

**カンボジア王国
理数科教育改善計画
終了時評価報告書**

平成15年4月
(2003年)

国際協力事業団
社会開発協力部

社協一
JR
03-007

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序 文

1993年に発足した新生カンボジア王国は、過去20年にわたる内戦で負った社会経済基盤の崩壊や、著しい人的損失といった「負債」を抱えながらも、市場経済へ移行することで国家復興をめざしている。1994年に策定された国家復興開発計画(NPRB)の中期展望のなかでは、最初の10年間で、GDPの倍増、保健医療・教育等社会サービスの向上があげられている。また、カンボジア王国の基礎教育改善計画(1995～2000年)では、「教育の質の改善」が目標として掲げられている。国家再建の礎となる教育の改善は、カンボジア王国にとって国家的な緊急課題であるが、特に理数科分野において、実験・実習を取り入れた実践的な授業が、これまで全くといってよいほど行われなかったことは、重大な問題であり、早急に改善されなければならない。

こうした背景を踏まえ、国際協力事業団は1994年にプロジェクト形成調査を行い、1995年には教育行政アドバイザーを長期専門家として派遣した。これに対してカンボジア王国政府は、1996年に日本政府へ教育養成・訓練の質的向上を目的とするプロジェクト方式技術協力(現在は技術協力プロジェクト)を要請してきた。基礎、事前、短期調査をそれぞれ実施した結果、この支援は妥当なものと判断されたため、当事業団は2000年8月1日から3年間の予定で、理数科教育改善計画プロジェクト(STEPSAM)を開始した。

本調査団は、プロジェクト終了まで約6か月となった段階で、これまでの活動実績を確認し、目標達成度の評価を行い、今後の対応を協議する目的で派遣された。この報告書は同調査団の調査・協議結果を取りまとめたもので、プロジェクトの今後を考える資料として、広く活用されることを願うものである。

最後に、今回の調査にご協力いただいた内外関係機関に改めて謝意を表するとともに、引き続き一層のご支援をお願いする次第である。

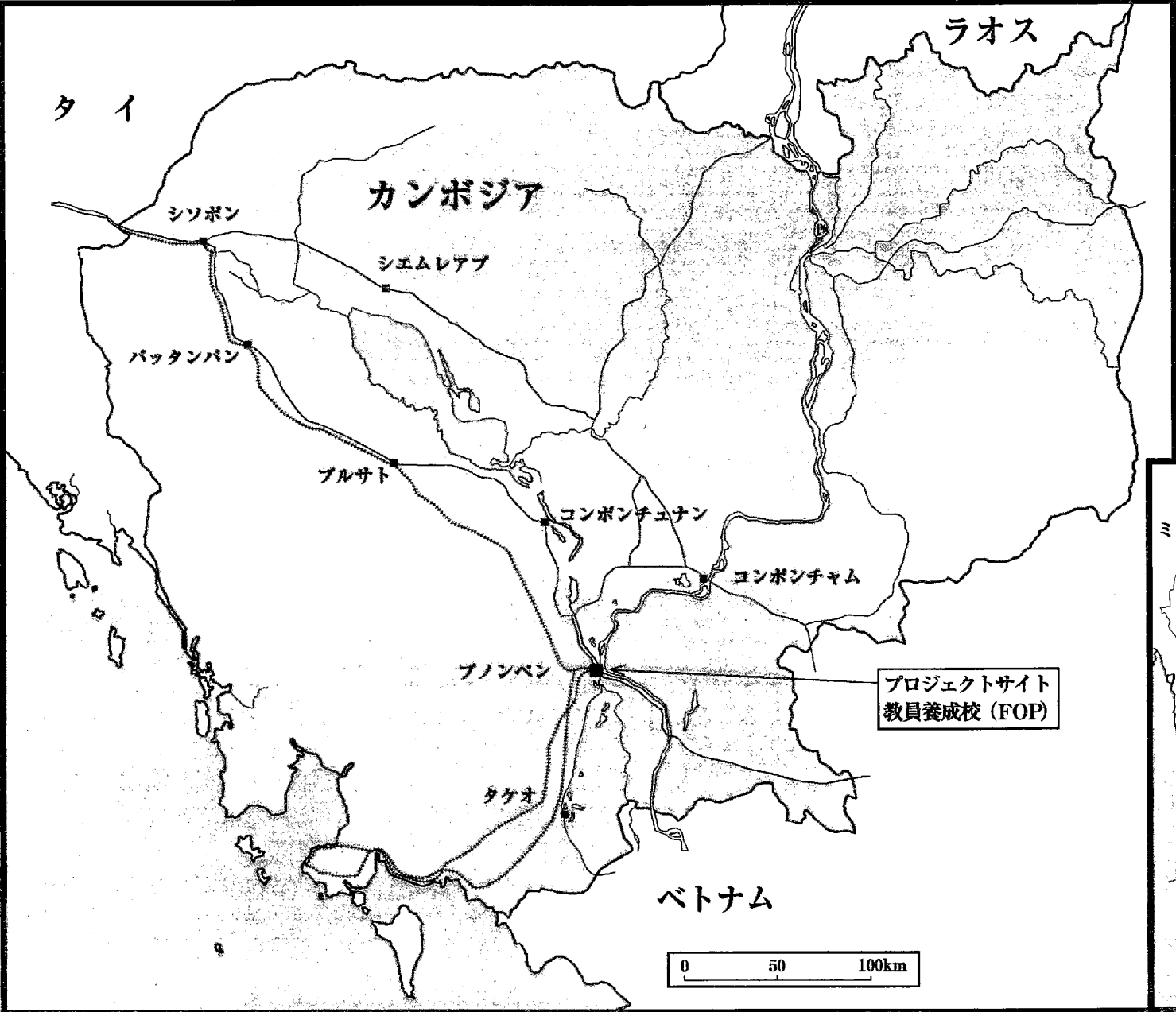
平成15年4月

国際協力事業団

社会開発協力部

末森 満

プロジェクトの位置図





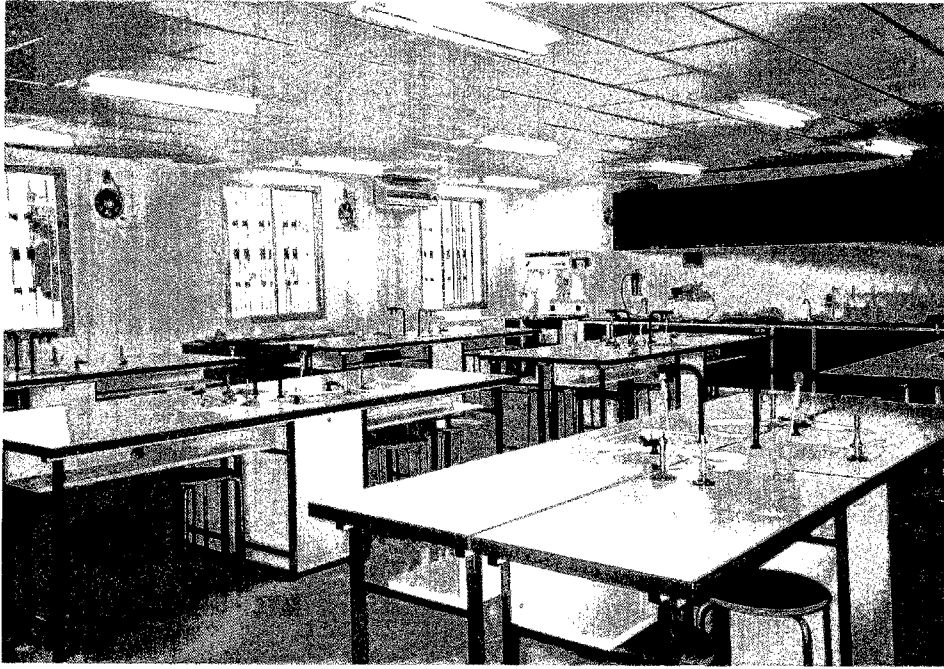
理数科教育センター (SMEC)
教員養成校 (FOP 構内)



カウンターパート (C/P) に
指導する高橋専門家
(数学教育) : 奥左



C/Pに指導する四家専門家
(物理教育) : 中央右



SMEC内の実験室
(化学)



Im Sethy 教育省長官へのヒヤリング
乾団長：中央左
Im Sethy 長官：中央
川泉団員：中央右



プレゼンテーションする村山専門家
合同調整委員会 (JCC) にて
(生物/将来計画)

略語一覧

ADB	: アジア開発銀行
C / P	: カウンターパート
FOP	: 教員養成校
JCC	: 合同調整委員会
MoEYS	: 教育・青年・スポーツ省
NPRD	: 国家復興開発計画
PDM	: プロジェクト・デザイン・マトリックス
PDM0	: 当初 PDM
PDM1	: 改定 PDM
PDMe	: 評価用 PDM
P / O	: 活動計画
PRD	: Pedagogical Research Department
R / D	: 討議議事録
RUPP	: 王立ブノンペン大学
SMEC	: 理数科教育センター
STEPSAM	: 理数科教育改善計画プロジェクト

評価調査結果要約表

. 案件の概要																
国 名：カンボジア王国	案件名：理数科教育改善計画															
分 野：教 育	援助形態：技術協力プロジェクト															
所轄部署：社会開発協力部 社会開発協力第一課	協力金額（評価時点）：約 5 億円															
	先方関係機関：高等学校教員養成校、教育・青年・スポーツ省（MoEYS）															
協力期間	(R / D)：2000 年 3 月 17 日															
	3 年間（2000 年 8 月 1 日～2003 年 7 月 31 日）															
	日本側協力機関：文部科学省、名古屋大学、愛知教育大学、岐阜大学、三重大学、奈良教育大学、東海女子短期大学															
	他の関連協力：国内研修、個別専門家派遣（教育省アドバイザー等）															
<p>1 . 協力の背景と概要</p> <p>1994 年に策定された国家復興開発計画（NPRD）の中期展望のなかでは、最初の 10 年間で GDP の倍増、保健医療・教育等社会サービスの向上があげられている。また、カンボジア王国（以下、「カンボジア」と記す）の基礎教育改善計画（1995～2000 年）では、「教育の質の改善」が目標として掲げられている。そのような背景から、理数科分野の教員養成 / 訓練プログラム強化に係るプロジェクト方式技術協力（現在は技術協力プロジェクト）の要請があった。</p> <p>2 . 協力内容</p> <p>(1) 上位目標：カンボジアの理数科教員の能力が向上する。</p> <p>(2) プロジェクト目標：</p> <p>1) 中等理数科教員養成・訓練の改善に係る中・長期計画が策定される。</p> <p>2) 教員養成校（FOP）の理数科教育に係る機能・能力が向上する。</p> <p>(3) 成 果：</p> <p>1) FOP の教員訓練プログラムの質が向上する。</p> <p>2) 教官の指導能力が向上する。</p> <p>3) 理数科教育に係る啓発活動が活発化する。</p> <p>4) 中等理数科教員訓練に係る将来計画が策定される。</p> <p>(4) 投 入（評価時点・一部確定した予定を含む）</p> <p>日本側：</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">長期専門家派遣</td> <td style="width: 20%;">延べ 6 名</td> <td style="width: 20%;">146 M / M</td> <td style="width: 10%;">機材供与</td> <td style="width: 10%;">4,670 万 5,000 円</td> </tr> <tr> <td>短期専門家派遣</td> <td>延べ 19 名</td> <td>50 M / M</td> <td>その他（運営経費）</td> <td>1 億 2,237 万円</td> </tr> <tr> <td>研修員受入れ</td> <td>延べ 12 名</td> <td>34 M / M</td> <td></td> <td></td> </tr> </table> <p>相手国側：</p> <p>カウンターパート（C / P）配置 延べ 12 名 M / M</p> <p>ローカルコスト負担（施設増改築を含む）</p> <p>旧事務所の提供、修復、C / P の給料、その他リカレントコスト等</p>		長期専門家派遣	延べ 6 名	146 M / M	機材供与	4,670 万 5,000 円	短期専門家派遣	延べ 19 名	50 M / M	その他（運営経費）	1 億 2,237 万円	研修員受入れ	延べ 12 名	34 M / M		
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・ 終了時評価調査団員の概要		
調査者	団長・総括：乾 英二 理科教育：川泉 文男 数学教育：鈴木 将史 評価企画：薬師 弘幸 評価分析：江波戸 美智子	国際協力事業団 社会開発協力部 社会開発協力 第一課長 名古屋大学 大学院 工学研究科 助教授 愛知教育大学 数学教育講座 助教授 国際協力事業団 社会開発協力部 社会開発協力 第一課 職員 日本工営株式会社
調査期間	2003年3月2日～2003年3月8日 (コンサルタント団員は1月19日～24日、 3月2日～7日)	評価種類：終了時評価
・ 評価結果の概要		
1. 評価結果の要約 (1) 妥当性 以下により妥当性は高いといえる。カンボジアの社会経済発展の基盤とされる人材育成の必要性は依然高く、それを支援する日本側の協力支援体制も整いつつある。また、他の援助機関は基礎教育整備に重点をおき、日本は後期中等教育に協力する唯一の援助機関である。加えて、将来的にも、基礎教育拡充に伴う後期中等教育への就学率の増加と、それに伴う教員の需要拡大が予想される。		
(2) 有効性 (達成度) プロジェクト目標1の「中等理数科教員養成・訓練の改善に係る中・長期計画の策定」はおおむね達成される見込みである。現在、中・長期計画案の位置づけと内容に関しての話し合いが関係者のなかで進行し、実施可能性のある中等理数科教員養成・訓練中・長期計画(案)が作成される見込みである。プロジェクト目標2の「教員養成校の理数科教育に係る機能・能力が向上する」は、成果1及び2は、計画当初予想していた教員の基礎的能力が予想以上に低かったため、プロジェクト期間内に十分に達成される見込みは低い。しかし、成果3の理数科教育に係る啓発活動については、現職地方教員に対する訓練やニュースレターの発行等によりほぼ達成される見込みである。		
(3) 効率性 本プロジェクトの長・短期の専門家投入はおおむね妥当であったが、理数科教育センター(SMEC)の完成の遅れが、全体の効率性をやや低める結果となった。C/P研修は、内容的にも有効なものであり、研修終了後、自前の実験器具を製作したりして、FOP教官たちは授業で活用している。期間中に1名のC/Pが解任されたが、FOP教官としては現在も中心的存在として就業しており、プロジェクトの効率性を低めたとはいえない。		
(4) インパクト 上位目標の達成に係るインパクトは、現職教員対象のワークショップ実施、及びFOP卒業生の能力向上によって徐々に発現し始めている。正のインパクトとしては、後期中等理科教		

育において、年間6時間の実験導入を定めたガイドラインをMoEYSが全高校に向けて発令したり、教員養成局が、現職地方教員向けの理数科ワークショップのための予算を確保するなど、政府の積極的な関与が認められる。これは、理数科教育改善計画プロジェクト(STEPSAM)の活動に対する評価が高かったことと、これによってMoEYSの高校理数科教育に対する認識が高まったことによる。負のインパクトは、FOPのSTEPSAMへの財政面での依存度が高まった可能性があるという点である。

(5) 自立発展性

自立発展性を確保するためには、若干の時間が必要と思われる。FOPの組織、及び財政措置の見通しが明確でないため、STEPSAMによって供与された資機材の活用・維持、及び活動の継続などの可能性は不明な点が多い。一方でFOP教官は、SMECの実験器具などに係る管理を既に実行しているため、彼らがFOPでの職務にある間は、最低限の機材維持に関する自立性は確保できる可能性がある。しかし教官が、今後自分の力で教授能力の向上を図れるようなレベルには到達しておらず、継続支援が必要である。

2. 効果発現に貢献した要因

(1) 計画内容に関すること

- ・長期専門家の現状に対応する適応性と柔軟性
- ・高い専門知識をもった短期専門家の効果的投入
- ・学習者の主体性に配慮したアプローチの導入
- ・現地調達可能な材料を利用した実験器具、実験方法の導入
- ・外国語文献のクメール語への翻訳による情報の普及

(2) 実施プロセスに関すること

- ・専門家とFOP教官の間でのコミュニケーションの円滑化による組織的能力の向上
- ・国内委員会との円滑かつ有効な情報交換

3. 問題点及び問題を惹起した要因

(1) 計画内容に関すること

- ・中・長期計画を何のために、誰のために策定するのかのコンセンサスが、関係者のなかに欠けていた。
- ・当初PDM(PDM0) 改定PDM(PDM1)とともに、長・短期専門家を必要に応じて派遣すると記述されている。また討議議事録(R/D)では理科・数学の専門家とされており、教科ごとの専門家派遣が明確にされていなかった。したがって、物理、生物の専門家の投入が遅れた。

(2) 実施プロセスに関すること

プロジェクトを円滑に実施・運営していくために、運営指導調査時点でのプロジェクト・デザイン・マトリックス(PDM)の改訂は妥当なものであった。しかし、3年というプロジェクト期間のなかで、効率性を高めるためには、SMECの早期完成が必要だった。また、FOP

教官への手当の支給に関して、しばしばプロジェクト活動が影響を受けたり、専門家との軋轢が生じたりした。しかし、手当の支給はプロジェクトの運営のためにはやむを得なかったと考えられる。

4. 提言(本プロジェクトに関する具体的な措置、提案、助言)

(1) プロジェクト期間の延長

以下の理由から本調査団は、本プロジェクトの1年3か月間(2004年10月末日まで)の期間の延長を関係者に対し提言する。

- 1) 計画当初に設定した目標のうち、成果1(FOPの教育訓練プログラムの質の向上)成果2(教官の指導能力の向上)の達成度が現在低く、プロジェクト目標2(FOPの理数科教育に関する能力向上)が、当初設定したプロジェクト期間3年で達成される見込みが低い。
- 2) SMECを活用した実験実習を伴った理数科教育の改善は、種々の成果を生み出しつつあり、あと2期分のスクールイヤーのプロジェクト活動を継続することにより、その効果を着実なものにする見込みが高い。

(2) プロジェクト期間を延長した場合の各学科の活動計画

上記に従い、プロジェクト期間を1年3か月延長した場合の各教科の技術移転計画を、今後、専門家とC/Pとの間で詳細を検討し、3月末日までに完成すること。

(3) SMEC

SMECの活用・運営のための委員会を設置し、同センターの運営・管理、施設の年間活用計画、及びプロジェクト終了後の維持管理予算確保の検討を行うこと。

(4) 人員配置(C/Pのインセンティブ)

C/Pの採用・配置については、より効果的・効率的な技術協力を実施するために、今後とも専門家チームともよく協議しながら取り組むこと。また、ワークショップやインサーブトレーニングについては、C/Pだけではなく、該当分野の教官全体に技術移転ができるように可能な限り配慮すること。

(5) 中・長期計画の策定

中・長期計画については、日本・カンボジア双方で検討し、2003年7月までにそのドラフトを完成する。また、プロジェクトが延長された場合は、その計画の実施可能性やより詳細な調査に日本・カンボジア双方で取り組むこととする。

7. 教訓

(1) プロジェクト期間

教育分野のプロジェクトを実施する場合は、その効果の発現までに時間を要するケースが多く、特に当該国で初めて協力を開始する場合は、その実施期間の設定は慎重に検討すべきである。

(2) プロジェクト評価

プロジェクトの評価については、計画開始時より、具体的な評価指標を設定し、その指標の有効性等についても、プロジェクト開始からなるべく早い段階で見直すべきである。

第1章 終了時評価調査の概要

1-1 調査団派遣の経緯と目的

1993年に発足した新生カンボジア王国(以下、「カンボジア」と記す)は、過去20年にわたった内戦による社会経済基盤の崩壊や、著しい人的損失といった「負債」を負いながら、市場経済への移行期のなかで国家復興をめざして努力を続けている。経済発展を加速させ、国際社会の一員としての責任を全うできる質の高い人材の育成を、教育の充実を通じて達成することが国家開発計画においても強調されている。しかし、その一方で、それを担うべき教師に対する教育実施体制あるいは教員養成体制は、決して十分なものとはいえないのが現状である。国家再建の礎となるべき教育現場における教師の質的・量的な改善、及び各種教材の開発は、国家的な緊急課題であるが、特に理数科教育の分野において、生徒が科学的な思考を身につけるために必須である実験・実習を取り入れた実践的な授業は、過去から現在に至るまで全くといってよいほど行われていない。従来の座学型授業を、生徒中心の実践型授業に速やかに改善していくことが必要であると考えられる。

こうした背景の下、国際協力事業団(JICA)は1994年にプロジェクト形成調査を実施、カンボジアにおける学校教育、特に理数科教育に関する現状の把握、問題分析、及び可能かつ効果的な援助の方向性などについて調査した。1995年には教育・青年・スポーツ省(MoEYS)に長期専門家として教育行政アドバイザーを派遣し、よりきめの細かい調査を続けながら、教育分野における案件形成を推進した。これらの動きに対応して、1996年カンボジア政府は日本政府に対し、カリキュラム・シラバスの改善や教材の開発を含む、教員養成・訓練の質的向上を目的とするプロジェクト方式技術協力(現在は技術協力プロジェクト)を要請してきた。1997年夏に勃発した武力衝突により、その年に予定されていた基礎調査団の派遣は中止となり、案件は一時棚上げされる形となった。その後紛争は沈静化し、社会も徐々に平穏を取り戻すに至り、カンボジア側は再度技術協力を要請してきた。これを受けてJICAは基礎、事前、短期調査を行った。その結果から、理数科教育改善のための支援を行うことは適当であると判断し、2000年8月1日から3年間の予定で理数科教育改善計画プロジェクト(STEPSAM)を開始した。

本終了時評価調査は、プロジェクト終了まで約6か月となった段階で、これまでの活動実績の確認や目標達成度の評価を行い、協力期間終了を念頭に置き、今後の対応方針について協議することを目的として実施した。

1 - 2 調査団の構成

担当分野	氏名	所属
団長・総括	乾 英二	国際協力事業団 社会開発協力部 社会開発協力第一課長
理科教育	川泉 文男	名古屋大学 大学院 工学研究科 助教授
数学教育	鈴木 将史	愛知教育大学 数学教育講座 助教授
評価企画	薬師 弘幸	国際協力事業団 社会開発協力部 社会開発協力第一課 職員
評価分析	江波戸 美智子	日本工営株式会社

1 - 3 調査日程

日順	月日(曜)		調査工程
1	1月19日(日)		江波戸団員(評価分析) 成田発 バンコク プノンペン(18:45)(TG698)
2	1月20日(月)	8:30 10:30 12:00	教員養成校(FOP)校長(Dr. Thor Sor)との打合せ JICA事務所打合せ 専門家チームとの打合せ 専門家チームへのヒアリング 理数科教育センター(SMEC)の調査
3	1月21日(火)	8:00 10:00 14:00 16:00	FOP校長(Dr. Thor Sor)へのヒアリング 清水専門家(教育アドバイザー)へのヒアリング FOP教官へのグループインタビュー 専門家チームへのヒアリング
4	1月22日(水)	11:00 14:00 16:00	アジア開発銀行(ADB)コンサルタントへのヒアリング カウンターパート(C/P)へのグループインタビュー 専門家チームへのヒアリング
5	1月23日(木)	8:30 14:00 16:00	FOP卒業生へのグループインタビュー 教員養成局長(H.E. Nath Bunroeun)へのヒアリング FOPワークショップ参加者へのグループインタビュー
6	1月24日(金)	8:30 10:30 14:00 15:00 16:00	Mr. David Ford氏〔王立プノンペン大学(RUPP)]へのヒアリング 村田チーフアドバイザーとの打合せ プロジェクトチームとの打合せ Pedagogical Research Department (PRD) (Dr. Nooraya Zakaria: ADBコンサルタント) JICA事務所報告 プノンペン発 バンコク(TG699)
7	1月25日(土)		成田着(6:25)(JL704)
8	3月2日(日)		乾団長、川泉団員、鈴木団員、薬師団員、江波戸団員 成田発 バンコク プノンペン(18:45)(TG698) (川泉、鈴木団員は名古屋発、バンコクで合流)

日順	月 日 (曜)		調査工程
9	3月 3日 (月)	8 : 30 11 : 30 14 : 30 15 : 30	専門家チームとの打合せ JICA カンボジア事務所打合せ MoEYS (Im Sethy 長官) へのヒアリング FOP の C / P へのヒアリング / 専門家チームとの打合せ
10	3月 4日 (火)	8 : 30 14 : 00 15 : 30	専門家チームへのヒアリング FOP 校長 (Dr. Thor Sor) へのヒアリング MoEYS 教員養成局長 (H.E. Nath Bunroeun) へのヒアリング
11	3月 5日 (水)	午 前 午 後	FOP 授業視察 (ビデオ) 専門家チームとの打合せ ミニッツ案作成
12	3月 6日 (木)	午 前 午 後	合同調整委員会 ミニッツ署名・交換 調査団主催レセプション
13	3月 7日 (金)	9 : 00 10 : 30 14 : 00 15 : 30 20 : 25	カンボジア開発協議会表敬 在カンボジア日本国大使館報告 JICA カンボジア事務所報告 MoEYS 大臣表敬 プノンペン (TG699) バンコク
14			成田 (6 : 25)(JL704)(乾団長、薬師団員、江波戸団員) 福岡 (JL648) 名古屋 (11 : 20)(JL824)(川泉団員、鈴木団員)

1 - 4 主要面談者

(1) 教育・青年・スポーツ省 : Ministry of Education, Youth and Sport (MoEYS)

H.E. Tol Lah Deputy Prime Minister / Minister of MoEYS
H.E. Im Sethy Secretary of State
H.E. Nath Bunroeun Director of Teacher Training Department
Ms. Ton Sa Im Director of Pedagogical Research Department
Ms. Kuy Phala Deputy Director of Planning Department

(2) 教員養成校 : Faculty of Pedagogy (FOP)

Dr. Thor Sor Dean

(3) 王立プノンペン大学 : Royal University of Phnom Penh (RUPP)

H.E. Pith Chamnam Rector
Dr. Neth Barom Vice Rector

(4) カンボジア開発評議会 : Council for the Development of Cambodia

Ms. Heng Sokun Director, Bilateral Aid Coordination, Department of
Japan-Asia Pacific-America

安達 一 JICA 専門家

(5) 在カンボジア日本国大使館

篠原 勝弘 公 使

惟住 智昭 二等書記官

渡辺 祐二 二等書記官

(6) JICA カンボジア事務所

力石 寿郎 所 長

原 智佐 次 長

合澤 栄美 担当所員

(7) プロジェクト専門家

村田 隆一 チーフアドバイザー

菊池 洋 業務調整員

高橋 光治 専門家 (数学教育)

前田 美子 専門家 (理科教育)

四家 明彦 専門家 (物理教育)

村山 哲也 専門家 (生物教育 / 将来計画)

第2章 プロジェクトの概要

2 - 1 基本計画

名 称	カンボジア理数科教育改善計画プロジェクト (STEPSAM) Secondary School Teacher Training Project in Science and Mathematics
協力期間	2000年8月1日～2003年7月31日(3年間)
上位目標	カンボジアの理数科教員の能力が向上する。
プロジェクト目標	1) 中等理数科教員養成・訓練の改善に係る中・長期計画が策定される。 2) 教員養成校(FOP)の理数科教育に係る機能・能力が向上する。
期待される成果	1) FOPの教員訓練プログラムの質が向上する。 2) 教官の指導能力が向上する。 3) 理数科教育に係る啓発活動が活発化する。 4) 中等理数科教員訓練に係る将来計画が策定される。

2 - 2 プロジェクト・デザイン・マトリックス (PDM)

本プロジェクトは参加型計画手法に基づいて計画が策定された。PDMは、プロジェクトの個々の活動とプロジェクト目標の論理的整合性を示すものであり、本プロジェクトはこれに基づいて運営・管理が行われ、プロジェクト期間内に必要に応じて修正された。本プロジェクトでは、2001年9月の運営指導調査において当初PDM(PDM0)が修正され、改定PDM(PDM1)が作成された。修正箇所に関しては、2 - 3のとおりである。また本評価調査実施にあたりPDM0、及びPDM1を基に、評価用PDM(PDMe)を3 - 2、及び付属資料1・ミニッツANNEX1(日本語は付属資料4)のとおり作成した。

2 - 3 PDMの変遷

(1) PDM0 から PDM1 へ

2001年9月に実施された運営指導調査に基づきPDM0に変更が加えられ、PDM1が作成された。以下に変更の概略を示す。

1) ターゲットグループ

FOP及び関係部局でワーキンググループを創設し、カウンターパート(C/P)とすることをしていたが、常設のワーキンググループを組織する活動自体に労力を要し、ワーキンググループの規模も大きくなってしまふことから、FOP教官グループをプロジェクトの対象とし、ワーキンググループは特定のミッションに従って開設・運営するアドホックなものとして位置づけた。

2) インサービストレーニング

FOPには現状では該当するコースが設置されていないことから、本プロジェクトの活動範囲からも除外し、本文言をPDMから削ることとした。ただし、ワークショップ(地方・市内)の運営、ワーキンググループの活動、ニュースレターの発行などを通じて、波及的に一般の教師などに及ぼす効果も視野に入れた活動を展開することとした。

3) National Center for Science and Mathematics Education

現段階では同センターの設立目的、組織的位置づけが明確でないことから、PDMより削除することとし、本プロジェクトでは、将来の理数科教育における secondary school teacher training の活動計画を策定するにとどめることとした。

2 - 4 活動計画

付属資料1 . ミニッツの ANNEX 2 のとおり。

第3章 終了時評価の方法

3 - 1 評価の手法

本終了時評価は「JICA 事業評価ガイドライン」に沿って、プロジェクト・デザイン・マトリックス (PDM) に基づいた評価デザインの検討〔評価用 PDM (PDMe) の作成、及び評価グリッド (評価調査表) の作成〕、プロジェクトの実績収集、評価 5 項目 (「妥当性」「有効性」「効率性」「インパクト」「自立発展性」) からの分析、分析結果に基づく総合判定 (結論)、評価結果の提示 (提言、教訓)、活用 (結果の公開、フィードバック) の流れで実施した。

3 - 2 PDMe の作成

本調査においては、当初 PDM (PDM0) 及び改定 PDM (PDM1) に基づき、指標を明確化する必要性があったため、いくつかの指標を追加し、付属資料 1 . ミニッツの ANNEX 1 のとおり PDMe を作成した。変更箇所は以下のとおりである。

(1) 上位目標

指標及び指標入手手段を追加した。本調査実施時点では、これらの指標を用いて評価することは不可能であるが、将来的にカンボジアの教育統計が整備されれば、このような客観指標に基づいて、教員の能力向上を評価することは可能である。

指 標：「カンボジアの理数科教員の能力が向上する」

指標入手手段：「教員の有効性に関する国家統計 (教員の知識度の統計、教員の教育に対する姿勢に関する統計、生徒の到達度などが考えられる)」

(2) プロジェクト目標

プロジェクト目標 2 に関する指標、及び指標入手手段を追加した。

指 標：「教員養成校 (FOP) 学生の能力が向上する」

指標入手手段：「FOP 校長、教員養成局長への聞き取り」「FOP 卒業生への聞き取り」

(3) 成 果

成果の指標と指標入手手段を以下のとおり追加した。

1) 成果 1

指標 1 - 4 : 「評価が実施される」

プロジェクト活動の 1 つとみなし、活動へ移行した。

2) 成果2

指標2：「新たな教授方法と教材がFOP研修生によって使用される」

指 標	指標入手手段
2 - 1：理数科教育の基礎概念に対するFOP教官の理解が向上する。	短期専門家への聞き取り
2 - 2：FOP教官の理数科教育教授法や教材に関する知識が向上する。	FOP教官に対する質問票（教授方法や教材に関する知識度を調べる）
2 - 3：導入された教授方法や教材を教官が活用する能力が向上する。	専門家の観察 FOP卒業生による評価

3) 成果3

指標3：「関係者、組織の広報活動への参加やプロジェクトの認識度を評価する」
に加えて以下の指標と指標入手手段を追加した。

指 標	指標入手手段
3 - 1：FOPの理数科教育に関する情報発信機能が強化される。	出版物リスト
3 - 2：関係者及び関連団体に向けて、新たに導入された教授方法を紹介したり、実験を実施する能力が向上する。	ワークショップ実施実績
3 - 3：関係者、関係団体の間で理数科教育に関する認識が高まる。	ワークショップ参加者、関係者、関連団体の認識度に関する聞き取り

3 - 3 評価のための情報

過去の実績を評価するために主に以下の情報を参考にした。

- (1) 討議議事録（R / D）、活動計画（P / O）、ミニッツ、四半期報告書
- (2) PDM
- (3) プロジェクトへの投入、プロジェクトの成果に関するデータ
- (4) 質問票回答、インタビュー結果
- (5) 直接観察

第4章 評価結果

4 - 1 評価用 PDM (PDMe) に基づく計画達成度

本終了時評価調査の結果、プロジェクト目標1「中等理数科教員養成・訓練の改善に係る中・長期計画が策定される」は、若干の軌道修正が必要ではあるものの、2003年7月末日までには達成される見込みである。

一方プロジェクト目標2「教員養成校(FOP)の理数科教育に係る機能・能力が向上する」については、成果1及び2の達成状況が十分ではなく、期待されるレベルまで到達するには、当初の協力期間よりも若干の時間を要するものと思われる。

計画達成度の概要は以下を参照。

表 - 1 PDMe に基づく計画達成度

プロジェクトの要約	指 標	結 果
【上位目標】 カンボジアの理数科教員の能力が向上する。	理数科教員の指導能力が向上する。	上位目標の達成は、明確に確認することはできないが、地方での現職教員を対象としたワークショップやFOP卒業生を通じて、部分的に達成されている。
【プロジェクト目標】 1. 中等理数科教員養成・訓練の改善に係る中・長期計画が策定される。	1. 理数科教員養成・訓練の中・長期計画(案)が教育・青年・スポーツ省(MoEYS)に提出される。	1. 本調査実施時点では、中・長期計画案の内容は、カリキュラム、テキスト改訂という限定的な内容にとどまっていた。今後、カンボジア関係者とも協議し、最終案を作成する必要がある。
2. FOPの理数科教育に係る機能・能力が向上する。	2. FOP学生の能力が向上する(FOP学生の理数科教育に係る知識レベルが向上する)。	2. 校長らへの聞き取りでは、FOPの学生(卒業生)の能力は向上したと判断される。また、理数科教育改善計画プロジェクト(STEPSAM)開始後の卒業生も、FOPで学んだことの有効性と、彼らの能力は他の教員に比べて高いと認識していることから、FOPの理数科教育に係る機能・能力は、プロジェクト開始当時と比較して向上したと判断される。

プロジェクトの要約	指 標	結 果
		<p>しかし、プロジェクト開始当初は実験・演習を 実践する環境が整っていなかったため、成果2 の達成状況が十分ではなく、FOPの教官に求め られるレベルに達するには、専門家チームの支 援の下に建設した理数科教育センター（SMEC） で、実験・演習を通じた活動を引き続き実践する 必要がある。成果1についても成果2の達成状 況に起因して、十分な成果をあげるには至って いない。これによりプロジェクト目標2を達成 するには若干の時間が必要と思われる。</p>
<p>【成 果】 1 . FOPの教員訓練 プログラムの質 が向上する。</p>	<p>1 - 1 FOPの教員 養成訓練のための カリキュラム、シ ラバス、参考文献 が、ワーキンググ ループとともに新 たに開発される。</p> <p>1 - 2 教材が開発 される。</p> <p>1 - 3 教員養成訓 練が開発されたカ リキュラムや教材 に基づいて十分に 実施される。</p>	<p>成果1</p> <p>新たなFOP教員養成カリキュラムや教材が、 日本人専門家とFOP教官によって整備、作成さ れた（参考図書リストはANNEX 5-5、教材リス トはANNEX 5-6を参照）。また、外国語の参考文 献がクメール語に翻訳され、FOP教官全員の能 力向上に貢献した。</p> <p>また、STEPSAM開始後のFOP卒業生は、FOP で学んだ内容が有効であるとしており、新規カ リキュラムに基づいた教員養成訓練は、十分に 実施されたといえる。</p> <p>しかし、FOP教官の実験や教授方法に関する 知識が担当科目全般にわたるものでないことか ら、1 - 3の教員養成訓練が、開発されたカリ キュラムや教材に基づいて十分に実施されてい るとはいえない。</p>
<p>2 . FOP教官の指導 能力が向上す る。</p>	<p>2 - 1 理数科教育 の基礎概念に対す るFOP教官の理解 が向上する。</p> <p>2 - 2 FOP教官の 理数科教育教授方 法や教材に関する 知識が向上する。</p>	<p>成果2</p> <p>長・短期の専門家は、相対的にはFOP教官の 能力は大きく向上したと評価している。また、 ほぼすべての教官が、STEPSAMによる何らかの 教授方法の変化を認めている。しかし、それらの 改善は担当科目全般にわたるものではなく、部 分的であることも明らかになった。</p> <p>また、FOP教官は、新たに学んだ教授方法や実 験を独力で活用していくことには依然として不 安を抱えていることが明らかになった。さらに、 FOP教官に科学的思考が依然として定着してい ないことを、専門家は指摘している。</p>

プロジェクトの要約	指 標	結 果
	2 - 3 導入された教授方法や教材を教官が活用する能力が向上する。	FOP 教官の担当科目に関する基礎知識、及び教授方法に関する質問票調査結果は、付属資料 1 . ミニッツの ANNEX 5-10 参照。
3 . 理数科教育に係る啓発活動が活発化する。	<p>3 - 1 FOP の理数科教育に関する情報発信機能が強化される。</p> <p>3 - 2 関係者及び関連団体に向けて、新たに導入された教授方法を紹介したり、実験を実施する能力が向上する。</p> <p>3 - 3 関係者、関係団体の中で理数科教育に関する認識が高まる。</p>	<p>FOP 教官により、地方の現職教員を対象にしたワークショップの実施や、ニュースレターの発行、電子メールのニュース、ニュースレター、実験書、生物辞書〔原稿は王立ブノンペン大学 (RUPP) で活動するオーストラリア人が提供、印刷費は STEPSAM が負担〕等様々な形で情報発信を行っている(発行部数及び費用に関しては、付属資料 1 . ミニッツ ANNEX 5-8 を参照)。</p> <p>ワークショップの参加者は、配布された資料や内容は適切であったと評価している。しかし、配布資料の項目の配列が、現行のカリキュラムに沿っていないことが指摘されている。この点の検証、改善が必要である(実施地域及び参加者数に関しては、付属資料 1 . ミニッツの ANNEX 5-7 を参照)。</p> <p>現職教員研修(ワークショップ)の予算化、実験導入を示すガイドラインの作成等のインパクトにかんがみれば、関係者、関係団体の中で理数科教育に関する認識は、非常に高くなったと判断できる。</p>
4 . 中等理数科教員訓練に係る将来計画が策定される。	4 . 中等理数科教員訓練に係る将来計画が策定される。	本調査実施時点では、中・長期計画案の内容は、カリキュラム、テキスト改訂という限定的な内容にとどまっていた。今後、カンボジア関係者とも協議し、最終案を作成する必要がある。

4 - 2 科目別計画達成度

付属資料 6 . を参照。

4 - 3 実施プロセス

プロジェクト実施プロセスは、おおむね妥当かつ効率的だったと評価できる。プロジェクトは、合同調整委員会 (JCC) 、運営委員会、及び国内委員会の協力の下に実施された。

(1) プロジェクト実施体制の確立

プロジェクト運営体制は、付属資料の 7 - (1) を参照。MoEYS、JICA 専門家、カンボジア

政府関係者の中で、JCC、運営委員会が組織された。JCCは1年に1回、運営委員会は半年に1度開催され、関係者の中でプロジェクトの進捗などについての情報交換が行われた。特に国内委員会は、プロジェクト専門家に対する技術的な助言、カウンターパート(C/P)の本邦研修の受入れ、短期専門家の派遣など、積極的にプロジェクト活動の実施に貢献した。

(2) 運営指導調査

運営指導調査は2001年9月に実施され、プロジェクト・デザイン・マトリックス(PDM)の修正や提言を通じて、プロジェクト運営の効率性を高めた。

(3) コミュニケーション

日本人専門家とFOP教官間のコミュニケーションはおおむね良好だった。また、プロジェクトとカンボジア教員養成局、MoEYSや教育セクターで活動する個人・団体との情報交換も活発に行われ、プロジェクトの運営に貢献した。

4 - 4 5 項目評価による調査結果

4 - 4 - 1 妥当性

本プロジェクトは以下の点において妥当であると考えられるため、その実施について、妥当性は高いものと判断できる。

(1) カンボジア国家政策

STEPSAMの国家開発計画、教育セクターのニーズに照らしての妥当性は高い。カンボジアは、1994年の国家復興開発計画(NPRD)及び2001年の社会経済開発計画で、経済開発のための産業振興、人材育成を打ち出している。これらのニーズに対しては、中等及び高等教育の教育内容の改革が必要であり、特に中等教育においては、理数科知識に代表される実務直結型の能力育成が求められる¹。本プロジェクトで実施している中等理数科教育は、この点において妥当であると考えられる。

(2) カンボジア教育セクターのニーズ

今後基礎教育が拡充されることによって、後期中等教育への進学率も急激に増加することが予想されることから、長期的なカンボジア教育開発支援の視点において、本プロジェクトの妥当性は高いと考えられる。

また、現状ではFOPの教官の資格制度が不在であるため、教官の資質が一定でなく、指導

1 国際協力事業団、国際協力総合研修所(2001)『国別援助研究会報告書』P.251。

内容も統一性を欠いている一方で、教官の研修や能力向上プログラムが未整備である²状況にかんがみれば、本プロジェクトで実施している FOP へのアプローチは、極めてニーズに合ったものと考えられる。

(3) 他ドナーの支援との関係

現在のところ教育分野における各ドナーの支援は、基礎教育が主流であり、後期中等教育分野で支援を行っているのは、本プロジェクトのみである。したがってニーズのある中等教育分野で JICA が本プロジェクトを実施する意義は極めて大きい。

(4) 日本の援助の優位性

JICA は、カンボジアにおける協力の重点項目の 1 つに「教育の充実」をあげており、特に理数科教育の改善については、工業開発等の経済開発を進めるうえで必要であるとしている。また、日本は理数科教育分野への援助の経験と知識を十分有しており、この蓄積において本プロジェクト実施の妥当性を一層高めている。

4 - 4 - 2 有効性

すべてのプロジェクト活動は、プロジェクト目標の達成に貢献するために効果的かつ妥当なものであった。一方で 4 - 1 に示したとおり、プロジェクト目標 1「FOP の理数科教育に係る機能・能力が向上する」については、現時点ではその達成状況は十分ではなく、今後 SMEC を活用した実験・演習を継続することで、期待レベルに達するものと思われる。そのほかの有効性に係る調査結果は以下のとおりである。

(1) SMEC の建設は、FOP 教官や学生が実験、実習を通じて学び、教える環境が整うこととなり、FOP 教官の能力向上に大きく貢献している。論理的な思考や抽象概念の理解等、理数科に求められる基礎能力を育てるためには、実験、実習の導入が有効であるが、SMEC が建設されるまでは、実験・実習を行うための設備が十分ではなかったため、その活動は非常に限られていた。SMEC の建設によってこのような問題が解決され、FOP の教官及び学生が実験・実習を行える環境が整ったことは、プロジェクト目標を達成するうえで非常に有効であると考えられる。それゆえに、SMEC の完成が当初予定していたよりも大幅に遅れたことによって〔4 - 4 - 3 (3) 参照〕、プロジェクト期間中に実験・演習等を行う期間が短くなってしまったことが悔やまれる。

(2) C / P の能力の向上により、C / P 以外の FOP 教官への知識の移転がより効率的に行われ

2 国際協力事業団、国際協力総合研修所(2001)『国別援助研究会報告書』P.250。

た。

(3) 地方でのワークショップの実施は、FOP 教官が自信をつけることとなり、彼らの学習意欲が刺激され自主的に学ぶきっかけになった。

(4) 出版物の製作では、読み手に分かる文章や教材を作成する能力を向上させた結果、彼ら自身の能力向上に貢献した。

4 - 4 - 3 効率性

投入は、質・量ともにおおむね適切であったと判断される。ただし SMEC の建設については、プロジェクト開始後決定し、その完成も当初の予定より遅れたことから投入が適切なタイミングとはならず、その結果、整った環境で実験や演習を実践する期間が短くなった。

(1) 長期専門家

長期専門家派遣はおおむね効率的であった。当初、チーフアドバイザー、業務調整員、理科、数学、合計 4 名の長期専門家が配置された。理科教育専門家 1 名で化学・生物・物理の 3 教科の活動を実施することは適切でなく、活動の効率性をやや低めた。しかし、2001 年 5 月より物理教育専門家、2002 年 7 月より生物教育専門家が派遣され、効率性は改善された。専門家による指導方法・内容はおおむね適切だった。

(2) 短期専門家

短期専門家派遣は、人数・指導内容・派遣時期などについて、おおむね効率的に実施された。FOP 教官の担当科目についての専門知識の向上に貢献し、効率性を高めた。短期専門家は国内委員、及びその推薦者が派遣されており、日常の頻繁な情報交換により、プロジェクトのニーズに合った内容の指導が実施された。一方で、派遣された短期専門家は、皆国内の大学に所属していたため、派遣できる時期が限られており、派遣時期がプロジェクトのニーズと必ずしも合致しないケースがあった。

(3) SMEC

SMEC の規模、質は適切だった。現在では、約 4 割の FOP 学生が SMEC を毎日利用し、またそのほかの学生も SMEC 内の図書室を利用するなど活用頻度は高い。

しかし、プロジェクト開始後に SMEC の投入が決定されたこと、完成が当初の予定より大幅に遅れたこと（当初の予定は 2001 年 12 月だったが、実際の完成は 2002 年 7 月だった）、完成の遅れに伴い薬品、実験器具などの整備が遅れたこと、参考図書は、注文から文献の到着まで半年以上かかるため、時間を要したことなどの理由で、数学、理科全教科で SMEC を活用した活動の進捗が遅れ、当初の協力期間終了時までに SMEC を活用し、十分な成果を

げる見込みが立たない結果となっている。

(4) C / P 本邦研修

C / P 研修の内容、派遣人数、実施時期などは、ほぼ効率的であった。C / P の 12 名全員が 2 ~ 3 か月の本邦研修を受講している。研修修了後は、実験の実施、身近な材料を用いての実験器具の作成、教材作成などを通じて、その成果が FOP 教員養成研修の指導に活用されている。研修内容は、国内委員会の協力によりカンボジアの現状に沿ったものだった。化学の C / P 1 名が経済的な理由により、C / P からはずれることとなったが、現在も FOP に継続して勤務しており、教官のなかでも中心的な存在であるため、効率性にはそれほど影響はなかったと考えられる。

(5) 地方での現職教員向けワークショップ

現職教員を対象に地方で実施されたワークショップは、プロジェクト目標と上位目標の達成の両方に貢献するものであり、効率的に実施された。また、この活動は、ワークショップ参加者だけでなく、MoEYS から大きく評価され、今後の活動拡大が期待されている。

(6) C / P

C / P は、現在は各教科 3 名ずつ、合計 12 名が配置されている。C / P の基礎知識は、当初想定していた大卒レベルを下回っていることがプロジェクト開始後判明したため、基礎知識の理解のために時間を割くことが必要となった。そのような状況のなか、現在はおおむね効率的に配置されている。C / P は、他の教官と日本人専門家の間のコミュニケーションを円滑にし、リソースパーソンとしての役割を果たしている。

4 - 4 - 4 インパクト

MoEYS による理科実験導入ガイドラインの発令、地方現職教員のためのワークショップ実施費用の予算化、上位目標の部分的達成など多くの正のインパクトが発現している。

(1) 上位目標の発現

地方での現職教員対象に実施したワークショップ参加者（延べ 913 人）及び FOP 卒業生（理数科、延べ 329 人）を通じて、上位目標の達成に貢献している。

(2) FOP への正のインパクト

FOP のマネージメントのなかでも、本プロジェクトの教員養成手法を取り入れることの有効性・必要性の認識が生まれてきており、理数科以外の科目の教員養成へのアプローチが変

わっていく可能性も見込まれる。

(3) 政策レベルへの正のインパクト

本プロジェクトの実施により、カンボジア政府のなかで、中等理数科教育への理解と関心が高まり、積極的に改善を図る動きが見え始めてきている。これまで後期中等教育の授業では、実験は導入されていなかったが、本プロジェクトの活動を受けて、年間6時間の実験導入を示すガイドラインが作成された。また、これまでなかった現職教員へのワークショップの費用が予算化されるなど、MoEYSの中等理数科教員養成へのコミットメントは格段と向上している。

(4) 日本国内への正のインパクト

本プロジェクトは国内委員会、及びその関係者との結びつきが非常に強く、結果これらの関係者がJICAの活動、国際協力、及びカンボジアの教育事情等について理解を深めることとなった。今後プロジェクトが終了したあとも、これらの日本国内の関係者、関係機関が、引き続き何らかの形でカンボジアへの教育支援、文化交流等を促進していくことが期待される。

(5) C / P 研修を通じての日本人専門家とのつながり

C / P 研修を通じて、研修関係者とC / Pとの信頼関係が醸成された。これにより帰国後もC / Pが担当科目に関して、日本の研修受入先に自由に質問等ができる環境がつけられた。

(6) 他の団体との連携

アジア開発銀行(ADB)や、他の高等教育分野で活動する専門家との連携が形成されつつあることは、今後の日本が、カンボジアにおける教育分野での協力を考えるうえで有益であった。また、RUPP理学部との協力関係もできており、今後FOPに入学する学生の質の向上にも本プロジェクトの活動が貢献できる可能性がある。

(7) その他のインパクト

プロジェクトの円滑な実施のためにはやむを得なかったが、C / Pを含むFOP教官に手当を支給したことにより、外部援助機関への依存度が高まったことが懸念される。

4 - 4 - 5 自立発展性

カンボジア教員養成制度のなかでのFOPの組織的位置づけがあいまいであること、FOP教官の教授方法や実験器具に関する知識が依然として網羅的でなく、定着していないこと、SMECの維

持管理体制が整っていないことなどから、自立発展性を確保するには、若干の時間が必要と思われる。しかし、教員養成局による現職教員のためのワークショップ費用の予算化は、本プロジェクトの活動の自立発展性を部分的に保証するものであり、将来の継続的な活動に期待ができる。

(1) 組織・制度の自立発展性

FOP 教官が、SMEC を有効活用するために必要な知識を十分に移転されるまでには、若干の時間が必要であると思われる。また、今後専門家チームの支援の下、SMEC の維持管理、有効活用のための委員会が組織されることとなっており、これが機能するようになれば、SMEC の自立発展性はある程度確保されるものと思われる。現時点では、プロジェクトチームと FOP 教官の共同で、日常の基本的な管理が行われている。

また、カンボジア教育制度のなかでの FOP の位置づけに不透明さが残されているため、継続して MoEYS、FOP 間の話し合いの経過を観察する必要がある。

(2) 財政的自立発展性

FOP が本プロジェクトの活動、及び供与資機材を継続して活用し、後期中等理数科教員の質の向上に貢献するためには、施設、機材等の維持管理、及び人件費にかかる予算の確保が必須である。本調査実施時点では、FOP の予算計画は明確でなかったため、引き続きモニタリングしていく必要がある。その一方で、後期中等教育における現職教員対象のワークショップにかかる予算は確保されたため、本活動については継続的に実施されるものと思われる。

(3) 技術的自立発展性

先に述べたように、理科・数学ともに基礎知識の定着が十分でなく、現時点では、理科ではすべての実験器具を活用することに不安をもつ教官が多く見られた。技術的な自立発展性を確保するためには、日本人専門家による実験指導、及び実習に係る指導が引き続き必要である。

4 - 5 結 論

本プロジェクト目標 2 の「FOP の理数科教育に係る機能・能力が向上する」は、プロジェクト開始時点からみて大きく向上したものと評価できる。しかし、プロジェクト目標 2 に係る、成果 1 と 2 が十分に達成されておらず、FOP 教官の基礎知識、及び教授方法に係る知識の向上は限定的なものにとどまっており、当初期待された達成度は得られなかった。これによりプロジェクト目標 2 の達成度を低めることとなり、また SMEC の自立発展的な活用にも影響を与えた。以上の評価結果を踏まえれば、プロジェクトの有効性、効率性、自立発展性を更に向上させるために一層の継続支援が望まれる。

第5章 提言と教訓

5 - 1 提言（本プロジェクトに関する具体的な措置、提案、助言）

（1）プロジェクト期間の延長

以下の理由から、本調査団は本プロジェクトの1年3か月間（2004年10月末日まで）のプロジェクト期間の延長をプロジェクト関係者に対し提言する。

- 1) 計画当初に設定した目標のうち、成果1〔教員養成校（FOP）の教育訓練プログラムの質の向上〕、成果2（教官の指導能力の向上）の達成度が現在は十分ではなく、プロジェクト目標2（FOPの理数科教育に関する能力向上）が、当初設定したプロジェクト期間3年では達成される見込みが低い。
- 2) 理数科教育センター（SMEC）を活用した実験実習を伴った理数科教育の改善は、種々の成果を生み出しつつあり、あと2期分のスクールイヤーのプロジェクト活動を継続することにより、その効果を着実にする見込みが高い。

（2）プロジェクト期間を延長した場合の各学科の活動計画

上記に従い、プロジェクト期間を1年3か月延長した場合の各教科の技術移転計画を、今後、専門家とカウンターパート（C / P）との間で詳細を検討し、3月末日までに完成すること。

（3）SMEC

SMECの活用・運営のための委員会を設置し、同センターの運営・管理、施設の年間活用計画、及びプロジェクト終了後の維持管理予算確保の検討を行うこと。

（4）人員配置（C / Pのインセンティブ）

C / Pの採用・配置については、より効果的・効率的な技術協力を実施するために、今後も専門家チームともよく協議しながら取り組むこと。また、ワークショップやインサービストレーニングについては、C / Pだけではなく、該当分野の教官全体に技術移転ができるように可能な限り配慮すること。

（5）中・長期計画の策定

中・長期計画については、日本・カンボジア双方で検討し、2003年7月までにそのドラフトを完成する。また、プロジェクトが延長された場合は、その計画の実施可能性やより詳細な調査に日本・カンボジア双方で取り組むこととする。

5 - 2 教 訓

(1) プロジェクト期間

教育分野のプロジェクトを実施する場合は、その効果の発現までに時間を要する 경우가多く、特に当該国で初めて協力を開始する場合は、その実施期間の設定は慎重に検討すべきである。

(2) プロジェクト評価

プロジェクトの評価については、計画開始時より、具体的な評価指標を設定し、その指標の有効性等についても、プロジェクト開始からなるべく早い段階で見直すべきである。

付 属 資 料

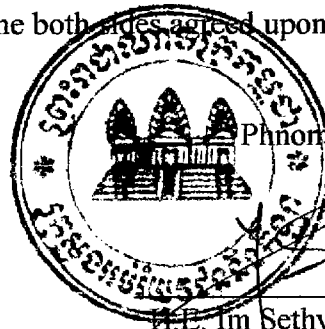
- 1 . ミニッツ
- 2 . PDM0
- 3 . PDM1
- 4 . PDMe (日本語)
- 5 . 評価グリッド
- 6 . 科目別計画達成度
- 7 . プロジェクト実施体制

MINUTES OF DISCUSSIONS
BETWEEN
THE JAPANESE EVALUATION STUDY TEAM
AND
AUTHORITIES CONCERNED OF THE KINGDOM OF CAMBODIA
ON
JAPANESE TECHNICAL COOPERATION
FOR
SECONDARY SCHOOL TEACHER TRAINING PROJECT
IN SCIENCE AND MATHEMATICS

The Japanese Final Evaluation Team (hereinafter referred to as “the Team”), organized by the Japan International Cooperation Agency (hereinafter referred to as “JICA”), headed by Mr. Eiji Inui, visited the Kingdom of Cambodia from March 2 to March 7, 2003, for the purpose of final evaluation of the Secondary School Teacher Training Project in Science and Mathematics (hereinafter referred to as “the Project”).

During its stay in the Kingdom of Cambodia, the Team had a series of discussions with the Cambodian authorities concerned and jointly evaluated the achievements of the Project and exchanged views on the project activities to fulfill the Record of Discussions signed on March 17, 2000.

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



Phnom Penh, March 17, 2003

Mr. Eiji Inui
Leader
Japanese Project Evaluation Team
Japan International Cooperation Agency
Japan

H.E. Im Sethy
Secretary of State,
Ministry of Education, Youth and Sport
Kingdom of Cambodia

(Witness)

Mr. Juro Chikaraishi
Resident Representative,
Cambodia Office,
Japan International Cooperation Agency

H.E. Nath Bunroeun
Director of Teacher Training Department,
Ministry of Education, Youth and Sport
Kingdom of Cambodia

THE ATTACHED DOCUMENT

1. INTRODUCTION

1-1. Preface

The Project was initiated in August 2000 and will be completed in July 2003. The Team dispatched by JICA visited the Kingdom of Cambodia from March 2 to March 7, 2003 for the purpose of evaluating the achievements of the Project. The evaluation has been undertaken jointly by the Cambodian authorities concerned and the Team.

1-2. Objectives of Evaluation

Objectives of the evaluation are as below;

- (1) To grasp the achievement of the Project according to the Project Design Matrix, in order to summarize the output.
- (2) To evaluate the Project from the aspects of five evaluation points: Effectiveness, Efficiency, Impact, Relevance, and Sustainability.
- (3) To suggest necessary arrangements to be conducted for successful completion of the Project.

1-3. Schedule of the Japanese Final Evaluation Team

Date & Time	Activities
Jan.19-24	Interview with JICA Experts, FOP counterparts and other trainers, graduates of FOP, and participants of workshops of FOP's promoting Activities) Survey on Science and Mathematics Education Center in FOP
Mar. 3, Mon.	Meeting with JICA Experts Meeting with JICA Cambodia Office Interview with Secretary of State of MoEYS (H.E.Im Sethy) Interview with FOP Counterparts
Mar. 4, Tue.	Interview with JICA Experts Interview with Dean of FOP (Dr. Thor Sor) Interview with Director of Teacher Training Department, MoEYS (H.E. Nath Bunroeun)
Mar. 5, Wed.	Survey on Science and Mathematics Education Center in FOP Survey on classes of FOP
Mar. 6, Thu.	Joint Coordinating Committee Signing of M/M Reception hosted by the team leader
Mar. 7, Fri.	Report to the Embassy of Japan Courtesy Call to Council for Development of Cambodia Report to JICA Cambodia Office Courtesy Call to the Minister of MoEYS (H.E. Tol Lah)

1-4. Collocutors and/or attendants of Joint Coordination Committee

1-4-1. The Japanese Side

The Study Team:

Mr. Eiji Inui	Leader
Dr. Fumio Kawaizumi	Science Cooperation
Dr. Masashi Suzuki	Mathematics Cooperation
Dr. Michiko Ebato	Project Evaluation
Mr. Hiroyuki Yakushi	Evaluation Planning

Project Team:

Mr. Ryuichi Murata	JICA Chief Advisor, STEPSAM
Mr. Hiroshi Kikuchi	JICA Project Coordinator, STEPSAM
Mr. Koji Takahashi	JICA Expert, STEPSAM
Ms. Mitsuko Maeda	JICA Expert, STEPSAM
Mr. Akihiko Shike	JICA Expert, STEPSAM
Mr. Tetsuya Murayama	JICA Expert, STEPSAM

JICA Cambodia Office:

Mr. Juro Chikaraishi	Resident Representative
Ms. Emi Aizawa	Assistant Resident Representative

1-4-2. The Cambodian Side

Ministry of Education, Youth and Sport:

H.E. Im Sethy	Secretary of State
H.E. Nath Bunroeun	Director of Teacher Training Department
H.E. Pith Chamnam	Rector of Royal University of Phnom Penh
Ms. Ton Sa Im	Director of Pedagogical Research Department
Ms. Kuy Phala	Deputy Director of Planning Department
Dr. Thor Sor	Dean of Faculty of Pedagogy
Dr. Neth Barom	Vice Rector of Royal University of Phnom Penh

Council for the Development of Cambodia

Ms. Heng Sokun	Deputy Director, Bilateral Aid Coordination Department of Japan-Asia Pacific-America
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Ministry of Economy and Finance

Ms. Yok Sophanary	Deputy Director of Investment & Cooperation Department
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1-5. Methodology of Evaluation

1-5-1. Definition of Evaluation

Evaluation is an assessment, as systematic and objective as possible, of an ongoing or completed project on its design, implementation and results. The aim is to determine the relevance and fulfillment of the objectives, effectiveness, efficiency, impact, and sustainability. An evaluation should provide information that is credible and useful. Based on the evaluation, recommendation and lessons will be drawn, which could be incorporated into the evaluated project and that of similar nature.

1-5-2. Methodology of Evaluation

Project Cycle Management (PCM) method was applied for the evaluation. In this method, Project Design Matrix (PDM) represents the project design and will be compared with the outcomes of the Project adopting the five evaluation criteria: relevance, effectiveness, efficiency, impact, and sustainability. The original PDM, documents, and reports were reviewed to produce a PDM for evaluation that describes the project design in the three-year cooperation period.

To compare the outcomes of the Project with its design, an evaluation grid has been produced. For each of the above criteria, evaluation and survey items were set, and method of data collection was selected. Prior to the arrival of the evaluation study team, various records and physically identifiable outputs have been presented by the project team for the assessment. The findings from the interviews as well as the questionnaire survey conducted by the study team have also been taken into consideration for making the evaluation.

1-5-3. Criteria of Evaluation

The team reviewed all the activities and achievement and evaluated the Project based on the following five aspects;

(1) Relevance

An overall assessment of whether the project purpose and overall goal are in keeping with the donor policy and with recipient needs and priorities.

(2) Effectiveness

A measure of whether the project purpose has been achieved. This is then a question of the degree to which the outputs have contributed towards achieving the intended project purpose.

(3) Efficiency

A measure of the production of outputs of the Project in relation to the total resource inputs. In other words, how economically various inputs have been converted into outputs.

(4) Impact

The positive and negative changes for the society have been produced directly and indirectly as the result of the Project, which were foreseen and unforeseen consequences.

(5) Sustainability

An overall assessment of the extent to which the positive changes achieved by the Project can be expected to last after the completion of the Project.

1-5-4. Information for Evaluation

In order to evaluate the past performance, the following materials were used:

(1) Record of Discussions (R/D), Plan of Operations (P/O), Minutes of Discussions, Quarterly monitoring reports, and other documents produced in the course of implementation of the Project.

(2) Project Design Matrix

(3) Data of input to and output from the Project

(4) Result of series of interviews and questionnaires

(5) Direct observation

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2. BACKGROUND AND SUMMARY OF THE PROJECT

2-1. Background of the Project

The Cambodian Government has sought a range of external assistance in order to achieve the holistic national development. However, it has been widely acknowledged that the lack of appropriate and necessary human resources hampered the country from achieving its goal yet the respective sector received less external support compared to other sectors.

In such context, the Cambodian Government has requested the assistance to Japanese Government in developing upper secondary teacher training in science and mathematics in particular. Although, the improvement in respective subjects has generally been regarded critical to the development of the human resources relevant to the industrialization and economic development of the respective society, the given situation has been challenging. The appropriate educational infrastructure and human resources to enable development of science and mathematics education have been insufficient. For this reason, the Secondary School Teacher Training Project has been launched by the Japan International Cooperation Agency (JICA) upon request of the Cambodian Government.

2-2. Summary of the Project

The Project management is based on PDM, which was revised during the Mid-Term Evaluation in September 2001. The Project Purpose is as follows;

- (1) A medium-term and long-term plan for improving secondary school teacher training in science and mathematics is prepared.
- (2) Capability of Faculty of Pedagogy (FOP) in science and mathematics education is enhanced.

Followings are the expected Outputs of the Project:


- (1) The quality of existing pre-service teacher training programs is improved.
- (2) Trainers are prepared for the introduction of new ideas.
- (3) Activities for promoting science and mathematics education are conducted.
- (4) A future plan for secondary science and mathematics teacher training is prepared

2-3. Project Design Matrix

This project has been designed based on the Participatory Planning Method, which emphasizes the logical coherence of each activity, output and the project purpose, which is represented in the Project Design Matrix (PDM). During the project life, PDM is to be revised accordingly in order to cope with the contingencies. In this project, PDM has been modified in September 2001, on the basis of review conducted by Japanese Mid-Term Evaluation Team dispatched by the Japan International Cooperation Agency (JICA). As a result, PDM1 was developed. Upon conducting final evaluation, a PDM for evaluation has been developed again on the basis of the PDMo and PDM1. In the following sections, the nature of adjustment took place is explained in brief.

2-3-1. PDMo to PDM1

The PDMo was altered on the basis of the advice by the Mid-Term Evaluation in the following points.



1) The Working Group

In the PDMo, “Working Groups” among the stakeholders were planned to be organized and involve in the project activities. However, in the PDM1, it has been removed.

2) In-Service Training

FOP, at the time of the mid-term review, did not formally conduct the in-service training program. Therefore, the “In-service training” was omitted. However, the project decided to continue propagation and awareness raising activities on science and mathematics education for the teachers already in-service.

3) National Center for Science and Mathematics Education

At the time of the mid-term evaluation, the rationale for establishing the National Center for Science and Mathematics Education was not clear. Therefore, the activity in relation to the Center was removed. Instead, the future secondary teacher training plan was intended to be developed by the project.

2-3-2. PDM1 to PDMe

This final evaluation is conducted on the basis of PDM developed out of PDMo and PDM1. The following points were altered.

1) Overall goal

The overall goal has remained the same. However, an objective verifiable indicator and a means of verification were added. It is not appropriate to examine these indicators when the final evaluation is conducted. In the future, these indicators shall be used to verify the impact of the project. The precondition to this is the relevant statistical data to be established in Cambodia.

Objectively Verifiable Indicators: The capability of the science and mathematics teachers is increased.

Means of Verification: National Teachers’ assessment of the effectiveness. (National statistics indicating Teachers’ knowledge, attitude and students achievement.)

2) Project Purpose

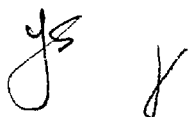
The project purpose has not been changed in the PDMe. However, the Objectively Verifiable Indicators for the Project Purpose 2 was altered as indicated below.

Objectively Verifiable Indicators: FOP Trainees’ capability is increased. (FOP students’/ Graduates’ capability of teaching science and mathematics is increased.)

3) Output

There are four outputs in this PDMe. Indicators and the means of verification were added for the sake of evaluation. This intends to determine the achievement of the project output.

Output-1



Objectively Verifiable Indicators 1-4: "Evaluation is carried out".

The above is considered to be an activity. Therefore, this has been shifted to the activity of the project.

Output-2

Initially Objectively Verifiable Indicator for Output-2 was "New teaching methods and materials are introduced by FOP trainers". However, this does not allow us to evaluate whether the intended output was achieved. The modification is indicated as bellow.

Objectively Verifiable Indicators	Means of Verification
2-1: Trainers' understanding of the basic concepts of the science and mathematics is increased.	Interview with the short-term experts
2-2: Trainers' knowledge of the teaching methods and materials of science and mathematics is improved.	Questionnaire for the FOP trainers evaluating the level of knowledge on the teaching methods and materials
2-3: Trainers' capability to utilize the teaching methods and materials introduced by the project is developed.	Observation by the experts Observation by the FOP graduates

Output-3

PDM1 shows "The degree of recognition and participation in promotion activities by related people and organizations is evaluated." as the indicator of the Output 3. However, this indicator alone is not adequate to evaluate the effectiveness of the activities in order to achieve the output 3. It is important to define the relevance of the activity to the development of the FOP's capacity. What is to be assessed here is the capability of the FOP trainers to propagate the information and sensitize teachers on science and mathematics education. Therefore, the indicators 3-1 and 3-2 were added. The original indicator was rephrased to clarify its meaning and added as Indicator 3-3. By this alteration, means of verifications were supplemented accordingly.

Objectively Verifiable Indicators	Means of Verification
3-1: The FOP's function of communicating and coordinating information on science and education is strengthened.	The list of publications The record of the organized workshops The assessment/ questionnaire
3-2: Trainers' ability to demonstrate the newly introduced methods to the teacher trainees and the relevant individuals and organizations is developed.	Record of the workshop
3-3: Level of recognition towards project and mathematics and science education is increased among the individuals and organizations concerned.	Newsletters, Journals, records of seminars and workshops

2-4. Plan of Operation for the Whole Period (3YP)

The plan of operation for the whole period is found in ANNEX 2 and is currently implemented.

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3. EVALUATION

3-1. Achievement of the Plan

The details of the achievements are shown in ANNEX 3.

3-2. Results of the Evaluation

Project purpose 1 will be accomplished by the end of July 2003. Output 1 and 2 have not been achieved as expected. Therefore, the Project Purpose 2 will not be accomplished in a full scale. Sections below summarize the results of the evaluation. The detail results of the evaluation study are attached at the back of this report (ANNEX 4).

3-2-1. Process of Project Implementation

The process of project implementation has mostly been appropriate and effectively coordinated by Joint Coordination Committee (JCC), Steering Committee (SC), Advisory Committee (AC), which has been formed mostly among the Japanese academics in the area of science and mathematics education and the project team.

Establishing the Management System

The project has established JCC and SC among the Ministry of Education, Youth and Sport (MoEYS), JICA experts and relevant authorities of the Cambodian Government. The JCC has been held annually and SC biannually. Each committee in this project has been to develop shared understanding of the project activities and provided necessary support. The project team has indicated that there needed a frequent interaction with the relevant authorities and individuals for its effective contribution. On the other hand, AC has committed itself to this project by dispatching the short-term experts, providing technical advice to the project team as well as conducting the counterparts training. The communication between the committee and the project team was efficient and effective by taking advantage of the Internet.

Mid-Term Evaluation

Mid-Term evaluation was appropriate in timing and its mission. It was carried out in September 2001. As a result of the study, PDMo was altered and PDM1 came into operation. The modification is indicated in 2-3. This was appropriate as it increased the effectiveness of the plan.

Communication

The level of communication has been high among the project team, FOP trainers, and other stakeholders such as the Teacher Training Department at the MoEYS and individuals working in the respective sector.

3-2-2. Relevance

The relevance of the Secondary School Teacher Training Project in Science and Mathematics (STEPSAM) is high in reference to the national development plan and the needs of the education sector in Cambodia as well as the Japanese expertise in science and mathematics education both in Japan and overseas.

The STEPSAM is relevant to the national development policy of Cambodia. The Cambodian Government is aiming at the rapid recovery from the destruction of the socio-economic order in the 1970s. In the National Program to Rehabilitate and Develop Cambodia (NPRD) in 1994 and Socio-Economic Development Plan in 2001, which have both indicated its economic development based on the improved social services and the infrastructure. In this context, development of human resources for the economic and industrial development is a priority issue to be dealt with.

The needs of upper secondary education development are considered to be high in the long-term perspectives of Cambodian education sector. As the development of basic education progresses, the enrollment in the upper secondary education is expected to rise. In the "Strategic Analysis" prepared by the MoEYS, the lower secondary school will require additional 23,000 teachers for the lower secondary school and 8,400 for upper secondary as the primary enrollment rises as expected (https://www.moeys.gov.kh/education_reform_in_cambodia/strategic_analysis/chapter_8.htm). While achieving the quantitative requirement of the teacher demand, it is also necessary to consider the qualitative aspect of the teacher training. Its content must be upgraded in order to provide the education with quality, which contributes to develop the foundation for the socio-economic development of Cambodia. Therefore, the project has the high relevancy to the needs of the education sector in Cambodia.

JICA's aid strategy in Cambodia also indicates the relevancy of the STEPSAM. It indicates that its commitment to the mid-long-term and sustainable development in Cambodia. Further, the advantage of the Japanese aid in the respective area is that the accumulation of the relevant experience both in Japan and overseas. Thus, the STEPSAM is high in relevancy. JICA is the only donor agency committed to the development of the science and mathematics education in upper secondary education, while the majority of donors are focused on the development of basic education.

3-2-3. Effectiveness

All the activities have been effectively conducted and relevant to achieve the project purpose. However, to achieve the project purposes sufficiently, further assistance is necessary.

The Project Purpose 1: "A medium-term and long-term plan for improving secondary school teacher training in science and mathematics is prepared." will be drafted by the end of July. At the time of the evaluation study, the "mid-term and long-term plan" has proposed the revision of curriculum/ textbook/ teachers' guide and the implementation of in-service teacher training program accordingly for the upper secondary science and mathematics education. This has been considered to be the most realistic suggestion for the improving quality of upper secondary science and mathematics education in Cambodia based on the STEPSAM's experiences and possible available resources.

The Project purpose 2: "Capability of Faculty of Pedagogy (FOP) in science and mathematics education is enhanced." is less likely to be achieved sufficiently by the end of

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the scheduled period. This is due to the low achievement of the Output 1 and 2, despite the successful achievement of Output 3.

1) Output 1: "The quality of existing pre-service teacher training program is improved."

The project activities aiming at Output 1 have been conducted effectively and sufficiently. The positive changes were induced by the year 2001 and 2002 curriculum developed by the FOP trainers in collaboration with the JICA experts as well as through the introduction of the experiments in science, which had distinguished FOP from Royal University of Phnom Penh. Such positive changes have increased the reputation of the FOP as well as the learning efficiency of the teacher trainees has increased owing to the improvement of the trainer's effectiveness.

However, the achievement of Output 1 has not reached to the level of achievement as expected by the project. This is owing to the limited attainment of FOP trainers' knowledge of the teaching methods in some topics and the insufficient experience of using the experimental equipments provided by the STEPSAM.

2) Output 2: "Trainers are prepared for the introduction of new ideas."

The activities conducted for the Output 2 have been conducted sufficiently. As a result of such activities, FOP trainers have indicated that their teaching ability has increased. They are gradually acquiring the logical thinking, which is fundamental to understand science and mathematics. However, The level of achievement of Output 2 will be limited by the end of the scheduled period, as improvement of such knowledge and capacity has been partial.

Workshops

The regular based workshops were conducted in order to enhance the FOP trainers' understanding of the respective subject in general and teaching methodology and to learn curriculum and teaching material development. The record of the workshops conducted for this purpose is indicated below.

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Regular Workshop								
		Objectives	Dates	Timing	Hours	Facilitator	Participants	Output
2000-2001	Regular Workshop	Development of Curriculum and Teaching Materials	2000,1 2001,7	Once a week	3hrs	Volunteer	FOP Trainers	Teaching Guide for the FOP trainers
	Regular Workshop	Development of Curriculum Translation of referred materials and understanding of the content.	2001,1 2002,7	Once a week	3hrs	Volunteer	FOP Trainers	Revised Teaching Guide for the FOP trainers.
2001-2002	Regular Workshop	Teaching Methodology	2001,1 2002,7	Once a week	3hrs	Volunteer	FOP Trainers	Revised Curriculum and Syllabus
	Lecture	Practicum (Science) further understanding each subject	2001,1	Once a week	2-3hrs	Japanese Expert	FOP Trainers (10 each subject)	
		Practicum (Mathematics) further understanding Mathematics	2002,8	Twice a week	3hrs			
	"Today's Science"	Science in General	2001,1	Once a week	2-3hrs	Japanese Expert	FOP Trainers (Voluntary participation from subject of Science)	
Individual Consultation	Daily Advise	2000,9			Japanese Expert	FOP Trainers	Experiment Guidebook, Teaching Material Handbook, Workbook etc.	

The ad-hoc workshops were conducted by the short-term experts. The record of the workshops conducted can be found in ANNEX 5-7.

Science and Mathematics Education Center (SMEC)

The construction of the Science and Mathematics Education Center was completed in July 2002, which was delayed for six months than it was planned. Therefore, the FOP trainers were unable to receive practical training as initially anticipated.

Teaching Methods

The improvement of the teaching methods among FOP trainers has been limited to a few topics in the respective subject. This, thus, restricted the achievement of the Output 2. Further training in teaching methods is required. In addition, the FOP trainers in science stated that they do not know how to use all the experimental equipments. Practical exercises using such equipments are necessary in order for them to make the best use of the equipments provided by the STEPSAM.

3) Output 3: "Activities for promoting science and mathematics education are conducted."

Output 3 is expected to be completed successfully.

Provincial Workshops

The workshops were conducted by the FOP trainers for the teachers in provinces. This has increased trainers' confidence in teaching and motivated them to learn on their own while the participants also gained the new skills and knowledge, which upgraded their teaching practices. The venues of the workshops included six Regional Teacher Training College and four provinces (see ANNEX 5-7). The participants to the workshops learned the use of the local materials for experiments and increased the learning efficiency of the students.

Publications

The publications circulated have contributed to expand the STEPSAM's network in Cambodia. The project has regularly issued the STEPSAM Newsletter in English and Khmer targeted to science and mathematics teachers throughout Cambodia. The number of copies circulated can be found in ANNEX 5-8. Its draft was prepared by the counterparts in collaboration with the JICA experts. Through this process, FOP trainers have learned the process of writing and developing the teaching materials by themselves. The list of publications and its cost is indicated in ANNEX 5-8.

Circulation of the STEPSAM news via e-mail aimed at facilitating the interaction between the project team and other individuals and organizations working in education sector in Cambodia towards the project activity. This facilitated the communication between STEPSAM and other relevant authorities. The network constructed was later initiated the project's collaboration with others.

- 4) Output 4: " A future plan for secondary science and mathematics teacher training is prepared."

"A future plan for secondary Science and Mathematics teacher training" is defined as the "Mid-Term and Long-term Plan for the Teacher Training" as indicated in the Project Purpose 1. Such wording shall be used inter-exchangeably in the project. The JICA experts have developed a possible feasible plan for the curriculum/ textbook/ teaches' guide revision and conducting the in-service training accordingly for the upper secondary science and mathematics education. The content of the plan has been discussed among the stakeholders and the concept is still evolving. However, the plan is likely to be completed by the scheduled end of the project. The feasibility of the plan shall be assessed in order for the plan to be relevant and practical for the teacher development in Cambodia.

3-2-4. Efficiency

The efficiency of the project is expected to be slightly low due to the inappropriate timing of the completion of the SMEC. Otherwise, the long and short-term experts, and the equipments provided by the STEPSAM have been efficient.

1) The JICA Experts

The dispatch of the JICA experts has mostly been appropriate. Long-term experts have been dispatched 146 M/M in total and short-term experts for 50 M/M in total including the approved manning plan at the time of the Evaluation study. However, the dispatching timing of the experts needs to be co-ordinated in order to increase its efficiency in quality and quantity of their assistance to the FOP.

2) Facilities and Equipments

Facilities and equipments provided by the project have been adequate and relevant. At the time of the evaluation study, 40% of the FOP trainees enjoy the facilities and equipments in the SMEC on the daily basis in science and mathematics education while more than 40% of the trainees at the FOP use the library at the SMEC. However, due to the delay of the completion of the SMEC, the chemicals, facilities and equipments for the purpose of

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experiments delayed to be installed in the building.

3) Training in Japan

The training program conducted for counterparts was relevant in its content, though the duration has been short. Many of the counterparts found it effective and relevant to the situation in Cambodia. Especially learning to utilize the locally available materials for experiments was highly relevant. After the training, the counterparts developed their own equipments for experiments and used in their training programs, which also gave the opportunity for other trainers to benefit from their training in Japan.

All the twelve counterparts of the project have so far received the training in Japan in their subject area. The training program was designed and conducted in cooperation with the AC. It has been reported that the training was conducted effectively and AC members made their effort to provide the relevant training. Although one counterpart has been demoted to the FOP trainer, he still remains very active among the trainers. Therefore, this incident itself shall not lower the efficiency of the project.

4) Workshops Conducted for the Teachers in-Service

The workshops conducted for the teachers in-service have been mostly efficient in reference to its contribution to the Outputs. The provincial workshops have been conducted in the selected areas such as Kampong Thom, Kampong Cham, Battambang, Kandal, Takeo, Prey Veng, Svay Rieng and Phnom Penh.

5) Counterparts

The allocation of the counterparts has been adequate. The detailed staffing of the counterparts can be found in ANNEX 5-2. Initially, two counterparts for each subject area (eight in total) were allocated as counterparts by the FOP at the initial stage of the training, which later became three for each subject. They have effectively facilitated the interaction between the JICA experts and FOP trainers. They also took the leading role in conducting the provincial workshops and acted as resource persons for the FOP trainers in the respective subject.

6) Local Cost

The Government of Japan has provided 3,749,278 USD between 2000 and 2002. This amount includes dispatching JICA experts, equipment, and other necessary activities and facilities including the cost of construction of the SMEC. The government of Cambodia has provided working spaces for the Project Team and its renovation cost while it was under construction. The land for the SMEC has been allocated within the FOP. The MoEYS has born the cost of the utility charges for the newly constructed center as well as the salary of the FOP trainers and counterparts.

7) The Building

The SMEC has been provided by the Project, which is mostly considered to be appropriate in size and its facility while the timing of completion was inappropriate. This consists of a specially designed classroom attached with a staff room for each subject with a common library. Staff rooms were used for the preparation of the lectures, experiments and meetings.

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This building has provided the spaces for the FOP trainers and trainees to conduct experiments and hands-on training especially for trainees in Science. It also became the common space for discussion among the FOP trainers as well as for interaction between the counterparts and experts.

8) Contribution of the Committees and Mid-Term Evaluation for Efficiency

The JCC and SC have supported the project implementation process by sharing the progress of the project activities with the project team. The AC in Japan, as mentioned earlier, has contributed to the efficient project activities through dispatching the experts and counterparts training in Japan. This was possible by the frequent and efficient communication between the AC and the project team via e-mail.

3-2-5. Impact

1) Positive Impact

Positive effects have been observed as a result of the project. Those are summarized below.

Issue of the Science Experiment Guideline

A guideline has been issued by the MoEYS to all the upper secondary schools to introduce six hours of experiment a year. This has been the fruit of the increased awareness of the MoEYS towards the positive implication of the experiments in the Science education, which has been demonstrated by the STEPSAM activities.

Budget for the In-Service Teacher Training in the Provinces

The budget for conducting workshops for the teachers in provinces for mathematics and science has been approved by the MoEYS. This is part of their commitment in further advancing the science and mathematics education and will lead to the increased sustainability of the project outputs. This has been made possible by the provincial workshops conducted by STEPSAM for teachers, which demonstrated the positive impact of workshops for teachers in provinces.

Networks

The positive impact emerged out of STEPSAM activities can be the expanded network of STEPSAM. This may increase the relevance of the STEPSAM. At the time of evaluation study, the partnership with the ADB has gradually been developed in terms of curriculum reform and textbook revision after June 2003. This could contribute to improve the quality of the upper secondary education and increase the relevancy of the STEPSAM's activities even further. Furthermore, the collaboration with the RUPP in chemistry could also develop the academic foundation of the students who might later enter the career of teaching via training in FOP.

“Introduction of Practical Work into Classroom” and the follow up observation study

The nature of “Introduction of Practical Work into Classroom” and the follow up observation study could be regarded as in-service teacher training. However, this, on the other hand, contributed to develop FOP trainers to learn how to conduct an in-service training and utilizing what they have learned from the JICA experts having more opportunities to demonstrate. Furthermore, the STEPSAM has made the impact to the

science education at the School level.

Bonds between Counterparts and JICA Short-Term Experts

STEPSAM has provided learning opportunities for the AC members to expand their understanding of what involves in the assistance for educational development as well as JICA's role in its process. Furthermore, the counterpart training has initiated the lasting relationship on the individual basis between the JICA short-term experts and the counterparts, which could be beneficial after the termination of the STEPSAM.

2) Other Impact

In order to ensure the effective and efficient progress of the project activities, the project has provided the incentives to the workshop participants and allowances to the FOP trainers. Although this has been the common practice in many donor funded projects in Cambodia, this may have negatively affected the sustainability of the project. In other words, the interest and participation of the teachers in the provinces as well as FOP trainers may not be maintained when the project comes to an end.

3) Overall Goal

The Overall goal is expected to be attained if activities initiated by STEPSAM are maintained and expanded beyond. This depends on the funds and personnel for the purpose as well as its cohesiveness to the national policy. At the time of the evaluation study, it has partly been achieved through the provincial workshops and FOP graduates since the launch of the STEPSAM. The total number of participants to the provincial workshops is 913 and the number of FOP graduates between 1999-2000 academic year and 2001-2002 academic year in science and mathematics is 329. Currently, 195 trainees are undergoing the training at FOP.

3-2-6. Sustainability

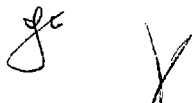
Sustainability of the project has been partly secured. This is due to the potential instability in the institutional arrangement in the teacher training in Cambodia. It is partly owing to the limited internalization of the knowledge and skills among the FOP trainers to enable them to make the full use of the facilities provided by STEPSAM. However, the funds for the in-service teacher training have been arranged by the Teacher Training Department (TTD), which is considered to contribute to the sustainability of the project activity as well as the overall goal to be achieved.

1) Institutional Sustainability

In order to secure the sustainability of the project outputs, the FOP must remain to train the teachers in science and mathematics education for the sustainability of the outputs of the project.

2) The Science and Mathematics Education Center

Due to the delay of completion of the SMEC, the arrangement for its maintenance has not been established sufficiently at the time of the evaluation study. However, the daily management and maintenance activities have been appropriately conducted and co-ordinated jointly with the project team and FOP trainers. In the future, such activities shall



be institutionalized in FOP for the effective and sustainable use of the building.

3) Financial Sustainability

The budget for conducting the workshops for the teachers at the provinces has been approved by MoEYS. FOP also has a plan to meet the recurrent costs in relation to the SMEC. The team will expect the MoEYS and FOP to continue their effort to fund and allocate the appropriate personnel for the teacher training at the FOP.

4) Technical Sustainability

Technical sustainability cannot be expected if the project ends as scheduled. FOP counterparts and trainers still lack the experience of lecturing using the new curriculum, and the equipments supplied by JICA. To assure the sustainability, more practical works assisted by JICA experts in the SMEC are necessary.

3-2-7. Conclusion of the Evaluation

Based upon the above evaluation results, the team and the Cambodian side acknowledge that the project has significantly improved the basic knowledge of the respective subject and teaching methods among the FOP trainers. However, insufficient development of their basic knowledge and skills in teaching methodologies and the delay of completion of the SMEC, the project purpose 2” Capability of Faculty of Pedagogy (FOP) in science and mathematics education is enhanced” will not be achieved sufficiently. Further, the sustainability of the project will be secured partly by the end of July 2003. The findings of the evaluation study suggest that the further training upon the teaching methods is required as well as the practices in handling the equipments in the laboratory in the SMEC.

4. OTHERS

4-1 Contents and Position of the “medium-term and long-term plan”

The content and its position of “a medium-term and long-term plan” of the project purpose 1 and “a future plan” of the output 4 (hereafter referred as “the plan”), that the both sides confirmed, are indicated below.

- 1) The plan shall be developed based on the experiences and lessons gained through STEPSAM. It should also make constructive suggestions and propose feasible plans to contribute to the overall development of the Science and Mathematics in upper secondary education in Cambodia.
- 2) The plan must comply with the overall plan of the upper secondary science and mathematics education sector and be a joint effort between the Cambodian and Japanese side.
- 3) A new project proposed by the plan shall be requested by the government of Cambodia to the government of Japan through the official route. The propriety of the new project will be decided in comparison with other requests forwarded.

4-2 Role of the FOP

Importance and the needs of upper secondary teacher education have been increasing. FOP will continue to exist as the only institution for upper secondary teacher education through pre-service training and in-service training.

5. RECOMMENDATION AND LESSONS LEARNED

5-1 Recommendation

(1) Extension of the project period

For the reasons below, the Team recommends the extension of project period for one year and three months.

1) As the level of achievement of Output 1 "The quality of existing pre-service teacher training programs is improved" and Output 2 "Trainers are prepared for the introduction of new ideas." are low, the project purpose 2 is less likely to be achieved by the end of the original project period.

2) The project has been effectively implemented, though to the limited extent. However, the introduction of experiments and construction of SMEC have brought significant changes and a gradual improvement in teaching practices in the respective subjects. Thus, supporting additional two academic years will lead to the lasting effectiveness of the project activities as well as the resources provided by STEPSAM.

(2) Plan of Operation (PO) for the extension period

In the case of one year and three months extension, the detailed Plan of Operation (PO) for the extension period shall be discussed between Cambodian side and Japanese side, and completed by the end of March 2003.

(3) Science and Mathematics Education Center (SMEC)

The both sides agreed to establish a committee for practical use and management of SMEC. The committee shall consider the management of the center for the maintenance, an annual plan for practical use, and budget for maintenance after completion of the project.

(4) Arrangement of personnel

Recruitment and arrangement of the counterpart personnel shall be considered with JICA experts for effective and efficient technical cooperation.

(5) Medium-term and long-term plan

Medium-term and long-term plan, mentioned in the 4-1, shall be discussed by both the Cambodian side and the Japanese side. A draft shall be completed by the end of July 2003. In the case of extension of the project period, both the Cambodian and the Japanese side shall apply for the feasibility study of the plan, and shall organize a committee for implementation of the feasibility study.

(6) Proper Budgetary allocation

The team has confirmed that the budget for upper secondary teacher training will be allocated from the Priority Action Program (PAP). The government of Cambodia shall

allocate appropriate budget for the implementation of the Project, especially for the operational cost of SMEC and workshops conducted for the teachers working in the provinces (in-service training).

(7) Workshops for provincial teachers

FOP resource shall be used practically for the workshops for provincial teachers, and TTD shall disburse the budget for the workshops at the right timing, and continue their effort even after the completion of the Project.

5-2 Lessons Learned

5-2-1 Project Period

In implementing a project in the education sector, the period of assistance shall be considered carefully as the visible changes take longer time to be identified. Thus in order to plan an effective and efficient technical assistance, in-depth understanding of the respective country enable us to make the most appropriate decision such as the duration of the cooperation and the nature of the project.

5-2-2 Project Evaluation

It is very important to set up concrete indicators at the initial stage of the project. Effectives of the indicators shall also be assessed as early stage as possible.

List of Attached Document

ANNEX 1: PDM for Evaluation (PDMe)

ANNEX 2: Plan of Operation (P/O) for the Whole Period

ANNEX 3: Achievement of the Project

ANNEX 4: Evaluation Grid

ANNEX 5: References

5-1. Dispatched Japanese Experts

5-2. Assignment of Counterparts

5-3. Counterpart Personnel Trained in Japan

5-4. Equipment Provided by Japan

5-5. List of Reference Materials Procured by the Project

5-6. List of Teaching Materials developed by Each Subject

5-7. Record of Workshops conducted at Various Venues

5-8. Number of Publications in Circulation

5-9. The Number of Students Graduated (1999-2000 to 2001-2003 Academic Year)

5-10. The Summary of the Questionnaire Survey

ANNEX 1

The PDM for Evaluation for Secondary School Teacher Training Project in Science and Mathematics (1/4)

Project title: Secondary School Teacher Training Project in Science and Mathematics.

Duration: 3 years (2000.8.1~2003.7.31)

Project area: Cambodia

Target Group: Teacher Trainers in FOP

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
<p>【Overall Goal】 Capability of Science and Mathematics teachers is enhanced.</p>	<p>The capability of the Science and Maths teachers is increased.</p>	<p>1. National Teacher's assessment of the effectiveness (National statistics indicating Teacher's knowledge, attitude and students achievement).¹</p>	<p>The basic development policy on secondary science and Mathematics education is unchanged.</p>
<p>【Project Purpose】</p> <p>1. A medium-term and long-term plan for improving secondary school teacher training in Science and Mathematics is prepared.</p> <p>2. Capability of Faculty of Pedagogy (FOP) in Science and Mathematics education is enhanced.</p>	<p>1. A proposal for improving secondary school teacher training in science and Mathematics is submitted to MoEYS.</p> <p>2. <u>(Effectiveness of FOP in Science and Mathematics education is increased.)</u> <u>FOP Trainees capability is increased. (FOP students/ Graduates' capability of teaching Science and Mathematics is increased.)</u></p>	<p>1 The Proposal is prepared.</p> <p>2a. <u>Interview with the Dean of FOP and the Director of the Teacher Training Department.</u> 2b. <u>Interview with the FOP Graduates (Teachers already in-service)</u></p>	<p>Political condition is stable.</p>
<p>【Output】</p> <p>1. The quality of existing pre-service teacher training programs is improved.</p>	<p>1-1. New curricula, syllabi and references for teacher training at FOP are developed in cooperation with working groups.</p> <p>1-2 Teaching materials are developed.</p> <p>1-3 Pre-service training is conducted sufficiently based on the new curricula and using developed teaching materials.</p>	<p>1-1. Developed curricula/syllabi and references</p> <p>1-2. Developed teaching materials</p> <p>1-3 a. Records of Training conducted</p> <p>1-3 b. Mid-term and final evaluation</p>	<p>Budget allocation and disbursement for FOP is stable.</p>

¹ During this survey, the data indicated may not be obtainable considering the situation of Cambodia. However, these indicators, in the future, could be useful in evaluating the projects of similar nature. For this purpose, respective statistical data shall be established as well as the teacher qualification system.

<p>2. Trainers are prepared for the introduction of new ideas.</p> <p>3. Activities for promoting Science and Mathematics education are conducted.</p> <p>4. A future plan for secondary Science and Mathematics teacher training is prepared</p>	<p>1-4 Evaluation is carried out. (Moved to Activities.)</p> <p>(2. New teaching methods and materials are introduced by FOP trainers.)</p> <p>2-1. Trainers' understanding of the basic concepts of the Science and Mathematics is increased.</p> <p>2-2 Trainers' knowledge of the teaching methods and materials of Science and Math is improved.</p> <p>2-3 Trainers' capability to utilise the teaching methods and materials introduced by the project is developed.</p> <p>(3. The degree of recognition and participation in promotion activities by related people and organizations is evaluated.)</p> <p>3-1. The FOP's function of communicating and co-ordinating information on Science and Mathematics Education is strengthened.</p> <p>3-2. Trainers' ability to demonstrate the newly introduced methods to the teacher trainees and the relevant individuals and organizations is developed.</p> <p>3-3. Level of recognition towards project and Science and Mathematics education is increased among the individuals and organisations concerned.</p> <p>4. A proposal for improving Science and Mathematics teacher training is prepared</p>	<p>reports</p> <p>1-3 c. Interview with the C/P and experts.</p> <p>1-4. Mid-term and Evaluation report (Deleted).</p> <p>(2. The number of new methods and materials used by trainers.)</p> <p>2-1. Interview with the short term-experts</p> <p>2-2. Questionnaire for the FOP trainers evaluating the level of knowledge on the teaching methods and materials.</p> <p>2-3a. Observation by the Experts</p> <p>2-3b. Observation by the FOP Graduates</p> <p>3-1a. The list of publications.</p> <p>3-1b. The record of the organised workshops.</p> <p>3-1c. Interview with the relevant individuals and organisations.</p> <p>3-2. Record of the workshop _____ (Observation)</p> <p>3-3-a. Newsletters, Journals, records of _____ seminars and workshops</p> <p>4. The prepared proposal</p>	
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Narrative Summary	Input		Important Assumption
<p>【Activities】</p> <p>1. Qualitative improvement of existing pre-service teacher training</p> <p>1-0. Baseline survey is conducted.</p> <p>1-1. New curricula, syllabi and references for teacher training at FOP are developed in cooperation with working groups.</p> <p>1-1-a). Working Groups are organized.</p> <p>1-1-b). Existing curricula and syllabi are studied.</p> <p>1-1-c). References for pre-service training in FOP are prepared.</p> <p>1-1-d). The new curricula, syllabi and references are produced.</p> <p>1-1-e). <u>To conduct training courses of working groups in 4 subject areas by Japanese experts at FOP.</u></p> <p>1-1-f). <u>To conduct monitoring and evaluation on the training courses.</u></p> <p>1-2. Teaching materials are developed.</p> <p>1-3. Pre-service training is conducted sufficiently based on the new curricula and using developed materials.</p> <p>1-3-a). Teacher trainees are trained in use of the developed curricula/syllabi/teaching materials.</p> <p>1-3-b). Teacher trainers are evaluated in terms of the implementation of developed curricula/syllabi/teaching materials.</p> <p>1-3-c). <u>Necessary facilities/equipment for project activities are provided.</u></p> <p>1-3-d). <u>Teacher trainers are evaluated and get feedback regarding teaching methods of developed curricula/syllabi/teaching materials. (Incorporated from PDMo)</u></p> <p>1-4. Final evaluation is conducted.</p>	<p>Japanese side</p> <p>1. Experts:</p> <p>-Long term experts Team Leader Science Math Physics Biology Co-ordinator</p> <p>-Short-term experts, if necessary. Biology Chemistry Physics Mathematics</p> <p>2. C/P Training in Japan</p> <p>3. Necessary machinery and equipment for the Project activities that Cambodian side cannot procure.</p> <p>4. <u>Cost and Facilities of making publications.</u></p> <p>5. <u>Cost and Facilities of organising workshops and seminars.</u></p>	<p>Cambodian side</p> <p>1. Personnel Counterparts (C/Ps)</p> <p>2. Facility Office space, land, buildings and facilities necessary for the Japanese experts and for the Project activities</p> <p>3. Machinery, equipment, Instruments, vehicles, Tools, spare parts and Any other materials Necessary for the Implementation of the Project</p> <p>4. Operation cost</p>	<p>Trained C/Ps selected from the FOP personnel continue working for FOP.</p> <p><u>The FOP trainers and C/Ps have the required understanding of the Science and Mathematics.</u></p> <p>【Preconditions】 Office space for JICA experts is prepared.</p>

2. Preparing trainers for the introduction of new ideas.

2-1. Trainers' knowledge in each subject is enhanced.

2-1-a) Necessary technical guidance and advice are provided.

2-1-b) Training is conducted abroad.

3. Activities for promoting Science and Mathematics education are conducted.

3-1 Teaching methods and materials are introduced to upper secondary Science and Mathematics teachers outside FOP.

3-1-a) Newsletters and/or journals are published in cooperation with related organizations and institutions.

~~3-1-b) The newsletters and publications are distributed to the relevant sources.~~

3-2-c) Seminars and workshops are held at FOP as well as at upper secondary schools and other educational institutions.

4. Preparing a future plan for training secondary school teachers in Science and Mathematics.

4-1. Training programmes for Cambodian Science and Mathematics secondary school teachers are studied.

4-2. Teaching ability of teachers in Science and Mathematics in secondary schools is studied

~~4-3. To identify the needs of upper secondary school teacher training in Science and Mathematics.~~

4-4. A proposal for improving Science and Mathematics teacher training at the secondary education level is prepared.

ANNEX 2

The Plan of Operation for the Whole Project Period (Jul 2000 - Jul 2003)
Project Activities for Secondary School Teacher Training Project in Science and Mathematics in Cambodia

Target area: Cambodia
 Target Group: Faculty of Pedagogy Cambodia
 Date: 28 January, 2003

Activities	Year												Person in Charge	Input		
	Year I				Year II				Year III							
	I	II	III	IV	I	II	III	IV	I	II	III	IV				
Study Team			☆												Japan Side	Cambodia Side
Baseline Survey(Feb-Apr 2001)			☆											Study Team	1. Japanese Experts 1. Experts: (Long Term) Project Coordinator: Mr. Hiroshi Kikuchi (16 Aug, 2000 - 15 Aug, 2003) Chief Advisor: Mr. Ryuichi Murata (18 Oct 2000- 31 Jul 2003) Mathematics Education: Mr. Kouji Takahashi (10 Oct 2000 - 31 July 2003) Science Education: Ms. Mitsuko Maeda (15 Mar 2001 - 31 July 2003) Physics Education: Mr. Akihiko Shike (12 May 2001 - 31 July 2003) Biology Education: Mr. Tetsuya Murayama (1 Jul 2002- 31 Jul 2003) Short Term Experts (50M/M) Detail can be found in the attached document.	1. Personnel Counterparts (C/Ps) Mathematics 2000-2001: 2 2001-2003: 3 Chemistry 2000-2001: 2 2001-2003: 3 Biology 2000-2001: 2 2001-2003: 3 Physics 2000-2001: 2 2001-2003: 3
Curriculum Development (Feb-Apr 2001)					☆								Study Team			
Mid Term Evaluation Study by the Japanese Consultative Team (Sep 2001)													Study Team			
Completion of the Construction of the Science and Mathematics Building						★				☆			Project Team			
0.1 To establish the working space for the Project Team,																
PDMo To prepare necessary facilities and equipment. To repair the temporary working space with the necessary equipment in FOP.													Deputy Project Manager			
0.2 Periodical holding of the Project's Steering Committee,																
PDMo To organize a Steering Committee for improvement of secondary school teacher training in Science and Mathematics													Project Director	Study Team Baseline Study Curriculum Development Mid Term Evaluation Detail can be found in the attached document.		
0 To hold the Steering Committee of the project periodically for the improvement of secondary teacher training in Science and Mathematics.													Project Director			

Activities		Year												Person in Charge	Input		
		Year I				Year II				Year III							
		I	II	III	IV	I	II	III	IV	I	II	III	IV				
1	Qualitative improvement of existing pre-service teacher training															2. Facility Office space land buildings and facilities necessary for the Japanese experts and for the Project activities 3. Cost of Renovation for the temporary office for the Japanese Project Team 4,000 US Dollars. 4. Cost of utility charges	
1-0/ PDMo	supplementary survey to update Science and Mathematics Education Secondary School Survey (1998)														Short Term Study team		2. C/P Training in Japan Mathematics Mr. Men Vain: Mar 2001 - May 2001 (Aichi University of Education) Mr. Chan Rada: Mar 2002 - Jun 2002 (Mie University) Mr. Thai Heng: Sep 2002 - Dec 2002 (Aichi University of Education)
PDMo	To examine problems in secondary school teacher training in Science and Mathematics.														Long Term Experts		
1-1	To develop new curricula, syllabi and references for teacher training at FOP in cooperation with working groups.														Team Leader, Project Manager		
1-1-a	To organize working groups.														Team Leader, Project Manager		
1-1-b	To study existing curricula/ syllabi/ teaching materials														Heads of Working Groups		Chemistry Mr. Sieng Sovanna: Mar 2002 - May 2001 (Aichi University of Education) Mr. Hap Phalthy: Mar 2002 - Jun 2002 (Mie University, Nagoya University) Mr. Set Seng: Sep 2002 - Dec 2002 (Aichi University of Education, Nagoya University, Mie University)
PDMo/ PDMe	To identify the needs of upper secondary school teacher training in Science and Mathematics.														Long Term Experts		
1-1-c	To prepare references for pre-service training in FOP.														Long Term Experts, C/Ps		
1-1-d	To produce the new curricula and syllabi.														Long Term Experts, C/Ps		Biology Mr. Day Bonna: Sep 2001 - Dec 2001 (Gifu University, Aichi University of Education) Ms. Em Sauth: Sep 2001 - Dec 2001 (Gifu University, Aichi University of Education) Ms. Hour Khim: Sep 2002 - Dec 2002 (Aichi University of Education, Gifu University)
PDMo/ PDMe	To conduct training courses of working groups in 4 subject areas by Japanese experts at FOP.														Long Term Experts		
PDMo	To revise the existing pre-service training syllabus and develop the in-service training syllabus.														Long Term Experts, C/Ps		
PDMo	To conduct in-service training courses for secondary school inspectors (4 subject areas) at FOP.														Long Term Experts, FOP Trainers		

Activities	Year												Person in Charge	Input
	Year I				Year II				Year III					
	I	II	III	IV	I	II	III	IV	I	II	III	IV		
1-2	To develop teaching materials.											Long Term Experts, FOP Trainers	Physics Mr. Ngor Penglong: Sep 2001 - Dec 2001 (Gifu University, Aichi University of Education) Mr. Touch Chantum: Sep 2001 - Dec 2001 (Gifu University, Aichi University of Education) Mr. Bo Chantha: Sep 2002 - Dec 2002 (Aichi University of Education)	
1-3	To conduct pre-service training sufficiently based on the new curricula and using developed materials.											Long Term Experts, FOP Trainers		
1-3-a	To train math and science trainees in use of the developed curricula/ syllabi/ teaching materials.											Long Term Experts, FOP Trainers		
1-3-b	To evaluate teacher trainers in terms of the implementation of developed curriculum/ syllabi/ teaching materials.											Long Term Experts		
PDMo/ PDMe	To procure necessary facilities/ equipments for project activities.											Project Team		
PDMo/ PDMe	To evaluate and get feedback regarding teaching methods of developed curricula/syllabi/ teaching materials.											Long Term Experts, C/Ps		
1-4	To conduct final evaluation.											Evaluation Study Team		
PDMo	To prepare Master plan for National Center for Science and mathematics Education.											Long Term Expert		
2	Preparing trainers for the introduction of new ideas.													
2-1	To enhance trainers' knowledge in each subject.											Long Term Experts, Short Term Experts		
2-1-a	To provide necessary technical guidance and advice											Long Term Experts, Short Term Experts		
2-1-b	To conduct training programs abroad.											DSC, Long Term Experts, C/Ps		

This activity is indicated in PDMo though not indicated in the initial P/O.

Altered after the Mid-Term Evaluation Study.

- 3. Science and Mathematics Education Building.
- 4. Apparatus and Chemicals for Experiment
- 5. Furniture
- 6. Facilities
- 7. Cost and Facilities of making publications. Newsletter
- Sep 01: 1900 copies(Cambodian) 3636USD
- 600 copies (English) 432USD
- Mar 02: 3900 copies (Cambodian) 5940USD
- 500 copies (English) 500USD
- Dec 02: 4000 copies (Cambodian) 2400USD

- 7. Cost of publications (Continued)
- Experiment Guide
- Vol. 1. 2700 copies, 3925USD
- Vol. 2. 3000 copies, 2100 USD
- Biology Dictionary
- Ver 1. 300 copies, 2550USD

Activities	Year												Person in Charge	Input
	Year I				Year II				Year III					
	I	II	III	IV	I	II	III	IV	I	II	III	IV		
3	Conducting activities for promoting Science and Mathematics education.													8. Cost and Facilities of organizing workshops and seminars. Mathematics 27-31, May 2001 Kampong Thom: 1628 USD 8-12 Jul, 2001 Cham: 4631 USD Kampong 8. Cost of Workshop (Continued) Science 14-17 Oct, 2002 Battambang: 7,794USD Kamdal: 7,284USD Takeo: 6,419USD 22-25 Oct, 2002 Phnom Penh: 7,036USD Prey Veng: 3,789USD 24-25 Oct, 2002 Kampong Cham: 2,805USD 15-17 Nov, 2002 Kampong Thom: 1,303USD
3-1	To introduce teaching methods and materials to upper secondary Science and Mathematics Teachers Outside FOP.												Long Term Experts, FOP Trainers	
PDMo	To hold seminars, workshops, and exhibitions for teachers and/ or students.												Long Term Experts, FOP Trainers	
3-1-a	To publish newsletters and/ or journals in cooperation with related organizations and institutions.												Long Term Experts, C/Ps	
PDMc	To deliver the newsletters and publications to the relevant sources. (The time of dissemination is indicated in stars.)												Long Term Experts	
3-2-b	To carry out seminars and workshops at FOP as well as at upper secondary schools and other educational institutes.												Long Term Experts, FOP Trainers	
4	Preparing a future plan for secondary teacher training													
4-1	To study training programs for Cambodian Science and Mathematics Secondary school teachers.												Long Term Experts	
4-2	To study teaching ability of teachers in Science and Mathematics teacher training at the secondary school level.												Long Term Experts	
4-3	To prepare a proposal for improving Science and Mathematics Teacher Training at the Secondary Education level.												Long Term Experts	

ANNEX 2

The Plan of Operation for the Whole Project Period (Jul 2000 - Jul 2003)
Project Activities for Secondary School Teacher Training Project in Science and Mathematics in Cambodia

Target area: Cambodia
 Target Group: Faculty of Pedagogy Cambodia
 Date: 28 January, 2003

Activities	Year												Person in Charge	Input		
	Year I				Year II				Year III							
	I	II	III	IV	I	II	III	IV	I	II	III	IV				
Study Team			☆												Japan Side	Cambodia Side
Baseline Survey(Feb-Apr 2001)			☆											Study Team	1. Japanese Experts	1. Personnel Counterparts (C/Ps)
Curriculum Development (Feb-Apr 2001)					☆									Study Team	1. Experts: (Long Term) Project Coordinator: Mr. Hiroshi Kikuchi (16 Aug, 2000 - 15 Aug, 2003) Chief Advisor: Mr. Ryuichi Murata (18 Oct 2000-31 Jul 2003)	Mathematics 2000-2001: 2 2001-2003: 3 Chemistry 2000-2001: 2 2001-2003: 3 Biology 2000-2001: 2 2001-2003: 3 Physics 2000-2001: 2 2001-2003:3
Mid Term Evaluation Study by the Japanese Consultative Team (Sep 2001)														Study Team	Mathematics Education: Mr. Kouji Takahashi (10 Oct 2000 - 31 July 2003) Science Education: Ms. Mitsuko Maeda (15 Mar 2001 - 31 July 2003) Physics Education: Mr. Akihiko Shike (12 May 2001- 31 July 2003)	
Completion of the Construction of the Science and Mathematics Building					★					☆				Project Team	Biology Education: Mr. Tetsuya Murayama (1 Jul 2002- 31 Jul 2003) Short Term Experts (50M/M) Detail can be found in the attached document.	
0.1 To establish the working space for the Project Team,																
PDMo To prepare necessary facilities and equipment. To repair the temporary working space with the necessary equipment in FOP.														Deputy Project Manager		
0.2 Periodical holding of the Project's Steering Committee,																
PDMo To organize a Steering Committee for improvement of secondary school teacher training in Science and Mathematics														Project Director	Study Team Baseline Study Curriculum Development	
0 To hold the Steering Committee of the project periodically for the improvement of secondary teacher training in Science and Mathematics.														Project Director	Mid Term Evaluation Detail can be found in the attached document.	

Activities		Year												Person in Charge	Input		
		Year I				Year II				Year III							
		I	II	III	IV	I	II	III	IV	I	II	III	IV				
	Qualitative improvement of existing pre-service teacher training															2. Facility Office space land buildings and facilities necessary for the Japanese experts and for the Project activities 3. Cost of Renovation for the temporary office for the Japanese Project Team 4,000 US Dollars. 4. Cost of utility charges	
1-0/ PDMo	supplementary survey to update Science and Mathematics Education Secondary School Survey (1998)														Short Term Study team		2. C/P Training in Japan Mathematics Mr. Men Vain: Mar 2001 - May 2001 (Aichi University of Education) Mr. Chan Rada: Mar 2002 - Jun 2002 (Mie University) Mr. Thai Heng: Sep 2002 - Dec 2002 (Aichi University of Education)
PDMo	To examine problems in secondary school teacher training in Science and Mathematics.														Long Term Experts		
1-1	To develop new curricula, syllabi and references for teacher training at FOP in cooperation with working groups.														Team Leader, Project Manager		
1-1-a	To organize working groups.														Team Leader, Project Manager		
1-1-b	To study existing curricula/ syllabi/ teaching materials														Heads of Working Groups		Chemistry Mr. Sieng Sovanna: Mar 2002 - May 2001 (Aichi University of Education) Mr. Hap Phalthy: Mar 2002 - Jun 2002 (Mie University, Nagoya University) Mr. Set Seng: Sep 2002 - Dec 2002 (Aichi University of Education, Nagoya University, Mie University)
PDMo/ PDMe	To identify the needs of upper secondary school teacher training in Science and Mathematics.														Long Term Experts		
1-1-c	To prepare references for pre-service training in FOP.														Long Term Experts, C/Ps		
1-1-d	To produce the new curricula and syllabi.														Long Term Experts, C/Ps		Biology Mr. Day Bonna: Sep 2001 - Dec 2001 (Gifu University, Aichi University of Education) Ms. Em Sauth: Sep 2001 - Dec 2001 (Gifu University, Aichi University of Education) Ms. Hour Khim: Sep 2002 - Dec 2002 (Aichi University of Education, Gifu University)
PDMo/ PDMe	To conduct training courses of working groups in 4 subject areas by Japanese experts at FOP.														Long Term Experts		
PDMo	To revise the existing pre-service training syllabus and develop the in-service training syllabus.														Long Term Experts, C/Ps		
PDMo	To conduct in-service training courses for secondary school inspectors (4 subject areas) at FOP.														Long Term Experts, FOP Trainers		

Activities	Year												Person in Charge	Input
	Year I				Year II				Year III					
	I	II	III	IV	I	II	III	IV	I	II	III	IV		
1-2	To develop teaching materials.											Long Term Experts, FOP Trainers	Physics Mr. Ngor Penglong: Sep 2001 - Dec 2001 (Gifu University, Aichi University of Education) Mr. Touch Chantum: Sep 2001 - Dec 2001 (Gifu University, Aichi University of Education) Mr. Bo Chantha: Sep 2002 - Dec 2002 (Aichi University of Education)	
1-3	To conduct pre-service training sufficiently based on the new curricula and using developed materials.											Long Term Experts, FOP Trainers		
1-3-a	To train math and science trainees in use of the developed curricula/ syllabi/ teaching materials.											Long Term Experts, FOP Trainers		
1-3-b	To evaluate teacher trainers in terms of the implementation of developed curriculum/ syllabi/ teaching materials.											Long Term Experts		
PDMo/ PDMe	To procure necessary facilities/ equipments for project activities.											Project Team		
PDMo/ PDMe	To evaluate and get feedback regarding teaching methods of developed curricula/syllabi/ teaching materials.											Long Term Experts, C/Ps		
1-4	To conduct final evaluation.											Evaluation Study Team		
PDMo	To prepare Master plan for National Center for Science and mathematics Education.											Long Term Expert		
2	Preparing trainers for the introduction of new ideas.													
2-1	To enhance trainers' knowledge in each subject.											Long Term Experts, Short Term Experts		
2-1-a	To provide necessary technical guidance and advice											Long Term Experts, Short Term Experts		
2-1-b	To conduct training programs abroad.											DSC, Long Term Experts, C/Ps		

3. Science and Mathematics Education Building.
 4. Apparatus and Chemicals for Experiment
 5. Furniture
 6. Facilities
 7. Cost and Facilities of making publications.
 Newsletter
 Sep 01: 1900 copies(Cambodian) 3636USD
 600 copies (English) 432USD
 Mar 02: 3900 copies (Cambodian) 5940USD
 500 copies (English) 500USD
 Dec 02: 4000 copies (Cambodian) 2400USD

7. Cost of publications (Continued)
 Experiment Guide
 Vol. 1. 2700 copies, 3925USD
 Vol. 2. 3000 copies, 2100 USD
 Biology Dictionary
 Ver 1. 300 copies, 2550USD

Activities	Year												Person in Charge	Input
	Year I				Year II				Year III					
	I	II	III	IV	I	II	III	IV	I	II	III	IV		
3	Conducting activities for promoting Science and Mathematics education.													8. Cost and Facilities of organizing workshops and seminars. Mathematics 27-31, May 2001 Kampong Thom: 1628 USD 8-12 Jul, 2001 Cham: 4631 USD Kampong 8. Cost of Workshop (Continued) Science 14-17 Oct, 2002 Battambang: 7,794USD Kanda: 7,284USD Takeo: 6,419USD 22-25 Oct, 2002 Phnom Penh: 7,036USD Prey Veng: 3,789USD 24-25 Oct, 2002 Kampong Cham: 2,805USD 15-17 Nov, 2002 Kampong Thom: 1,303USD
3-1	To introduce teaching methods and materials to upper secondary Science and Mathematics Teachers Outside FOP.												Long Term Experts, FOP Trainers	
PDMo	To hold seminars, workshops, and exhibitions for teachers and/ or students.												Long Term Experts, FOP Trainers	
3-1-a	To publish newsletters and/ or journals in cooperation with related organizations and institutions.												Long Term Experts, C/Ps	
PDMe	To deliver the newsletters and publications to the relevant sources. (The time of dissemination is indicated in stars.)												Long Term Experts	
3-2-b	To carry out seminars and workshops at FOP as well as at upper secondary schools and other educational institutes.												Long Term Experts, FOP Trainers	
4	Preparing a future plan for secondary teacher training.													
4-1	To study training programs for Cambodian Science and Mathematics Secondary school teachers.												Long Term Experts	
4-2	To study teaching ability of teachers in Science and Mathematics teacher training at the secondary school level.												Long Term Experts	
4-3	To prepare a proposal for improving Science and Mathematics Teacher Training at the Secondary Education level.												Long Term Experts	

ANNEX 3

Achievement of the Project

Project title: Secondary School Teacher Training Project in Science and Mathematics.

Project area: Cambodia

Target Group: Teacher Trainers in FOP

Duration: 3 years (2000.8.1~2003.7.31)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Summary of Result of Evaluation
<p>【Overall Goal】 Capability of Science and Mathematics teachers is enhanced.</p>	<p>The capability of the Science and Maths teachers is increased.</p>	<p>1. National Teacher's assessment of the effectiveness (National statistics indicating Teacher's knowledge, attitude and students achievement).¹</p>	<p>1. (Gradually emerging.) The impact has not been confirmed in reference to the suggested Objectively Verifiable Indicators. However, the impact has been partly achieved the provincial workshops conducted for the teachers and through the FOP graduates after the launch of the STEPSAM.</p>
<p>【Project Purpose】</p> <p>1. A medium-term and long-term plan for improving secondary school teacher training in Science and Mathematics is prepared.</p> <p>2. Capability of Faculty of Pedagogy (FOP) in Science and Mathematics education is enhanced.</p>	<p>1. A proposal for improving secondary school teacher training in science and Mathematics is submitted to MoEYS.</p> <p>2. <u>(Effectiveness of FOP in Science and Mathematics education is increased.)</u> <u>FOP Trainees capability is increased.</u> <u>(FOP students/ Graduates' capability of teaching Science and Mathematics is increased.)</u></p>	<p>1. The Proposal is prepared.</p> <p>2a. <u>Interview with the Dean of FOP and the Director of the Teacher Training Department.</u></p> <p>2b. <u>Interview with the FOP Graduates (Teachers already in-service)</u></p>	<p>1. The project purpose 1 is expected to be achieved by the end of July 2003. The proposal for the mid-long term plan for the teacher training in Science and Mathematics has been prepared and under discussion with the Teacher Training Department of MoEYS. However, the scope of the draft, at the time of the evaluation study, was limited to the curriculum and textbook revision. In the remaining project period, the project team is recommended to develop the plan to achieve the lasting impact and increased sustainability of the STEPSAM in collaboration with the stakeholders.</p> <p>2. The project purpose 2 will not be achieved sufficiently by the end of July 2003 due to the limited attainment of the Output 1 and 2. However, the FOP has increased its capability compared to the initial stage of the STEPSAM.</p> <p>2a. The Dean of the FOP has indicated that the FOP trainers have increased their motivation and capability of teacher training. The STEPSAM also increased the publicity of the FOP.</p> <p>2b. According to the findings from the interview conducted with the selected FOP graduates, we may conclude that the capability of trainers and the content of the teacher training have improved. They have indicated the relevance and effectiveness of the teacher training that they have received at FOP. The useful technique they learned included the learner-centred approach and conducting experiments using the local materials.</p>

¹ During this survey, the data indicated may not be obtainable considering the situation of Cambodia. However, these indicators, in the future, could be useful in evaluating the projects of similar nature. For this purpose, respective statistical data shall be established as well as the teacher qualification system.

<p>[Output] 1. The quality of existing pre-service teacher training programs is improved.</p>	<p>1-1. New curricula, syllabi and references for teacher training at FOP are developed in cooperation with working groups.</p> <p>1-2 Teaching materials are developed.</p> <p>1-3 Pre-service training is conducted sufficiently based on the new curricula and using developed teaching materials.</p> <p>1-4 Evaluation is carried out. (Moved to Activities.)</p>	<p>1-1. Developed curricula/syllabi and references</p> <p>1-2. Developed teaching materials</p> <p>1-3. a. Records of Training conducted</p>	<p>Output 1 The Output 1 is limited in its achievement due to the FOP trainers' limited acquisition of the skills and knowledge in relation to the teacher training in the respective subject areas.</p> <p>1-1. New curriculum, syllabi and references for teacher training have been developed by the FOP trainers in collaboration with the Japanese experts. Purchased foreign textbooks and references in English have been translated into Khmer by the Trainers so that those who have limited English proficiency could also enjoy the richness of information that can provide.</p> <p>1-2. The list of developed teaching materials is attached in ANNEX 5-6.</p> <p>1-3a. A series of the workshops were conducted for developing the capability of FOP trainers. The table below indicates the regular workshops conducted in order to develop the curriculum and teaching materials as well as to enhance the basic understanding of the respective subject.</p> <p style="text-align: center;"><u>Regular Workshop</u></p> <table border="1" data-bbox="1317 679 1895 1358"> <thead> <tr> <th></th> <th></th> <th>Objectives</th> <th>Dates</th> <th>Timing</th> </tr> </thead> <tbody> <tr> <td>2000-2001</td> <td>Regular Workshop</td> <td>Development of Curriculum and Teaching Materials</td> <td>2000,11-2001,7</td> <td>Once a week</td> </tr> <tr> <td rowspan="4">2001-2002</td> <td>Regular Workshop 1</td> <td>Development of Curriculum, Translation of reference materials and understanding of the content.</td> <td>2001,11-2002,7</td> <td>Once a week</td> </tr> <tr> <td>Regular Workshop2</td> <td>Teaching Methodology</td> <td>2001,11-2002,7</td> <td>Once a week</td> </tr> <tr> <td rowspan="2">Lecture</td> <td>Practicum (Science) for further understanding of each subject</td> <td rowspan="2">2001,11-2002,8</td> <td>Once a week</td> </tr> <tr> <td>Practicum (Mathematics) for further understanding of Mathematics</td> <td>Twice a week</td> </tr> <tr> <td>"Today's Science"</td> <td>Science in General</td> <td>2001,10-</td> <td>Once a week</td> </tr> <tr> <td>Individual Consultation</td> <td>Daily Advise</td> <td>2000, 9-</td> <td></td> </tr> </tbody> </table>			Objectives	Dates	Timing	2000-2001	Regular Workshop	Development of Curriculum and Teaching Materials	2000,11-2001,7	Once a week	2001-2002	Regular Workshop 1	Development of Curriculum, Translation of reference materials and understanding of the content.	2001,11-2002,7	Once a week	Regular Workshop2	Teaching Methodology	2001,11-2002,7	Once a week	Lecture	Practicum (Science) for further understanding of each subject	2001,11-2002,8	Once a week	Practicum (Mathematics) for further understanding of Mathematics	Twice a week	"Today's Science"	Science in General	2001,10-	Once a week	Individual Consultation	Daily Advise	2000, 9-	
		Objectives	Dates	Timing																																
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"Today's Science"	Science in General	2001,10-	Once a week																																	
Individual Consultation	Daily Advise	2000, 9-																																		

<p>2. Trainers are prepared for the introduction of new ideas.</p>	<p>(2. New teaching methods and materials are introduced by FOP trainers) <u>2-1. Trainers' understanding of the basic concepts of the Science and Mathematics is increased</u> <u>2-2. Trainers' knowledge of the teaching methods and materials of Science and Math is improved.</u> <u>2-3. Trainers' capability to utilise the teaching methods and materials introduced by the project is developed.</u></p>	<p>1-3 b. Interview with the C/P and experts.</p> <p>(2. The number of new methods and materials used by trainers.)</p> <p><u>2-1. Interview with the short term-experts</u></p> <p><u>2-2. Questionnaire for the FOP trainers evaluating the level of knowledge on the teaching methods and materials.</u></p> <p><u>2-3a. Observation by the Experts</u></p> <p><u>2-3b. Observation by the FOP Graduates</u></p>	<p>1-3b. The pre-service training has been conducted based on the revised curriculum in 2000 and 2001. The newly developed teaching materials have also been in use. It has been observed by the Japanese experts that the FOP trainers including C/Ps have indicated that their way of teacher training has changed in many aspects, although such improvement has been observed in limited aspects of the respective subject areas.</p> <p>Output 2. The achievement of the Output 2 has been restricted. This is because FOP trainers have not improved their basic understandings and teaching methodology in all aspects of the respective subject areas.</p> <p>2-1. The short term experts indicated that the counterparts and FOP trainers have advanced their understanding in basic knowledge and learned the way of logical and scientific thinking. However, Trainers for Science, in particular, have the premature understanding of the Mathematics, which has limited their capability to obtain the knowledge and skill in teaching methods in Science. Thus the continuous assistance in Mathematics is necessary for the Science Trainers.</p> <p>2-2. The result of the questionnaire has indicated that the majority of the FOP trainers have improved their knowledge in basic understanding, teaching methodology as well as teaching materials. However, such improvement has not been observed in all topics of the respective subject. The summary of the questionnaire is indicated in ANNEX 5-10. Furthermore, many of the trainers in Science indicated that they have not learned how to use all the equipments in the laboratory. Thus, they requested the training on using the equipments that they are not familiar with.</p> <p>2-3a. The observation by the Japanese experts indicated that the FOP trainers have increased their ability to utilise the introduced teaching methods and materials. However, such knowledge and experiences have not been internalised among the trainers because their experience has not been substantial in its length and frequency. Therefore, further training and assistance by the Japanese experts are considered to be necessary.</p> <p>2-3b. The findings from the interview conducted with the FOP graduates since the launch of the FOP graduates allow us to induce the capability to utilise the teaching methods and materials introduced by the project has been developed. This is based on the fact that the teacher training has been effective and relevant to the daily teaching practices. Without the relevant skills, FOP trainers could not have been able to conduct the sufficient training and convey the knowledge to the trainees.</p>
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<p>3. Activities for promoting Science and Mathematics education are conducted.</p>	<p>(3. The degree of recognition and participation in promotion activities by related people and organisations is evaluated.)</p> <p>3-1. The FOP's function of communicating and co-ordinating information on Science and Mathematics Education is strengthened.</p> <p>3-2. Trainers' ability to demonstrate the newly introduced methods to the teacher trainees and the relevant individuals and organizations is developed.</p> <p>3-3. Level of recognition towards project and Science and Mathematics education is increased among the individuals and organisations concerned.</p>	<p>3-1a. <u>The list of publications</u></p> <p>3-1b. <u>The record of the organised workshops.</u></p> <p>3-1c. <u>Interview with the relevant individuals and organisations</u></p> <p>3-2. <u>Record of the workshop (Observation)</u></p> <p>3-3-a. <u>Newsletters, Journals, records of seminars and workshops</u></p>	<p>Output 3 Output 3 has been achieved sufficiently through the circulation of the publications and through the provincial workshops.</p> <p>3-1a. FOP counterparts have issued and circulated STEPSAM Newsletters both in English and Khmer with assistance of Japanese experts. This was effective in a way to develop counterparts' capability in developing the teaching materials.</p> <p>3-1b. The workshops for the teachers in-service have been successfully conducted in the following provinces. Science: Battambang, Kandal, Takeo Phnom Penh, Prey Veng, Kampong Cham, Kampong Thom Svay Rieng Mathematics: Kampong Thom, Kampong Cham.</p> <p>3-1c. The publication was indicated to be very useful among the workshop participants. However, the arrangement of the topics may need to be modified according to the current upper secondary school curriculum.</p> <p>3-2. According to the observation by the Japanese experts, the FOP trainers have obtained the necessary skills and knowledge to conduct the demonstration in public. Furthermore, they have increased their motivation to learn by themselves in order to respond to the questions from the audiences at the workshops.</p> <p>3-3. The newsletter have developed the common understanding towards the activities of the STEPSAM and opened the channels for dialogue and developed the collaboration beyond STEPSAM.</p>
<p>4. A future plan for secondary Science and Mathematics teacher training is prepared</p>	<p>4. A proposal for improving Science and Mathematics teacher training is prepared</p>	<p>4. The prepared proposal</p>	<p>Output 4 Output 4 is expected to be achieved by the end of July 2002.</p> <p>The draft of the proposal for the teacher training plan has been in progress and discussed with the MoEYS. However, as mentioned above, the plan has focused on the curriculum and textbook reform. The final output is expected to incorporate the suggestions for the effective use and maintenance of the Science and Education Building as well as the approach to the teacher training at FOP as a whole. In this process, it is advised for the project team to solicit the participation of the stakeholders including counterparts.</p>

Narrative Summary	Achievement	
<p>[Activities]</p> <p>1. Qualitative improvement of existing pre-service teacher training</p> <p>1-0. Baseline survey is conducted.</p> <p>1-1. New curricula, syllabi and references for teacher training at FOP are developed in cooperation with working groups.</p> <p>1-1-a). Working Groups are organised.</p> <p>1-1-b). Existing curricula and syllabi are studied.</p> <p>1-1-c). References for pre-service training in FOP are prepared.</p> <p>1-1-d). The new curricula, syllabi and references are produced.</p> <p>1-1-e). <u>To conduct training courses of working groups in 4 subject areas by Japanese experts at FOP.</u></p> <p>1-1-f). To conduct monitoring and evaluation on the training courses.</p> <p>1-2. Teaching materials are developed.</p> <p>1-3. Pre-service training is conducted sufficiently based on the new curricula and using developed materials.</p> <p>1-3-a). Teacher trainees are trained in use of the developed curricula/syllabi/teaching materials.</p> <p>1-3-b). Teacher trainers are evaluated in terms of the implementation of developed curricula/syllabi/teaching materials.</p> <p>1-3-c). <u>Necessary facilities/equipment for project activities are provided.</u></p> <p>1-3-d). <u>Teacher trainers are evaluated and get feedback regarding teaching methods of developed curricula/syllabi/teaching materials.(Incorporated from PDMo)</u></p> <p>1-4. Final evaluation is conducted.</p>	<p>Japanese side</p> <p>1. Experts:</p> <p>Long Term Experts</p> <p>Project Coordinator: Mr. Hiroshi Kikuchi (16 Aug, 2000 - 15 Aug, 2003)</p> <p>Chief Advisor: Mr. Ryuichi Murata (18 Oct 2000-31 Jul 2003)</p> <p>Mathematics Education: Mr. Kouji Takahashi (10 Oct 2000 - 31 July 2003)</p> <p>Science Education: Ms. Mitsuko Maeda (15 Mar 2001 - 31 July 2003)</p> <p>Physics Education: Mr. Akihiko Shike (12 May 2001-31 July 2003)</p> <p>Biology Education: Mr. Tetsuya Murayama (1 Jul 2002-31 Jul 2003)</p> <p>Short Term Experts</p> <p>Science Education Ms. Mitsuko Maeda (18 Sep 2000-10 Jan 2001)</p> <p>Mathematics Education: Mr. Kouji Takahashi (11 Oct 2000-20 Jan 2001)</p> <p>Mathematics Education: Mr. Kenji Kotani (31 Jul 2001-8 Sep 2001) Aichi University of Education</p> <p>Biology Education: Dr. Hirokazu Morimoto (21 Aug 2001-15 Sep 2001) Nara University of Education.</p> <p>Chemistry Education: Dr. Fumio Kawaizumi (11 Feb 2002-21 Mar 2002) Nagoya University</p>	<p>Cambodian side</p> <p>1. Personnel</p> <p>Counterparts (C/Ps) (throughout the project period)</p> <p>Mathematics</p> <p>2000-2001: 2</p> <p>2001-2003: 3</p> <p>Chemistry</p> <p>2000-2001: 2</p> <p>2001-2003: 3</p> <p>Biology</p> <p>2000-2001: 2</p> <p>2001-2003: 3</p> <p>Physics</p> <p>2000-2001: 2</p> <p>2001-2003:3</p> <p>2. Facility Office space, land, buildings and facilities necessary for the Japanese experts and for the Project activities</p> <p>3. Cost of Renovation for the temporary office for the Japanese Project Team 4,000 US Dollars.</p> <p>4. Cost of utility charges</p>

<p>2. Preparing trainers for the introduction of new ideas. 2-1. Trainers' knowledge in each subject is enhanced. 2-1-a) Necessary technical guidance and advice are provided. 2-1-b) Training is conducted abroad.</p> <p>3. Activities for promoting science and mathematics education are conducted. 3-1 Teaching methods and materials are introduced to upper secondary science and Mathematics teachers outside FOP. 3-1-a) Newsletters and/or journals are published in cooperation with related organisations and institutions. 3-1-b) The newsletters and publications are distributed to the relevant sources 3-2-c) Seminars and workshops are held at FOP as well as at upper secondary schools and other educational institutions.</p> <p>4. Preparing a future plan for training secondary school teachers in science and mathematics 4-1. Training programs for Cambodian science and mathematics secondary school teachers are studied. 4-2. Teaching ability of teachers in science and mathematics in secondary schools is studied 4-3. To identify the needs of upper secondary school teacher training in science and mathematics 4-4. A proposal for improving science and mathematics teacher training at the secondary education level is prepared</p>	<p>Short Term Experts (Continued) Biology Education: Mr. Masaomi Kanamori (19 Feb 2002-20 Apr 2002) Aichi University of Education Physics Education: Mr. Masao Ando (31 Mar 2002-27 Apr 2002) Tokai Women's College Biology Education: Dr. Hirokazu Morimoto (27 Jul 2002-21 Aug 2002) Nara University of Education Physics Education: Mr. Masao Ando (29 Jul 2002-24 Aug 2002) Tokai Women's College Mathematics Education: Mr. Masashi Suzuki (5 Aug 2002-13 Sep 2002) Aichi University of Education Chemistry Education: Mr. Takeo Nomoto (10 Aug 2002-7 Sep 2002) Mie University</p>	<p>Input by Japan Side Study Team <u>Baseline Study (Feb-Apr 2001)</u> Educational Development: Dr. Yutaka Otsuka (Nagoya University) Biology Education: Mr. Masaomi Kanamori (Aichi University of Education) Physics Education: Mr. Hiromi Ozaki (Gifu University) Chemistry Education: Mr. Seiji Kakihara (Mie University)</p> <p><u>Curriculum Development (Feb-Apr 2001)</u> Biology Education: Dr. Hirokazu Morimoto (Nara University of Education) Chemistry Education: Dr. Fumio Kawaizumi (Nagoya University) Physics Education: Mr. Masao Ando (Tokai Women's College) Mathematics Education: Mr. Masashi Suzuki (Aichi University of Education)</p> <p>Project Monitoring (Sep 2001) International Educational Development: Dr. Mitsuru Wakabayashi (Nagoya University) Mathematics Education: Mr. Masashi Suzuki (Aichi University of Education) Ms Sayaka Nakamura (JICA)</p>
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Input by Japan Side (Continued)

2. Counterparts Training

Mathematics

Mr. Men Vaing (Mar 2001-May 2001, Aichi University of Education)

Mr. Chan Rada (Mar 2002-Jun 2002, Mie University)

Mr. Thai Heng (Sep 2002-Dec 2002, Aichi University of Education)

Chemistry

Mr. Sieng Sovanna: Mar 2002 - May 2001 (Aichi University of Education)

Mr. Hap Phalthy: Mar 2002 - Jun 2002 (Mie University, Nagoya University)

Mr. Set Seng: Sep 2002 - Dec 2002 (Aichi University of Education, Nagoya University, Mie University)

Biology

Mr. Day Bonna: Sep 2001 - Dec 2001 (Gifu University, Aichi University of Education)

Ms. Em Sauth: Sep 2001 - Dec 2001 (Gifu University, Aichi University of Education)

Ms. Hour Khim: Sep 2002 - Dec 2002 (Aichi University of Education, Gifu University)

Physics

Mr. Ngor Penglong: Sep 2001 - Dec 2001 (Gifu University, Aichi University of Education)

Mr. Touch Chantum: Sep 2001 - Dec 2001 (Gifu University, Aichi University of Education)

Mr. Bo Chantha: Sep 2002 - Dec 2002 (Aichi University of Education)

Continued on the other side

3. Science and Mathematics Education Building.

4. Apparatus and Chemicals for Experiment

5. Furniture

6. Facilities

7. Cost Publication:

Newsletter

Vol.	Date	To	Copies	Cost
1(Khmer)	Sep, '01	FOP Trainers, Upper-Secondary Schools in all provinces, MoEYS and its Departments, Participants of the Workshops, Visitors	1,900	3,636USD
1(English)	Sep, '01	Individuals and Organisations involved in Educational Development in Cambodia, Visitors	600	432USD
2(Khmer)	Mar, '02	FOP Trainers, Upper-Secondary Schools in all provinces, MoEYS and its Departments, Participants of the Workshops, Visitors	3,900	5,940USD
2(English)	Mar, '02	Individuals and Organisations involved in Educational Development in Cambodia, Visitors	500	500USD
3(Khmer)	Dec, '02	FOP Trainers, Upper-Secondary Schools in all provinces, MoEYS and its Departments, Participants of the Workshops, Visitors	4,000	2,400USD
3(English)	Dec, '02	Individuals and Organisations involved in Educational Development in Cambodia, Visitors	300	500USD

Other Publications

Name of the Publication		Number of Copies	Cost
Science Experiment Guide	Vol. 1.	2,700	3,925 USD
Science Experiment Guide	Vol. 2.	3,000	2,100 USD
Biology Dictionary	Ver. 1.	300	2,550USD

8. Cost and Facilities of organizing workshops and seminars in USD.

Record of Workshops				
Subject	Venue	Date	Number of Participants	Total Cost
Mathematics	Kampong Thom	27-31 May 2001	36	1,628
	Kampong Cham	8-12 Jul. 2001	65	4,631
Science	Battambang	14-17 Oct. 2002	108	7,794
	Kandal	14-17 Oct. 2002	123	7,284
	Takeo	14-17 Oct. 2002	147	6,419
	Phnom Penh	22-25 Oct. 2002	123	7,036
	Prey Veng	22-25 Oct. 2002	69	3,789
	Kampong Cham	24-25 Oct. 2002	83	2,805
	Kampong Thom	15-17 Nov. 2002	83	1,303
	Svay Rieng	15-17 Nov. 2002	76	1,173

ANNEX 4. Evaluation Grid

Secondary School Teacher Training Project in Science and Mathematics

0. Process of Project Implementation and Achievement

Evaluation Item	Survey Item	Means of Verification	Result
0.1. Achievement of the Overall Goal	0.1.1. Capacity of Science and Mathematics teacher is enhanced.	<ul style="list-style-type: none"> • Educational Statistics of Cambodia • Interview with individuals and authorities concerned 	The relevant statistical data has not been established by the MoEYS. Therefore, when the evaluation study was conducted, the indicators were not obtainable. However, in the future, these could be used for measuring the impact of the project. However, through the FOP graduates and the participants to the provincial workshops, the overall goal has been achieved to the limited extent.
0.2. Achievement of the Project Purpose	0.2.1. A Mid-term and Long-term plan for improving secondary school teacher training is prepared.	<ul style="list-style-type: none"> • Document 	This output has been partly achieved at the time of the evaluation, though it is expected to be fully achieved as scheduled. The plan has been drafted by a long-term expert. It has focused on the curriculum and textbook reform. Therefore, in the remaining project period, its scope shall be widened and the second draft should be developed in cooperation with the stakeholders including counterparts.
	0.2.2. Capability of Faculty of Pedagogy (FOP) in Science and Mathematics education is increased.	<ul style="list-style-type: none"> • Achievement • Interview with the Dean of FOP and the director of the Teacher Training Department • Interview with the FOP trainees (graduates) 	Achievement is indicated in ANNEX 3. The regular based workshops were conducted in order to enhance the FOP trainers' understanding of each subject areas as well as teaching methodology and development of curriculum and teaching materials. Furthermore, the ad-hoc workshops were conducted by the short-term experts. The record of these workshops conducted for this purpose is indicated in ANNEX 5-7.

	<p>0.2.2. Capability of Faculty of Pedagogy (FOP) in Science and Mathematics education is increased. (Continued).</p>	<ul style="list-style-type: none"> • Reports • Interview with Japanese Experts 	<p>According to the interview with the selected graduates of the FOP, their capability of teaching has been increased. What they have learned, such as learner centered approach and the experiments is very much useful in their teaching career. The group discussion, visualized and hands-on exercises help students learn effectively. They also consider that their way of teaching is better than other teachers, who have more experience compared to them. However, the difficulty they face arises when teachers work under a principal, who is not keen on introducing such activities into the classroom. Furthermore, the overpopulated classroom (70 students or above in a classroom) does not allow sufficient space for them to conduct such activities.</p> <p>Japanese experts indicated that the FOP trainers have improved both in their knowledge and attitude. They are still in the process of learning the way of logical and scientific thinking. Their basic knowledge has been expanded yet the practices and continuous training are required in order for them to fully take advantage of the given knowledge.</p>
<p>0.3. Achievement of Output</p>	<p>0.3.1. Project Management System</p>	<ul style="list-style-type: none"> • Document • Interview with JCC, SC, AC¹ • Monitoring Report • Interview with the Project Leader • Interview with the Project Team 	<p>The meeting of JCC was held once a year and SC biannually. Their role in this project has been to develop shared understanding of the project activities. On the other hand, AC has committed itself to this project providing short-term experts, the technical advice to the project team as well as conducting the counterparts training. The communication between the committee and the project team was efficient and effective as they have constructed mailing list among the individuals and organizations concerned.</p> <p>When the technical issue was raised by the project, AC provided the relevant advice to the project team. Other than that, the project team would hold discussions and came to the decision. When necessary, the project team consulted the JICA office in Cambodia and Headquarter.</p>

¹ JCC: Joint Coordinating Committee; SC: Steering Committee; AC: Advisory Committee formed mostly among the Japanese academics and specialists in Science and Mathematics Education.

	<p>0.3.2. The quality of existing pre-service teacher training program is improved.</p>	<ul style="list-style-type: none"> • The list of the reference materials • Interview with the Japanese Experts • Interview with the FOP trainers • Record of the teacher training(i.e. Curriculum) • Mid-term and Final Evaluation Repots • Interview with the C/Ps 	<p>The curriculum has been developed for 2000-2001 and implemented by the FOP trainers in collaboration with the Japanese expert. They also revised it and developed 2002-2003 by incorporating the increased number of practical works using the newly constructed Science and Mathematics Education Center. Textbooks and teacher's guide were produced by Mathematics and all subjects in Science. The list of developed teaching materials is attached to ANNEX 5-6.</p> <p>48 titles of reference materials of 90 copies in total have been purchased. The list of the books is found in ANNEX 5-5.</p> <p>The literature written in English has been translated into Khmer, which allowed the entire FOP trainers to deploy it. As the availability of the Khmer literature in Science and Mathematics education is limited, this was very effective and efficient in developing the knowledge of the FOP trainers.</p> <p>The change of the curricula and teaching materials were relevant and increased effectiveness of the quality of training at FOP. Owing to this, lecturers observed that the trainees are more interested in Science and Mathematics Education than before. Especially introducing the experiment in the classroom has made it easier for the trainees to understand theory.</p>
	<p>0.3.3. Trainers are prepared for the introduction of new ideas.</p>	<ul style="list-style-type: none"> • Interview with the short-term experts • Questionnaire for the FOP trainers • Evaluation by the Observation of Japanese Experts • Evaluation by the FOP trainees • Self-Evaluation workshop by the FOP trainers 	<p>The understanding of the basic concepts of the Science and Mathematics were increased compared to the initial stage of the project. However, the level of improvement varies among the individual trainers as well as between the units of the respective subject. Younger trainers tend to have better achievement compared to the older trainers. The understanding of the Mathematics was lacking among the trainers of Science, which affected negatively to the Science trainers. As the Mathematics is the foundation for the Science, it is necessary for the trainers to further develop the foundation for Mathematics.</p>

			<p>Trainers have learned various teaching methods and use of the teaching materials. They now have the experience in developing their own teaching materials. However, they have not had adequate experience in using them and have not internalized the acquired knowledge and skills, therefore, it is likely that they would deteriorate fairly quickly after the project period. Furthermore, they expressed that they have not learned how to use all the equipments, which needs to be taught by the Japanese experts.</p>
	<p>0.3.4. Activities for promoting Science and Mathematics education are conducted.</p>	<ul style="list-style-type: none"> • The list of Publication • The record of workshops conducted • Questionnaire for the FOP trainers • Interview with FOP trainers • Evaluation by the Japanese Experts Observation 	<p>A series of workshops have been conducted in provinces. The detail can be found in the ANNEX 5-7.</p> <p>The trainers are capable of deploying the experimental tools and teaching teachers in publishing at the workshops. This has enabled the trainers to strengthen their teaching skills and their motivation to acquire more knowledge as they find it very important to be able to answer all the questions asked at the workshops.</p> <p>The list of publication is found in ANNEX 5-8.</p> <p>The publications circulated have contributed to expand the STEPSAM's network in Cambodia. The project has regularly issued the STEPSAM Newsletter in English and Khmer targeted at Science and Mathematics teachers throughout Cambodia. Through this process, FOP trainers have learned writing and developing teaching materials by themselves.</p> <p>Circulation of the STEPSAM news via-e-mail aimed at facilitating the interaction between the project team and other individuals and organizations working in education sector in Cambodia towards the project activity. This facilitated the communication between STEPSAM and other relevant authorities. The network constructed was later initiated the project's collaboration with others.</p>

		<ul style="list-style-type: none"> • Newsletters and Journals • Interview with the participants and recipients of the publications 	<p>The recognition of the project has been increased among the teachers in-service as well as the individuals and organizations concerned through the workshops and circulating the newsletters. Three issues of newsletter have been published both in English and Khmer. The former amounts 1400 copies and the latter 9800 copies. The English version has been distributed to the upper secondary schools, teachers and workshop participants. The English version is circulated among other organizations. The number of Newsletters circulated and the cost of printing can be found in ANNEX 5-8.</p> <p>Furthermore, the representative of STEPSAM has taken part in the EDUCAM meeting, which is formed among the NGOs and donors operating in the education sector in Cambodia.</p>
	0.3.5. A future plan for secondary Science and Mathematics teacher training	<ul style="list-style-type: none"> • Progress of the draft Science and Mathematics Teacher Training Plan 	The draft plan has been in progress. The idea has been also discussed among the stakeholders,
0.4. Achievement of Activities	0.4.1. Plan of Operation and Achievement	<ul style="list-style-type: none"> • Report etc. 	P/O is found in ANNEX 2 and Achievement in ANNEX 3.
0.5. Input	0.5.1. Plan of Input and Achievement	<ul style="list-style-type: none"> • List of experts and C/Ps trained in Japan • List of Equipments provided by the project • List of teaching materials and manuals provided by the government of Japan • Record of Expenditure by the Government of Japan • Record of the Local Cost born by the Government of Cambodia • List of Equipments provided by the Government of Cambodia • Other facilities provided by the Government of Cambodia 	<p>The list of input by Japan side is found in ANNEX 3.</p> <p>The Cambodia side has allocated the 12 counterparts in the whole period and provided the their salaries. The temporary working spaces for the project team and the cost of renovation were also bore by the Cambodian government. The land for the Science and Mathematics Center was allocated by the FOP. Currently, the project team has been exempt of the utility charges.</p>

0.6. Appropriateness of the Project Implementation Process	0.6.1. Plan of Monitoring and Achievement	<ul style="list-style-type: none"> • Mid-Term Evaluation report • Quarterly Reports 	Mid-Term evaluation was carried out in March 2001. This exercise was appropriate and increased the efficiency of the project. As a result of the study, PDMo was altered and PDM1 came into operation.
	0.6.2. Interaction between the Experts and the C/Ps, FOP trainers.	<ul style="list-style-type: none"> • Interview with C/Ps and Japanese experts 	<p>The level of communication has been high between the Japanese experts and the FOP trainers including counterparts. However, in some cases, the FOP trainers only come to the FOP for lecturing for a few times a week, they did not have as frequent interaction with the FOP trainers as the counterparts.</p> <p>There seems to be a gap within the project team in interpretation of the project management based on the PDM. Therefore, some of the activities are directly related to the overall goal. However, it must be noted that this also had a positive impact of it. That is the network it initiated with other individuals and donor agencies that work in the education sector.</p>
	0.6.3. Appropriateness of the teaching methodology and materials introduced by the project	<ul style="list-style-type: none"> • Interview with Japanese experts and FOP trainers 	<p>FOP trainers are now active and self-motivated in developing teaching materials and communicating with the trainees. Their confidence has increased through conducting the workshops in the provinces, developing teaching materials as well as curriculum. In reference to the progress of the project activities, the negotiation between the project team and counterparts upon the allowances have brought a halt to the project activities.</p> <p>Japanese experts have found that the FOP trainers have a weak foundation of the basic knowledge in the respective subject in addition to the lack of teaching experience. Therefore, they have incorporated the activities in order to enhance the basic understanding through workshops and lectures. The workshops conducted outside of the FOP have given the trainers to put what they have learned into practice and helped them to internalize the newly acquired knowledge and skills. Use of the local materials for experiments encouraged the trainers to conduct their lessons as well as stimulated the interest of both trainees and the teachers in service.</p>

1. Relevance

Evaluation Item	Survey Item	Means of Verification	Result
1.1. Relevance of Overall Goal and Project Purpose	1.1.1. Relevance to the National Education Policy	<ul style="list-style-type: none"> • National Education Policy Document 	<p>The project is highly relevant in the context of Cambodia. The Royal Government of Cambodia (RGoC) has developed the National Program to Rehabilitate and Develop Cambodia (NPRD) in 1994 and Socio-Economic Development Plan in 2001, which have both indicated its economic development based on the improvement of the social services and the infrastructure. The government intends to increase the secondary enrollment as the basic education sector has been heavily invested by donor agencies. The secondary enrollment has been doubled since the 1995-1996, which requires the effective and efficient teacher training for the respective sector.</p> <p>Furthermore, the national development plan can benefit from the STEPSAM. In order for Cambodia to achieve the socio-economic development, it is critical that the human resource is developed. Particularly the science and mathematics education is a key to the Cambodia's industrial development.</p>
	1.1.2. Relevance to the emerging policy	<ul style="list-style-type: none"> • Interview with Director of the teacher Development Department and the Secretary of the MoEYS 	<p>The MoEYS has issued the guideline to introduce six hours of experiment in upper secondary curriculum. Furthermore, the MoEYS decided to support the workshops for the teachers in-service. These emerged as a result of this project, however, indicate the relevance of the project to the needs of secondary education in Cambodian.</p>

		<ul style="list-style-type: none"> • Interview with Mr. Shimizu (Education Adviser) • Interview with Staff of ADB 	<p>Japan has been the sole donor agency to invest in upper secondary education, which shows the relevancy of the STEPSAM in the context of SWAP. It is known as a function to coordinate the donor interventions in the sector and solicit common funds among the donors so that they can be allocated effectively. In other words, this intends to co-ordinate the donor interventions in the education sector. So far, Swedish SIDA, UNICEF, EU with strong initiative of ADB have been active in co-ordination. These donors have concentrated on the development of basic education. The next agenda in the sector development is the secondary education. This will be discussed in the coming donor meetings. In this sense, the STEPSAM has taken a lead of other donors and has a high relevancy.</p>
	1.1.3. Relevance to the Japanese aid policy for the respective country.	<ul style="list-style-type: none"> • JICA reports • Reports • Documents • Interview with JICA 	<p>A team of consultants has been dispatched by ADB to develop the institutional capacity in the selected departments of MoEYS. One of them is the Pedagogical Research Department, which is responsible for developing the curriculum and textbook. ADB intends to follow up the educational policy development of MoEYS and make a decision to invest in the curriculum and textbook development. At the moment, the collaboration with the STEPSAM has been discussed.</p>
	1.1.4. Relevance to the Japanese aid policy for the respective country	<ul style="list-style-type: none"> • JICA reports • Reports • Documents • Interview with JICA 	<p>JICA's aid strategy for Cambodia indicates the importance of the human resource development in the respective country. Furthermore, JICA has been the only development agency, which has been engaged in the upper secondary education. Therefore, the relevance of the project is high.</p>
	1.1.5. Advantage of Japanese foreign assistance	<ul style="list-style-type: none"> • Documents • Interview with the Project Team and MoEYS 	<p>Japan's accumulation of knowledge of the Science and Mathematics Education both in Japan and overseas has been an advantage of implementing this project. Therefore, this project has devised the rich asset of Japanese experts in the respective areas.</p>

	1.1.6. Relevance to the Needs of Education Sector in Cambodia	<ul style="list-style-type: none"> • Reports • Documents on the State of Education in Cambodia 	The STEPSAM has a high relevance in reference to the needs of Cambodia. In history, Cambodia has lost vast amount of individuals with intellectual asset. This has lead to a lack of the individuals with the adequate knowledge to train teachers as well as to teach in the higher educational institutions. As the government expands the primary education, the enrollment in secondary education is also expected to rise. In such context, it is apparent that the teachers' training must be upgraded in order to provide the education with quality, which contributes to develop the foundation for the socio-economic development of Cambodia. Therefore, the project has the high relevancy to the needs of the education sector in Cambodia.
1.2. Appropriateness of the Project Design	1.2.1. Cohesiveness between the Overall Goal and Project Purpose	<ul style="list-style-type: none"> • Reports • Interview with individuals concerned 	The project purpose and overall goal are cohesive. As FOP is the only institution that provides pre-service training for upper secondary schools in Cambodia, STEPSAM has chosen a suitable institution for developing the capability of the teachers in Cambodia.
	1.2.2. Appropriateness of the process of project planning	<ul style="list-style-type: none"> • Interview with the Project Team, Dean of FOP and JCC • Reports 	The process of planning was appropriate. However, the issue came when the project was suspended from implementation due to the unstable political situation in Cambodia. Furthermore, the PDMo lacked the clarity in terms and indicators shown in the matrix. The modification of the PDM at the Mid-Term Evaluation study was appropriate and increased the efficiency of the project.
	1.2.3. Relevance of the Output	<ul style="list-style-type: none"> • Reports • Interview with the Project Team 	The all the outputs of the project were relevant to the project purpose. However, Output 3 is more relevant to the overall goal rather than to the project purpose.
	1.2.4. Relevance of the alteration of the project plan	<ul style="list-style-type: none"> • Interview with the Japanese Experts, Dean of FOP and FOP trainers • Reports 	As indicated in 0.6.

	1.2.5. Appropriateness of the Input	<ul style="list-style-type: none"> • Actual Input • Interview with Japanese Experts, FOP trainers, and C/Ps 	<p>As indicated in ANNEX 3.</p> <p>The input was mostly appropriate both in quality and quantity. However, the completion of the Science and Mathematics Center delayed nearly 1 year compared to the initial plan. This has affected the progress of the project activities, which only allowed the FOP trainers to achieve the limited experience and understanding of using the facilities and equipments.</p> <p>The long-term experts could also be assigned appropriately if it has been discussed in detail prior to the launch of the project. Due to the lack of clarity in the project plan, the subject-matter long-term experts were dispatched for Mathematics and Science. Later it was revealed that the Science required one expert for each subject area of Science. Therefore, Physics and Biology experts joined the project at the later stage of the project.</p>
1.3. Remarks	Remarks, if the relevance was low in above items.	<ul style="list-style-type: none"> • Interview with the individuals concerned. 	Relevance was high in all the aspects.

2. Effectiveness

Evaluation Item	Survey Item	Means of Verification	Result
2.1. Achievement of each Output	2.1.1. Achievement of each Output	<ul style="list-style-type: none"> • Achievement 	<p>See ANNEX 3 for achievement.</p> <p>Output 1 and 2 will not be achieved at the highest level. The output 3 and 4 are expected to be achieved successfully by the end of the project.</p>
2.2. Achievement of the Project Purpose	2.2.1. Achievement of Project Purpose	<ul style="list-style-type: none"> • Achievement • Interview with the Japanese Experts, C/Ps, AC, JCC, MoEYS • Mid-Long term plan 	<p>See ANNEX 3 for achievement.</p> <p>Project Purpose 1 will successfully be completed by the end of the project. However, the scope of the draft plan requires further discussion among the stakeholders including the counterparts.</p> <p>The project purpose 2 was achieved by 30-40% although each output was successfully completed.</p>
2.3. Contribution of the Outputs in achieving Project Purpose	2.3.1. Contribution of the Outputs in achieving Project Purpose	<ul style="list-style-type: none"> • Interview with Project Team • Achievement 	<p>See ANNEX 3 for achievement.</p> <p>Output 1,2,3 contributed to achieve Project Purpose 2 and Output 4 contributed to achieve project purpose 1. The level of achievement of the Output 1 and 2 is achieved to the limited extent. The project has successfully developed the teaching materials and helped to develop the capability of the FOP trainers. On the other hand, such materials have not been fully utilized. Therefore the achievement of these outputs are expected to be limited. On the other hand, the Output 3 will successfully be achieved. Output 4 may be achieved by the end of the scheduled project period, though it requires some adjustment.</p>

	<p>2.3.2. Contribution of the Input procured by the Project</p>	<ul style="list-style-type: none"> • Actual Input and the list of equipments and materials • Questionnaire for the FOP trainers • Interview with the FOP trainers • Questionnaire for the Japanese Experts 	<p>See ANNEX 5-4.</p> <p>The FOP trainers including counterparts have obtained the knowledge of how to use the equipments and materials provided by the project. However, the trainers do not know all the equipments in the laboratories and their attainment of the teaching methods in all aspects of the respective subject still remains low.</p> <p>The Science and Mathematics Education Center is used everyday by the trainers and the students of FOP for the training. Currently, 223 students benefit from the building and equipment provided by the STEPSAM. Most frequently used facility and equipment provided by the project was the computer, reference material and chemicals for experiments. Furthermore, the staff room in the Science and Mathematics Center has provided all the lecturers to convene and discuss their issues both informally and formally. This has effectively contributed to develop their capability as a Trainer.</p>
	<p>2.3.3. Contribution to the Pre-Service Training</p>	<ul style="list-style-type: none"> • Interview with FOP trainers and graduates 	<p>The trainers found it very interesting as well as effective to introduce the collective learning approach and introducing many practical exercises such as experiments. As a result, the FOP trainers could explain better to the trainees. The list of the teaching materials and the experiment guides can be found in ANNEX 5-5 and 5-8.</p>
	<p>2.3.4. Contribution of the improvement of the C/P's capability</p>	<ul style="list-style-type: none"> • Questionnaire for the C/Ps • Self-Evaluation by the FOP trainers • Evaluation by the Japanese Experts • Quarterly Reports 	<p>The experts of the project indicated that the C/P's understanding of the respective subject has increased compared to the launch of the project. Particularly, their motivation to learn was stimulated through their training in Japan as well as the daily interaction with the long-term experts. They have, then, acted as a tutor for the other lecturers. This was very helpful for the other trainers, as many of them could understand better in Cambodian.</p> <p>However, the improvement of the teaching methods among FOP trainers has been limited to a few topics in the respective subject. This, thus, restricted the achievement of the Output 2. Further training in teaching methods is required. In addition, the FOP trainers in Science stated that they do not know how to use all the experimental equipments. Practical exercises using such equipments are necessary in order for them to make the best use of the equipments provided by the STEPSAM.</p>

	2.3.5. Effectiveness of the Science and Mathematics Education Center	<ul style="list-style-type: none"> • Questionnaire for the FOP trainers • List of Equipments and materials • Questionnaire for the Japanese Experts 	Both experts and trainers including C/Ps have expressed that the building has provided a space for them to settle down and work effectively in collaboration with each other. Furthermore, trainees sometimes visit the staff room to speak to the trainers, which did not happen when they were working in the old building. Furthermore, the laboratory was very effective for the trainers to understand and teach the trainees through experiments. However, the timing of the construction was not appropriate as the delay of the completion meant that less time for the trainers to become accustomed to using the facilities.
	2.3.6. Effectiveness of factors other than the Project	<ul style="list-style-type: none"> • Interview with the Japanese Experts • Interview with Dean of FOP and FOP trainers 	Taking advantage of the network expanded through the promotion activities, some activities were conducted jointly and contributed to develop the FOP trainers' capability as well as the teachers in-service. One is publishing of the biology dictionary. This was initially compiled by an Australian Volunteer and was donated to the project. STEPSAM has printed 300 copies for circulation.

3. Efficiency :

Evaluation Item	Survey Item	Means of Verification	Result
<p>3.1. Appropriateness of the Input in terms of quality, quantity and timing.</p>	<p>3.1.1. Dispatch of the Japanese Experts (subject area, timing, number of experts dispatched, duration).</p>	<ul style="list-style-type: none"> • Record of dispatch of Japanese Experts • Questionnaire for the FOP trainers, C/Ps and the Japanese Experts 	<p>See ANNEX 5-1 for the record of Japanese Experts.</p> <p>The dipatch of the Japanese experts has mostly been appropriate. Long Term Experts have been allocated 146 M/M through the project period. Short-term experts have been assigned for 50M/M in total. (These include the approved assignment at the time of the evaluation study.)</p> <p>The dispatch of the Japanese experts is considered to be appropriate in the subject area, duration and its number. The short-term experts were dispatched on the basis of request by the long-term experts. The subject area and timing were mostly appropriate with some exception. The timing was occasionally late as the short term experts finds their time during the University holidays while they have no lectures. The C/Ps find it very effective the advice of the older experts owing to their patience and the relevance of their post World War II experience.</p>
	<p>3.1.2. Equipments provided (timing, quality, quantity and type).</p>	<ul style="list-style-type: none"> • Achievement • List of the Equipments and apparatus provided by the project • Questionnaire for the Japanese Experts and the FOP trainers 	<p>See ANNEX 3 for Achievement.</p> <p>See ANNEX 5-4 for the list of the equipments and apparatus provided by the project.</p> <p>Facilities and equipments provided by the project have been adequate and relevant. At the time of the evaluation study, 223 out of 344 FOP trainees enjoy the facilities and equipments in the Science and Mathematics Education Center. Most frequently used equipments and facilities by the FOP trainers can be summarized as follows: computers, overhead projector (Mathematics), reference materials and equipments for experiments (Science). However, due to the delay of the completion of the Science and Mathematics Education Center, the chemicals, facilities and equipments for the purpose of experiments delayed to be installed in the building.</p>

			<p>The quality of the equipments provided by the project was good. Mostly the quantity was also adequate. The problems pointed out by the project team were the difficulties in purchasing books. Reference materials are mostly procured from the U.S. or England, which takes more than six months to arrive. As the reference materials published in Cambodian language are limited in circulation. Therefore, it is critical that the foreign reference materials arrive to the project in a short period of time so that it can be translated into Cambodian. This is due to the limited language proficiency of the trainers other than C/Ps.</p>
	<p>3.1.3. C/Ps training in Japan.</p>	<ul style="list-style-type: none"> • Achievement (Record of C/P training) • Interview with the Japanese Experts and C/Ps 	<p>See ANNEX 5-3 for the record of the C/P training.</p> <p>All the C/Ps have received the training in Japan. They have evaluated that the training program was relevant though the length of the training period was too short. This was also pointed out by the lecturers who trained the C/Ps in Japan. According to their observation, they take half of the time to accommodate themselves in the socio-cultural environment in Japan. The effectiveness of their learning further increases once they are settled.</p> <p>In particular, the counterparts found it useful to make use of the locally available materials. For instance, the counterparts of physics have made the apparatus and equipments on their own and used in the lectures. In biology, the experiment has been conducted in use of the local materials.</p> <p>One counterpart has been demoted to the FOP trainer, he still remains very active among the trainers. Therefore, this incident itself shall not lower the efficiency of the project.</p>

	<p>3.1.4. Workshop conducted for teachers in-service.</p>	<ul style="list-style-type: none"> • Record of the Workshops conducted • Interview with the participants of the workshops • Interview with the participants of the workshops 	<p>See ANNEX 3.</p> <p>The workshops conducted for the teachers in-service have been mostly efficient in reference to its contribution to the Outputs. The provincial workshops have been conducted in the selected areas as indicated in ANNEX 5-7. The Mathematics workshops were conducted in Kampong Thom and Kampong Cham with the total number of participants of 101. The Science workshops were conducted in 8 locations with the total participants of 812.</p> <p>The content and publications provided at the workshops were found very relevant and useful by the participants. The participants mostly tried to conduct experiments with their limited available resources. Some of them found it difficult as the school principle were not supporting the idea. The constraints in the schools included that the no budget for the teaching material development and short of space as the classroom is crowded. However, when the experiment is conducted, students became more interested in Science and learned it for sure what was written in the textbook. Therefore, teachers who attended the workshop found it very helpful and effective in their teaching career.</p> <p>The information of the workshop was distributed through the school principle, the Ministry and the C/Ps. They have found the duration of each workshop was to short and suggested it to be conducted more frequently or at the beginning of the school year. They also mentioned that the experimental guide was effective if the topic is arranged in accordance with the textbook content, it could have been more helpful.</p>
	<p>3.1.5 Other activities</p>	<ul style="list-style-type: none"> • Interview with the Japanese Experts 	<p>All the activities carried out are coherent to the P/O.</p>

	3.1.6. Allocation of C/Ps	<ul style="list-style-type: none"> • Interview with the Japanese Experts • Interview with the C/Ps 	<p>See ANNEX 5-2 for the C/Ps assignments.</p> <p>The counterparts have advanced their capability both in knowledge and attitude through the project. Now they are the core personnel in the FOP and are capable of acting as a resource person for other FOP trainers.</p> <p>They are aware of their role as a key player in FOP as well as in STEPSAM. Their motivation was increased as the project progressed and supported others. However, the issue of the allowance has sometimes caused a tension between the project team and the C/Ps.</p>
	3.1.7. Local Cost	<ul style="list-style-type: none"> • Achievement • Questionnaire for FOP trainers and Japanese Experts 	<p>See ANNEX 3.</p> <p>The amount of local cost born by the Government of Cambodia was appropriate. However, ideally, the MoEYS is expected to provide the sufficient amount of salary for the FOP trainers so that every trainer could take part in the regular workshop and work with the long-term experts more often.</p>
	3.1.8. Building and Facilities	<ul style="list-style-type: none"> • Achievement • Questionnaire for FOP trainers and Japanese experts 	<p>See ANNEX 3 for achievement.</p> <p>The building and facilities are considered to be mostly appropriate.</p>
	3.1.9. Allocation of Project Budget	<ul style="list-style-type: none"> • Record of Input by the Government of Japan and government of Cambodia • Interview with the Dean of FOP, Director of the Teacher Development Department, and Project Leader 	<p>See ANNEX 3.</p> <p>The project budget was appropriate.</p>

3.2. Supporting System for Project Operation and Efficiency	3.2.1. Level of Contribution by the Advisory Committee	<ul style="list-style-type: none"> • Interview with the AC • Interview with the Japanese Experts 	The AC has contributed to the project implementation through providing the technical advises, dispatching the short-term experts to the project and C/Ps training in Japan. Frequently communication between the project team and the AC has increased its relevancy of such activities.
	3.2.2. Contribution of JCC and SC.	<ul style="list-style-type: none"> • Interview with the Project Team • Minutes of JCC 	JCC has been held annually and SC biannually. These committees have not contributed to increase the efficiency of the project. These meetings functioned as a place to share the information and what's happening in the project. The level of commitment had varied among individual member.
	3.2.3. Relevance of Reports and Meetings	<ul style="list-style-type: none"> • Achievement • Interview with the Project Team • Reports 	<p>As mentioned in 3.2.2.</p> <p>The timing of the baseline study was not appropriate, as the project duration was only three years. This should have been conducted prior to the project implementation in order for the project to be implemented effectively and efficiently.</p> <p>The monitoring report was appropriate in timing and has increased the effectiveness and efficiency of the project activities.</p>
3.3. Factors hindered the Efficiency.	3.3. Remarks	<ul style="list-style-type: none"> • Interview with the Project Team • Reports 	All mentioned in the above.

4. Impact

Evaluation Item	Survey Item	Means of Verification	Result
4.1. Direct Impact (Project Purpose)	4.1.1. Direct Impact	<ul style="list-style-type: none"> • Reports • Interview with the Secretary of MoEYS, Director of the Teacher Development Department, Dean of FOP and Japanese Experts 	<p>(Positive) The workshop was welcomed by the government. This has increased the commitment of the government to the Science and Mathematics education in upper secondary education. As a result, the MoEYS has issued the guideline for the secondary schools to conduct experiments for six hours in an academic year. In addition, the budget for the provincial workshops is intended to be solicited from the PAP facility. These could be considered as part of the positive impact of the STEPSAM.</p> <p>(Negative) On the other hand, the payment of the allowances to the counterparts may have increased the dependency to the funds and decreased the financial sustainability of the project.</p>

<p>4.2. Indirect Impact (Overall Goal).</p>	<p>4.2.1. Achievement of the Overall Goal</p>	<ul style="list-style-type: none"> • Achievement • Interview with the Secretary of MoEYS, Director of the Teacher Development Department, Dean of FOP and Japanese Experts 	<p>See ANNEX 3.</p> <p>(Positive) There are following two points to be noted as signs of impact. One can be observed through the graduates of the FOP after the project was launched. The findings from the evaluation study has indicated that the FOP graduates who teach at upper secondary schools indicated in all subject, that what they learned at the FOP is very effective in teaching. Through teaching in the learner-centered and practical methods, their students are more interested in the subjects and increased their learning efficiency. They observe that their way of teaching is different from other teachers though they may have longer teaching experiences.</p> <p>(Positive) The other is through the teachers in-service through the workshops conducted in the provinces such as "Introduction of Practical Work into Classroom" and the follow up observation study in Science as well as Mathematics workshops. Through the workshop, all the informants whom the study team interviewed mentioned that they themselves improved their understandings of the subject and therefore could teach effectively after the workshop. In science, the experiments also grabbed the attention of the students. Not only they believe what the teachers say but also they understand better.</p> <p>(Positive) The Overall goal is expected to be attained if the activities initiated by STEPSAM are maintained and expanded beyond. This depends on the funds and personnel are secured for the purpose and this remains cohesive to the national policy. At the time of the evaluation study, it has partly been achieved through the provincial workshops and FOP graduates since the launch of the STEPSAM. The total number of participants to the provincial workshops is 913 and the number of FOP graduates between 1999-2000 academic year and 2001-2002 academic years in Science and Mathematics is 329. Currently, 195 trainees are undergoing the training at FOP.</p> <p>(Positive) According to the graduates of the FOP, 90% of their classmates are teaching upper secondary schools. On the other hand, there were informants who proceed to the advanced studies. However, their ultimate goal is to teach at the University level. Therefore, they mentioned that their learning experience at FOP would be useful when they teach in the future.</p>
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	<p>4.2.2. Indirect Impact other than Overall Goal.</p>	<ul style="list-style-type: none"> • Interview with the FOP graduates • Interview with the Japanese Experts and C/Ps • Interview with the participants of the workshops 	<p>(Positive) The trainers who graduated after the launch of STEPSAM found the teaching methods learned at the FOP effective and stimulate the interest of the students. They found that they are different from other teachers despite their experience in teaching.</p> <p>(Positive) The teachers have learned experiments and found very effective in their daily teaching activities. Further the students' interest in Science have increased. Although this is based on the limited information, it can be concluded that the STEPSAM has contributed to enhance the capability of the teachers in-service, which is relevant to the overall goal.</p> <p>(Positive) The workshop was welcomed by the government. The MoEYS is now expecting the STEPSAM to conduct the workshops for the teachers. As the provincial workshops have been completed in success, the government increased its interest and commitment to investing in Science and Mathematics Education. As a result, the guideline for experiments to be conducted six hours per year in the upper-secondary schools has been issued. (See also 4.2.1. and 3.1.4.)</p> <p>(Positive) One is the construction of the networks between STEPSAM and other actors engaged in development of the education in Cambodia. Secondly, STEPSAM has provided the learning opportunities for the AC members to expand their understanding in the assistance for educational development as well as JICA's role in its process. Furthermore, the counterpart training has initiated the lasting relationship between the Japanese short-term experts and the counterparts, which could be beneficial after the termination of the STEPSAM.</p>
<p>4.3. Other enabling factors for emergence Impact</p>	<p>4.3. Other enabling factors for the Impact. (I.e. Contribution by ADB and other donors.)</p>	<ul style="list-style-type: none"> • Interview with the secretary of MoEYS, Director of the Teacher Development Department, Dean of FOP and Japanese Experts. 	<p>The ADB has been planning to conduct curriculum reform and textbook revision after June 2003. This could contribute to improve the quality of the upper secondary education, which could increase the relevancy of the STEPSAM's activities even further. The collaboration with the RUPP in chemistry could also help prepare the academic basis for the prospective FOP trainees before joining the FOP. However, the coordination among the stakeholders should closely monitored.</p>

5. Sustainability

Evaluation Item	Survey Item	Means of Verification	Result
5.1. Institutional Aspect	5.1.1. Role of Implementing Agency and its future.	<ul style="list-style-type: none"> • Interview with the Secretary of the MoEYS, Director of the Teacher Development Department, Dean of the FOP and the Project Team 	The FOP will remain as the single national institution to train upper secondary teachers. The TTD plans to enhance its function of in-service training especially for the private school teachers and lower secondary teachers to up-grade their skills. The consensus within the government is still not yet established and therefore, the progress of this discussion shall be monitored.
	5.1.2. Institutional Establishment of the Implementing Agency	<ul style="list-style-type: none"> • Interview with the Dean of FOP • Interview with the Project Team 	See 5.1.1.
	5.1.3. Operation Policy and Plan.	<ul style="list-style-type: none"> • Interview with the Dean of FOP and Project Leader 	FOP indicated its interest in expanding the provincial workshop in Mathematics and Science for the purpose of in-service training. This leads the STEPSAM to achieve the overall-goal.
	5.1.4. Organizational capacity to maintain the Science and Mathematics Education Center	<ul style="list-style-type: none"> • Interview with the Dean of FOP, Project Leader and the Director of the Teacher Development Department 	<p>The trainers shall be able to manage the equipments and facilities safely. However, the question still remains at their knowledge and capability of utilizing them in the training programs. They have indicated that they still have not learned how to use all the laboratory equipments and teaching methods of all areas of the subject. Therefore, they will be unable to devise them in the training program. (See also 2.3.2.)</p> <p>The Building management for the daily operation has been implemented by the counterparts jointly with the Project Team. In the remaining project period, a committee will be established to provide a place to discuss the issues in relation to the maintenance and the use of the Science and Mathematics Center and to make plan for the finance.</p>

5.2. Financial Aspect	5.2.1. Sustainability of the Budget allocated for Teacher Training	<ul style="list-style-type: none"> • Interview with the Dean of FOP and Project Leader • Interview with the Secretary of MoEYS and the Director of the Teacher Development Department 	The financial outlook of the FOP is bleak. It has not identified the ways of soliciting funds for maintaining the STEPSAM activities, building and facilities. The Dean of FOP intends to conduct private classes and rent out the building to meet the operational cost. TTD has secured the funds for the workshops conducted for the provincial teachers.
	5.2.2. Financial Sustainability for maintaining Science and Mathematics Education Center	<ul style="list-style-type: none"> • Interview with the Secretary of MoEYS, Director of the Teacher Development Department, the Dean of FOP and Project Leader 	See 5.2.1.
5.3. Technical Aspect	5.3.1. Embeddedness of the teaching methods and materials introduced by the project.	<ul style="list-style-type: none"> • Questionnaire for the FOP trainers • Evaluation by the Japanese Experts based on the observation 	Both the trainers including C/Ps and the long-term experts find that the knowledge transferred to them were not yet embedded. As indicated in the ANNEX 5-10, the FOP trainers' knowledge of the teaching methods in respective subject has been limited. Therefore, further assistance is necessary in this area so that the transferred knowledge through the project shall be able to be put into effective use in a sustainable manner.
	5.3.2. Capability of C/Ps to develop teaching materials and Sustainability.	<ul style="list-style-type: none"> • Interview with Japanese Experts and FOP trainers 	FOP Trainers including C/Ps have the increased motivation to develop the teaching materials has increased according to the interview with the experts and the trainers. However, there remains a question of sustainability as their experience is limited and they require further repetition and learning by doing.
	5.3.3. Sustainability of C/Ps allocation	<ul style="list-style-type: none"> • Interview with the Director of the Teacher Development Department and Secretary of MoEYS 	C/Ps intend to work for FOP continuously. However, this all depends on the state of finance of the FOP. Therefore, the financial plan of managing the STEPSAM and C/Ps shall be discussed urgently.
	5.3.4. Maintenance and Management of the Facilities and Equipments provided by the project.	<ul style="list-style-type: none"> • Interview with the Director of the Teacher Development Department, Secretary of MoEYS and the Dean of FOP • Questionnaire with FOP trainers 	TTD has confirmed that the budget for the provincial teachers' workshops have been approved. The financial sustainability has partly been sustained. See 5.1.4.
5.4. Remarks	NA		