

- (a) 対象村落のベースライン調査を実施し、社会経済状況を分析する。
 - (b) 森林管理に関わる住民意識のモニタリング及び評価を行う。
- ③-2 森林火災予防に有効な森林管理技術に関する調査・分析・試行を行う。
- (a) 火災予防のための森林管理技術の情報分析を行う。
 - (b) 森林火災予防の技術モデルを開発する。
 - (c) 森林管理技術を試行する。
- ③-3 森林管理技術を用いた住民参加型森林火災予防手法を提案する。
- (a) 住民参加型森林火災予防手法を開発する。
 - (b) 住民参加型森林火災予防手法を実施する。
- (5) 外部条件について（変更点⑦）
- 外部条件については、PDM（オリジナル）を大きく変更していない、新たに設定した上位目標からスーパーゴールに対して、政策、普及体制、行政間の協調、予算、気象の5つの観点より外部条件を設定している。またプロジェクト目標から上位目標に対しても、政策、普及体制、予算にカウンターパートの異動を加えた4つの観点より外部条件を設定している。これらの観点の内、特に気象変動と国家経済に関する条件は、今後のインドネシア国の経済状況並びに全世界の気象状況（エルニーニョの発生状況）を十分モニターし、もし恒常的なものと判断されるのであれば、目標設定の変更を考慮する必要がある。（当該外部条件がキラアサンクションになってしまうため）

第4章 分野別評価

4-1 早期警戒・発見システム

リモートセンシングによる森林火災の早期発見システム分野では、そのシステムはよく稼働し、評価は高い。プロジェクトが始まって半年ほど経た1996年末にエルニーニョ現象が報告され、大規模森林火災が予測されていた。衛星情報受信、処理のハードウェア/ソフトウェアの導入を早期に導入できれば、早期警戒にとって重要な知見が得られたであろうと思われる。

これらの経緯を踏まえながらも、今後一層このプロジェクトの重要性が増すと考えられると共に、相手側機関の積極的な活動状況から判断して、当該分野の活動を拡充すべきとの提言に達した。

詳細4-1-1以下に報告する。

4-1-1 投入実績（日本側およびインドネシア側）

(1) 日本側

長期専門家：1名

短期専門家：2名

助手の配置：1名

供与機材：衛星受信システム（ひまわり、NOAA）

システム構築：森林火災早期発見システム開発

(2) インドネシア側

カウンターパートの配置

Bogorでのオペレーターの配置

Jambiでのオペレーターの配置

機材設置：情報収集用パソコンネットワーク (Bogor)

衛星データ処理室の確保 (Bogor)

4-1-2 活動の実施状況

本プロジェクトで導入した衛星データ受信システムによって得られた情報を利用した森林火災早期発見および煙霧モニタリングの技術が開発され、関連情報を毎日カウンターパート機関が利用できるようになった。

具体的には、次のような活動が日々行われている。

- ・ NOAA衛星データとひまわりの画像をスケジューリングして自動受信
- ・ 深夜のNOAA衛星データからHotspotを抽出
- ・ Hotspotをベースデータ (ランドサットTM, 森林分布図、Concession (森林伐採権を有する企業が管理する林地) 境界情報等) に重ねて位置を確認
- ・ ひまわりによる煙霧の確認
- ・ 林業農園省担当部への通報
- ・ ジャンビ州への通報

ジャンビ州にもパソコンとカラープリンターが設置され、基本情報がARC view によって整備されたところである。そこへ、毎日ホットスポット情報がE-mailによって届けられ、合成画像を作っている。合成画像上で森林地帯に火 (Hot spot) が見つかった場合は、その森林を管理するConcession (森林伐採権を有する企業) へ通報し、チェックさせて連絡を返させることを義務づける体制がとられている。各Concession (森林伐採権を有する企業) へはファクスを利用して合成画像とHot spot の位置座標を連絡している。

4-1-3 成果の達成状況

上述したように、森林火災早期発見システムによって森林火災の通報を毎日行えるようになった。ただし、早期発見システムを具体的な消火活動へ利用するにあたって、最も重要と考えられているHot spot 発生日点の延焼危険度の評価法は加えられていないため、さらに改良が必要である。

また、早期警戒システムは具体的なシステムが作成されていない。気象条件による異常乾燥注意報や火災警報とともに、立地環境に基づく森林火災発生危険度および延焼危険度マップを作成し、危険性を通報するシステムの開発が待たれているところである。早期警戒システムの開発にあたって、現在の最大のネックは分析に必要な気象情報や他の衛星観測情報などの情報を得る手段が本プロジェクトサイトに欠如していることである。専用ネットワーク回線の設置は不可欠である。専用ネットワークの施設は約1万ドルで、毎月の経費は300ドルと見積もられている。

4-1-4 評価結果の分析

早期発見システムの重要性は予想以上に高く評価されており、インドネシア側から Bogor と Jambi でのオペレーター配置がされるなど、積極的な対応を見せている。利用にあたってはインドネシア側からのアイデアが生かされ、Hot spot を Concession（森林伐採権を有する企業）へ通報する体制が整っていた。今後、一層の活用が期待できる。

1996年末にエルニーニョ現象が報告され、大規模森林火災が予測されていた。プロジェクトが開始して、ハードウェア/ソフトウェアの導入を早期に導入できれば、早期警戒にとって重要な知見が得られたであろうと思われる。適切な時期に機材が間に合わなかったことは残念である。

4-2 森林火災予消防

4-2-1 投入実績（日本側およびインドネシア側）

(1) 日本側

長期専門家：1名

短期専門家：1名

助手の配置：1名

供与機材：移動式消火ポンプ、ホース、ジェットシューター、火たたき等
普及啓蒙活動費

(2) インドネシア側

カウンターパートの配置

Jambiでの野外訓練等

機材設置：消火用機材保管倉庫

4-2-2 活動の実施状況

(1) 森林火災の発生状況を勘案し、活動の地域、対象、内容、組織等に関する普及システムを開発した。普及対象別に、マニュアル等の普及教材を作成し、森林火災予防普及活動をジャンビ州ナンガピノ郡及び西カリマンタン州ランタウラサウ郡に於いて実施した。

(2) 初期消火体制整備のため、県レベルの POSKOLAK、郡レベルの SATLAK の組織を中心として、消火機材の整備、消火訓練を実施した。

4-2-3 成果の達成状況

(1) 普及教材として、①マニュアル「焼き畑・水田の火入れ時における安全な火の使い方」「森林火災予防普及ガイド」、②普及用リーフレット（住民一般専用2種類、住民代表用1種類、小学生用1種類、高校生用1種類）、③スライド2種類等のほか、小学生用に標語入りカバン（2種類）、消火隊用の帽子等を作成、配布した。

普及啓蒙活動を、一般住民向け12か所、住民代表向け8か所、農民グループ向け11グループ、小学校向け13校、高校向け3校で述べ7,876人を対象に実施した。

（数字は、1996年、1997年度の実績、1998年度4～10月までの実績は一般住民6か所2,500人、小学校5校962人、中学校5校679人）。

(2) SATLAK等の組織を活用して、危険時用のパトロール体制を整備した。消火機材をジャンビ、西カリマンタン両側に設置し、訓練を実施した。また、住民による初期消火体

制を整備するために、住民が自作可能な消火機材を開発し、訓練を実施した。

(1996、1997年の実績は、4回、延べ218人。1998年4月～10月までの実績は、5か所、154人)。

4-2-4 評価結果の分析

(1) 森林火災予防に関する啓蒙、普及については、システムが開発されており、普及教材の整備、普及員の育成・強化がほぼ計画通り進んでいる。

特に、普及対象毎の普及教材開発や中学生に対してはポスター・コンクール、住民用には、映画会等効果的な開催方法についての工夫がされている。

(2) 初期消火体制整備、訓練についてもほぼ計画通り進んでいる。特に、住民による消火体制整備については、普及活動による意識高揚を活用しながら、住民自身が整備可能な機材の開発等も実施されている。

しかしながら、①消火機材については、移動式ポンプ、ジェットシューター等を中心に整備されつつあるが、供与機材到着が遅れ気味であるとともに、現場に保管庫を整備するなど林業農園省職員等を中心とした消火隊の編成にあわせた現場への配置の検討、②住民によるパトロール、消火体制整備については活動の活性化手法の検討が行われている。

4-3 住民参加型予防手法

4-3-1 投入実績（日本側およびインドネシア側）

(1) 日本側

長期専門家：1名

短期専門家：3名

助手の配置：1名

供与機材：なし

造林対策費

(2) インドネシア側

カウンターパートの配置

4-3-2 活動の実施状況

(1) ジャンビ州ランタウラサウ村及びスンガイランブット村で社会経済調査を最初の2年間で実施した。

(2) (1) の調査結果に基づき、森林火災予防のためのグリーンベルトのモデルをデザインした。住民の主体的な参加を引き出すために、住民の意向を取り入れて、住民参加のインセンティブとした。

(3) 住民の組織化を行い、住民の意向の確認及びグリーンベルトを実際に造成する際の作業グループとして活性化を図った。

4-3-3 成果の達成状況

(1) ジャンビ州ランタウラサウ村及びスンガイランブット村の2村で展示苗畑がそれぞれ1か所ずつ造成され、苗木3樹種109.3千本を生産した。また、グリーンベルト計画延長14.1Kmのうち、フェンス設置78%、掘削64%、植栽32～54%が実行された。

(2) ジャンビ州ランタウラサウ村及びスンガイランブット村で4地区11グループ（参加世帯

数：260世帯)の住民グループの組織化が実施された。

4-3-4 評価結果の分析

- (1) 前半2年間の社会経済調査は、住民の初期消火を行うためのインセンティブを引き出す情報を提供した。また、調査対象とした2村はブルバック国立公園との境界に位置し、①保護対象となる森林が明確であること、②森林から農地へ侵入するノブタの害を防止する効果が期待できること、などから住民の理解を得ることができ、組織化、グリーンベルトの造成がほぼ計画通りに進んでいる。

しかしながら、問題点として、①グリーンベルトの位置、苗は他の管理等について村長の意見が強く反映されたものになっていることから、冠水して植え付けが出来ない箇所があること、②キャッシュクロップとして住民の植栽要望が強いピンロウジュ以外の樹種について植栽が遅れ気味であること、③グリーンベルト造成後の除草等の管理に対する住民の参加意欲が必ずしも高くない地区が見られること、など、わずかではあるが当初の目的を達成できていない箇所がある。

- (2) 住民参加型のグリーンベルト造成は、住民の農地を利用して行われることとなるため、①農作物に代わる収入源となるような植栽樹種の選択、②樹間、樹下を利用した耕作方法の開発、普及、③将来の植栽木の利用による循環利用管理方法の開発、普及などが必要となっている。
- (3) 苗畑については、当初、住民自身による管理が困難とのことから、村毎に造成している。苗畑については次の内容を変更、修正することが望まれる。①樹種選択の範囲を拡大する。②ピンロウジュ等グリーンベルト用途外で、植栽を希望する苗木を販売可能とする。③植栽地までの運搬などの改善を行うため、今後は小規模苗畑の造成技術、育苗技術の普及、指導を行い、住民自身による育苗をするように指導をする。

第5章 教訓および提言等

5-1 評価結果に基づく教訓・提言

インドネシア側と合同で行った調査の結果、合同調査団として今後の協力活動、およびプロジェクトを構成している日本側およびインドネシア側(林業農園省)に対して、プロジェクト運営上の観点から以下の4項目の提言を行った。これら提言について、日本側調査団と専門家との間で各項目への具体的対処方針を検討した。

また、技術的な観点から(5)の指導を行った。

(1) 長期専門家の増員

日本側は、次の役割を担う長期専門家を派遣(増員)することが望ましい。

- ① 森林火災に関する他援助機関との連携の支援、調整を行う。
- ② 当該分野における日本の他の援助スキームによる追加協力に係る連携、調整を行う。
- ③ プロジェクト対象地域以外でのプロジェクト成果の波及に係る林業農園省の活動を指導、助言を行う。

インドネシア側は、その専門家に対するカウンターパートを任命する。

当初計画ではプロジェクト専門家は中長期的な観点から計画されたが、実際に森林火災が発生すると、援助機関との連携、日本からの緊急援助、マスコミ等、各方面の対応をせざるをえず、その後の対応が恒常的に継続することがわかった。そういった対応は、中長期的なプロジェクトを念頭に置いた専門家派遣計画では、業務量の点から対応が困難であると判断された。また、数年後に森林火災が発生することが予想されるため、森林火災対策の優先地域、州を対象に早急にプロジェクト成果の波及に関する協力を支援することが望まれる。特に、③については、林業農園省が実施するプロジェクト成果を波及する活動をプロジェクト全体として支援する際の、指導、調整役を念頭に置いている。

なお、基本計画における協力活動の変更及びそれに伴う専門家の増員はR/Dの修正を必要とするものであり、12月に開催予定の「東南アジア森林火災フォーラム」の結果を踏まえて、このR/D修正方針を最終決定し、インドネシア側と協議、署名することが望ましい。

(2) 林業農園省によるプロジェクト効果の波及

上位目標を達成するために、林業農園省は、開発された技術や専門知識をプロジェクト対象地域以外の森林火災対策優先地域・州に普及するよう努力をすることが望まれる。例えば、現在ではジャンピ州に限定している参加型森林管理手法を西カリマンタン州にも適用することや州政府の当該分野関連職員の訓練である。プロジェクトは林業農園省によって実施されるプロジェクト効果の波及事業を適切に支援することが望まれる。

しかし、インドネシア側の予算不足からこのような活動をになうべき中央のC/Pの全国的な活動が制約を受けている状況がある。中央C/Pおよびインドネシア側が自主的に行う全国的な活動を強化するために、必要最小限の普及資機材、旅費等の支援、あるいは専門家による技術的な支援を可能な限り検討することがプロジェクト成果の全国的な波及促進のために必要と思われる。

また、普及手法、グリーンベルトデザイン等について、林業農園省、州政府職員等を通じた普及を図るため、林業農園省研修施設に於ける研修の中に森林火災に関するコースを設置し、カリキュラムを整備するために必要な支援も検討を要する。

(3) モニタリング・評価計画書に基づいたモニタリング

本調査団で署名したモニタリング評価計画書に基づいて、モニタリングをプロジェクト内で実施する。また、評価は2000年10月頃に終了時評価調査団を派遣し、合同評価を実施する。

(4) 持続性確保のための検討

制度的、財政的、技術的側面のプロジェクト活動の持続性確保のための方法と行動計画を、合同運営委員会で検討すること。

(5) 技術面の提言

1) 早期警戒・発見システム

Hot spot関連衛星情報ネットワークの拡大は、本プロジェクトの成果を評価した上で
の要求とはいえ、オペレーターの養成、機材メンテナンス、他のドナーとの調整、全国レベルでの最適システムの検討などが必要となろう。ただし、本プロジェクトの成果のように、Hot spotから関連するConcession（森林伐採権を有する企業が管理する林地）

を割り出し、その企業に火災の確認をさせるというシステムは、企業が管理する森林地帯での大規模火災の予防が期待できる、現段階で最も効果的な方法であると考えられる。そのため、この要請に対しても、何らかの具体的な対応を提案すべきであろう。林業農園省でHot spotの情報を持ちながら、それを全国規模で活用できない現状は、予想される大規模森林火災が再び起こった際、その責任問題を一層大きくさせるのではないかと危惧される。

2) 森林火災予消防

a) 各普及対象別の普及活動が実施されているが、住民の生活慣習の違い（定着耕作型と移動耕作型など）による火入れに対する意識、火入れの方法等の違いに対応した普及のポイントの分析、それに応じた普及教材の作成、改訂等を行う。特に、政府が1997年9月に発表した火入れ開墾の全面禁止の大統領声明を受けた普及教材の改訂を行う。

また、その際に、住民参加型森林管理手法の開発時に実施した住民のベースライン調査の結果や手法を活用する。

b) 火入れ開墾の全面禁止に対応した火入れ無しの耕作についての普及教材が検討されているが、その効果と除草剤の利用等が環境へ及ぼす影響について検証する。

d) 住民による消火活動の活性化を図る。特に、ジャンビ州のグリーンベルト造成に参加している地区については、その住民組織を活用し、住民の要望を取り入れた消火体制整備、活性化を図る。

e) 供与した消火機材の有効活用を図るため、州林政局、SATLAK、国立公園事務所等を中心とした役割分担と組織体制を整備するとともに、保管庫の整備等効果的な活用について検討する。

f) 住民への普及、訓練については、活動中のNGO等との連携についても検討する。

g) 普及、啓蒙については、新聞、ラジオなど多様なメディアの活用方法、必要な資料について検討する。

3) 住民参加型予防手法

a) 各農民集団、集落の特性及びグリーンベルト造成活動の内容に応じた住民組織化手法を開発（拡充）するとともに、参加住民とともに活動評価手法を開発する。また、住民が活動の全体像、自らの活動の位置づけが分かるような地図の整備等について検討する。

b) 住民の要望も取り入れながら、植栽樹種、グリーンベルト・デザインの多様化について開発すると共に、展示林を設置し、他の地域への普及効果の拡大を図る。

また、住民組織による小規模苗畑の造成、管理手法の検討、試行をするとともに、グリーンベルト管理のための簡易な火の見やぐら等の設置について検討する。

特に、グリーンベルト造成後の管理手法については、開始されたばかりでもあり、地域内での耕作も含めて、今後、住民へのインセンティブの与え方も含めて検討する。

c) ジャンビ州に於ける活動は、インドネシア側にも高く評価されており、全国への普及が期待されているが、水田定住型で国立公園と隣接しているジャンビ州2村でも住民の違い（地元のムラユ人以外にジャワ人、ブギス人を主体とした地域が参加している）により、住民参加の状況、グリーンベルトに対する期待などに差が見られることから、

活動については様々な住民、農業の形態にあわせた手法をインドネシア側が開発していくことが課題となっている。

そのためには、ジャンピ州での活動成果を活用し、焼き畑移動耕作型の西カリマンタン州に於いて、既にジャンピ州で開発、試行された、住民の社会経済調査から組織化、グリーンベルト造成、管理に至るまでの一連の流れをインドネシア側が主体となって実施することとし、プロジェクトが必要な資機材等についての協力を検討する。

5-2 今後の活動方針の検討

インドネシア側から強い要請のあった活動は、他地域でのグリーンベルト造成、Hot spot 関連衛星情報ネットワークの拡大、森林火災トレーニング対象者の拡大、被災地の復旧であった。いずれも本プロジェクトのこれまでの成果を確認した上での要請であり、森林火災問題にとって重要な課題であることから、極めて積極的なインドネシア側の対応が生まれていることは評価できる。これらの要請に対する対応の基本的な考え方はインドネシア側関連機関の活動活性化を支援することであろう。その点から本プロジェクト内で積極的に支援すべきこととして、西カリマンタンに於ける住民参加型対策とその結果としてのグリーンベルト造成や、森林火災トレーニングのための教材や資機材の整備などが考えられよう。

森林火災被災地を無償資金によって造林する要請に対しては、被災地に関する情報を本プロジェクトでも提供すべきであるが、本プロジェクトに直接関係する問題ではない。別のプロジェクトとして発足させることが検討されるべきであろう。しかし、本プロジェクトの立場からは、森林火災早期発見・警戒システムが整備されていない地域での造林はするべきではないと提言する。

なお、多くの国がインドネシア森林火災に関係する情報を提供しているところであり、本プロジェクトの効率性、緊急事態への対応の面からも、早急に専用のインターネット回線を施設することが必要と思われる。

以上の評価結果と提言を踏まえて、今後の活動方針を次のように検討した。

(1) 現在のPO, PDMはプロジェクト目標と上位目標の乖離が大きく、また一部の指標の取り方が適切でないと思われるので、変更することが望まれる。現行プロジェクトを前提にした場合の改訂案はPDM (変更案2) の通り (資料7)。

(2) 専門家を増員することによって、プロジェクトの活動内容、範囲が変わるため、活動方針を次のようにすることが望ましいと思われる。

1)1997年の反省でインドネシア政府は、森林火災を防ぐ為に、海外の援助も含めあらゆる手段を使って、対策をたてようと努力している。先方政府が主体的な努力をする意思が感じられたので、林業農園省の普及活動を活性化させることも含め、林業農園省の意欲を積極的に支援することが望まれる。

財政的な持続性については、自立発展性の評価の項目でも記載されているとおり、見通しは明るくない。しかし、特に林業農園省が自主的に実施する意思のある個別の計画については、森林火災予防の観点からも、可能な範囲で支援の検討をすることが望まれる。

- 2) 森林火災はある程度の周期性があることは指摘されているため、次の森林火災の時期を想定した上で、自然保護総局が実施するプロジェクト成果の普及、波及プログラムを共同で計画することも、先方の主体的な普及の動機付けになると思われる。
- (3) 衛星画像の伝達システム（パソコン及びインターネットによる伝達）が先方から要望されたが、機材の維持管理能力、そのための技術者配置、森林火災時に於ける対応方法の確立程度、等の点で広範囲なシステム整備以前に解決すべき問題があると思われる。それらの課題が解決されるまでは中央での情報の精度を向上させて、的確な情報提供と延焼予防、消火の指示、命令を可能とする方向が望ましいと思われた。
- (4) 専門家を増員するために必要なR/Dの変更案は、プロジェクトの日本側専門家と調査団で検討した。R/D修正のための手続き等に関しては、本調査団帰国報告会の後、各方面の意見を踏まえて進めることとする。

以上

添付資料

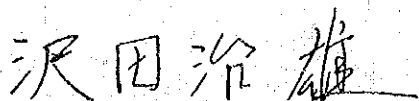
MINUTES OF MEETING
 BETWEEN JAPANESE ADVISORY TEAM
 AND AUTHORITIES CONCERNED OF THE GOVERNMENT OF
 THE REPUBLIC OF INDONESIA
 ON THE JAPANESE TECHNICAL COOPERATION
 FOR THE FOREST FIRE PREVENTION MANAGEMENT PROJECT
 IN THE REPUBLIC OF INDONESIA

The Japanese Advisory Team (hereinafter referred to as "the Team"), organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Dr. Haruo SAWADA, visited The Republic of Indonesia for the purpose of reviewing past overall progress of the Japanese Technical Cooperation on the Forest Fire Prevention Management Project in The Republic of Indonesia (hereinafter referred to as "the Project") jointly with the Indonesian Evaluation Team.


A Joint Evaluation Mission consist of the Team and the Indonesian Evaluation Team conducted interviews with the Indonesian counterparts, the Japanese experts assigned to the Project and other personnel concerned with the Project, and made field surveys, exchanged views among themselves.

As a result of the above activities, the two teams agreed to a summary of evaluation and recommendation report attached herewith.

Jakarta, October 22, 1998



Dr. Haruo SAWADA
 Leader
 Japanese Advisory Team
 Japan International Cooperation Agency
 Japan



Ir. Soemarsono
 Director General of Forest Protection
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Joint Evaluation Report on the Japanese Technical Cooperation for the Forest Fire Prevention Management Project in the Republic of Indonesia

1. Introduction

The Forest Fire Prevention Management Project (hereinafter referred to as "the Project") has been implemented since April 15, 1996, based on the Record of Discussions (hereinafter referred to as "the R/D"), signed on March 5, 1996, between the Government of Japan and the Government of the Republic of Indonesia.

According to the R/D, the project purpose is to improve methods of taking prompt measures against forest fires at the central government level and methods of forest fire prevention and initial suppression at the local community level, and thereby contribute to the reduction of occurrence and spread of forest fires. Furthermore, the overall goal of the Project is to reduce the damage of forest fires in Indonesia, thereby reduce the forest devastation and environmental disturbances caused by the smoke of forest fires.

In order to enhance an effective implementation of the Project Type Technical Cooperation, JICA has introduced a project management system called "JPCM" (JICA Project Cycle Management). This is a summary of the interim evaluation undertaken on the third year of the project period as a part of the system.

The interim evaluation was carried out by a joint evaluation team consisting of a Japanese advisory team and an Indonesian evaluation team. In the first step of the evaluation, the joint team assessed a degree and prospect of achievement of the project purpose and outputs based on the Project Design Matrix (PDM) and the Plan of Operation (PO) of the Project, which had been prepared before the evaluation. In the next step, the team analyzed and evaluated the Project from the view points of "Efficiency", "Effectiveness", "Relevance" and "Sustainability" in accordance with the JPCM system. Finally, the team made a set of recommendations to the Project in order to improve the project design and to make a smooth achievement of the project purpose.

2. Member of Joint Evaluation Team

2.1 Japanese Side

- 1) Dr. Haruo SAWADA : Leader / Early Warning and Detection System
Chief, International Forest Environment Research Team, Research Coordination Division, Forestry and Forest Products Research Institute (FFPRI), Ministry of Agriculture, Forestry and Fisheries (MAFF).
- 2) Mr. Kazuyuki MORITA : Forest Fire Prevention and Initial Suppression
Assistant Director, Forestry Labour Office, Forest Cooperatives Division, Administrative Department, Forestry Agency, MAFF.

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- 3) Mr. Minoru MIYASAKA : Project Management
Project Officer, Forestry Cooperation Division, Forestry and Fisheries Development Cooperation Department, Japan International Cooperation Agency (JICA)
- 4) Mr. Yoji MIZUGUCHI : Evaluation Analysis
Environmental Specialist, Office of Environmental Science and Engineering,
Consulting Engineers, Nippon Koei Co., Ltd.

2.2 Indonesian Side

- 1) Mr. Soemarsono :
Director General of Forest Protection and Nature Conservation (PHPA), Ministry of Forestry and Estate Crops (MoF&EC).
- 2) Mr. Wasiman Siswanto :
Director of Forest Protection, Directorate General of PHPA, MoF&EC.
- 3) Mr. Soedarmo :
Sub-Director of Forest Fire, Directorate of Forest Protection, Directorate General - PHPA, MoF&EC.

3. Objectives of the Evaluation

Main objectives of the evaluation of the Project are as follows :

- i) to conduct a comprehensive evaluation of the achievement in accordance with the original plan described in the R/D, Tentative Schedule of Implementation (TSI), PDM and PO; and
- ii) to make recommendations and suggestions to the Project team regarding future project activities and necessity of amendment of the project design at the interim evaluation stage.

4. Process of the Evaluation

4.1 Investigation for the Evaluation

The joint evaluation team carried out a reconnaissance survey in Bogor and in the field trial sites in Jambi Province to grasp progress of the project activities. In addition, the Team also made interviews with the Indonesian counterparts engaged in the Project, Japanese experts, and other government officials concerned to draw important and useful information out.

4.2 Items of the Evaluation

(1) Accomplishment of the Project

The achievement level of the project activities in terms of inputs, activities and outputs, as the accomplishment of the Project, is assessed in comparison with the original plan such as R/D, TSI, PDM and PO.

(2) Evaluation Criteria

(a) Effectiveness

Effectiveness is assessed by analyzing the extent to which the outputs and purpose of the Project have been achieved or/and can be expected to be achieved at the time of evaluation.

(b) Efficiency

Efficiency of project implementation is assessed by analyzing productivity of the implementation process. Practically, it is to evaluate the relationship between the outputs and inputs in terms of timing, quality and quantity, and to reconsider availability of the alternative strategy to produce the outputs more efficiently.

(c) Relevance

Relevance is clarified by examining whether the outputs, project purpose and overall goal are still in keeping with the priority needs and concerns of the Indonesian Government at the time of evaluation. At the same time, the rationale of the Project, especially the relationships between each item in the narrative summary, is also reviewed on the PDM.

(d) Sustainability

Sustainability of the Project is clarified by examining whether the project activities and benefits are likely to continue after the assistance is completed. In fact, it can be forecasted by examining the institutional and management capacity, financial condition, technical ability, and ownership of the implementing organization.

5. Results of Evaluation

5.1 Accomplishment of the Project

5.1.1 Inputs

The following inputs have been provided for the Project from both sides of Japan and Indonesia by the time of evaluation.

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(1) Japanese Side

(a) Dispatch of experts

i) Long-term expert

Five (5) long-term experts in total have been dispatched for two (2) years from 1996 to 1997. The experts dispatched cover five fields of Leader, Coordinator, Early warning/detection system, Forest fire prevention and initial suppression and Participatory methods for forest fire prevention. In 1998, some of them are replaced by their successors.

ii) Short-term expert

Eight (8) short-term experts in total have been dispatched, and the fields of experts dispatched are as follows:

- Extension and Public Relations
- Forest Fire Prevention
- Early Warning
- Early Detection
- Reforestation and Forest Soil
- Socio-environmental Analysis

(b) Provision of machinery and equipment

The machinery and equipment worth approximately 73 million Japanese yen in total (at the time of evaluation) were provided to the Project by JICA.

(c) Training of Indonesian counterpart personnel in Japan

Until the time of evaluation, two (2) Indonesian counterparts in the field of "Forest Fire Control" were trained in Japan.

(2) Indonesian Side

(a) Appointment of counterparts and other personnel

The Director of Forest Protection, Directorate General-PHPA, was appointed as the Project Director. The Head of Sub-directorate of Forest Fire and Staff of Forest Fire Control Section were also appointed as the Project Manager and the Project Coordinator, respectively. In addition to them, 13 counterpart personnel in total have been appointed for the Project by the time of the evaluation.

(b) Allocation of budget

About 170 million Rupiah in total has been allocated as a running cost for the Project in 1997.

(c) Provision of land, building and facilities

The following facilities have been provided for the Project.

- Several facilities in the project sites in West Kalimantan and Jambi
- Building and related facilities for the experts in Bogor
- Building and related facilities for the experts in West Kalimantan and Jambi

- Building and related facilities for the Team Leader of the Project in Jakarta

5.1.2 Activities

Activities of the Project are divided into the following four (4) work fields according to PDM and PO. The activities completed and ongoing at the time of evaluation are summarized as follows.

(1) Enhance prompt measures against forest fires (Early warning and detection system)

Completed Activities

- To establish the detection and monitoring system using satellite information

Ongoing activities

- To improve methods of early detection and observation of forest fires
- To develop early warning methods
- To identify danger areas and periods of the occurrence of forest fires
- To support implementation of prompt measures against forest fires

(2) Strengthen forest fire prevention and initial suppression systems

Completed Activities

- To conduct extension for forest fire prevention and training on initial suppression

Ongoing activities

- To survey, make trials and improve forest fire prevention techniques
- To build up institutional capacities of responsible sections in the local government
- To develop manuals and materials for extension and training
- To conduct survey on burning mechanisms of peat layer

(3) Enhance participatory forest management systems which are effective in forest fire prevention

Completed Activities

- To analyze socio-economic conditions of participating communities through base line surveys / basic diagnostic surveys
- To analyze information of forest management technologies for fire prevention
- To develop participatory methods for fire prevention

Ongoing activities

- To comprehend participating communities' awareness of forest fires through monitoring and evaluation
- To create technological models for forest fire prevention
- To make trials of forest management models proposed
- To apply participatory methods for fire prevention

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(4) Others

Ongoing activities

- To conduct survey on forest fires in national parks
- To conduct seminars and workshops on activities of the Project

5.1.3 Outputs

(1) Enhance prompt measures against forest fires (Early warning and detection system)

The detection and monitoring system of forest fires by using satellite information of NOAA / GMS (HIMAWARI) have been established through the project activities. The system worked very effectively during the large scale forest fires in 1997/1998. The Project could detect forest fires and monitor haze using satellite system, and inform the outputs of the monitoring to MoF&EC everyday.

On the other hand, the early warning system is presently under development. Since the activities of the early warning system were concentrated in Bogor, activities to be conducted in local area did not much progress. In future, the activities in local area (Jambi and West Kalimantan province) should be emphasized more to attain the output on the schedule.

(2) Strengthen forest fire prevention and initial suppression systems

Several leaflets for extension of forest fire prevention were prepared and distributed to the villagers including children by the Project team. The public education programs have been carried out in the both provinces since 1996. The numbers of the participants of the public education programs from 1996 to 1997 are shown below.

	(Unit : Persons in total)			
	Jambi		West Kalimantan	
	1996	1997	1996	1997
All villagers	1,300	1,340	1,200	1,400
Villagers' Representatives	30	89	270	-
Farmers' Groups	-	173	-	92
Students in Primary School	410	467	519	450
Students in High School	-	-	-	136

Through the above extension activities, the villagers' awareness on the prevention and initial suppression of forest fires has been improved gradually. In addition to the villagers' aspects, the capability of responsible section of the local governments has been gradually promoted to conduct the extension activities. In fact, the local governments established the executing organizations of forest fire, which have a meeting every year at provincial and district level. In the meeting, countermeasures to forest fires in local areas are reinforced through the active public relations and extension programs to local people.

(3) Enhance participatory forest management systems which are effective in forest fire prevention

The Project team carried out the field survey by using participatory methods such as RRA (Rapid Rural Appraisal). Through this survey, the socio-economic, racial and geographical background and features of the project sites were generally grasped and they used for the planning of the participatory forest management program. At the same time, existing indigenous forest management technologies which are effective forest fire prevention were also investigated. Based on the both survey results, the Project team proposed the green belt plantation as a technical model of forest fire prevention system with participatory forest management. The green belt plantation shows the validity for the forest fire prevention through the field trials with villagers' participation.

(4) Others

The field surveys of the forest fires in national parks were carried out by the Project team. The causes, geographical characteristics, levels of damage and social background were grasped through the surveys. The information obtained from the survey have been fed back effectively into the project activities in the fields.

5.1.4 Achievement of Project Purpose

According to the PDM, the achievement of the project purpose is assessed by the degree of contribution to forest fire prevention activities throughout the country. As mentioned in section 5.1.3, the Project has developed the following systems.

- the early detection system
- parts of the forest fire prevention and initial suppression system
- a trial model of the participatory forest management system effective for forest fire prevention

With the achievement of the outputs, the local government's intention for forest fire prevention in Jambi and West Kalimantan provinces has been motivated. In fact, both provincial officials appreciate the activities of the Project, especially green belt plantation, and intend to apply the systems to the other areas in the provinces. To promote the forest fire prevention activities throughout the country, however, it is important to support activities of the counterpart agency to disseminate the outputs of the Project as well as to improve the systems mentioned above.

5.2 Evaluation

5.2.1 Effectiveness

(1) Effectiveness of outputs

The following table shows the present achievement level of the outputs.

Outputs	Present Achievement Level
Enhance prompt measures against forest fires (Early warning and detection system)	- Monitoring and detection system was established. - Early warning system is under development.
Strengthen forest fire prevention and initial suppression systems.	- Villagers' awareness has been improved. - Forest fire prevention and suppression system was formulated and proposed. - Executing organization of forest fire initial suppression became active.
Enhance participatory forest management systems which are effective in forest fire prevention	- Forest fire prevention methods with participatory forest management were applied in the trial fields. - Validity of the above methods were proved through field trials.

As a whole, the attainment of the outputs is slightly behind due to the disturbance and influence caused by the forest fires in 1997/1998. However, the Project has been recovering the delay by the efforts of the Project team.

(2) Effectiveness of project purpose

As noted in section 5.1.4, the project purpose is being accomplished with realization of the outputs. By achieving the outputs, the Project can propose a comprehensive model including forest fire detection, prevention and initial suppression. Although the developing of the model will contribute to promoting the forest fire prevention activities, it is important to support the activities of the counterpart agency to extend the concept of the model smoothly throughout the country.

On the other hand, the forest fires in 1997/1998 has forced the Project team to take urgent measures for the fires, and it has also affected to the activities of the Project. Furthermore, it is considered that there is possibility of forest fire's occurrence in the large area in near future.

Considering the above situations, the joint evaluation team considers that a long term expert should be dispatched additionally in charge of public relations including coordination with related organizations and projects, and attendance to international and domestic seminars for forest fires. Furthermore, the activities of the counterpart agency should be also supported for dissemination of the outputs of the Project to other priority areas / provinces.

5.2.2 Efficiency

(1) Timing of inputs

Counterpart training

The counterpart training in 1997 was delayed because candidates were involved in forest fire protection efforts in 1997.

Dispatch of experts

Japanese experts were dispatched with appropriate timing.

(2) Quantity and Quality

Dispatch of expert

Short-term experts gave positive contribution to the progress of the Project.

Provision of Materials and Equipment

The materials and equipment especially related to satellite information, forest fire prevention and initial suppression met the expectation of Indonesian side. In addition, they made a remarkable impact for the publicity of the Project.

(3) Linkage with other cooperations / other aid agencies

The linkages with other cooperations which influence the Project are as follows :

- a) Relationships with other donor agencies (GTZ, EU, ITTO, etc.) that are conducting projects on the forest fire sector in Indonesia are being maintained through information exchange and collaborative projects, such as :
 - spot propagation on TV for forest fire prevention (with GTZ, EU and WWF); and
 - utilization of the weather index developed by GTZ as a training materials.
- b) Relationships with international agencies (WB, ADB, ASEAN, etc.), NGOs and research institutions within and outside the country are being maintained by information exchange through meetings and conferences on forest fires and haze.

5.2.3 Relevance

(1) Relation with the national policy

If the overall goal is achieved, deforestation in Indonesia caused by fire will be reduced and environmental disruptions by fire smoke in ASEAN countries will be mitigated. Therefore, the overall goal is fully consistent with the policy of Indonesia and is assumed to bring significant social and economical merits.

(2) Rationale

It is considered that the relationships between activities, outputs, and project purpose of the Project are logical. Although there is the rationale between project purpose and overall goal, the external factors (important assumptions), such as extreme climatic changes and financial condition of the Government, might influence the linkage. It is important to monitor such external factors during the project period and to modified the PDM of the Project, if required.

5.2.4 Sustainability

(1) Institutional aspect

Laws and regulation for forest fire are established in both central and local governments.

However enforcement of them needs to be socialized through extension and other related activities to secure the sustainability of the activities initiated by the project. During the evaluation, the Indonesian side expressed the intention to utilize the technologies for the fire prevention to other areas. The evaluation team believes that it is important to maintain the Indonesian positive attitude inspired by experience of the forest fire and effect of the project activities.

(2) Financial aspect

Considering the recent economic situation, appropriate countermeasures should be considered to strengthen the sustainability of the activities. Their considering points are to maintain and enhance accountability and ownership of Indonesian side.

(3) Technical aspect

The developed technologies have been gradually acquired by Indonesian counterparts. However, it is required to make further effort to obtain the abilities to apply the developed technologies, models and outputs in following fields to secure the sustainability of the activities from technical aspect.

- Establishment of early warning system of forest fire.
- Preparation of useful manuals and materials for extension and training.

The evaluation team believes that the counterparts of the Project will acquire the technologies and expertise through the activities. In addition, manuals and materials which are essential for training are expected to be completed by the end of the project.

(4) Others

Until forest fire in 1997/1998, the peat fire had been a common potential issue across three technical fields of the Project. The importance of peat fire was realized in the recent forest fire, however the information of peat fire is limited at present. Formation of countermeasures against the peat fire, such as collecting information of peat fire, is important to maintain the sustainability of the Project in remaining project period.

6. Conclusion and Recommendations

6.1 Conclusion

During the half period of the Project, a large scale forest fires actually occurred in 1997/1998. The Project team has contributed to preparation of urgent countermeasures against the forest fires, and these urgent works have affected to the progress of the Project. However, the outputs of the activities have been gradually achieved through the efforts of the project personnel of both Indonesian and Japanese sides. A comprehensive model including forest fire detection, fire prevention system, initial suppression system and participatory method for fire prevention is being developed as the results of the progress.

The joint evaluation team evaluated the progress of the Project in terms of the four evaluation criteria, such as "effectiveness", "efficiency", "relevance" and "sustainability". As for the "efficiency", the evaluation team judges that the Project has been operated and managed in an efficient way. As for the "relevance", the evaluation team confirms that the purpose of the Project are closely consistent with the policy of the Government, and the linkages between items of the narrative summary are logical.

As for the "effectiveness", the project purpose is being accomplished with realization of the outputs. However, the evaluation team considers that some activities in the Project should be reinforced to achieve the project purpose smoothly within the remaining project period. In addition, it is expected that the activities of the Project will be still influenced by several works caused by the forest fires in 1997/1998. Furthermore, there is possibility that forest fires in the large area will occur again within the coming years, and it will also affect the plan of operation. In this connection, the joint evaluation team considers that a long term expert should be dispatched additionally in charge of public relations including coordination with related organizations and projects, and attendance with international and domestic seminars for forest fires. Furthermore, the activities of the counterpart agency should be also supported for dissemination of the outputs of the Project to other priority areas / provinces.

The "sustainability" of the Project is not quite high especially in terms of the institutional and financial aspects. Since they are closely connected with the Governmental policy and recent economic condition of the country respectively, they are actually beyond the scope of the project activities. However, it is essential to maintain and to enhance leadership and ownership of Indonesian side through transferring the technologies and disseminating the importance of the Project.

6.2 Recommendation

The following recommendations are concluded for smooth operation and management of the Project, and for realization of the project purpose so as to achieve the overall goal.

- 1) Both sides should monitor the achievement of the entire project activities and their results based on the "Monitoring and Evaluation Plan".
- 2) Japanese side should dispatch a long term expert in charge of public relations (including coordination with related organizations and projects, and attendance to international and domestic seminars for forest fires) additionally, in order to contribute to the achievement of the project purpose smoothly and to support for counterpart agency disseminating outputs of the Project, based on the experiences and the lessons of the disastrous forest fires in 1997/1998. Indonesian side also should assign his/her counterpart. (subject to the revision of the R/D)
- 3) Counterpart agency should make efforts to disseminate technology and expertise developed to the other priority areas / provinces for smooth realization of the overall goal, for example application of participatory forest management in West Kalimantan

(12)

7

and training the governmental staff concerned. Japanese side should provide appropriate supports for such dissemination of outputs of the Project taken by Indonesian Side. (subject to the revision of the R/D. if required)

- 4) Joint Coordinating Committee should discuss the measures and make an action plan to achieve the sustainability of the project activities in institutional, financial and technical aspects.

(1)

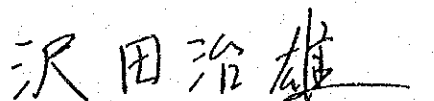
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**THE MINUTE OF MEETING
BETWEEN JICA ADVISORY TEAM
AND THE AUTHORITIES CONCERNED
OF THE GOVERNMENT OF THE REPUBLIC OF INDONESIA
ON MONITORING AND EVALUATION PLAN,
PROJECT DESIGN MATRIX, AND PLAN OF OPERATION
OF THE FOREST FIRE PREVENTION MANAGEMENT PROJECT
IN THE REPUBLIC OF INDONESIA**

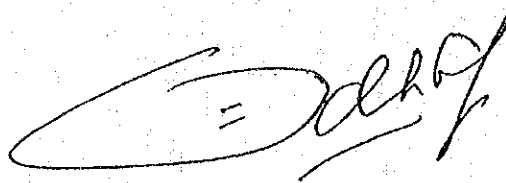
The Japanese Advisory Team organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Dr. Haruo SAWADA and authorities concerned of the Republic of Indonesia jointly prepared the Monitoring and Evaluation Plan, Project Design Matrix (hereinafter referred to as "the PDM") and Plan of Operation (hereinafter referred to as "the PO") as shown in the document attached hereto.

These plans were prepared based on the Record of Discussion (hereinafter referred to as "the R/D"), signed on March 5, 1996, and the Minute of Understanding (hereinafter referred to as "the MOU") for the Tentative Schedule of Implementation (hereinafter referred to as "the TSI"), signed on January 21, 1997, between the Government of Japan and the Government of Indonesia. However, these plans prepared by both teams can be modified in the framework of the R/D, if it is required some modification of the plans on the implementation stage.

Jakarta, October 22, 1998



Dr. Haruo SAWADA
Leader
Japanese Advisory Team
JICA



Mr. Soedarmo
Sub-Director of Forest Fire,
Directorate of Forest Protection,
Directorate General of Forest Protection
and Nature Conservation,
Ministry of Forestry and Estate Crops

Monitoring and Evaluation Plan

Date of Preparation : 22 / October / 1998

Name of Project : The Forest Fire Prevention Project in the Republic of Indonesia
Project Period : 15/April/1996 - 14/April/2001 (for 5 years)
Name of Mission : Advisory Team
Leader of Mission : Haruo SAWADA
Mission Period : 11/October/1998 - 23/October/1998
Section in JICA : Forestry Cooperation Division, Forestry and Fisheries Development Cooperation Department
Officer in charge : Minoru MIYASAKA

I. Outline of Project

1. Project Design Matrix (PDM - see Attachment 1)

Based on the original PDM prepared on December, 1997, the PDM were modified by the Project team (both Japanese team and Indonesian counterparts in charge) in consultation with the Advisory team.

[Special matters to be mentioned]

If the Record of Discussion (R/D) for the Project will be changed through the discussion between both Governments based on the results of a seminar for forest fire prevention in December 1998, the PDM will also be modified in accordance with the R/D by the Project team.

2. Plan of Operation (PO - see Attachment 2)

Based on the original Plan of Operation (PO) prepared on December, 1997, the PDM were modified by the Project team (both Japanese team and Indonesian counterparts in charge) in consultation with the Advisory team.

[Special matters to be mentioned]

If the Record of Discussion (R/D) for the Project will be changed through the discussion between both Governments based on the results of a seminar for forest fire prevention in December 1998, the PO will also be modified in accordance with the R/D by the Project team.

II. Executing Organization for Monitoring and Evaluation

1. Monitoring

In accordance with the monitoring schedule in Section III, the Project will open regular meetings chaired by the project manager to monitor the progress of activities. Sufficient data for monitoring should be provided by the responsible persons for each activity. The Project Achievement Chart (Attachment III) will be prepared under the monitoring works.

The executing organization for monitoring will be composed by the member of the Project, since the main purpose of monitoring is to feed back the results of monitoring into project in order to improve the operation and management of the ongoing project. The members of the executing organization are basically set up as follows :

Japanese side : Team Leader,
Coordinator, and
Experts dispatched.

Indonesian side : Project Manager,
Project Coordinator, and
Counterparts.

2. Evaluation

Intermediate and terminal evaluation will be carried out by the joint evaluation team consisting of the Indonesian evaluation team and the Japanese evaluation team dispatched by JICA.

The members of the Indonesian evaluation team will be selected from those of the Joint Committee.

III. Tentative Schedule for Monitoring and Evaluation (M&E) Works

Schedule of M&E	Type of M&E	Participants of M&E	Reporting
March in 1996	Signing of R/D		
April in 1996	Starting the cooperation		
January in 1997	Formulation of TSI	Japanese Consultation Team	Minute of Understanding
December in 1997	Joint Committee (1st Monitoring)	1st Joint Committee	Joint Committee Report
October in 1998	Interim Evaluation	Joint Evaluation Team	Minute of Meeting
April in 1999	2nd Monitoring	Project Team	Monitoring report
October in 1999	3rd Monitoring / Joint Committee	Project Team and 3rd Joint Committee	Monitoring report Joint Committee Report
April in 2000	4th Monitoring	Project Team	Monitoring report
October in 2000	Terminate Evaluation / Joint Committee	Joint Evaluation Team and 4th Joint Committee	Minute of Meeting Joint Committee Report
April in 2001	(End of the Project)		

IV. Monitoring and Evaluation Criteria

1. Monitoring Criteria

[Special matters to be mentioned]

The monitoring criteria is basically same as each topic in the Plan of Operation.

As a basic data, an achievement sheet shall be prepared at the time of monitoring.

The form of the sheet is shown in Attachment- 3.

2. Evaluation Criteria

[Special matters to be mentioned]

The outline of the evaluation criteria and its check points are shown in Attachment - 4.

Attachment - 1 Project Design Matrix (Original)

Project Name : Forest Fire Prevention Management Project

1. Period of Cooperation : 5 years (1996.4 - 2001.4)

2. Implementation Agency in Beneficiary Country : PHPA, MoF&EC

3. Target Group : Staff of PHPA, Villagers of Pontianak area and Nangapirao / Nippapanjang area

4. Project Area : Boger (Center), Pontianak in Jambi Province and Nangapirao / Nippapanjang in West Kalimantan

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumption
<p>Overall Goal</p> <p>1. Alleviate devastation of forests caused by wild fires</p> <p>2. Mitigate environmental disruptions by subsequent forest devastation and emission of smoke and fog</p> <p>Project Purpose</p> <p>Improve prompt measures against forest fires at the central government level, and methods of prevention and initial suppression of forest fires at the local level.</p>	<p>1. Reduce the area of forest fires by 30,000 ha per year in average. (by decree of Directorate General of Forest Protection and Nature Conservation, Ministry of Forest, 1994)</p> <p>2. Reduce the number of forest fires every year.</p> <p>1. Promote forest fire prevention activities throughout the country</p>	<p>1. Official statistics of Ministry of Forestry and Estate Crops</p> <p>1. Annual report of Ministry of Forestry and Estate Crops</p>	<p>1. Indonesia does not change forest protection policies</p> <p>2. There are no extreme climatic changes throughout Indonesia</p> <p>1. Indonesia keeps up its own efforts to distribute project outputs to the whole country</p> <p>2. Collaboration is maintained between central government and local governments (at the provincial, district, sub-district and village levels)</p>
<p>Outputs</p> <p>Central Level</p> <p>1. Enhance prompt measures against forest fires</p> <p>Local Level</p> <p>1. Strengthen forest fire prevention and initial suppression systems</p> <p>2. Enhance participatory forest management systems effective for forest fire prevention</p>	<p>Central Level</p> <p>1. The country improves its ability to detect forest fires with satellite information.</p> <p>2. Warning techniques are developed.</p> <p>Local Level</p> <p>1. Communities' awareness is improved toward forest fire prevention</p> <p>2. The number of available personnel increases for fire fighting.</p> <p>3. (1) The area of pilot plantations increases with forest management technologies selected</p> <p>(2) The number of people increases participating in forest fire prevention program</p>	<p>Central Level</p> <p>(1) Project reports</p> <p>(2) Project reports</p> <p>Local Level</p> <p>(1) Project reports</p> <p>(2) Project reports</p> <p>(1) Project reports</p> <p>(2) Project reports</p>	<p>1. Sufficient number of counterpart personnel is fully assigned for the project</p> <p>2. Indonesia makes sufficient financial contributions to the project</p>
<p>Activities</p> <p>Central Level</p> <p>1. Observe forest fires with satellite information.</p> <p>2. Propose methods to improve existing countermeasures against forest fires to the government with facilitation in implementation of them.</p> <p>Local Level</p> <p>1. Support public relations on forest fire prevention</p> <p>2. Support initial forest fire suppression system</p> <p>3. Conduct surveys for analysis of socio-economic conditions of communities, including cultural aspects of local people</p> <p>4. Make analysis and trial of forest management technologies effective for forest fire prevention.</p> <p>5. Propose participatory forest fire prevention methods with application of forest management technologies</p>	<p>Japanese Side</p> <p>1. Recruit Japanese experts</p> <p>Long-term experts : 5 persons x 5 years</p> <p>Short-term experts : some persons / year x 2-3 month</p> <p>2. C Training of counterpart personnel in Japan : some persons / year x 2-3 month</p> <p>3. Supply equipment (machinery and materials required for project activities)</p> <p>4. Provide financial support to Government of Indonesia to bear relevant expenses (including costs of field activities, office administration and utilities)</p>	<p>Indonesia Side</p> <p>1. Appoint government staff as counterpart personnel and other project staff</p> <p>2. Bear operational costs</p> <p>3. Provide land, buildings and other facilities to the project</p>	<p>1. Counterpart personnel are appointed as the initial plan</p> <p>2. Indonesia allocates sufficient counterpart budget for the project.</p> <p>3. Satellite information continues to be received from "Himawari" and "NOAA".</p>
			<p>Prerequisite</p> <p>1. Local communities are not opposed to the project.</p> <p>2. Community members participate in the project.</p> <p>3. Land owners do not stand against establishment of green belts in their land for the project</p>

Attachment - 2 Plan of Operation (PO)

(1/6)

Activities	Target	Year					Responsible person	Inputs	Remarks
		1st	2nd	3rd	4th	5th			
CENTRAL LEVEL									
1 Observe forest fires by using satellite information									
1-a Improve methods of early detection and observation of forest fire by using NOAA/GMS images	NOAA hot spot detection and Himawari haze monitoring on Sumatra and Kalimantan are continuously operated.						Mr. Johnnie H. Prakoso		
1) Detect hot spots by using NOAA									
2) Detect smokes by GMS									
3) Develop base maps									
2 Suggest methods of making improvement on the existing systems for taking prompt measures against forest fires and to support their implementation									
2-a Develop early warning methods of forest fire	Fire danger rating systems are established in Jambi and West Kalimantan.						Mr. Johnnie H. Prakoso		
1) Develop forest fire danger indices by using weather information									
2) Develop forest fire danger potential maps									
3) Develop methods for predicting forest fire danger areas statistically by using hot-spot / smoke data identified by NOAA / GMS									
4) Develop methods for forest fire data collection and their statistical use									
2-b Identify danger areas and periods	Fire prevention activities is operated by applying the fire rating systems in Jambi and West Kalimantan.						Mr. Johnnie H. Prakoso		
1) Predict forest fire danger periods by using weather indices									
2) Identify forest fire danger areas by using the early warning methods									
2-c Support implementation of prompt measures against forest fires	Communication systems are established, and forest fire information are transferred by using the systems in Jambi and West Kalimantan.						Mr. Johnnie H. Prakoso		
1) Strengthen communication network (Bogor - Pontianak / Jambi - Nanga Pinoh / Nippapanjang)									

Attachment - 2 Plan of Operation (PO)

(2/6)

Activities	Target	Year					Responsible person	Inputs	Remarks
		1st	2nd	3rd	4th	5th			
LOCAL LEVEL									
3-1 Support public relations for forest fire prevention									
3-1-a Survey, make trials and develop forest fire prevention techniques	Forest fire prevention technologies are established through field trials.						Mr. Danang P. Mardijono Ir. Erwin Effendi Ir. Syaharuddin Ir. Hana Suhana Mr. Oman Superman		
1) Review existing techniques									
2) Select and develop proper techniques through field trial									
3) Make teaching manuals for local staff / leaders									
3-1-b Develop the system of public relations, extension, and education	Extension system including education and public relations are established, and its manuals for future dissemination are also developed.						Mr. Danang P. Mardijono Ir. Erwin Effendi Ir. Syaharuddin Ir. Hana Suhana Mr. Oman Superman		
1) Proposed extension system at the whole country level, including subjects, methods and organizational skills of extension									
2) Proposed extension methods at project sites through stimulation of SATLAK									
3) Development extension material									
4) Development extension systems through field trial at project sites									
5) Conceptualize manuals on extension activities out of project experience for local staff									

Attachment - 2 Plan of Operation (PO)

(3/6)

Activities	Target	Year					Responsible person	Inputs	Remarks
		1st	2nd	3rd	4th	5th			
<p>3-2 Support the forest fire initial suppression system</p> <p>3-2-a Build up institutional capacities (This item also covers warming activities)</p> <ol style="list-style-type: none"> 1) Conduct surveys of geographical information for suppression at project sites 2) Make plans for suppression at project sites, including patrolling, warning and suppression activities 3) Develop suppression systems and proper techniques through field trial at project sites 4) Arrange suppression tools 5) Conceptualize manuals on suppression activities out of project experience, including suppression training for local staff / leaders <p>3-2-b Conduct training of initial suppression techniques</p> <ol style="list-style-type: none"> 1) Conduct fire trainings for staff 2) Organize suppression teams among communities and hold fire drills 3) Make teaching manuals and training material on fire training for local staff / leaders 	<p>Initial suppression units in local level are strengthened in terms of its institutional aspects.</p> <p>Initial suppression techniques are developed, and teaching manuals and training materials are developed for further extension.</p>								
							<p>Mr. Danang P. Mardijono</p> <p>Ir. Erwin Effendi</p> <p>Ir. Syaharuddin</p> <p>Ir. Hana Suhana</p> <p>Mr. Oman Suparman</p>		
							<p>Mr. Danang P. Mardijono</p> <p>Ir. Erwin Effendi</p> <p>Ir. Syaharuddin</p> <p>Ir. Hana Suhana</p> <p>Mr. Oman Suparman</p>		

Attachment - 2 Plan of Operation (PO)

(4/6)

Activities	Target	Year					Responsible person	Inputs	Remarks
		1st	2nd	3rd	4th	5th			
4-1 Research and analyze socio-economic aspects including the culture of local residents									
4-1-a Analyze socio-economic conditions of participating communities through base line survey / basic diagnostic surveys	Understandings of socio-economic characteristics of target communities are improved for formulation of participatory forest fire prevention programs.						Mr. Sumantri Mr. Atang Setiawan Mr. Kuspriyadi		
1) Introduce survey methodologies to counterparts							Suristio		
2) Help counterparts understand local communities' conditions for participatory planning including identification of target groups							Mr. Madari Mr. Hapiz		
3) Improve community consultation skills							Mr. Suratman		
4-1-b Comprehend participating communities' awareness of forest fires through monitoring and evaluation	Participatory forest fire prevention programs are elaborated in accordance with levels of participating communities' awareness of forest fires.						Mr. Sumantri Mr. Atang Setiawan Mr. Kuspriyadi		
1) Introduce participatory monitoring and evaluation methods to counterparts and communities							Suristio		
2) Help counterparts and communities assess levels of people's awareness of forest fires							Mr. Madari Mr. Hapiz Mr. Suratman		

Attachment - 2 Plan of Operation (PO)

(5/6)

Activities	Target	Year					Responsible person	Inputs	Remarks
		1st	2nd	3rd	4th	5th			
4-2 Research, analyze and make trials of forest management technologies which are effective for forest fire prevention									
4-2-a Analyze information on forest management technologies for fire prevention 1) Make analysis of existing tree plantation models effective for forest fire prevention 2) Encourage communities to gain ideas useful for forest fire prevention	Existing forest management technologies are appraised for fire prevention including green belt development.		█				Mr. Sumantri Mr. Atang Setiawan Mr. Kuspriyadi Surtisto Mr. Madari Mr. Hapiz Mr. Suratman		
4-2-b Create technological models for forest fire prevention 1) Introduce forest management models elaborated to counterparts and communities, including species selection, crop plantation design, and tree growing technologies 2) Facilitate farmers' selection of appropriate models by their past experience and knowledge gained from the project	Appropriate technological components are completed for forest fire prevention linking with green belt development based on analysis results.		█				Mr. Sumantri Mr. Atang Setiawan Mr. Kuspriyadi Surtisto Mr. Madari Mr. Hapiz Mr. Suratman		
4-2-c Make trials of forest management models proposed <1 1) Introduce appropriate methods to counterparts and communities for preparation of field demonstration sites 2) Help counterparts and communities examine forest management technologies proposed through field trial	The proposed technological models are fully tried and modified for effective forest fire prevention.		█				Mr. Sumantri Mr. Atang Setiawan Mr. Kuspriyadi Surtisto Mr. Madari Mr. Hapiz Mr. Suratman Mr. P. Harahap		

Remarks : <1 Activities are carried out only in Jambi province.

Attachment - 2 Plan of Operation (PO)

(6/6)

Activities	Target	Year					Responsible person	Inputs	Remarks
		1st	2nd	3rd	4th	5th			
<p>4-3 Suggest participatory methods of forest fire prevention applying the forest management technologies</p> <p>4-3-a Develop participatory methods for fire prevention <1</p> <p>1) Introduce participatory forest fire prevention models to counterparts and communities</p> <p>2) Organize community groups based on survey findings</p> <p>3) Help community groups select models suitable for field conditions together with counterparts</p>	<p>Mechanisms of community participation are finalized in forest fire prevention programs by community consultation and institutional building.</p>								
<p>4-3-b Apply participatory methods for fire prevention <1</p> <p>1) Encourage communities to implement forest fire prevention models selected</p> <p>2) Introduce participatory methods to communities and counterparts for joint monitoring and evaluation of field activities</p> <p>3) Apply participatory monitoring and evaluation of field activities with communities and counterparts</p> <p>4) Develop institutional mechanisms sustaining the participatory forest fire prevention programs</p> <p>5) Develop technical guidelines for community-based forest fire prevention out of project experience</p>	<p>Community-based forest fire prevention is fully implemented with authorized forest management technologies and community empowerment.</p>								

Remarks : <1. Activities are carried out only in Jambi province.

Attachment - 3 Achievement Chart for the Activities

(1/6)

Activities	Target	Year					Progress	Distinguished Achievement	Problems and Countermeasures
		1st	2nd	3rd	4th	5th			
CENTRAL LEVEL									
1 Observe forest fires by using satellite information									
1-a Improve methods of early detection and observation of forest fire by using NOAA/GMS images	NOAA hot spot detection and Himawan haze monitoring on Sumatra and Kalimantan are continuously operated.								
1) Detect hot spots by using NOAA									
2) Detect smokes by GMS									
3) Develop base maps									
2 Suggest methods of making improvement on the existing systems for taking prompt measures against forest fires and to support their implementation									
2-a Develop early warning methods of forest fire	Fire danger rating systems are established in Jambi and West Kalimantan								
1) Develop forest fire danger indices by using weather information									
2) Develop forest fire danger potential maps									
3) Develop methods for predicting forest fire danger areas statistically by using hot-spot / smoke data identified by NOAA / GMS									
4) Develop methods for forest fire data collection and their statistical use									
2-b Identify danger areas and periods	Fire prevention activities is operated by applying the fire rating systems in Jambi and West Kalimantan.								
1) Predict forest fire danger periods by using weather indices									
2) Identify forest fire danger areas by using the early warning methods									
2-c Support implementation of prompt measures against forest fires	Communication systems are established, and forest fire information are transferred by using the systems in Jambi and West Kalimantan.								
1) Strengthen communication network (Bogor - Pontianak / Jambi - Nanga Pinoh / Nippapanjang)									

(16)

Attachment - 3 Achievement Chart for the Activities

(2/6)

Activities	Target	Year					Progress	Distinguished Achievement	Problems and Countermeasures
		1st	2nd	3rd	4th	5th			
LOCAL LEVEL									
3-1 Support public relations for forest fire prevention									
3-1-a Survey, make trials and develop forest fire prevention techniques	Forest fire prevention technologies are established through field trials.								
1) Review existing techniques									
2) Select and develop proper techniques through field trial									
3) Make teaching manuals for local staff / leaders									
3-1-b Develop the system of public relations, extension, and education	Extension system including education and public relations are established, and its manuals for future dissemination are also developed.								
1) Proposed extension system at the whole country level, including subjects, methods and organizational skills of extension									
2) Proposed extension methods at project sites through stimulation of SATLAK									
3) Development extension material									
4) Development extension systems through field trial at project sites									
5) Conceptualize manuals on extension activities out of project experience for local staff									

Attachment - 3 Achievement Chart for the Activities

(3/6)

Activities	Target	Year					Progress	Distinguished Achievement	Problems and Countermeasures
		1st	2nd	3rd	4th	5th			
3-2 Support the forest fire initial suppression system 3-2-a Build up institutional capacities (This item also covers warning activities) 1) Conduct surveys of geographical information for suppression at project sites 2) Make plans for suppression at project sites, including patrolling, warning and suppression activities 3) Develop suppression systems and proper techniques through field trial at project sites 4) Arrange suppression tools 5) Conceptualize manuals on suppression activities out of project experience, including suppression training for local staff / leaders	Initial suppression units in local level are strengthened in terms of its institutional aspects.								
3-2-b Conduct training of initial suppression techniques 1) Conduct fire trainings for staff 2) Organize suppression teams among communities and hold fire drills 3) Make teaching manuals and training material on fire training for local staff / leaders	Initial suppression techniques are developed, and teaching manuals and training materials are developed for further extension.								

Attachment - 3 Achievement Chart for the Activities

(4/6)

Activities	Target	Year					Progress	Distinguished Achievement	Problems and Countermeasures
		1st	2nd	3rd	4th	5th			
<p>4-1 Research and analyze socio-economic aspects including the culture of local residents</p> <p>4-1-a Analyze socio-economic conditions of participating communities through base line survey / basic diagnostic surveys</p> <p>1) Introduce survey methodologies to counterparts</p> <p>2) Help counterparts understand local communities' conditions for participatory planning including identification of target groups</p> <p>3) Improve community consultation skills</p>	<p>Understandings of socio-economic characteristics of target communities are improved for formulation of participatory forest fire prevention programs.</p>								
<p>4-1-b Comprehend participating communities' awareness of forest fires through monitoring and evaluation</p> <p>1) Introduce participatory monitoring and evaluation methods to counterparts and communities</p> <p>2) Help counterparts and communities assess levels of people's awareness of forest fires</p>	<p>Participatory forest fire prevention programs are elaborated in accordance with levels of participating communities' awareness of forest fires.</p>								

Attachment - 3 Achievement Chart for the Activities

(5/6)

Activities	Target	Year					Progress	Distinguished Achievement	Problems and Countermeasures
		1st	2nd	3rd	4th	5th			
4-2 Research, analyze and make trials of forest management technologies which are effective for forest fire prevention									
4-2-a Analyze information on forest management technologies for fire prevention 1) Make analysis of existing tree plantation models effective for forest fire prevention 2) Encourage communities to gain ideas useful for forest fire prevention	Existing forest management technologies are appraised for fire prevention including green belt development.		█						
4-2-b Create technological models for forest fire prevention 1) Introduce forest management models elaborated to counterparts and communities, including species selection, crop plantation design, and tree growing technologies 2) Facilitate farmers' selection of appropriate models by their past experience and knowledge gained from the project	Appropriate technological components are completed for forest fire prevention linking with green belt development based on analysis results.		█						
4-2-c Make trials of forest management models proposed <1 1) Introduce appropriate methods to counterparts and communities for preparation of field demonstration sites 2) Help counterparts and communities examine forest management technologies proposed through field trial	The proposed technological models are fully tried and modified for effective forest fire prevention.		█						

Remarks : <1 Activities are carried out only in Jambi province.

(56)

Attachment - 3 Achievement Chart for the Activities

(6/6)

Activities	Target	Year					Progress	Distinguished Achievement	Problems and Countermeasures
		1st	2nd	3rd	4th	5th			
4-3 Suggest participatory methods of forest fire prevention applying the forest management technologies									
4-3-a Develop participatory methods for fire prevention <1	Mechanisms of community participation are finalized in forest fire prevention programs by community consultation and institutional building.								
1) Introduce participatory forest fire prevention models to counterparts and communities									
2) Organize community groups based on survey findings									
3) Help community groups select models suitable for field conditions together with counterparts									
4-3-b Apply participatory methods for fire prevention <1	Community-based forest fire prevention is fully implemented with authorized forest management technologies and community empowerment.								
1) Encourage communities to implement forest fire prevention models selected									
2) Introduce participatory methods to communities and counterparts for joint monitoring and evaluation of field activities									
3) Apply participatory monitoring and evaluation of field activities with communities and counterparts									
4) Develop institutional mechanisms sustaining the participatory forest fire prevention programs									
5) Develop technical guidelines for community-based forest fire prevention out of project experience									

Remarks: <1. Activities are carried out only in Jambi province.

Attachment 4 Evaluation Criteria

1. Accomplishment of the Project

The achievement level of the project activities in terms of inputs, activities, outputs and project purpose, as the accomplishment of the Project, is assessed in comparison with the original plan such as R/D, TSI, PDM and PO.

(1) Inputs

- Accomplishment of the inputs from Japanese side in comparison with the plan
- Accomplishment of the inputs from Indonesian side in comparison with the plan

(2) Activities

- Progress of the activities planned on the Plan of Operation
- Degree of differences between the plan and actual condition
- Reasons and constraints for the slipping and postponement

(3) Outputs

- Achievement level of the outputs planned on the PDM

(4) Project purpose

- Achievement level of the project purpose planned on the PDM

2. Evaluation Criteria

2.1 Effectiveness

Effectiveness is assessed by analyzing the extent to which the outputs and purpose of the Project have been achieved or/and can be expected to be achieved at the time of evaluation. The evaluation questions to be checked are considered as follows :

[Project Purpose]

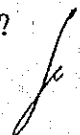
- To what extent has the project purpose been achieved in comparison with the achievement of the outputs ?
- What factors can be considered for delaying or obstructing the realization of the project purpose ?
- When will the project purpose be attained ?

[Outputs]

- To what extent has the outputs been achieved ?
- How much have the activities contributed to the achievement of the outputs ?
- Have the research activities been proceeded on schedule of the plan ?
- Are there any outputs and activities have been changed during the Project ?

[Important assumption]

- How did the recent economic crisis influence the research works or outputs ?
- How did the extreme climatic changes influence the outputs ?



2.2 Efficiency

Efficiency of the project implementation is assessed by analyzing the productivity of the implementation process. Practically, it is to evaluate the relationship between outputs and inputs in terms of timing, quality and quantity, and to reconsider availability of alternatives strategy to produce the output more efficiently. The evaluation questions to be checked are considered as follows :

[Accomplishment of outputs]

- To what extent has the outputs been achieved by the time of evaluation ?

[Timing of input]

- Has the inputs been delivered on schedule ?
- Is the timing of the inputs (Japanese side : dispatch of experts, provision of equipment, C/P training, Indonesian side : provision of land and facilities, participation of C/P, disbursement of local cost) assumed to have been appropriate in comparison with the outputs obtained ?

[Content of input]

- Are the quality (member of experts, curriculum of training course, etc.) and quantity (amount of budget, number of experts, equipment provided, etc.) of the inputs assumed to have been appropriate in comparison with the output obtained ?

[Relations between outputs and inputs]

- Have the outputs been attained on the schedule ?
- Are there any differences between the original plan and the research proceeding ?
- Is the equipment efficiently working ?
- Does C/Ps have an enough technologies developed through the Project ?
- What factors can be considered to delay or obstruct the realization of the outputs ?

2.3 Impact

Impact of the project activities will be identified by focusing mainly on positive and negative direct impact of the Project. The realization of the overall goal of the Project is also one of the positive direct impacts. The evaluation questions to be checked are considered as follows :

- Have the research results (project purpose) contributed to the realization of the overall goal ?
- Are any impact from social, economical, institutional and environmental aspects predicted by the continuation of the Project ?
- What are the causes for the impacts which will be occurred ?

2.4 Relevance

Relevance is clarified by examining whether the outputs, project purpose and overall goal are still in keeping with the priority needs and concerns of the Indonesian Government and the local villagers at the time of evaluation. In the same time, the rationale of the Project, especially the relationships between each item in the narrative summary, is also reviewed on the PDM. The evaluation questions to be checked are considered as follows :

[Overall Goal]

- Is the overall goal consistent with the Governmental policy such as "National Development Plan" ?
- Is the overall goal consistent with needs for beneficiaries ?

[Project Purpose]

- Does the project purpose contribute to achievement of the overall goal ?
- Is the project purpose consistent with the action plan of PHPA ?

[Outputs, Inputs]

- Are the outputs, activities as well as inputs adequate for achievement of the project purpose ?

2.5 Sustainability

Sustainability of the Project is clarified by examining whether the project activities and benefits are likely to continue after the assistance is completed. In fact, it can be forecasted by examining the institutional and management capacity, financial condition, technical ability, ownership of the implementing organization, etc. The evaluation questions to be checked are considered as follows :

[Overall goal and project purpose]

- Will the overall goal and project purpose be consistent with the governmental policy and be supported by the agencies concerned ?

[Institutional aspect]

- Is the monitoring and extension activities of PHPA expected to be continuously supported by the Ministry of Forest, other agencies concerned, etc.

[Financial aspect]

- Have the implementing organizations secured necessary financial and human resources for continuing the activities ?
- Can the enough budget for the operation and management be kept continuously in future ?

[Technical aspect]

- Will the inputs of the Project such as facilities, equipment, manpower, transferred technology, etc. been fully utilized after the Project ?
- Have the C/Ps fully mastered the developed technologies ?
- Have the Project raised the interest of community members in terms of the fields of forest fire prevention and forest management ?