the State of RN.</p> <p>1-5 Prepare a report on utilization of lands and vegetation in the semi-arid region in the State of RN</p> <p>2-1 Identify the livestock form – land extension, types, number and utilization of animals - in the semi-arid region in the State of RN</p> <p>3-1 Select a pilot plot in a degraded area</p> <p>3-2 Make the soil and vegetation maps of the pilot plot and an observation plot in reserved area (i.e. an experimental field of EIMPARN in Terras Secas)</p> <p>3-3 Conduct meteorological observation daily in the pilot plot and the observation plot</p> <p>3-4 Prepare researcher's manuals</p> <p>4-1 Identify the community needs for their life and livestock farming related to trees and grasses relevant to the pilot plot</p> <p>4-2 Select potentially useful tree and grass species for the community life relevant to the pilot plot</p> <p>4-3 Select potentially useful tree and grass species for the livestock farming relevant to the pilot plot</p> <p>4-4 Prepare a catalog for researchers about the species identified in 4-1</p> <p>4-5 Prepare a leaflet for local people about the species identified in 4-1</p> <p>5-1 Estimate the plant biomass and productivity for the livestock farming in the pilot plot</p> <p>5-2 Survey the dietary habits of livestock in the pilot plot.</p> <p>5-3 Estimate carrying capacity of the pilot plot</p> <p>5-4 Propose germination techniques for the selected species</p> <p>5-5 Propose seeding production techniques for the selected species.</p> <p>5-6 Identify planting techniques for the selected species</p> <p>5-7 Test the planting techniques identified above in the pilot plot.</p> <p>5-8 Make researcher's manuals for the techniques which are developed in 5-1~5-7</p> <p>5-9 Prepare a technical report on revegetation system for semi-arid areas of the State of RN, including the information on carrying capacity</p> <p>5-10 Prepare a leaflet for local people about revegetation methods</p> <p>6-1 Identify sustainable fodder production techniques depending on the livestock farming capacity in the pilot plot.</p> <p>6-2 Test the identified techniques in the pilot plot</p> <p>6-3 Make researcher's manuals for the techniques which are developed in 6-1 and 6-2</p> <p>6-4 Prepare a technical report on sustainable fodder production</p> | <p>The Government of Japan:</p> <ol style="list-style-type: none"> 1. Dispatch of Experts 2. Training of Brazilian Counterpart personnel in Japan 3. Provision of equipment 4. Running expenses <p>The Government of Brazil:</p> <ol style="list-style-type: none"> 1. Provision of land, building and other facilities for the Project 2. Assignment of counterpart personnel and administrative staff 3. Running expenses | <p>- Counterparts remain in the Project</p> <p>Pre-conditions:</p> |

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| Activities | Target | Responsible persons | 02 | | 2003 | | | 2004 | | | 2005 | | | 2006 | | | | | |
|---|--|---|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|--|--|--|
| | | | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct | | | |
| <1.The general situation of utilization of v egetation and soil in semi-arid region in the State of RN is made clear > | | | | | | | | | | | | | | | | | | | |
| 1-1 | Analyze the actual land utilization using the satellite images in the State of RN | J/E<LE>Kishimoto C/P<Vegetation>:Regin a | | | | | | | | | | | | | | | | | |
| a | Obtain satellite images | -Satellite images obtained J/E<LE>Kishimoto C/P<Vegetation>:Mede iros | | | | | | | | | | | | | | | | | |
| b | Analyze the images | An analytical report prepared J/E<LE>Kishimoto C/P<Vegetation>:Regin a, Katia | | | | | | | | | | | | | | | | | |
| 1-2 | Survey the vegetation of the semi-arid region in the State of RN. | J/E<LE>Kishimoto C/P<Vegetation>:Regin a | | | | | | | | | | | | | | | | | |
| a | Collect existing information | Existing information on vegetation collected. J/E<LE>Kishimoto C/P<Vegetation>:Mede iros | | | | | | | | | | | | | | | | | |
| b | Conduct field survey | Filed surveys in low land and hilly areas conducted. J/E<LE>Kishimoto C/P<Vegetation>:Regin a, Antonia Katia | | | | | | | | | | | | | | | | | |
| c | Prepare a vegetation map of the State of RN | A vegetation map of RN prepared by March 2005 -do- | | | | | | | | | | | | | | | | | |
| 1-3 | Identify the land utilization in the semi-arid region in the State of RN | J/E<LE>Kishimoto C/P<Vegetation>:Regin a | | | | | | | | | | | | | | | | | |
| a | Collect existing information | Existing information collected. J/E<LE>Kishimoto C/P<Vegetation>:Mede iros | | | | | | | | | | | | | | | | | |
| b | Conduct field survey | Filed surveys in low land and hilly areas conducted. J/E<LE>Kishimoto C/P<Vegetation>:Regin a, Antonia Katia | | | | | | | | | | | | | | | | | |
| c | Prepare a land use map | A land use map of RN prepared -do- | | | | | | | | | | | | | | | | | |
| d | Prepare an analytical report | An analytical report prepared by August 2005 -do- | | | | | | | | | | | | | | | | | |
| 1-4 | Survey the utilization of trees and grasses in the semi-arid region in the State of RN. | J/E<LE>Kishimoto C/P<Vegetation>:Regin a | | | | | | | | | | | | | | | | | |
| a | Collect existing information | Existing information collected. J/E<LE>Kishimoto C/P<Vegetation>:Mede iros | | | | | | | | | | | | | | | | | |
| b | Conduct field survey | Filed surveys in low land and hilly areas conducted. J/E<LE>Kishimoto C/P<Vegetation>:Regin a, Antonia Katia | | | | | | | | | | | | | | | | | |
| c | Prepare a survey report | A survey report prepared -do- | | | | | | | | | | | | | | | | | |
| 1-5 | Prepare a report on utilization of lands and vegetation in the semi-arid region in the State of RN | A technical report prepared J/E<LE>Kishimoto C/P<Vegetation>:Regin a, Antonia Katia | | | | | | | | | | | | | | | | | |
| <2.The general situation of stock farming in the semi-arid region in the State of RN is made clear > | | | | | | | | | | | | | | | | | | | |
| 2-1 | Identify the livestock form – land extension, types, number and utilization of animals, - in the semi-arid region in the State of RN | J/E<SE in Animal Science>:Sekine C/P <Animal Science> Galvao | | | | | | | | | | | | | | | | | |
| a | Collect existing information | Existing information collected -do- | | | | | | | | | | | | | | | | | |

| Activities | Target | Responsible persons | 02 | | 2003 | | | 2004 | | | 2005 | | | 2006 | | | | | | |
|--|---|--|--|-----|------|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|--|--|--|--|
| | | | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct | | | | |
| b) Conduct field survey | Questionnaire survey to farmers conducted | -do- | | | | | | | | | | | | | | | | | | |
| c) Prepare a survey report | A survey report prepared | -do- | | | | | | | | | | | | | | | | | | |
| <3.The natural characteristics, including the vegetation and degradation, in the pilot plot and the observation plot are made clear > | | J/E:<LE>Kishimoto C/P<Ecology>Maria Clarete | | | | | | | | | | | | | | | | | | |
| 3-1 | Select a pilot plots in a degraded area | The pilot plots selected and fenced. | J/E:<SE in Ecology>:Tamai C/P:R. Galvao | | | | | | | | | | | | | | | | | |
| 3-2 | Make the soil and vegetation maps of the pilot plot and an observation plot in reserved area (i.e. an experimental field of EMPARN in | | J/E:<LE>Kishimoto C/P<Pedology & Vegetation>: Duda & Regina | | | | | | | | | | | | | | | | | |
| a) | Conduct soil survey of the pilot plot and the observation plot | A survey report prepared for each plot | J/E<SE in Pedology>:Yabe C/P<Pedology>: Duda | | | | | | | | | | | | | | | | | |
| b) | Prepare soil maps of the pilot plot and the observation plot | A soil map prepared for each plot | -do- | | | | | | | | | | | | | | | | | |
| c) | Conduct vegetation survey of the pilot plot and the observation plot | A survey report prepared for each plot | J/E:<LE>Kishimoto C/P<Vegetation>: Regina, Antonio Katia | | | | | | | | | | | | | | | | | |
| d) | Prepare vegetation maps of the pilot plot and the observation plot | A vegetation map prepared for each plot | -do- | | | | | | | | | | | | | | | | | |
| 3-3 | Conduct meteorological observation of the pilot plot and the observation plot daily | | J/E<SE in Meteorology> C/P<Meteorology>Jose Espinola | | | | | | | | | | | | | | | | | |
| a) | Conduct observation | A meteorological station established and maintained in each plot | -do- | | | | | | | | | | | | | | | | | |
| b) | Prepare a monthly report | A monthly report prepared for each plot | -do- | | | | | | | | | | | | | | | | | |
| 3-4 | Prepare researcher's manuals | | J/E:<LE>Kishimoto C/P<PM>: Galvao | | | | | | | | | | | | | | | | | |
| a) | Prepare a soil survey manual | A soil survey manual prepared | J/E:<LE>Kishimoto C/P<Pedology>: Duda | | | | | | | | | | | | | | | | | |
| b) | Prepare a vegetation survey manual | A vegetation survey manual prepared | J/E:<LE>Kishimoto C/P<Vegetation>: Regina, Antonio Katia | | | | | | | | | | | | | | | | | |
| <4.Trees and grass species potentially useful for local community relevant to the pilot plot selected.> | | | J/E:<LE>Kishimoto C/P<PM>Galvao | | | | | | | | | | | | | | | | | |
| 4-1 | Identify the community needs for their life and livestock farming related to the trees and grasses relevant to the pilot plot | | J/E<SE in Plant Breeding> Nobuchi C/P<Plant Breeding>:(Galvao) | | | | | | | | | | | | | | | | | |
| a) | Conduct field survey | Field survey conducted | -do- | | | | | | | | | | | | | | | | | |
| b) | Prepare a survey report on the community needs | A survey report prepared | -do- | | | | | | | | | | | | | | | | | |
| 4-2 | Select potentially useful tree and wood species for the community life relevant to the pilot plot | Potentially useful tree and grass species for the community life selected. | -do- | | | | | | | | | | | | | | | | | |

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| Activities | Target | Responsible persons | 02 | | 2003 | | | 2004 | | | 2005 | | | 2006 | | | | | |
|---|---|---|--|-----|------|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|--|--|--|
| | | | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct | | | |
| 4-3 | Select potentially useful tree and grass species for the livestock farming relevant to the pilot plot | Potentially useful tree and grass species for livestock farming selected. | J/E:<SE in Animal Science>:Sekine C/P<Animal Science>:Galvao | | | | | | | | | | | | | | | | |
| 4-4 | Prepare a catalog for researchers about the species identified in 4-1 above. | A catalog prepared | J/E:<SE in Vegetation> C/P<Vegetation>:Regina, Antonio Katia | | | | | | | | | | | | | | | | |
| 4-5 | Prepare a leaflet for local people on the species identified in 4-1 above | A leaflet prepared | -do- | | | | | | | | | | | | | | | | |
| <5. Techniques for revegetation are developed through research in the pilot plot > | | | J/E: <LE>Kishimoto C/P<Forestry> August Camara | | | | | | | | | | | | | | | | |
| 5-1 | Estimate biomass and productivity of the plant for the livestock farming in the pilot plot | | J/E:<SE in Plant Physiology> C/P<Ecology>Maria Clarete | | | | | | | | | | | | | | | | |
| a | Conduct field survey | Filed surveys conducted. | J/E:<SE in Plant Physiology> C/P<Ecology>Clarete, Camara | | | | | | | | | | | | | | | | |
| b | Prepare a report on biomass and productivity | A report on biomass prepared | -do- | | | | | | | | | | | | | | | | |
| 5-2 | Survey the dietary habits of livestock in the pilot plot | | J/E:<SE in Animal Science>:Sekine C/P<Animal Science>:Galvao | | | | | | | | | | | | | | | | |
| a | Conduct survey | Dietary habit test conducted for the selected species | -do- | | | | | | | | | | | | | | | | |
| b | Prepare a survey report | A report on dietary habits prepared | -do- | | | | | | | | | | | | | | | | |
| 5-3 | Estimate carrying capacity of the pilot plots | A report on carrying capacity | J/E:<SE in Plant Physiology> C/P<Ecology>Clarete, Camara | | | | | | | | | | | | | | | | |
| 5-4 | Propose germination techniques of the selected species | | J/E:<LE>Kishimoto, <SE in Afforestation> C/P<Forestry> Camara, | | | | | | | | | | | | | | | | |
| a | Collect seeds | Seeds of the selected species collected | -do- | | | | | | | | | | | | | | | | |
| b | Conduct germination tests of the selected species as necessary | A report on germination test prepared | -do- | | | | | | | | | | | | | | | | |
| c | Prepare a report on germination system | A report prepared | -do- | | | | | | | | | | | | | | | | |
| 5-5 | Propose the seedling production technique for the selected species | Seedling production technique proposed | J/E:<LE>Kishimoto, <SE in Afforestation> C/P<Forestry> Camara, | | | | | | | | | | | | | | | | |
| 5-6 | Identify planting technique for the selected species | Possible planting techniques identified | -do- | | | | | | | | | | | | | | | | |
| 5-7 | Test the planting techniques identified above. | | J/E:<LE>Kishimoto C/P<Forestry> Camara, | | | | | | | | | | | | | | | | |
| a | Construct nursery | Nursery constructed | -do- | | | | | | | | | | | | | | | | |
| b | Produce seedlings of the selected species | Seedling production report prepared | J/E:<LE>Kishimoto, <SE in Afforestation> C/P<Forestry> Camara, <Afforestation>Erivaldo | | | | | | | | | | | | | | | | |

| Activities | Target | Responsible persons | 02 | 2003 | | | | 2004 | | | | 2005 | | | | 2006 | | | | |
|------------|---|---|--|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|-----|
| | | | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct | Jan | Apr | Jul | Oct |
| b | Conduct digestion trials for the selected fodder species in rainy and dry seasons | Digestion trials of the selected species conducted | -do- | | | | | | | | | | | | | | | | | |
| c | Conduct nutrition analysis of the fodder and excrement of domestic animals | Nutrition analysis of the selected species conducted | -do- | | | | | | | | | | | | | | | | | |
| d | Identify potentially appropriate fodder species | Possible fodder species identified | -do- | | | | | | | | | | | | | | | | | |
| e | Propose fodder production techniques of the species identified above. | Fodder production techniques proposed for the identified | -do- | | | | | | | | | | | | | | | | | |
| 6-2 | Test the identified techniques | | J/E<SE in Animal Science> C/P<Animal Science> Galvao | | | | | | | | | | | | | | | | | |
| a | Produce fodder of the species identified above | Fodder of the identified species (50 kg per species) produced | -do- | | | | | | | | | | | | | | | | | |
| b | Conduct feeding test in the pilot plot in rainy and dry seasons | •Feeding test for two of the selected species (Fejao Brabo, Flor de Seda) and newly selected species (Algaroba and possibly dried cashu fruits) completed •Preliminary feeding test for the other three selected species (i.e. Sabia, Catingueria and Leucena) completed | -do- | | | | | | | | | | | | | | | | | |
| c | Monitor the weight of the animals periodically | A monthly monitoring conducted. | -do- | | | | | | | | | | | | | | | | | |
| d | Recommend fodder species appropriate for stock farming in the area surrounding the pilot plot | •Appropriate fodder species recommended from Fejao Brabo, Flora de Seda and Algaroba (and possibly dried cashu fruits) •Preliminary appropriate fodder species recommended from the other selected species (i.e. possibly Sabia, Catingueria and Leucena) | -do- | | | | | | | | | | | | | | | | | |
| 6-3 | Make researcher's manuals for the techniques which are developed by the project. | | J/E<SE in Animal Science> C/P<Animal Science>:R. Galvao, A. | | | | | | | | | | | | | | | | | |
| a | Prepare a manual for digestion trial | A manual prepared in Portugese. | -do- | | | | | | | | | | | | | | | | | |
| b | Prepare a manual for nutrition analysis | -do- | -do- | | | | | | | | | | | | | | | | | |
| c | Prepare a manual for fodder production | -do- | -do- | | | | | | | | | | | | | | | | | |
| d | Prepare a manual for feeding test | -do- | -do- | | | | | | | | | | | | | | | | | |
| 6-4 | Prepare a technical report on sustainable fodder production | -do- | J/E<SE in Animal Science> C/P<Animal Science>:R. Galvao, A. | | | | | | | | | | | | | | | | | |

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