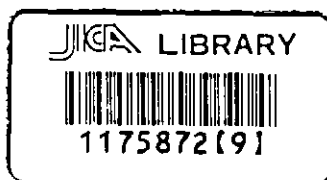


ガーナ共和国
小中学校理数科教育改善計画
中間評価報告書

平成16年1月
(2004年)



独立行政法人 国際協力機構
社会開発協力部

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序 文

ガーナ共和国では、基礎教育の拡充を図るため「基礎教育の義務化・無料化プログラム」(1996～2005)を実施していますが、その具体化の一つとして、同国政府は小中学校における理数科教育の強化に係るプロジェクト方式技術協力を、1998年8月に我が国に要請してきました。これを受けて、当機構は2000年3月から5年間にわたる協力を実施しています。

このたび、協力期間の中間時点を迎えたため、これまでのプロジェクトの活動が計画どおりに行われているか確認し、中間評価を行うとともに、プロジェクト後半における協力の方向性や活動などについてガーナ共和国側関係機関及びプロジェクト関係者と協議し、提言や必要に応じて計画の見直しを行うために、2002年11月27日から同年12月13日までの日程で、広島大学大学院の黒田則博今日中を団長として運営指導(中間評価)調査団を派遣しました。

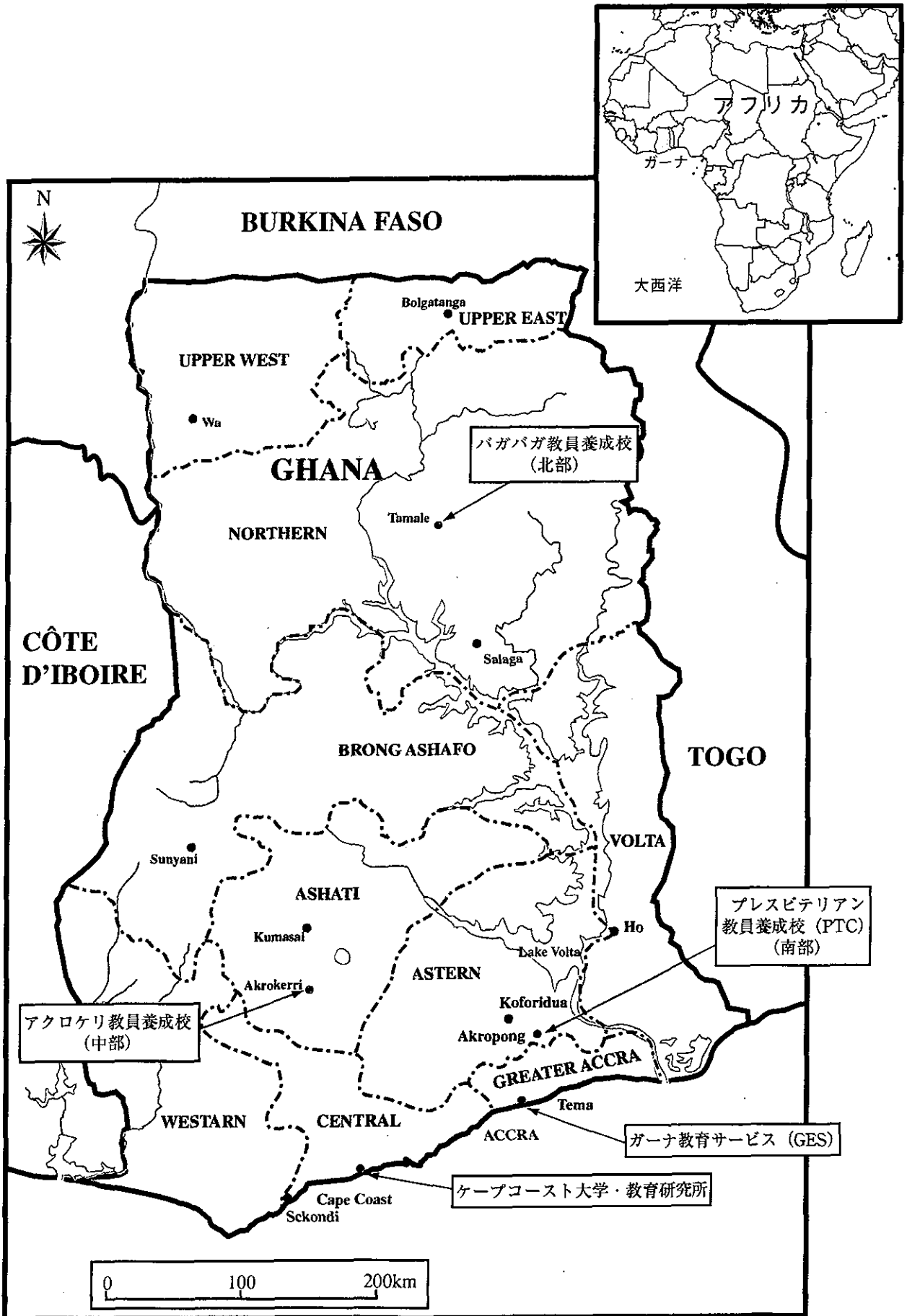
本報告書は、その調査結果を取りまとめたものです。ここに本調査にご協力を賜りました関係各位に深甚なる感謝の意を表しますとともに、引き続き一層のご支援をお願い申し上げます。

平成16年1月

独立行政法人 国際協力機構
社会開発協力部長
末森 満

略語一覧

略語	正式名	日本語表記
C/P	Counterpart	カウンターパート
DTST	District Teachers Support Team	
f CUBE	free Compulsory Universal Basic Education	基礎教育の義務化・無料化
GES	Ghana Education Service	ガーナ教育サービス
INSET	In-service Training	現職教育研修
JCC	Joint Coordinating Committee	合同調整委員会
JSS	Junior Secondary School	中学校
PCM	Project Cycle Management	プロジェクト・サイクル・マネージメント
PDM	Project Design Matrix	プロジェクト・デザイン・マトリックス
PO	Plan of Operation	活動計画
PRESET	Pre-service Training	
PTC	Presbyterian Training College	プレスビテリアン教員養成校
R/D	Record of Discussions	討議議事録
SD	Standard Deviation	標準偏差
STM	Science, Technology and Mathematics	
SWAp	Sector Wide Approach	セクターワイドアプローチ
TED	Teacher Education Division	教師教育局
T/Lm、 TLM s	Teaching/Learning materual(s)	教材
TTC	Teacher Training College	教員養成校



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第1章 中間評価の概要

1-1 調査団派遣の経緯と目的

ガーナ共和国政府(以下、「ガーナ」と記す)は、基礎教育の拡充を図るため「基礎教育の義務化・無料化プログラム (fCUBE : Free Compulsory Universal Basic Education)」(1996~2005)を実施しているが、その具体化の一つとして、理数科の教師教育プログラムの強化に係るプロジェクト方式技術協力の要請がガーナ側からあげられた。これを受け、南部・中部・北部の3つの教員養成校を拠点とし、同地域の小中学校理数科教員の学習指導力が向上することをプロジェクト目標として、ガーナ小中学校理数科教育改善計画は協力期間を5年間として、2000年3月に開始した。

今年度は開始から3年目にあたり、協力期間の中間時点にあたる。この機会にこれまでの活動が計画どおりに行われているかどうかを確認するとともに、現在の方向性を修正する必要があるかどうかについて検証し、今後のプロジェクトの方針・活動に対する提言を行うことを目的として中間評価調査を実施した。

1-2 調査方針

- (1) プロジェクト・デザイン・マトリックス (PDM) 及び活動計画 (PO) に基づき、計画達成度、投入実績、活動実績を確認する。
- (2) 評価5項目 (効率性、有効性、インパクト、妥当性、自立発展性) の観点から評価を行う。
- (3) 上記(2)の評価結果に基づき、必要に応じて PDM を修正する。
- (4) 今後のプロジェクトの方向性及び活動計画について協議し、プロジェクトチーム、ガーナ側関係機関の双方に対して必要な提言を行う。
- (5) 協議結果をガーナ側・日本側双方の合意事項として協議議事録 (ミニッツ) に取りまとめる。

1-3 調査団の構成

担当分野	氏名	所属
団長・総括	黒田 則博	広島大学大学院教育開発国際協力研究センター 教授 (国内支援委員長)
教育評価	傘田 博光	東京工業大学大学院社会理工学研究科 教授 (国内支援委員)
協力企画	松山 剛士	国際協力事業団 社会開発協力部社会開発協力第二課

1-4 評価調査日程

期 間：2002年11月27日～同年12月13日

日順	月日	曜日	移動及び業務	
1	11月27日	水		成田発→アムステルダム着
2	11月28日	木		アムステルダム発→アクラ着 成田発
3	11月29日	金		JICA事務所訪問、日本大使館表敬 教育省訪問 →パリ着 パリ発→アムステルダム着 アムステルダム発→アクラ着
4	11月30日	土		アクロポンのプロジェクトサイト視察 カウンターパート C/P・専門家との協議
5	12月1日	日		資料整理
6	12月2日	月		午前：合同調整委員会 午後：PDM改訂のためのワークショップ
7	12月3日	火	成田発→ アムステルダム着	PDM改訂のためのワークショップ
8	12月4日	水	アムステルダム発 →アクラ着	学校見学 国別特設研修受講者（教員養成校教官）へのインタビュー アクラ発→
9	12月5日	木	アクロポンのプロジェクトサイト視察 今後の活動についての協議 （アクロケリ・タマレの教員養成校教官、 郡教育事務所）	→ロンドン着 ロンドン発→
10	12月6日	金	セミナー準備	→成田着
11	12月7日	土	ミニッツ案作成	
12	12月8日	日	セミナー準備	
13	12月9日	月	中間評価結果紹介セミナー開催 ミニッツ協議	
14	12月10日	火	ミニッツ協議 ガーナ側との協議	
15	12月11日	水	ミニッツ署名 日本大使館報告 JICA事務所報告 アクラ発→	
16	12月12日	木	→アムステルダム着 アムステルダム発→	
17	12月13日	金	→成田着	

1-5 主要面談者

(1) ガーナ教育サービス (Ghana Education Service: GES)

Mr. John Budu-Smith	ガーナ教育サービス (GES) 総裁
Ms. Lydia Osei	GES 副総裁 (Management Services)
Mr. Ofori-Awuah	GES 副総裁 (Quality & Access)
Ms. Margaret Benneh	教師教育局 (TED) 局長

(2) ガーナ側カウンターパート

Mr. Stephen Adu	業務調整
Ms. Francesca Haizel	数学教育
Ms. Rosinar Adobor	理科教育
Mr. J.W.Molennar	理科教育
Mr. Philop V. Akoto	数学教育

(3) ローカルコンサルタント

Dr.Kwame Acheampong	Director, Institute of Education, University of Cape Coast
Ms. Marian Tadeffa-Kubabom	コンサルタント (PCM ワークショップモデレーター)
富田 真紀	東京工業大学大学院社会理工学研究科

(4) 在ガーナ日本大使館

浅井 和子	大使
黒田 孝伸	一等書記官

(5) 日本人専門家チーム

横関 祐見子	チーフアドバイザー
澁谷 和朗	業務調整/教育計画
長尾 英一郎	数学教育
相馬 敬	理科教育
林本 由紀	理科教育
山崎 丈	数学教育

(6) JICA ガーナ事務所

高畑 恒雄	所長
小淵 伸司	次長
広瀬 恵美	所員

1-6 評価方法

本調査は、JICA 事業評価ガイドラインに基づいて実施した。中間評価は、協力期間の中間時点でプロジェクトの成果などの実績や評価5項目（妥当性、有効性、効率性、インパクト、自立発展性）の観点からプロジェクトを評価するもので、必要に応じて計画の見直しを行うことを主たる目的としている。JICA プロジェクトはプロジェクト・サイクル・マネジメント（PCM）手法を用いて運営されており、中間評価においてもその手法を活用している。

プロジェクト評価手法の流れは、①プロジェクト・デザイン・マトリックス（PDM）に基づいた評価のデザインの検討（PDM に記載される項目の定義は表-1 を参照）、②プロジェクトの実績を中心とした必要情報の収集、③妥当性、有効性、効率性、インパクト、自立発展性という5つの評価の観点（評価5項目）からのデータ収集・分析、④分析結果に基づく総合判定（結論）、⑤評価結果の提示（提言・教訓の抽出及び報告）、⑥活用（結果の公開、フィードバック）から成っている。

主な手順は以下のとおりである。

(1) 評価グリッドの作成

計画達成度及び評価5項目に関する評価グリッドを作成した。

(2) PDM の改訂

2001年3月に改訂したPDM(2nd version)の成果・指標等について検討し、改訂した。

(3) 評価グリッドに沿って、プロジェクトに関するデータ及び関連する情報を以下のとおり収集した。

- ・ 基本的資料：討議議事録（R/D）、PDM、活動計画（PO）、これまでの調査団報告書等
- ・ ヒアリング対象：日本人長期専門家、カウンターパート C/P、GES、郡教育事務所、教員養成校 TTC 関係者

(4) 集められたデータ・情報を基に、計画達成度を把握し、評価5項目による評価を行った。

1) 計画達成度

計画達成度を測るために、PDM における指標や活動計画を用いて、実際の達成状況を、①投入実績、②活動の実施状況、③成果の達成状況、④プロジェクト目標や上位目標の観点から把握した。

2) 評価5項目による評価

PCM 手法に従って、客観的及び多面的に評価を行うために、「評価5項目」の観点から調査・分析を行った。「評価5項目」とは、①効率性、②有効性、③インパクト、④妥当性、⑤自立発展性の5項目である。各項目は以下のように定義され、PDM との関係性は表-1 のように表される。

① 効率性

プロジェクトの「投入」から生み出される「成果」の程度を把握する。各投入のタイミング、量、質の適切度を把握する（専門家派遣、C/P 配置、機材供与、研修員受入れ、ローカルコスト、現地業務費等）。

② 有効性

プロジェクトの「成果」の達成の度合い、及びそれが「プロジェクト目標」の達成度にどの程度貢献しているかを検討する。

③ インパクト

プロジェクトが実施されたことにより生じる直接的・間接的な正・負の影響を検討する。計画当初に予想されていない影響も含む。上位目標は「期待される正のインパクト」として、効果の一つととらえる。

④ 計画の妥当性

評価時においてもプロジェクト目標・上位目標が有効であるかどうかを検討する（相手国の開発政策、受益者ニーズ、実施機関ニーズとの整合性、計画設定の妥当性、日本の援助戦略との整合性等）。

⑤ 自立発展性

プロジェクト終了後も自立発展できるかどうかを検討する（実施機関の運営管理面、財政面、技術面、社会経済的な側面等）。

表-1：評価5項目とPDMの関係性

	①効率性	②有効性	③インパクト	④妥当性	⑤自立発展性
上位目標			↑ プロジェクトを実施した結果、どのような正・負の影響が直接的・間接的に表れたか ↓	↑ プロジェクト目標、上位目標、成果は評価時においても目標として意味があるか ↓	↑ 協力終了後どれだけプロジェクトの正の効果を維持することができるか ↓
プロジェクト目標		↑ ・プロジェクト目標が達成されたか ・成果がその達成にどれだけ貢献したか ↓			
成果	↑ 活動・投入が成果にどれだけ変換されたか ↓				
活動・投入					

<p>ガーナ側のオーナーシップ</p>	<p>マネージメントスタッフのプロジェクト活動への参加 予算措置</p> <p>C/Pの配置</p>	<p>- チーフアドバイザーの働きかけもあり、教育省、ガーナ教育サービス(GES)、教師教育局(TED)は、いずれもプロジェクトの実施に協力的であり、会議等にも積極的に参加している。</p> <p>- 教育省は、INSETの実施にかかる予算(受講者の交通費等)を支出できていないが、プロジェクトオフェイスの改修、C/P給与の支給、ノンプロジェクト無償見返り資金を教員養成校教官宿舍の建設等に投入するなど、他の面では様々な予算措置を行っている。</p> <p>- 5名のC/Pが、配置されている(1名は途中で交代)。理数科のC/Pについては、INSETを行うごとに指導力が上がっており、一部の講義では日本人専門家の指導がなくても十分実施できる能力がある。業務調整のC/Pについては、卓越したリーダーシップでプロジェクトチームをまとめ</p>
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2-2 評価5項目による評価

評価項目	評価の細目	確認事項	結果
妥当性	上位目標とガーナの国家開発政策との整合性	国家開発政策との整合性	- ガーナ政府は、2020年までの中長期国家開発戦略 Vision2020に基づき、1996年からの10年間を実施期間とする、基礎教育の義務化・無料化プログラム(fCUBE: Free Compulsory Universal Basic Education)を策定し、①教育・学習の質的向上、②教育へのアクセス・参加の改善、③教育運営管理の強化に取り組んでいる。本プロジェクトの上位目標である「児童・生徒の学習到達度向上」は上述の①に該当する。
	日本の援助政策との整合性	SWAP (セクターワイドアプローチ)における本プロジェクトの位置づけ ガーナに対するODA政策との整合性 技術面における日本の優位性	- 主にfCUBEに対するドナー協力の枠組みとしては、英国による包括的教育プログラムであるWHOLE SCHOOL DEVELOPMENT のコンポーネントの一つとして、他ドナーの行う教育プロジェクトと同様に位置づけられている。 - ガーナに対するJICA国別事業実施計画では、教育が重点分野の一つとしてあげられているので、合致しているといえる。
	プロジェクト目標とガーナ国のニーズの間の整合性	教育政策全般との整合性	- 日本の小中学校で使われている理科・算数の授業方法は国際的にも高い評価を受けている。また、JICAの理数科授業改善を目的とした類似プロジェクトはアジアのほか、アフリカではケニア、南アフリカ共和国でも行われており、経験の蓄積がある。
	各種指標の達成度	教育政策全般との整合性	ガーナ政府のfCUBEで掲げている「教育・学習の質的向上」に合致している。
有効性	プロジェクト目標の達成度	各成果の指標の、現在までの達成度	付属資料3参照
	投入の量、質、及びタイミング	プロジェクト目標の指標の、現在までの達成度 ガーナ側の投入	同上
効率性	投入の量、質、及びタイミング	専門家派遣	TTC 教官の増員、施設の改修等はタイミングよく行われた。C/P も必要な数が配置されている。しかしINSETにかかる経費については、これまでガーナ側で負担できていない。
			- 長期専門家は学校現場の経験が豊富な現職教員とした。短期専門家はプロジェクト活動の範疇とならざる時期にタイムリミットよく投入されてきた。また、国内支援大学からは、これまでに各大学からパラナスよくガーナに派遣されており、専門家を通過して現地でガーナ側との信頼関係を構築できたことが、その後の研修員受入れにも効果をあげているといえる。 - 理数科フェアへの短期専門家に関しては、小中学校の現職教員を派遣すること、現場プロジェクトに小中学校の視点から実践的なドバイスや教材を入手できるといふ成果をもたらした。ただし、派遣時期が年度末となり派遣側/受入側双方ともにも多忙な時期であり、より効果的に実施していくには7月末等、双方にとつて都合の良い時期に変更することが望ましい。

	研修員受入れ	<p>- これまで個別特設研修で8名×4回=32名、C/P研修で15名が来日し、日本の教育制度について学び、学校現場の視察、関係者との協議、理数科の訓練を受けた。特にTTC教官については、対象TTCの教官の大半をカバーしたことになる。このためTTC教官を講師として活用する本プロジェクトにおいては、意識の向上、授業案・教材づくりの能力向上ができたことは大きな役割を果たしているといえる。その一方で、研修から帰国すると通常業務の教員養成課程の業務に費やす時間が多く、本邦研修の成果を継続していく機会に乏しいのが現状である。教員養成・校内で研修成果を供給し、帰国後はINSETでの講義を担当するような制度的な位置づけがないと研修効果が損なわれる恐れもある。</p> <p>- 研修の内容については、ガーナ側関係者が日本の教育システムや教師の立場について学ぶこととできたことで、プロジェクト実施への理解を促進した。また、短期専門家派遣を通じて国内支援大学の受入体制の整備が進み、年を追うごとに大学内で研修マニユアルやハンドアウトの冊子などが作成されたことは、毎年の研修効率を高める要因となった。更に教科に関する詳細な情報を「情報シート」としてまとめ、プロジェクトと受入側との情報共有ができたことは効果的な措置であった。ただし、ガーナでのINSETが進むにつれ、本邦研修では日本の教員研修の実際に、より時間をかけて触れ、帰国後に期待される業務に役立てる必要性があげられている。</p> <p>- C/P研修員が個別特設研修に合流することは、運営上の手間や受入先の都合を考慮すると、効果的な措置であったといえる。</p>
インパクト	上位目標達成の見込み	<p>- ほぼ計画どおりの執行と活用がなされている。</p>
自立発展性	組織的自立発展性	<p>- 算数については学力向上がみられたが、理科については一部、結びついていないものもあった。詳細は付属資料3の「インパクト評価」参照。</p>
	財政的自立発展性	<p>- これまでプロジェクトチームが主体となってINSETを実施してきており、将来的にINSETの担い手となるべき郡教育事務所と教員養成校が、主体的にINSETを実施できる体制にはなっていない。</p>
	技術的自立発展性	<p>- TTC教官は通常の講義が忙しく、研修に十分に協力できない。教官不足について教育省より教官増員の許可を得て2002年にはプレスビテリアン教員養成校(PTC)1名(理科)、アクトケリTTC1名(理科)、バガバガTTC2名(数学)が増員となったが、更なる増員が望まれる。</p> <p>- 研修に関する経費(参加者の日当・交通費等)は、教育省が予算計上を続けているが、たとえ承認されなくても実際に資金がこないことが多い。現状ではプロジェクトの現地業務費から支出している。他のドナーの行うINSETについても、ドナー側の資金で行われている。したがってガーナ教育省の独自予算でINSET実施を行う見込みは低い。</p> <p>- ノンプロジェクト無償見返り資金が教育省の予算として活用できるとなり、南部・中部地区のINSET実施にかかる経費を支出することができるようになった。TTC教官に対する講師謝金や参加者の日当・交通費等を支出している。</p>
	制度的自立発展性	<p>- INSETの実施マニユアル、プログラム、教育/学習教材が開発され、内容は高い評価を受けている。</p> <p>- INSETのプログラムのうち、大半の講義はC/P自身で実施できるまじになった。</p> <p>- 3郡で確立したINSETをガーナ政府の教師教育政策に反映させる道筋は、まだ検討中である。</p>

第3章 提言

(1) INSET の制度化

ガーナ側が主体となって INSET を実施できるような体制づくりに取り組む。具体的には郡教育事務所・教員養成校 TTC 等の関係機関の責任分担を明確化し、INSET の実施マニュアルの整備を行う。また、INSET の経験がガーナの教育政策に反映されるよう、政策提言を行う。

(2) INSET モデルの確立

教員の離職率は依然として高い。そのため INSET を受講した教員が離職しても学校で研修効果が持続するよう、北アクアピン郡において次のような INSET のモデルを確立する。

- ・ 対象を新任の教員に絞った初任者研修を行う。
- ・ 校内研修の支援を行う。具体的には校内研修のファシリテーターとなる教員への研修、校内研修を支援する学校長・サーキットスーパーバイザー、DTST(District Teachers Support Team) へのオリエンテーションを行う。

なお、他の2地区については従来の研修を継続して実施する。

(3) モニタリングの重要性

プロジェクトが与えた児童・生徒の学力に対するインパクトを正確に評価するため、終了時評価を見据えた追加調査を実施する。具体的には調査対象を拡大し、問題を一部修正した理科・数学のテストに加え、理科に影響を与えていると推測される英語力についても調査する予定である。

(4) ガーナ側の経費負担

ガーナ政府に研修の経費を負担するよう働きかけているが、現状では困難であるため、見返り資金等援助機関の資金を使って、ガーナ側だけで INSET を運営できる体制をつくるようサポートすることが重要である。

付属資料

1. 調査団議事録 (Minutes of Meeting)
2. PLAN OF OPERATION によるプロジェクトの進捗状況
3. コンサルタント報告書：インパクト評価・添付資料
4. STM のこれまでの投入のまとめ
5. 研修員受入実績
6. PCM ワークショップモデレーター報告書
7. 「アフリカ地域の援助潮流の中でのプロジェクト運営-ガーナ小中学校理数科教育改善計画の事例から-」

1. 調査団議事録 (Minutes of Meeting)

MINUTES OF MEETINGS
BETWEEN THE JAPANESE MID-TERM REVIEW TEAM
AND
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF
THE REPUBLIC OF GHANA
ON
JAPANESE TECHNICAL COOPERATION
FOR
IMPROVEMENT OF EDUCATIONAL ACHIEVEMENT
IN SCIENCE, TECHNOLOGY AND MATHEMATICS (STM)
IN BASIC EDUCATION

The Mid-term Review Team (hereinafter referred to as “the Team”), organized by the Japan International Cooperation Agency (hereinafter referred to as “JICA”) and headed by Prof Norihiro KURODA, visited the Republic of Ghana from 28 November to 11 December 2002

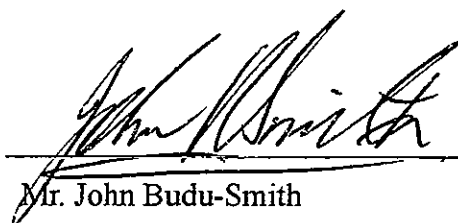
During its stay in the Republic of Ghana, the Team had a series of discussions with the Ghanaian authorities and jointly reviewed the achievements of Japanese Technical Cooperation for the project on Improvement of Educational Achievement in Science, Technology and Mathematics (STM) in Basic Education (hereinafter referred to as “the Project”).

As a result of the discussions, both the Team and the Ghanaian authorities concerned agreed to report to their respective Governments the matters referred to in the document attached hereto

Accra, 11 December 2002

黒田 則博

Prof. Norihiro KURODA
Leader
Japanese Mid-term Review Team
Japan International Cooperation Agency
Japan



Mr. John Budu-Smith
Ag. Director General
Ghana Education Service
Ministry of Education
The Republic of Ghana

KEY TO ABBREVIATIONS

BECE	Basic Education Certificate Examination
DTST	District Teachers Support Team
GES	Ghana Education Service
INSET	In-service training
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
JSS	Junior Secondary School
M&E	Monitoring and Evaluation
PCM	Project Cycle Management
PDM	Project Design Matrix
PRESET	Pre-service training
PTC	Presbyterian Training College
STM	Science, Technology and Mathematics
TTC	Teacher Training College
UP	Upper Primary level

THE ATTACHED DOCUMENT

1. INTRODUCTION

1.1. Preface

The Governments of Japan and the Republic of Ghana have been long-time development partners, especially as both countries share a vision on the crucial role of human resource development in advancing the social and economic aims of the Ghanaian society as a whole.

Basic education provides the fundamental knowledge and skills in realizing the goal of empowering the citizenry to participate in civil, social, and economic life of the country. The Government of Ghana adopted fCUBE programme (free Compulsory Universal Basic Education) for a period of ten years from 1996 to 2005. The programme has three main objectives as follows: 1) improvement in the quality of teaching and learning, 2) reinforcement of educational management, and 3) improved access to education. Along this line, the two Governments agreed in 1999 to implement "The Improvement of Educational Achievement in Science, Technology, and Mathematics in Basic Education or STM Project", aiming at the enhancement of quality of teaching and learning at basic schools. The Project started in March 2000 for a five-year period.

As the Project reached the 3rd year, the Team dispatched by JICA visited the Republic of Ghana from 28 November to 11 December 2002 for the purpose of Mid-term Review. The review has been undertaken jointly by the Ghanaian side and the Japanese side.

1.2. Objectives of the Review

Objectives of the review are stated as below.

- 1) To review the activities and achievements of the Project
- 2) To clarify the problems and issues to be addressed for the successful implementation of the Project
- 3) To make recommendations for the activities and directions to be undertaken for the remaining period of the Project

1.3. JICA Mid-term Review Team

Prof. Norihiro KURODA	Team Leader
Prof. Hiromitsu MUTA	Educational Evaluation
Mr. Takeshi MATSUYAMA	Cooperation Planning

The Team had an extensive consultation with Ghanaian counterparts and as many stakeholders as possible.

1.4. Review Process and Methods

Mid-term Review contained the following two phases; data collection and analysis as a preparation for the Mid-term review, and consultation of the Team and workshops with the Ghanaian authorities and the Project by the Team.

(1) Data Collection and Analysis

Prior to arrival of the Team in Ghana, the following tasks were performed in order to obtain data on project achievement:

- 1) Analysis of monitoring data of in-service training (herein after referred as "INSET") trained teachers: In order to compare teachers' teaching performance before and after the INSET, lesson notes and lesson presentation were assessed.
- 2) INSET trained teachers' perception: Questionnaires were given to the teachers who participated in STM INSET to find out their attitudes towards teaching as well as issues they were facing, such as the school environment. In addition, focus group discussion of some of the teachers was held to obtain qualitative data on their perception and observation on STM INSET.
- 3) Pupils' achievement in science and mathematics: Achievement tests in science and mathematics were given to pupils in upper primary (P4 to P6) and junior secondary (JSS1 and 2) schools in Akuapem North District. These tests were administered in three sample primary schools and three sample JSSs as it was done in the baseline survey carried out in 2000. Their achievement was then compared with the performance at the baseline survey.
- 4) Interview of pupils, parents and teachers about their views on science and mathematics: Some pupils and their parents/guardians were randomly

chosen for interviewing to find out their attitudes and opinions towards science and mathematics as well as general school issues.

(2) Consultation by the Team and workshops

The Team carried out a series of consultation with the Ghanaian authorities and the Project. After the initial meeting with the Project to discuss the review data, a Joint Coordinating Committee (JCC) meeting was held to share the project achievement and challenges. It was agreed that the existing PDM was to be revised at a PCM workshop and future strategies formulated. Based on the agreement at JCC, the PCM workshop was held where the achievement and constraints of the Project were reviewed in detail. To follow this up, another workshop to formulate strategies for future activities was held. Both workshops were participated in by representatives from three districts and Teacher Training Colleges (TTCs).

(3) Seminar to present the outcome of Mid-term Review was held for other Development Partners and GES personnel.

(4) Analysis was made by the Review Team according to the five criteria of review described below.

1) Efficiency

Efficiency of the Project implementation is analyzed with emphasis on the relationships between outputs and inputs in terms of timing, quality, and quantity.

2) Effectiveness

Effectiveness is assessed by reviewing to what extent the Project has achieved its purpose and clarifying the relationships between that purpose and outputs.

3) Impact

Impact of the Project is assessed by looking at either the positive or negative influence caused by the Project, which is not originally expected in the Project plan.

4) Relevance

Relevance of the Project Plan is reviewed by the validity of the Project purpose and the overall goal in connection with the development policy of the

Government of Ghana and needs of the beneficiaries and also by the logicity of the Project plan.

5) Sustainability

Sustainability of the Project is assessed in organizational, financial and technical aspects by examining the extent to which the achievements of the Project are sustained or expanded after the Project is completed.

(5) Detailed schedule is shown in Annex I.

2. REVIEW RESULTS

2.1. Achievement in the last two and half years

In March 2001 PDM was revised; verifiable indicators were added reflecting the result from the baseline survey. This 2nd version of PDM is attached in Annex II.

2.1.1. PDM Monitoring

(1) The achievement of the Project purpose

The Project aims at building teachers' capacity in teaching science and mathematics at upper primary and junior secondary levels through the provision of INSET. Monitoring data of INSET-trained teachers in lesson notes preparation and lesson presentation showed statistically significant improvement both in science and mathematics. There was a great improvement in the use of teaching and learning materials. This was one of the subjects emphasized during INSET in order to promote activity-oriented and child-centred learning. Questionnaire survey and focus group discussion revealed that teachers were satisfied with STM INSET and found it useful.

On the other hand, the survey revealed that only 74 % of STM trained teachers remained in the same districts after two years; nearly 12% left for further studies and the rest were reported to have left the districts. Higher percentage of JSS teachers left for further studies than primary school teachers. The summary of data analysis is in Annex III.



(2) The achievement of overall goal

The overall goal of the project is to improve pupils' performance in science and mathematics. In primary schools, pupils taught by INSET trained teachers showed significant improvement in their performance both in science and mathematics. In JSS mathematics, although, not statistically significant, there was a slight tendency that students performed better at the Mid-term than at the baseline survey. The summary of data analysis is in Annex III.

(3) Achievement of outputs

The achievement of outputs according to PDM is shown in Annex IV.

2.1.2. Project Progress according to the Plan of Operation

Most of the project activities have been implemented as scheduled. The project progress according to the Plan of Operation is shown in Annex V.

2.2. Review according to the five criteria

The following is a summary of the results of the review according to the five criteria.

2.2.1. Efficiency

It can be summarized that the Project has been implemented efficiently in terms of quality of inputs by the Ghanaian side and the Japanese side. Those inputs greatly contributed to the achievement of the Project outputs.

2.2.2. Effectiveness

As shown in 2.1.1, the capacity of INSET trained teachers has improved in lesson note preparation and lesson presentation in science and mathematics. INSET programme which was designed based on the baseline survey was effective for achieving the Project purpose. In order to maintain the level of achievement of the Project purpose, the following points have to be taken into consideration: more stable commitment of the TTC tutors, information sharing at school level, budgetary support for INSET, and so on.

2.2.3. Impact

As shown in 2.1.1, the Project purpose made a positive impact on the achievement of pupils. However, the following factors limiting impact on school-levels are to be considered: high attrition rate of INSET-trained teachers, lack of materials and equipment at school level.

2.2.4. Relevance

The overall goal, the Project purpose and the outputs are relevant to the national policies and social need of the Government of Ghana. Also the Project is consistent with the policy of Japanese international cooperation toward Ghana.

2.2.5. Sustainability

As far as the organizational aspect is concerned, as the Project Team (Ghanaian Counterparts and Japanese Experts) has taken primary initiative in implementing INSET and the responsibilities of the Districts and TTCs concerned for INSET implementation has not been clarified, it is difficult to say whether a structure for INSET implementation will be able to be established after the end of the Project.

As far as the pedagogical aspect is concerned, the Project seems to be successful in designing content and methodology of INSET programme, and making fruitful results such as teaching manuals for INSET and teaching/learning materials.

As to financial resources for the Project, with the current state of resources and low productivity/income, the Government of Ghana may not be able to sustain INSET without the external aid from Development Partners and/or supplementary self-financing by schools and communities.

3. Conclusions

At the Mid-term Review, the Team has realized that the Project INSET-trained Teachers' capacity of teaching in science and mathematics has been significantly improved, and pupils' achievement at the Project schools improved to some extent. However, some issues to address have been identified such as high attrition rate of INSET-trained teachers. On the basis of the review results presented above, both sides have made the following recommendations and agreements, which lead to the revision of the PDM and Plan of Operations for the remaining period of the Project.



3.1 Recommendations and Agreements

3.1.1 Institutionalization of INSET:

- 1) Organizational / Management Aspect: In order to institutionalize INSET, it is agreed that clear roles and responsibilities be developed and stipulated with regard to Teacher Education Division, the Districts and TTCs concerned and Participating Schools in designing and implementing INSET. This is particularly important for Akuapem North District as a model where the structured INSET has been developed.

- 2) Policy Advocacy: The Project has been contributing to Teacher Education Policy from the experience of INSET implementation in the three project areas. It is expected the Project would further accumulate experience and knowledge on pedagogical content and managerial aspects of INSET in the form of occasional papers on related issues and so on. These could constitute a source of continuous contributions from the Project to policy dialogue on the process of institutionalization of INSET.

3.1.2 Mitigating the impact of high attrition rates

- 1) School-based INSET: In order to alleviate the high attrition rate of INSET- trained Teachers, it is agreed that school-based INSET should be promoted further to share the knowledge and skills delivered through INSET so as to make institutional memories at school level possible. The Project will carry out the training of Facilitators for school-based INSET from September 2003.

- 2) Induction Training: At Akropong, all the schools have been covered by centre-based INSET and it is agreed that the existing six-day training will continue in order to provide Induction Training for all Newly Recruited Teachers.

3.1.3 Improved Monitoring and Evaluation

In order to assess the impact of the Project more accurately in detail, further improvement in monitoring and evaluation system was recommended. Renewed baseline survey (Mid-term Baseline Survey) including Reviewing, Modifying of Achievement Tests and Development of the Tracking System of INSET-trained Teachers was recommended.



3.1.4 Securing funds for INSET

The Team requested the Ghanaian authorities to secure funds for INSET. The Ghanaian side pointed out the important contribution from the Development Partners in this field is necessary because of budgetary constraints of the Government of Ghana. The Ghanaian side further referred to the necessity of sourcing the counter-value fund located in the Ministry of Finance which was provided by the Government of Japan. Possibility of application for timely and continuous disbursement of the Project from this fund should be explored and pursued by the Ministry of Education/GES and Japanese side.

3.2 Revision of PDM

The PDM (2nd version) was reviewed and modified according to the actual progress and achievement of the Project in the PCM workshop. The revised PDM (3rd version) is attached as Annex VI, and will be finalized in next JCC.

The following is the revised Narrative Summary (hierarchy of objectives) for the Project:

Goal:

Long-Term: Students' educational achievement in STM at Upper Primary/Junior Secondary School (UP/JSS) is improved in Project Areas.

Short-Term: The educational achievement in STM of UP/JSS students who have been taught by STM/INSET-Trained Teachers is improved in Project Areas

Purpose:

The capacity of STM/INSET-Trained Teachers for delivering STM (skills, contents) is improved for UP/JSS in the Project Areas

Outputs:

- 1) The existing STM education at Upper Primary/JSS is reviewed and recommendations reflected in the Project Design
- 2) Structured INSET established in Akuapem North District and linked with school-based INSET (as a model for replication).



- 3) INSET Programme replicated in other Project Areas
- 4) Institutionalization of INSET supported and policy advocacy implemented
- 5) Awareness-creation and information-sharing on STM promoted
- 6) Monitoring and Evaluation of INSET regularized

Modified Main Project Points:

The main points which have been modified are as follows:

- (1) The Goal and Purpose statements were retained, but their indicators were revised in terms of setting the targets lower. This was necessary based on the results of the monitoring study that revealed that although there was a general improvement in both teacher and student performance, there has been a slower upgrading in the field of science.
- (2) Output statements were reformed through a process of participatory brainstorming and consensus-building. The thrust of the discussion centered on identifying Outputs and strategies that will ensure the sustainability of structured INSET. Preliminary indicators were identified during the workshop and were finalized during a subsequent meeting.

Justification for each reformed Output:

Output 2:

The essential components for a structured INSET model have been developed and tested in Akuapem North District. Nevertheless, the model has so far focused on center-based INSET and will not be complete until it incorporates a systematic linkage with school-based INSET. This will then be the thrust as well as of the Project developing the model that illustrates an effective management system for INSET.

Output 3:

Continuous center-based training would be conducted in the Tamale Municipality and Akrokerri District, but there will also be a conscious effort to establish linkage with the school-based INSET as well as between the Districts and the TTCs for the purpose of institutionalizing procedures and relationships.



Output 4:

The review emphasized on the critical need to take up measures that could assist MOE/GES in the process of institutionalizing INSET. This is the only way that the achievement of the Goal can be assured. Also, the vision beyond the Project is that a Structured INSET is replicated across all districts in the country. The strategy is to establish a model that has been developed and tested from the experiences in the Project Areas and forward this to GES as input to the development of a national INSET policy. Certain other related policies are to be advocated especially those that pertain to high attrition rates among STM INSET-trained Teachers, funding and sustainability.

Output 6:

Although monitoring and evaluation of project implementation and effects/impact is not an Output in the same manner as those that the Project would seek to produce, it was agreed that this concern be highlighted because the results of the ensuing activities are very necessary for the success of the other Outputs. It is also important that a M & E system of INSET to be adopted by the Project could be consciously regularized and documented for the benefit of institutionalization.

- (3) The Output on PRESET was not included in the revised PDM since it was realized that the Project could not be responsible for PRESET improvement at the level that it is intervening. The focus of the Project is INSET and to ensure that the TTC tutors are trained for the purpose of training school teachers, the real target beneficiaries. Also, it was equally realized that the Project would have limited time resources to pursue M&E of tutor performance on STM. Nevertheless it is hoped and expected that the trained TTC tutors would help improve PRESET in the Project Colleges.

3.3 Future Strategies

After agreeing on the Outputs and the key components of the strategies to be adopted, group work was conducted to elaborate each Output into a plan of activities including time frame of accomplishment, milestone targets, and responsible units. The plan was finalized by the same core group of STM Project Team. The Plan of

Operation is attached in Annex VII .

And the chart of structure for INSET implementation for the future is attached in Annex VIII. .

4. REQUEST FROM THE GHANAIAIAN SIDE

The Team was informed that in spite of constraints, the STM Project constitutes a very important component of the Ghanaian Government's FCUBE programme and is already a success story. In this connection, Ghanaian side requested that the Project be extended to the 2nd phase so as to enhance its long-term impact and replication in other TTCs and Districts.

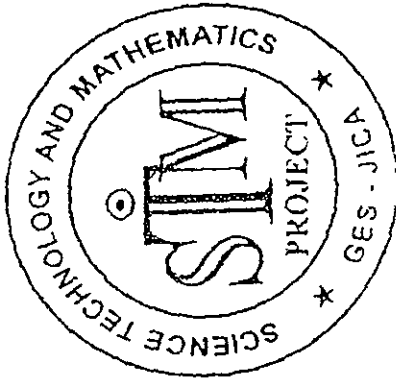


Annex I	Schedule of Mid-term Review
Annex II	PDM (2nd version)
Annex III	The summary of data analysis
Annex IV	PDM Monitoring
Annex V	The Project progress according to the Plan of Operation
Annex VI	Revised PDM (3rd version)
Annex VII	The Plan of Operation (January 2003 – February 2005)
Annex VIII	The Chart of structure for INSET implementation



Schedule of the Japanese Mid-term Review Team

<u>Date</u>	<u>Schedule</u>
28 Nov.	Arrival at Accra (Mr.MATSUYAMA)
29 Nov.	Meeting with Director General of GES, Arrival at Accra (Prof. MUTA)
30 Nov.	Viewing site of Akropong (Presbyterian Teachers' Training College), Meeting and Discussion with Project Team
2 Dec.	Joint Coordinating Committee, PCM workshop for revising PDM, Courtesy Call to the Embassy of Japan
3 Dec.	PCM workshop for revising PDM
4 Dec.	School Visits in Akropong, Discussion with ex-participants of Country-focused training, Departure from Accra (Prof. MUTA), Arrival at Accra (Prof. KURODA)
5 Dec.	Viewing site of Akropong (Presbyterian Teachers' Training College), Discussion on strategies for the future activities
6-8 Dec.	Preparation for the Seminar, Discussion of the Minutes
9 Dec.	Seminar to present the outcome of the Mid-term review, preparation of the Minutes
10 Dec	Preparation of the Minutes
11 Dec,	Signing on the Minutes, Reporting to the Embassy of Japan and JICA office, Departure from Accra



STM PROJECT

Project Design Matrix

(2nd Draft, 30 March 2001)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions																																										
<p>Goal:</p> <p>Long-Term:</p> <p><i>Students' educational achievement in STM at upper primary/Junior Secondary School (JSS) is improved in project areas</i></p>	<p>The number of upper primary pupils obtaining at least standard grades in STM subjects increase:</p> <table border="1" data-bbox="358 1035 555 1606"> <thead> <tr> <th>Science</th> <th>Mathematics</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>From 35%</td> <td>35%</td> <td>2*</td> </tr> <tr> <td>to 40%</td> <td>40%</td> <td>5</td> </tr> </tbody> </table> <p>The number of JSS students obtaining at least standard grades in STM subjects increase:</p> <table border="1" data-bbox="698 1035 797 1606"> <thead> <tr> <th>Science</th> <th>Mathematics</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>From 30%</td> <td>30%</td> <td>2*</td> </tr> <tr> <td>to 40%</td> <td>40%</td> <td>5</td> </tr> </tbody> </table> <p>The number of upper primary pupils obtaining at least standard grades in STM subjects increase:</p> <table border="1" data-bbox="967 1035 1093 1606"> <thead> <tr> <th>Science</th> <th>Mathematics</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>From 35%</td> <td>35%</td> <td>2*</td> </tr> <tr> <td>to 40%</td> <td>40%</td> <td>3</td> </tr> <tr> <td>to 50%</td> <td>50%</td> <td>5</td> </tr> </tbody> </table> <p>The number of JSS students obtaining at least standard grades in STM subjects increase:</p> <table border="1" data-bbox="1236 1035 1370 1606"> <thead> <tr> <th>Science</th> <th>Mathematics</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>From 30%</td> <td>30%</td> <td>2*</td> </tr> <tr> <td>to 40%</td> <td>40%</td> <td>3</td> </tr> <tr> <td>to 50%</td> <td>50%</td> <td>5</td> </tr> </tbody> </table> <p>(*note: base data is from the STM baseline survey)</p>	Science	Mathematics	Year	From 35%	35%	2*	to 40%	40%	5	Science	Mathematics	Year	From 30%	30%	2*	to 40%	40%	5	Science	Mathematics	Year	From 35%	35%	2*	to 40%	40%	3	to 50%	50%	5	Science	Mathematics	Year	From 30%	30%	2*	to 40%	40%	3	to 50%	50%	5	<p>Standardised mock exams in the three project districts for upper primary and JSS</p> <p>BECE for JSS 3 students</p> <p>Baseline test in science and mathematics</p>	<p>(Applies to both long and short-term goals)</p> <p>GES accept the INSET Programme for nationwide application</p> <p>MOE/GES provide continuous & effective support for the INSET Programme</p> <p>Adequate financial support is received from both government and other stakeholders</p> <p>MOE/GES maintains an effective teacher education structure</p> <p>Key players in INSET maintains their commitment to sustain the Programme</p> <p>Teachers trained in the INSET Programme stay long enough to make an impact</p> <p>Head teachers support STM teachers in school</p> <p>District Education Directorates have the resources to support school-based INSET</p> <p>Schools are making effective use of material support</p>
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<p>Short-Term:</p> <p><i>The educational achievement in STM of upper primary/JSS students who have been taught by STM/INSET-trained teachers is improved in project areas</i></p>																																													

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
<p>Purpose:</p> <p><i>The capacity of STM/INSET-trained teachers for delivering STM (skills, contents) is improved for upper primary/JSS in the project areas.</i></p>	<p>70% of upper primary and 80% of JSS STM/INSET-trained and practicing teachers have the capacity to deliver STM according to project performance standards*</p> <p>(* Note: Performance standards could include measures of communication skills, class management, and willingness to continue to teach)</p>	<ul style="list-style-type: none"> - Questionnaire - Investigation of lesson notes - Observation of Classroom activities 	<p>MOE/GES provide continuous and effective support for the INSET Programme</p> <p>Turn-over of STM/INSET-trained teachers is low</p> <p>STM/INSET-trained teachers is motivated through incentives and logistics</p> <p>Favourable teacher-pupil ratio is maintained</p> <p>Textbooks and teaching/learning materials are available</p> <p>Management at school is supportive of teachers</p>

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
<p>Output 1: The existing STM education at upper primary/JSS is reviewed & recommendations reflected in the Project Design</p>	<p>STM/INSET activities truly reflect the recommendations arising out of the baseline survey done in Year 1 Majority of the stakeholders understand the importance and challenges of STM education by end of Year 2</p>	<ul style="list-style-type: none"> - PDM - STM baseline survey results dissemination seminar questionnaire 	<p>(Applicable to all Outputs) MOE/GES provide continuous and effective support for the INSET Programme</p>
<p>Output 2: Structured programme for in-service training (INSET) of teachers established in Akiapem North District</p>	<p>Starting the 2nd quarter of Year 2, STM/INSET curricula and materials are being consistently used at the Project Centre at Presbyterian Training College (PTC) according to project standards Starting the 2nd quarter of Year 2, counterparts and PTC tutors are providing the INSET to teachers in the District according to project performance standards By the end of Year 2, 360 STM teachers, and by the end of Year 3, 720 STM teachers are trained in Akiapem North District.</p>	<ul style="list-style-type: none"> - STM/INSET curricula and teaching/learning materials - STM/INSET training schedule - STM Report 	<p>MOE/GES regularly reviews STM syllabi, to incorporate improved methodology of the project Counterparts have adequate motivation to remain in the Project TTC tutors are available to participate in the STM/INSET District Education Directorates in the project areas have the resources to support school-based INSET Majority of TTC STM tutors are retained by the end of Year 5.</p>

<p>Output 3: <i>INSET Programme replicated in other Project Areas and its institutionalization supported</i></p>	<p>By the end of Year 2, major actors in INSET are aware and apply appropriate roles, responsibilities, and relationships</p> <p>Infrastructure and equipment are sufficiently available at the project areas by the end of Year 2</p> <p>Adequate number of STM tutors are in place in the Project Areas by Year 3</p> <p>Starting Year 3, tutors at TTC in other Project Areas, together with TED counterparts and administrative personnel, are providing the INSET to teachers according to project performance standards</p> <p>By the end of Year 5, the manualised procedure and regulations for carrying out INSET has been accepted by TED</p> <p>By the end of Year 5, 2880 STM teachers are trained in all project areas</p>	<p>STM Report</p>	
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Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
<p>Output 4:</p> <p><i>The pre-service training (PRESET), especially teaching practices in STM, improved as a result of the structured INSET</i></p>	<p>By the end of Year 3, 50% of STM student trainees at PTC prepare good STM lesson notes during teaching practice</p> <p>By the end of Year 5, the number of student trainees preparing good STM lesson notes during teaching practise are as follows*:</p> <ul style="list-style-type: none"> - At least 70% at PTC, Akropong - At least 50% at Baga-baga, Tamale - At least 50% at Akrokerr <p>By the end of Year 5, the number of student trainees delivering good STM lesson notes during teaching practise are as follows*:</p> <ul style="list-style-type: none"> - At least 70% at PTC, Akropong - At least 50% at Baga-baga, Tamale - At least 50% at Akrokerr <p>(* Note: Measuring standards for good lesson notes could include clearly-set objectives, child-centred and activity oriented approach, appropriate core points, and effective methods of evaluation etc.)</p> <p>By the end of Year 3, 70% of PTC STM tutors teach students using improved methodology</p> <p>By the end of Year 5, the number of STM tutors using improved methodology are as follows:</p> <ul style="list-style-type: none"> - 90% at PTC, Akropong - 70% at Baga-baga, Tamale - 70% at Akrokerr 	<ul style="list-style-type: none"> - Questionnaire - Investigation of lesson notes - Observation of classroom activities - Assessment result by TTC tutors 	

<p>Output 5: <i>Advocacy and information sharing promoted</i></p>	<p>Attendance of people from the Project Areas to scheduled and announced STM Fairs (district, regional, and national) increase:</p> <table border="1"> <thead> <tr> <th>No. of People</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>From 500</td> <td>2</td> </tr> <tr> <td>To 1,000</td> <td>3</td> </tr> <tr> <td>To 1,500</td> <td>5</td> </tr> </tbody> </table> <p>Students' interest in STM in the project areas maintained at 80%</p> <p>Students in project areas applying practical STM skills in daily life (e.g. home and surroundings) increase from 62% in Year 1 to 70% in Year 5</p> <p>Parents' interest in STM in project areas maintained at 90%</p> <p>Number of STM teachers, government officers and development partners who obtain information from the Project Newsletter has increased</p> <table border="1"> <thead> <tr> <th>No. of Newsletters Distributed</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>From 400</td> <td>2</td> </tr> <tr> <td>To 600</td> <td>3</td> </tr> <tr> <td>To 1,000</td> <td>5</td> </tr> </tbody> </table>	No. of People	Year	From 500	2	To 1,000	3	To 1,500	5	No. of Newsletters Distributed	Year	From 400	2	To 600	3	To 1,000	5	<p>STM report Baseline survey</p>	
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ANNEX III

SUMMARY REPORT ON DATA ANALYSES

1. LESSON MONITORING

1-1) MONITORING METHOD

● Lesson Presentation

In order to monitor lesson presentation, typically, a team of two or three subject specialists assessed the work. These specialists visited the schools and observed the lessons. Five statements containing presentation in general, teachers knowledge of the subject matter, personal and professional attributes, learners’ activities and subject specific knowledge were used. The assessment was made by rating into five-scale ratings, 1 (poor) to 5 (excellent) based on the agreed rating criteria.

● Lesson Notes

For each teacher whose lesson was monitored, a lesson note was also observed and assessed according to seven clusters of statements comprising objectives, introduction, TLMs, development, core points, evaluation and overview were used. As well as lesson presentation, the assessment was made by a five-scale rating, 1 (poor) to 5 (excellent) based on the agreed rating criteria.

1-2) MATHEMATICS

● Monitoring of Lesson Notes Presentation

As seen in the figure 1-1, an overall comparison of teachers’ lesson presentation before and after the training revealed a great improvement in all five areas of “presentation general”, “teachers’ knowledge of subject matter”, “personal and professional attributes”, “learners’ activities”, and “subject specific matters in mathematics”. T-test shows it is statistically significant that teachers’ average performance in lesson presentation improved after STM training. (p<0.01)

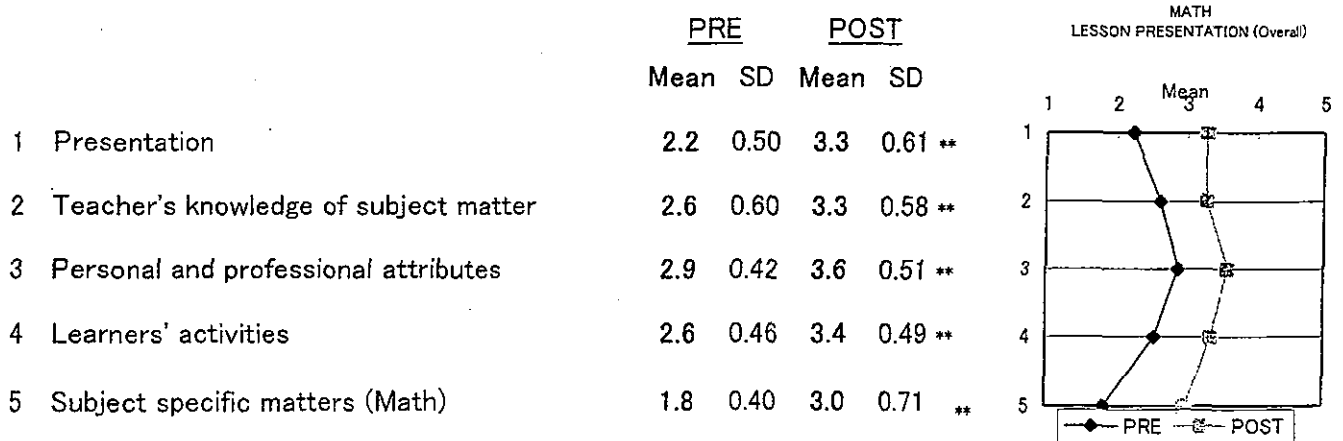
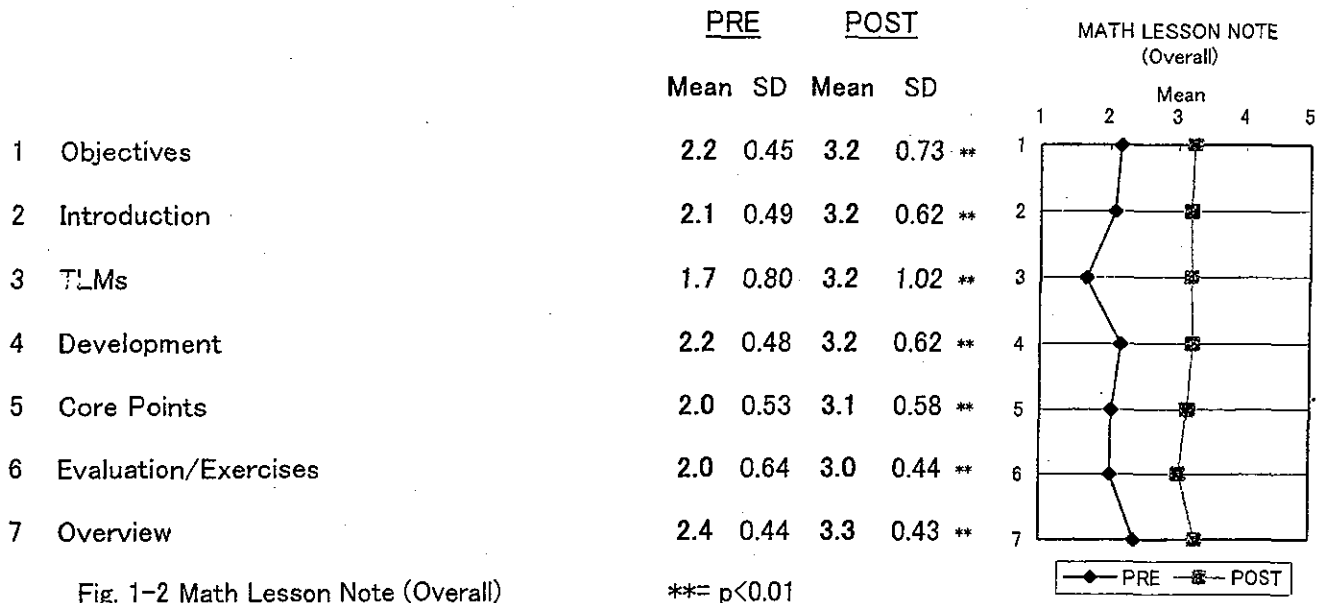


Fig.1-1 Overall Mathematics Presentation **= p<0.01

● **Monitoring of Lesson Notes**

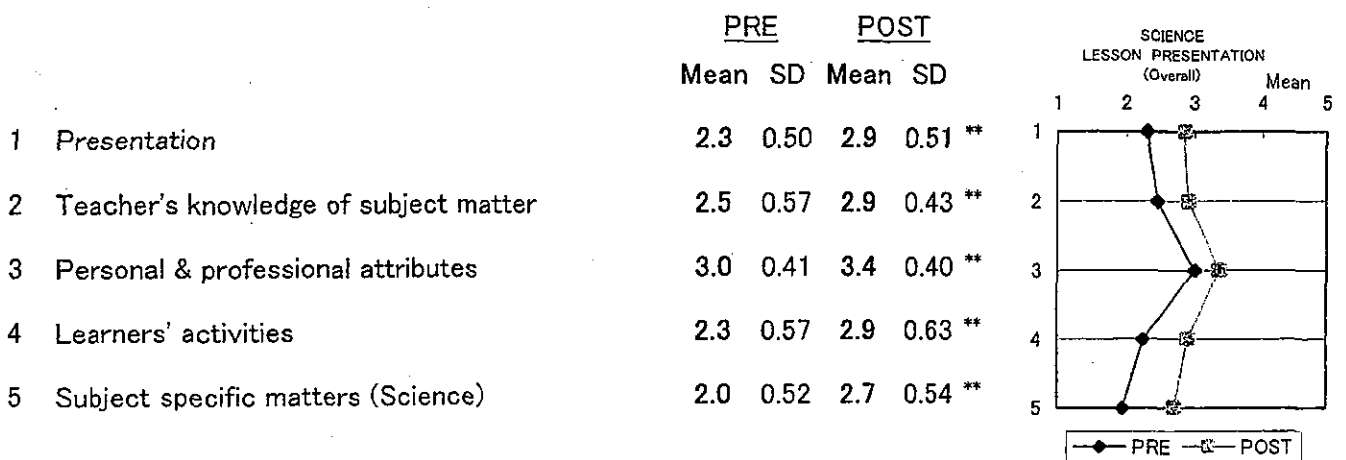
As observed in the lesson presentation, great improvement was noticed in the preparation of lesson notes, which supported lesson presentation. In the questionnaire of STM INSET, the lesson note preparation has been rated high for its usefulness of the training in their work. Many teachers had had little knowledge on how to write lesson notes before INSET, however, as seen in figures, the lesson note preparation improved on the average, which was statistically significant. ($p < 0.01$) Especially, as observed in the lesson presentation, usage of TLMs was well stated in the notes at the post-monitoring stage.



1-3) **SCIENCE**

● **Lesson Presentation**

As seen in the Fig. 1-3, most teachers showed marked improvement, after INSET, in all aspects of lesson presentation, namely Presentation, Teachers' Knowledge of Subject Matters, Personal & Professional Attributes, Learners' Activities, Subject Specific Matters.



● **Lesson Notes**

Generally, significant improvement in lesson note planning and preparation was observed after INSET. Improvement was especially visible in “TLMs” and “Evaluation” (1.9 to 3.1 in TLMs, and 1.9 to 2.9 in Evaluation, respectively). This could be attributed to the activities outlined at the training for teachers. A thorough discussion of terms used in a lesson note was done with teachers. In addition to this, teachers were tasked to select a topic each from the syllabus and write individual lesson notes. Then teachers also planned and prepared group lesson notes for micro-teaching. Their participation in model lesson observation and discussion gave them enough experience to plan and prepare a better lesson, which could go to explain the improvement in their lesson notes preparation at the post-monitoring stage.

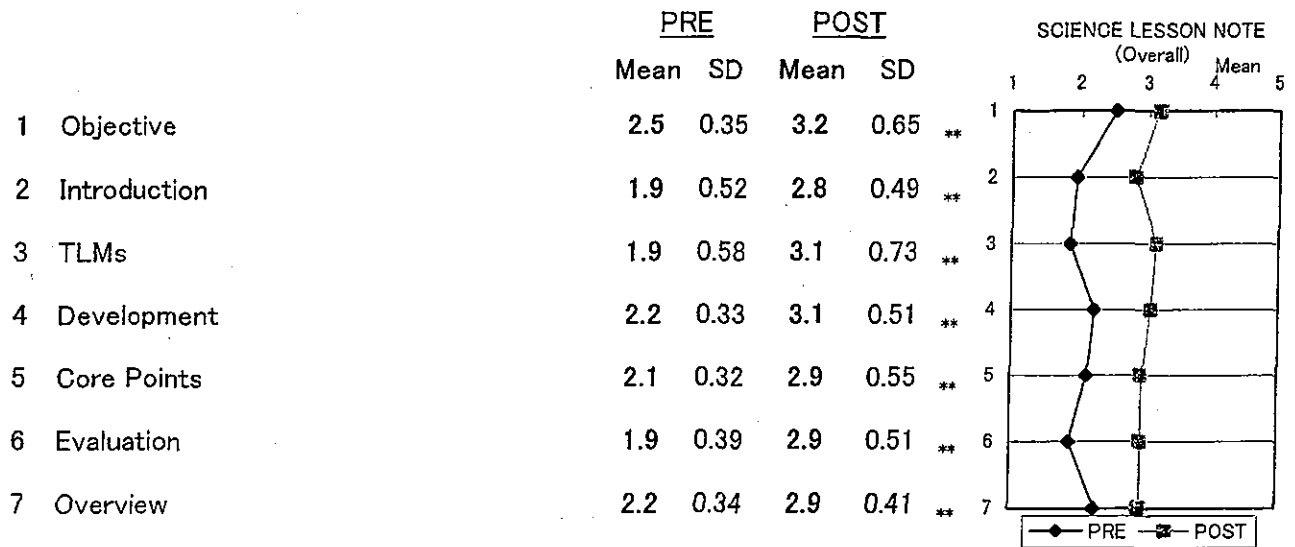


Fig. 1-4 Science Lesson Notes (Overall) **= p<0.01

2. Teachers' Feedback on STM Training and Their Work

2-1) DATA COLLECTION

For the mid-term review of the project, teachers' questionnaires were filled in by teachers who took STM INSET. The data was collected in two districts, Akropong and Tamale. School visits were made by the district officers and circuit supervisors as well as STM project members to call for teachers. Generally, teachers were put in a group of ten to fifteen at a time. At first, brief explanation about the purpose of the survey and how to fill in the questionnaires was made.

Table 2-1 shows the number of schools visited. Nearly 73% of all schools where teachers took STM training were visited (Primary 71.3%, and JSS 75.2%, respectively). Table 2-2 shows teachers information of the schools visited for mid-term survey. As you can see in the table, almost 26% of teachers left the district either for transfer, further studies or other professions. In addition, out of STM-trained teachers, about 12% left for further studies. Further investigation revealed that the percentage of teachers who went for study leave was higher in JSS, approximately 17% in JSS whereas about 10% of primary teachers left.

Table 2-1 School Visit Information

School Type	Total No. of Schools where teachers took STM Training	Total No. of Schools visited for Mid-term Survey	% of Schools visited
Primary	237	169	71.3%
JSS	121	91	75.2%
TOTAL	358	260	72.6%

Table 2-2 STM-trained Teachers' Information

School Type	Total No. of trained teachers in visited schools — ①	No. of teachers ① still in the same district — ②	Total No. of teachers ① not in the same district (① - ②) = ③	Total No. of Teachers in ③ for further studies
Primary	332	254 (76.5%)	78 (23.5%)	32 (9.6%)
JSS	127	86 (67.7%)	41 (32.3%)	22 (17.3%)
TOTAL	459	340 (74.1%)	119 (25.9%)	54 (11.8%)

3-1) DATA SET

Table 2-3 and 2-4 show distribution of respondents indicating the type of training they received (mathematics and science, respectively).

Table 2-3 Questionnaire Response (MATH)

Class	Number	[%]
P4	32	21
P5	77	52
JSS	41	27
Total	150	100

Table 2-4 Questionnaire Response (SCIENCE)

Class	Number	[%]
P4	33	20
P6	88	52
JSS	46	28
Total	167	100

2-2) INFORMATION ABOUT RESPONDENTS

● Teachers' Gender

Table 2-5 shows teachers' gender distribution. As a whole, about one third of the teachers were female and about two thirds were male. However, the table revealed some differences district by district. The male female ratio was about 6:4 in Akropong, whereas about 8.5: 1.5 was noted in Tamale. Thus, the ratio of female teachers was much higher in Akropong compared to that of Tamale.

Table 2-5 Teachers' Gender Distribution

	TOTAL (n=295)		Akropong (n=211)		Tamale (n=84)	
	Frequency	[%]	Frequency	[%]	Frequency	[%]
female	94	31.9	81	38.4	13	15.5
male	201	68.1	130	61.6	71	84.5

● Class Teachers were Teaching (Akropong Only)

Many transfers and changes in class teaching were found among teachers in Akropong. Out of 211 respondents, about 11%(23 teachers) were transferred within the district, mostly within the same school level (such as primary to primary). Furthermore, as seen in the Table 2-6 below, in the primary school about one third (33%) of the teachers taught a different class from the one they were teaching when they came to STM INSET. Presumably, only 2 % change was found in JSS.

Table 2-6 Primary School teachers Teaching Classes
-Comparison of the classes they were teaching when they took STM INSET

Response	n=165	
	Frequency	[%]
No	54	32.7
Yes and No	6	3.6
Yes	105	63.6

● **Teachers' Age**

Table 2-7 and Fig 2-1 show teachers' age range distribution. The investigation found that there were lots of young teachers at school. In all 46.8 % of the teachers were under thirty years old (42.7% in Akropong and 57.1% in Tamale). Especially in Tamale, teachers were relatively young. More than 90% of teachers who took the training were below forty years old.

Table 2-7 Teachers' Age Range Distribution Total and by District

	TOTAL (n=295)		Akropong (n=211)		Tamale (n=84)	
	Frequency	[%]	Frequency	[%]	Frequency	[%]
≤30	138	46.8	90	42.7	48	57.1
31-40	82	27.8	54	25.6	28	33.3
41-50	62	21.0	54	25.6	8	9.5
≥50	13	4.4	13	6.2	0	0

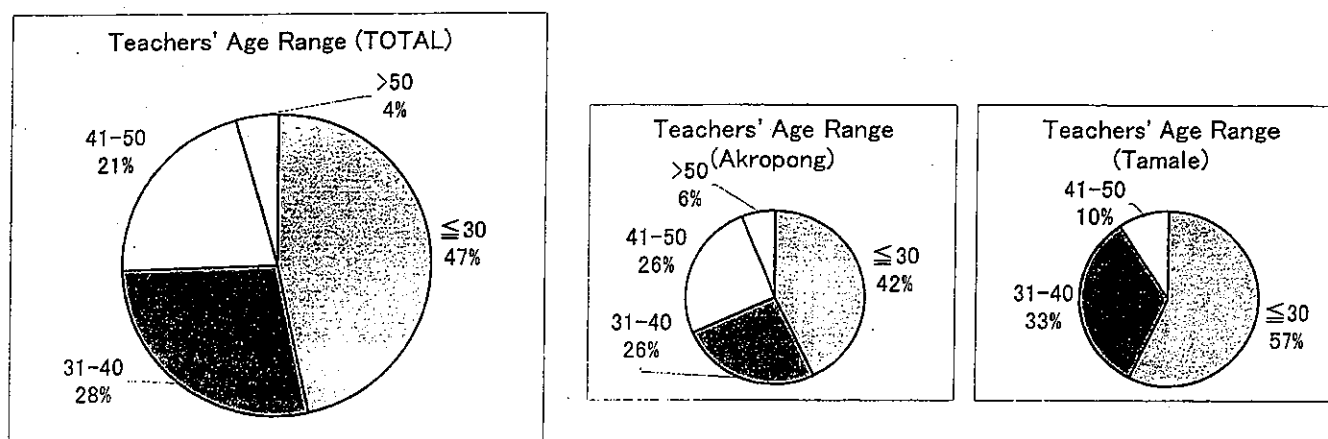


Fig. 2-1 Teachers' Age Range Total and by District

● **Teachers' Experience**

Table 2-8 and Fig 2-2 show the distribution of teaching experience among teachers. As expected from the age distribution, there were a number of teachers with limited years of experience in teaching. The result shows that about half of the teachers had less than five years of experience (48.1 % in total, 45.5% in Akropong and 54.8% in Tamale). Furthermore, in Tamale, 80% of teachers had less than ten years of teaching experiences.

Table 2-8 Experience as a teacher Total and by District [yrs]

Years	TOTAL (n=295)		Akropong (n=211)		Tamale (n=84)	
	Frequency	[%]	Frequency	[%]	Frequency	[%]
0-5	142	48.1	96	45.5	46	54.8
6-10	48	16.3	26	12.3	22	26.2
11-20	76	25.8	62	29.4	14	16.7
21-30	25	8.5	23	10.9	2	2.4
>31	4	1.4	4	1.9	0	0

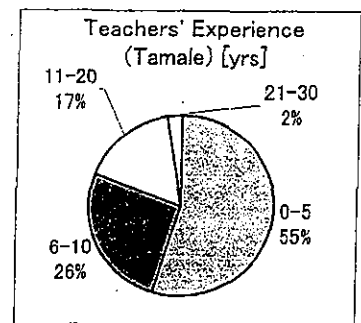
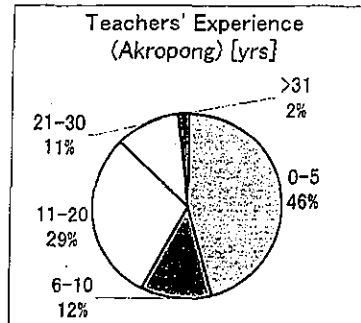
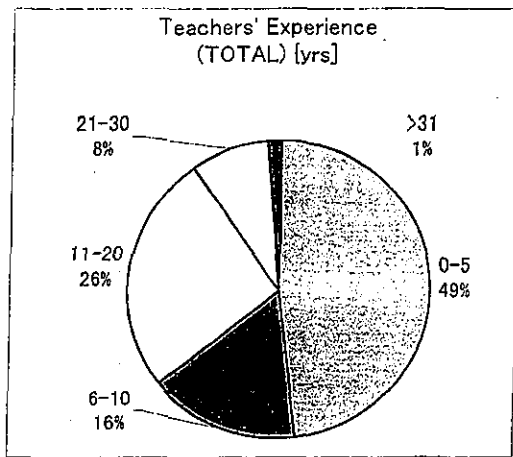


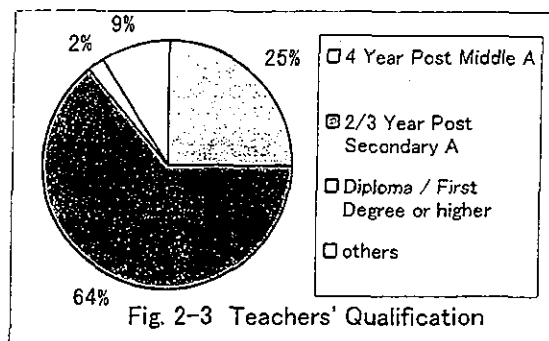
Fig 2-2. Experience as a teacher Total and by District [yrs]

● **Teachers' Qualification**

Table 2-9 and Fig 2-3 show teachers' educational and professional qualifications. As seen in the table, most teachers had two/three-year post-secondary Certificate A (very few had two-year post-secondary, thus it was combined with three year post sec.) or four-year post-middle Certificate A. About two-thirds (64%) of teachers had two/three-year post-secondary Certificate A and about one fourth (25%) teachers had four-year post-middle Certificate A. As seen in Table 2-10 and Fig 2-4, there was a tendency for younger teachers to have two/three-year post-secondary Certificate A, while teachers with longer years of service had four-year post-middle Certificate A.

Table 2-9 Teachers' Qualifications

	Frequency	[%]
4-Year Post-Middle A	74	25.1
2/3-Year Pos- Secondary A	188	63.7
Diploma / First Degree or higher	7	2.4
others	26	8.8



Age Group	4 yr post middle A (n=74)		2/3 yr post sec A(n=188)	
	Frequency	[%]	Frequency	[%]
≤30	3	4%	118	63%
31-40	22	30%	49	26%
41-50	38	51%	20	10.5%
>50	11	15%	1	0.5%

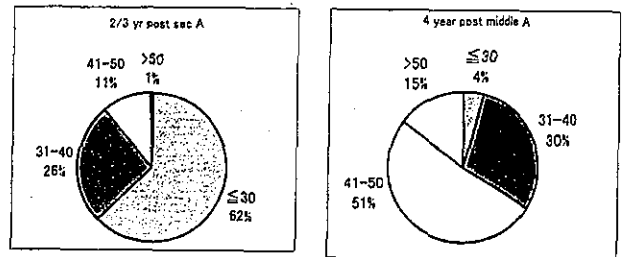


Fig 3-8. Teachers' Age Distribution by Two Qualifications

2-3) QUESTIONNAIRES ANALYSES

2-3-1) Evaluation of STM Training for Teachers

The evaluation for the STM INSET was rated in five scales; 1 for “strongly disagree”, 2 for “disagree”, 3 for “hard to tell”, 4 for “agree” and 5 for “strongly agree”. Overall, most of the items were rated around 4.5 on average.

2-3-2) Usefulness and Constraints of STM Training

For the usefulness and constraint, teachers were asked to choose maximum of three statements from the list as their response. The responses about usefulness of STM INSET concentrated on a few statements, in lesson note preparation (74.2 %), TLM preparation (54.6%) and improvement of their teaching method (61.0%). On the other hand, it did not help them much for their improving classroom management (2.4%) and pupils’ performance (12.5%). Although about half of (48.5 %) teachers responded that it had helped in increasing pupils’ interests towards their lesson, only 12.5 % answered it had actually helped improve pupils’ performance as well.

In terms of the constraints to practice what they gained from STM INSET, the response was focused on lack of resources, (90% of teachers expressed as constraints), such as lack of needed materials including TLMs at school as well as provision of learning needs from parents.

2-3-3) Impact on Classroom Setting

This section investigated the impact of STM INSET on teachers’ and pupils’ attitude and actual classroom learning. Categorized statements were rated with a scale of five, 1 for “strongly disagree”, 2 for “disagree”, 3 for “hard to tell”, 4 for “agree” and 5 for “strongly agree” as their opinion, and 1 for “never”, 2 for “seldom”, 3 for “sometimes”, 4 for “often” and 5 for “always” as showing the frequencies. They responded how they had felt before INSET and how they felt then (the time they were responding to the questionnaire). This way of asking their opinions might have influenced their reply with a logical expectation for improvement after the training. Therefore, absolute rating may not be reliable. However, relative comparison between the two different times would be fairly reliable considering that some items had higher rating than others, and some had a larger gap between “before” and “now” than others.

- **Attitude of Teachers and Pupils**

Teachers expressed improvement in their attitude towards their teaching as a whole. In pupils' attitude, although all the items were rated very high, their enjoyment of the lessons, understanding the subject, and participation in class were rated especially high, teachers seemed to feel that more active classroom learning was provided after INSET.

- **Teaching Methodology and TLMs**

Generally, the average rate of teaching methodology and TLMs, rated between 4.2 to 4.5 after the INSET. Ratings of this section were not as high as teachers' attitude or pupils' attitude. The rating of an item, asking if TLMs would help pupils' learning, were higher than others in this section. This observation might have revealed some gap between their perception and their actual performance in classroom teaching.

- **Networking and Information Sharing**

On the whole, the rating on network and information sharing was not as high as the other section. Even responses for "now" were rated below 4.0 on average. Thus, many teachers did not seem to explore and exchange what they had frequently enough.

This series of section observed that almost all statements in this section had shifted parallel to the better rating. This parallel movement in average responses may indicate that at least the teachers who took the INSET generally found improvement in their classroom learning situation and attitude.

2-3-4) Other Teaching Environment

In this section of the questionnaire, teachers' opinions about overall teaching environment were asked. Like the other sections, each statement was asked to rate in five given scales.

- **Head Teachers and School Management**

Overall investigation revealed that teachers generally felt that they had some opportunity of expressing their opinions and suggestions at school. "Head teachers' openness for the new ideas and changes" was rated quite high. On the other hand, "If head teachers like teachers to be in his/her preferred way" was rated close to 3.0, (=sometimes), which seems to contradict the previous responses. In addition, teachers seem to feel that head teachers were not very supportive in advising on their classroom teaching such as lesson note preparation or observation of lessons, rating them 2.88 and 3.49 on average, respectively. Quite a few teachers rated 1(=never) or 2(=seldom) for the question about headteachers' support in writing lesson notes.

- **Support and Understanding from Parents**

Teachers expressed the importance of parental support towards pupils' better learning. Nevertheless, they expressed that they were facing some difficulties in getting assistance from parents, and getting little interest from parents in their children's academic performance.

- **Job Satisfaction**

Considering the fact that many teachers leave for further studies and not many of them return to the teaching job at basic level, teachers' motivation in teaching and satisfaction on their job were surveyed as the crucial factors for reviewing STM Project. For the first question of asking their intention of leaving for a better-paid job, the responses split. However, further analysis for this question revealed a clear picture that younger teachers and teachers with higher qualifications (mainly three year post secondary certificate A) had stronger desire for leaving for a better-paid job. In the "agree" group, which was "agree" and "strongly agree", the percentage of younger age-group was higher. On the other hand, in "disagree" group, the percentage of responses was relatively higher in the older age groups. In addition, the percentage of two/three-year post Certificate A was more than that of four-year post middle in "agree" group, whereas this order reversed in "disagree" group.

The next question, asking their intention of leaving school for further studies, indicated that most teachers wish to go for further studies, regardless of their age and qualifications. A comparison between "agree" and "strongly agree" also found the same tendency as in the first question. In the "strongly agree" group, the percentage of responses was higher among the younger group, and in "agree", the percentage was higher in the older group. Furthermore, in "strongly agree", there were more percentage of teachers with two/three-year post secondary Certificate A than those with four-year post-middle Certificate A, whereas this order reversed in "agree", with more four-year post-middle and less two/three-year post-secondary teachers.

Thus, a survey of these two factors suggested that higher qualification teachers were younger, they had stronger intention for leaving teaching job either for better paid job or for further studies which would promise a better job in the future. This will be something to be considered for reviewing the future direction of the project.

2-3-5) Suggestion for Future Improvement in STM INSET

Lastly, suggestion for further improvement in STM INSET was asked. Teachers were asked to choose as many as three. The suggestions focused on two points, periodic workshop on subject training and provision of certificate for STM to be accredited for further teacher training programme.

3. Pupils' Achievement Test in Mathematics & Science

3-1) PRIMARY MATHEMATICS

Table 3-1 shows mean and standard deviation of primary mathematics achievement test at the baseline and mid-term. As seen from the figures, the overall mean score increased by 1.9 at the mid-term ($p < 0.1$, mean=32.2 at the baseline, 34.1 at the mid-term respectively). Further regression analysis showed that the difference in pupils' performance on average was significant. It is likely that pupils at the mid-term performed better if other factors had been controlled.

Table 3-1 Overall Comparison of Primary Math Achievement Test between Baseline and Mid-Term

Baseline 2000			Mid-term 2002		
n	Mean	SD	n	Mean	SD
326	32.2	13.2	303	34.1	14.9

3-2) PRIMARY SCIENCE

Table 3-2 shows overall mean and standard deviation of primary science achievement test at the baseline and the mid-term. Pupils' performance in science test score at the mid-term is slightly lower than that of the baseline, although the difference was not significant. Based on the fact that only P6 teachers were trained in science in these schools, further investigation was made in terms of class. As shown in Table 3-3, in P6, the mean of the science test score improved by 4.8 at the mid-term compared to the one at the baseline. This difference is statistically significant and it is likely that P6 pupils performed better at the mid-term as a whole. This improvement in pupils' performance could be partially explained by the impact of STM INSET.

Table 3-2 Overall Comparison of Primary Science Achievement Test between Baseline and Mid-Term

Baseline 2000			Mid-term 2002		
n	Mean	SD	n	Mean	SD
326	27.5	14.1	303	26.0	16.7

Table 3-3 Comparison of Primary Science Achievement Test between Baseline and Mid-term by class

Class	Baseline 2000			Mid-term 2002		
	n	Mean	SD	n	Mean	SD
P4	117	20.1	10.5	111	17.3	10.7
P5	97	29.9	14.2	105	25.2	14.7
P6	112	33.1	14.2	87	37.9	18.0

3-3) JSS MATHEMATICS

Table 3-4 shows mean and standard deviation of junior secondary mathematics achievement test at the baseline and mid-term. As seen in the figures, the overall mean score was slightly higher at mid-term (although the difference is not significant).

Assuming that JSS2 students were more likely to be taught longer by the teachers who

took STM INSET, further analysis was done class by class. (Table 3-5) At the baseline, the difference in students' performance between JSS1 and JSS2 was not significant, whereas the difference between JSS1 and JSS2 became significant at the mid-term. ($p < 0.01$) Furthermore, in JSS1, no significant difference in students' test score was found between the baseline and mid-term. However, it was statistically significant in JSS2 ($p < 0.05$). Students at the mid-term survey performed better than those at the baseline on average.

Table 3-4 Overall Comparison of Primary Math Achievement Test between Baseline and Mid-Term

Baseline 2000			Mid-term 2002		
n	Mean	SD	n	Mean	SD
171	22.7	10.2	178	24.0	9.9

Table 3-5 Comparison of JSS Math Achievement Test between Baseline and Mid-term by CLASS

Class	Baseline 2000			Mid-term 2002		
	n	Mean	SD	n	Mean	SD
JSS1	92	21.9	9.0	98	20.9	7.2
JSS2	79	23.7	11.3	80	27.8	11.4

3-4) JSS SCIENCE

Table 3-6 shows mean and standard deviation of junior secondary science achievement test at the baseline and mid-term. As seen from the figures, the overall mean score was slightly lower at the mid-term.

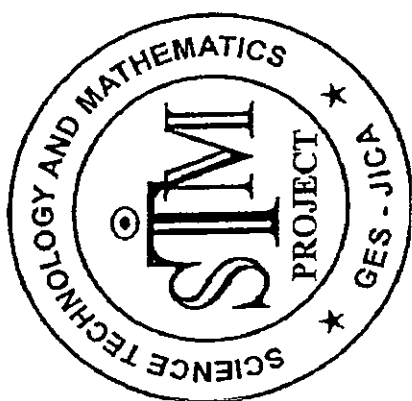
Table 3-6 Overall Comparison of JSS Science Achievement Test between Baseline and Mid-Term

Baseline 2000			Mid-term 2002		
n	Mean	SD	n	Mean	SD
172	23.2	13.6	178	20.5	11.1

4. Focus Group Discussion with Country Focus Training

A group of Ghanaian teachers conducting STM INSET at TTC and district officers involved in STM INSET administration were sent to Japan every summer. Approximately half of the participants were called for the focus group discussion as a part of the mid-term review and asked about the impact and the usefulness of the training.

Overall evaluation of the training by the participants was very good. They expressed their interest in learning about Japanese teachers and their teaching methods as well as their attitudes, all of which they found quite different from those of Ghanaian teachers. Administrative officers in the project districts were also sent as members of this training programme this year, which was found quite productive and effective for the project. They also showed their productive learning and gains from the training. A great improvement and strong supportive attitudes towards STM INSET in its administration have been observed after the training. Especially, when more school-based INSET are to be initiated as the project's future strategy, it is essential that administrative capacities are also strengthened accordingly.



STM Project Monitoring

(November 2002)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Monitoring																																										
<p>Goal:</p> <p>Long-Term: <i>Students' educational achievement in STM at upper primary/Junior Secondary School (JSS) is improved in project areas</i></p> <p>Short-Term: <i>The educational achievement in STM of upper primary/JSS students who have been taught by STM/INSET-trained teachers is improved in project areas</i></p>	<p>The number of upper primary pupils obtaining at least standard grades in STM subjects increase:</p> <table border="1" data-bbox="355 998 454 1607"> <thead> <tr> <th>Science</th> <th>Mathematics</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>From 35%</td> <td>35%</td> <td>2*</td> </tr> <tr> <td>to 40%</td> <td>40%</td> <td>5</td> </tr> </tbody> </table> <p>The number of JSS students obtaining at least standard grades in STM subjects increase:</p> <table border="1" data-bbox="602 998 702 1607"> <thead> <tr> <th>Science</th> <th>Mathematics</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>From 30%</td> <td>30%</td> <td>2*</td> </tr> <tr> <td>to 40%</td> <td>40%</td> <td>5</td> </tr> </tbody> </table> <p>The number of upper primary pupils obtaining at least standard grades in STM subjects increase:</p> <table border="1" data-bbox="883 998 999 1607"> <thead> <tr> <th>Science</th> <th>Mathematics</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>From 35%</td> <td>35%</td> <td>2*</td> </tr> <tr> <td>to 40%</td> <td>40%</td> <td>3</td> </tr> <tr> <td>to 50%</td> <td>50%</td> <td>5</td> </tr> </tbody> </table> <p>The number of JSS students obtaining at least standard grades in STM subjects increase:</p> <table border="1" data-bbox="1148 998 1280 1607"> <thead> <tr> <th>Science</th> <th>Mathematics</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>From 30%</td> <td>30%</td> <td>2*</td> </tr> <tr> <td>to 40%</td> <td>40%</td> <td>3</td> </tr> <tr> <td>to 50%</td> <td>50%</td> <td>5</td> </tr> </tbody> </table> <p>(*note: base data is from the STM baseline survey)</p>	Science	Mathematics	Year	From 35%	35%	2*	to 40%	40%	5	Science	Mathematics	Year	From 30%	30%	2*	to 40%	40%	5	Science	Mathematics	Year	From 35%	35%	2*	to 40%	40%	3	to 50%	50%	5	Science	Mathematics	Year	From 30%	30%	2*	to 40%	40%	3	to 50%	50%	5	<ul style="list-style-type: none"> - Standardised mock exams in the three project districts for upper primary and JSS - BECE for JSS 3 students - Baseline test in science and mathematics 	<ul style="list-style-type: none"> ● The ratio of upper primary and JSS pupils who attained the standard grades are summarised as follows: ● 38% of upper primary pupils attained the standard, which is lower than the target but an improvement compared to the baseline survey. When compared in each grade, 42% in 4th grade, 50% in 5th grade and 41% in 6th grade. ● 32% of upper primary pupils attained the standard, which is lower than the target but an improvement compared to the baseline survey. When compared in each grade, 22% in 4th grade, 31% in 5th grade and 44% in 6th grade reached the standard. ● JSS Mathematics attainment rate in the 3rd year reached 37%. ● JSS Science attainment rate was 21% which was below the baseline. However close examination of the data revealed that girls and "C" School had a higher rate than the baseline.
Science	Mathematics	Year																																											
From 35%	35%	2*																																											
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Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Monitoring
<p>Purpose:</p> <p><i>The capacity of STM/INSET-trained teachers for delivering STM (skills, contents) is improved for upper primary/JSS in the project areas</i></p>	<p>70% of upper primary and 80% of JSS STM/INSET-trained and practicing teachers have the capacity to deliver STM according to project performance standards*</p> <p>(* Note: Performance standards could include measures of communication skills, class management, and willingness to continue to teach)</p>	<ul style="list-style-type: none"> - Questionnaire - Investigation of lesson notes - Observation of Classroom activities 	<p>Monitoring data shows that teachers prepare better lesson notes in the following areas:</p> <ul style="list-style-type: none"> • Objective • Introduction • TLMs • Development • Core points • Evaluation • Overview <p>Monitoring data shows that teachers lesson delivery improved in the following areas:</p> <ul style="list-style-type: none"> • Presentation • Teacher's knowledge of subject matter • Personal and Professional attributes • Learners' activities • Subject specific matters

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Monitoring
<p>Output 1: <i>The existing STM education at upper primary/JSS is reviewed & recommendations reflected in the Project Design</i></p>	<p>STM/INSET activities truly reflect the recommendations arising out of the baseline survey done in Year 1</p> <p>Majority of the stakeholders understand the importance and challenges of STM education by end of Year 2</p>	<p>PDM</p> <p>STM baseline survey results dissemination seminar questionnaire</p>	<ul style="list-style-type: none"> ● PCM workshop was held in March 2000 and PDM was revised. ● DG and DDG of GrS participated in the workshop. The importance of INSET of teachers and institutionalisation is slowly becoming recognised.
<p>Output 2: <i>Structured programme for in-service training (INSET) of teachers established in Akuapem North District</i></p>	<p>Starting the 2nd quarter of Year 2, STM/INSET curricula and materials are being consistently used at the Project Centre at Presbyterian Training College (PTC) according to project standards</p> <p>Starting the 2nd quarter of Year 2, counterparts and PTC tutors are providing the INSET to teachers in the District according to project performance standards</p> <p>By the end of Year 2, 360 STM teachers, and by the end of Year 3, 720 STM teachers are trained in Akuapem North District.</p>	<p>STM/INSET curricula and teaching/learning materials</p> <p>STM/INSET training schedule</p> <p>STM Report</p>	<ul style="list-style-type: none"> ● Since the first INSET started in February 2001, content and methods of INSET have been modified and improved. ● In the beginning Japanese experts and Ghanaian counterpart experts carried out INSET. Since June 2001, on average 20% of INSET (5 out of 22 sessions of INSET) were facilitated by TTC tutors. The gradual progress of pairing with TTC tutors and then handing-over is on course. ● As of March 2002, 390 teachers had received six-day INSET in Akrokpong. ● A two-day workshop for headteachers was held in response to the request by the district education office. 160 headteachers participated. ● Additional 60 teachers participated in INSET from May to June 2002. All schools in Akrokpong are now covered. Additional INSET is planned to cover new teachers numbering 90.

STM Report

INSET Programme replicated in other Project Areas and its institutionalization supported

By the end of Year 2, major actors in INSET are aware and apply appropriate roles, responsibilities, and relationships

Infrastructure and equipment are sufficiently available at the project areas by the end of Year 2

Adequate number of STM tutors are in place in the Project Areas by Year 3

Starting Year 3, tutors at TTC in other Project Areas, together with TED counterparts and administrative personnel, are providing the INSET to teachers according to project performance standards

By the end of Year 5, the manualised procedure and regulations for carrying out INSET has been accepted by TED

By the end of Year 5, 2880 STM teachers are trained in all project areas

- INSET in Tamale started in February 2002. INSET continued in Feb., March, June, October and November. Four sets of INSET were completed in Tamale.
- In Akropong, INSET started in October and one set of INSET was completed.
- INSET in Tamale was at first carried out in two consecutive weeks, but the experience showed that INSET would be more effective when carried out with an interval of four weeks between the first and second three day sessions. These experiments and improvements were made in Tamale and Akrokerri.
- As of November 2002, 180 primary school teachers and 60 primary teachers had completed INSET in Tamale. 60 primary school teachers completed INSET in Akrokerri. The number of INSET trained teachers in (b) area became 300 in total.
- TTC tutors, district coordinators and other related personnel from Akrokerri and Tamale came to Akropong in June and October 2001 to learn how to implement INSET recognising roles of each person. Two mathematics tutors from Akrokerri TTC and Bagabaga TTC came as an attachment during INSET in Akropong for two months.
- INSET facilities in Tamale was renovated and furniture provided in Feb.2001. The current facilities are on loan from TTC. Construction of seminar rooms will start as soon as funds (Japanese counter-value funds) become available.
- More TTC tutors are needed to implement INSET.
- INSET for TTC tutors started in April 2002 and continued.
- Training manuals for Science and Mathematics (draft) were completed. They will be revised.

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Monitoring
<p>Output 4:</p> <p><i>The pre-service training (PRESET), especially teaching practices in STM, improved as a result of the structured INSET</i></p>	<p>By the end of Year 3, 50% of STM student trainees at PTC prepare good STM lesson notes during teaching practice</p> <p>By the end of Year 5, the number of student trainees preparing good STM lesson notes during teaching practise are as follows*:</p> <ul style="list-style-type: none"> - At least 70% at PTC, Akropong - At least 50% at Baga-baga, Tamale - At least 50% at Akrokerrri <p>By the end of Year 5, the number of student trainees delivering good STM lesson notes during teaching practise are as follows*:</p> <ul style="list-style-type: none"> - At least 70% at PTC, Akropong - At least 50% at Baga-baga, Tamale - At least 50% at Akrokerrri <p>(*Note: Measuring standards for good lesson notes could include clearly-set objectives, child-centred and activity oriented approach, appropriate core points, and effective methods of evaluation etc.)</p> <p>By the end of Year 3, 70% of PTC STM tutors teach students using improved methodology</p> <p>By the end of Year 5, the number of STM tutors using improved methodology are as follows:</p> <ul style="list-style-type: none"> - 90% at PTC, Akropong - 70% at Baga-baga, Tamale - 70% at Akrokerrri 	<ul style="list-style-type: none"> - Questionnaire - Investigation of lesson notes - Observation of classroom activities - Assessment result by TTC tutors 	<ul style="list-style-type: none"> ● A two-day seminar for PTC students were held in response to the request by the Principal. However, not enough activities have been done for this output. ● TTC tutors who participated in country-focus training in Japan improved their instruction and lesson delivery. Output can be seen as an impact of Output 3.

Advocacy and information sharing promoted

Attendance of people from the Project Areas to scheduled and announced STM Fairs (district, regional, and national) increase:

No. of People	Year
From 500	2
To 1,000	3
To 1,500	5

Students' interest in STM in the project areas maintained at 80%

Students in project areas applying practical STM skills in daily life (e.g. home and surroundings) increase from 62% in Year 1 to 70% in Year 5

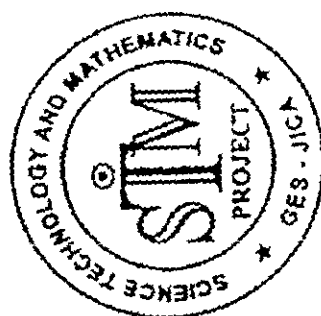
Parents' interest in STM in project areas maintained at 90%

Number of STM teachers, government officers and development partners who obtain information from the Project Newsletter has increased

No. of Newsletters Distributed	Year
From 400	2
To 600	3
To 1,000	5

STM report
Baseline survey

- GES Fair held from 30 Oct to 3 Nov 2000 attracted over 500 students visiting STM exhibition. Science and Mathematics Fairs held in Akropong in March 2001 had over 300 primary and JSS pupils as well as teachers participating.
- The number of participants to STM related activities were over 1000 by the end of the third year. Science and Mathematics Fair held in April 2002 had over 420 pupils from primary schools and JSS attending. STME clinic attracted over 500 female students. Moreover, a one-day seminar held in Kedjebi in August 2002 had over 120 primary school teachers participating. Book Fair held in November 2002 also had nearly 200 people visiting TED exhibition stand where STM project was introduced.
- Mid-term review shows that pupils' interest in Science and Mathematics is high. Over 80% responded that they liked the subjects.
- Students in project areas reported to have applied practical Science skills in daily life was 95.6%, while that for Mathematics was 96.9%. These figures show an increase in the figures obtained from the baseline survey.
- Parents' interest in STM was high. 78.5% responded that Science was important and 81.5% said that Mathematics was important. Although lower than the figures obtained in the baseline survey, parents' interest remained high.
- Issues of project newsletter were published in January, May, September 2001, March, August and November 2002. Each issue had about 300 to 500 in circulation. The first year circulation was 300, second year 900 and the third year 600, as of Nov. 2002.



STM PROJECT PROGRESS ACCORDING TO THE PLAN OF OPERATION

(March 2000 - November 2002)

<p>2-1) To develop strategies for providing improved INSET</p> <p>2-2) To provide learning opportunities for TTC tutors in the programme area (a).</p> <p>2-3) To provide structured INSET for STM teachers in the programme area (a)</p> <p>2-4) To supplement the material supply at the programme area (a) for practical STM</p> <p>2-5) To undertake a follow-up of the INSET participants (performance monitoring)</p> <p>2-6) To monitor and evaluate the structured INSET in the programme area (a) (impact monitoring)</p>						<p>2-1) September, two short-term experts on science and mathematics visited Ghana and held workshops as a trial INSET. Based on the results of the baseline survey, INSET planning started in mid-November.</p> <p>2-2) Country-focus training was held in Hiroshima University and Fukuoka Education University in August and September. 8 TTC tutors participated. In Akropong, the TTC principal who had been to Japan for the C/P training led other tutors and held a seminar to share Japanese experience.</p> <p>2-3) INSET started on 6 February in Akropong, one month earlier than planned. Two short-term experts came to advise and assist.</p> <p>2-4) Preparations were made to produce self-learning materials for pupils. These materials were to be used by pupils while their teachers attended INSET. Materials were distributed to schools before INSET started.</p> <p>2-5) Follow-up, such as school visit to where the INSET trained teachers are teaching, was done.</p> <p>2-6) Some feed-back from INSET trained teachers was planned.</p>
<p>3-1) To provide learning opportunities for TTC tutors in the programme area (b)</p> <p>3-2) To provide INSET for STM teachers in the programme area (b)</p> <p>3-3) To undertake a follow-up of the INSET participants (performance monitoring)</p> <p>3-4) To monitor and evaluate the INSET in the programme area (b) (impact monitoring).</p> <p>3-5) To assist in the institutionalization of the INSET system.</p>						<p>3-1) Plan was to be made to invite TTC tutors from Akrokerri and Bagabaga TTCs to Akropong to observe and participate in INSET to prepare them to take up the training in the programme areas (b).</p> <p>3-2) Training for Akrokerri and Bagabaga to be planned.</p> <p>3-3) Interview with tutors of TTCs and officers at the district education office was carried out in order to know their opinions on INSET.</p> <p>3-4) Monitoring plans in Akropong was to be used.</p> <p>3-5) Teacher Education plans formulated at TED reflected STM INSET. Original plan was to share our experience after doing INSET. However, the plan was used as a model for institutionalised INSET.</p>

<p>4-1) To analyze present teaching practices in STM.</p> <p>4-2) To develop strategies to improve teaching practices in STM.</p> <p>4-3) To develop strategies that link INSET and PRESET</p>	<p>***</p> <p>***</p> <p>***</p> <p>***</p> <p>***</p> <p>***</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>4-1) Teaching practice was looked into as part of the baseline survey. Current teaching practice is relatively short and instruction at the school level is not very effective.</p> <p>4-2) According to the baseline survey and the advice of the short-term experts, plan was underway to improve teaching practice. GTS reviewed PRESET and were planning to introduce IN-IN-OUT which included one full year teaching practice. STM project made contribution in the process.</p> <p>4-3) STM project contributed to GES through seminars and workshops.</p>
<p>5-1) To provide information and support to promote teaching learning groups.</p> <p>5-2) To publish project newsletters in order to promote information exchange among STM teachers.</p> <p>5-3) To plan and provide activities to stimulate interest in STM among teachers and pupils such as Science Fairs.</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>5-1) Information dissemination for the teachers' groups was planned. Teachers' Resource Centre in Akropong was expected to be used for teachers' voluntary activities.</p> <p>5-2) Publication of the project Newsletter was delayed. The first newsletter was prepared in December 2000 and published in January 2001. STM Newsletter was planned to be published regularly and distributed to teachers.</p> <p>5-3) STM team set up its exhibition as well as demonstration of TLMs at GES Fair in October 2000. Science and Mathematics Fair was held from the end of March to the beginning of April with the support of Japanese primary school teachers who visited Ghana.</p>

April 2001 to March 2002

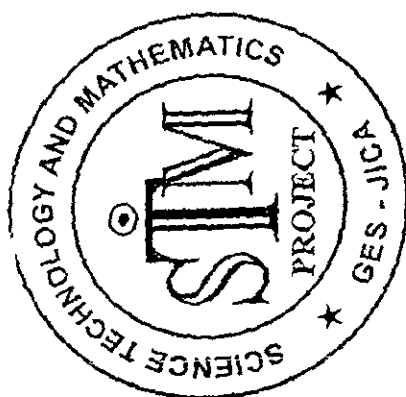
Activities	2001												2002			Progress
	4	5	6	7	8	9	10	11	12	1	2	3				
	***	***	***	***	***	***	***	***	***	***	***	***				
1-4) To monitor and evaluate of the project as a whole	***	***	***	***	***	***	***	***	***	***	***	***	***	1-4) Monitoring of INSET trained teachers continued. The plan for the mid-term review was formulated in March 2002 with the support of the short-term expert.		
2-1) To develop strategies for providing improved INSET	---	---	---	---	---	---	---	---	---	---	---	---	---	2-1) While continuing INSET, the content and methods were reviewed and necessary improvements were made.		
2-2) To provide learning opportunities for TTC tutors in the programme area (a).	---	---	---	---	---	---	---	---	---	---	---	---	---	2-2) Eight tutors including four from Akropong participated in the country-focus training held in Japan from July to September 2001.		
2-3) To provide structured INSET for STM teachers in the programme area (a)	---	---	---	---	---	---	---	---	---	---	---	---	---	2-3) INSET continued in Akropong (5/8~5/31, 6/12~7/5, 10/2~10/25, 11/5 ~ 11/29). The total of 240 teachers participated in INSET.		
2-4) To supplement the material supply at the programme area (a) for practical STM	---	---	---	---	---	---	---	---	---	---	---	---	---	2-4) Teachers took TLMs, syllabus and textbooks back to their schools after INSET. Distribution of self-learning materials for pupils continued.		
2-5) To undertake a follow-up of the INSET participants (performance monitoring)	---	---	---	---	---	---	---	---	---	---	---	---	---	2-5) Schools where INSET trained teachers were teaching were visited for the follow-up purpose.		
2-6) To monitor and evaluate the structured INSET in the programme area (a) (impact monitoring)	---	---	---	---	---	---	---	---	---	---	---	---	---	2-6) Monitoring started to compare teachers' lesson presentation before and after INSET. Assessment sheets were developed and revised.		

<p>3-1) To provide learning opportunities for TTC tutors in the programme area (b)</p> <p>3-2) To provide INSET for STM teachers in the programme area (b)</p> <p>3-3) To undertake a follow-up of the INSET participants (performance monitoring)</p> <p>3-4) To monitor and evaluate the INSET in the programme area (b) (impact monitoring).</p> <p>3-5) To assist in the institutionalization of the INSET system.</p>			***	***	***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	<p>3-1) Eight tutors including four from Akropong participated in the country-focus training held in Japan from July to September. Mathematics tutors from Akrokerri and Bagabaga came to join INSET in Akropong to learn how to run INSET</p> <p>3-2) Headteachers' seminar workshop was held at Tamale in January. Two sets of INSET were held at Tamale in February and March 2002.</p> <p>3-3) Follow-up including school visit was carried out.</p> <p>3-4) Monitoring was carried out following the strategies formulated in Akropong.</p> <p>3-5) STM project contributed to the institutionalisation of INSET through policy papers and discussions.</p>
<p>4-3) To develop strategies that link INSET and PRESET</p>			---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	<p>4-3) TTC tutors who came back from the country-focus training were teaching better, which was pointed out by some of the INSET participants. INSET for TTC tutors was carried out at Tamale in February 2002.</p>
<p>5-1) To provide information and support to promote teaching learning groups.</p> <p>5-2) To publish project newsletters in order to promote information exchange among STM teachers.</p> <p>5-3) To plan and provide activities to stimulate interest in STM among teachers and pupils such as Science Fairs.</p>			---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	<p>5-1) Teachers' Resource Centre building in Akropong was completed.</p> <p>5-2) STM Newsletter was published in May, September 2001 and March 2003. The newsletter served the role of disseminating information from the project. More teachers' contribution was needed.</p> <p>5-3) The project supported STME clinic in August 2002. In March 2002, Science and Mathematics Fair was held with support from a Japanese primary school teacher. The fair was better-organised than the previous year.</p>

April 2002 to November 2002

Activities	2002												2003			Progress
	4	5	6	7	8	9	10	11	12	1	2	3				
1-4) to monitor and evaluate of the project as a whole	***	***	***	***	***	***	***	***	***	***	***	---	---	---	1-4) Monitoring and evaluation continued. From July to October 2002 data collection for the mid-term review was done.	
2-1) To develop strategies for providing improved INSET	***	***	***	***	***	***	***	***	---	---	---	---	---	---	2-1) INSET content was revised and improved.	
2-2) To provide learning opportunities for TIC tutors in the programme area (a).	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2-2) 6 TIC tutors and two district coordinators participated in country-focus training in Japan from July to September 2002.	
2-3) To provide structured INSET for STM teachers in the programme area (a)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2-3) INSET continued in Akropong.	
2-4) To supplement the material supply at the programme area (a) for practical STM	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2-4) TLMs and other materials were distributed to teachers at INSET. In Mathematics, some TLMs were locally manufactured. Self-learning materials continued to be distributed to pupils.	
2-5) To undertake a follow-up of the INSET participants (performance monitoring)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2-5) School visits continued as part of the follow-up activities.	
2-6) To monitor and evaluate the structured INSET in the programme area (a) (impact monitoring)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2-6) Monitoring of INSET trained teachers continued.	

<p>3-1) To provide learning opportunities for TTC tutors in the programme area (b)</p> <p>3-2) To provide INSET for STM teachers in the programme area (b)</p> <p>3-3) To undertake a follow-up of the INSET participants (performance monitoring)</p> <p>3-4) To monitor and evaluate the INSET in the programme area (b) (impact monitoring).</p> <p>3-5) To assist in the institutionalization of the INSET system.</p>	***	***	***	***	***	***	***	***	***	<p>3-1) TTC tutors and District coordinators participated in country-focus training in Japan. INSET for tutors continued in Tamale and Akrokerri.</p> <p>3-2) INSET in Tamale continued. INSET in Tamale was carried out continuously for two weeks, but it was decided that INSET was more effective if carried out with one-month interval between the first and second three-day sessions. In September a one-day seminar workshop for headteachers was held in Akrokerri. INSET in Akrokerri started in October 2002. Two short-term experts joined the training in Tamale and Akrokerri in October.</p> <p>3-3) Questionnaire for INSET participants continued. Focus-group discussions of INSET trained teachers was held in Akropong.</p> <p>3-4) Monitoring continued.</p> <p>3-5) The project contributed to the policy papers. As part of efforts in the institutionalisation of INSET, the project supported seminar-workshop on teacher education by Cape Coast University and Sussex University.</p>
<p>4-3) To develop strategies that link INSET and PRESET</p>	***	***	***	***	***	***	***	***	***	<p>4-3) Two day seminar for PTC students was held in Akropong in response to the request made by the Principal.</p>
<p>5-1) To provide information and support to promote teaching learning groups.</p> <p>5-2) To publish project newsletters in order to promote information exchange among STM teachers.</p> <p>5-3) To plan and provide activities to stimulate interest in STM among teachers and pupils such as Science Fairs.</p>	**	***	***	***	***	***	***	***	***	<p>5-1) A plan for the effective use of the Resource Centre was formulated.</p> <p>5-2) Project Newsletter was published in August and November. In August, a one-day workshop for primary school teachers was held in Kadjebi in Volta Region. In November 2002, the project was introduced at the Book Fair.</p> <p>5-3) Science and Mathematics Fair was held in April. Project supported STME clinic in August.</p>



STM PROJECT

Project Design Matrix

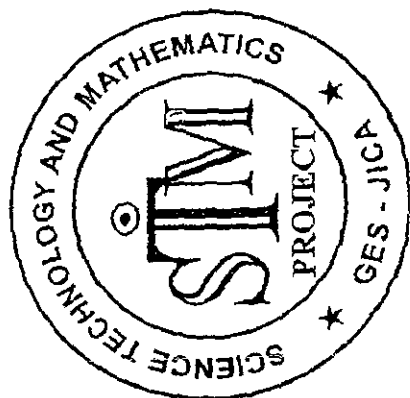
(3rd Version, December 2002)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Monitoring																																																								
<p>Goal:</p> <p><i>Long-Term:</i></p> <p><i>Students' educational achievement in STM at upper primary/Junior Secondary School (JSS) is improved in project areas</i></p> <p>Short-Term:</p> <p><i>The educational achievement in STM of upper primary/JSS students who have been taught by STM/INSET-trained teachers is improved in project areas</i></p>	<p>The number of upper primary pupils obtaining at least standard grades in STM subjects increase:</p> <table border="1" data-bbox="327 1067 428 1538"> <thead> <tr> <th>From</th> <th>Science</th> <th>Math</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>to</td> <td>35%</td> <td>35%</td> <td>2*</td> </tr> <tr> <td></td> <td>40%</td> <td>40%</td> <td>5</td> </tr> </tbody> </table> <p>The number of JSS students obtaining at least standard grades in STM subjects increase:</p> <table border="1" data-bbox="579 1067 680 1538"> <thead> <tr> <th>From</th> <th>Science</th> <th>Math</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>to</td> <td>30%</td> <td>30%</td> <td>2*</td> </tr> <tr> <td></td> <td>40%</td> <td>40%</td> <td>5</td> </tr> </tbody> </table> <p>The number of upper primary pupils obtaining at least standard grades in STM subjects increase:</p> <table border="1" data-bbox="882 1067 999 1538"> <thead> <tr> <th>From</th> <th>Science</th> <th>Math</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>to</td> <td>35%</td> <td>35%</td> <td>2*</td> </tr> <tr> <td></td> <td>40%</td> <td>40%</td> <td>3</td> </tr> <tr> <td>to</td> <td>45%</td> <td>45%</td> <td>5</td> </tr> </tbody> </table> <p>The number of JSS students obtaining at least standard grades in STM subjects increase:</p> <table border="1" data-bbox="1167 1067 1285 1538"> <thead> <tr> <th>From</th> <th>Science</th> <th>Math</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>to</td> <td>30%</td> <td>30%</td> <td>2*</td> </tr> <tr> <td></td> <td>35%</td> <td>35%</td> <td>3</td> </tr> <tr> <td>to</td> <td>40%</td> <td>40%</td> <td>5</td> </tr> </tbody> </table> <p>(note: base data is from the STM baseline survey)</p>	From	Science	Math	Year	to	35%	35%	2*		40%	40%	5	From	Science	Math	Year	to	30%	30%	2*		40%	40%	5	From	Science	Math	Year	to	35%	35%	2*		40%	40%	3	to	45%	45%	5	From	Science	Math	Year	to	30%	30%	2*		35%	35%	3	to	40%	40%	5	<ul style="list-style-type: none"> - Standardised mock exams in the three project districts for upper primary and JSS - BECE for JSS 3 students - Mid-term baseline test in science and mathematics 	<p>(Applies to both long and short-term goals)</p> <p>GES accept the INSET Programme for nationwide application</p> <p>MOE/GES provide continuous & effective support for the INSET Programme</p> <p>Adequate financial support is received from both government and other stakeholders</p> <p>MOE/GES maintains an effective teacher education structure</p> <p>Key players in INSET maintain their commitment to sustain the Programme</p>
From	Science	Math	Year																																																								
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to	40%	40%	5																																																								

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Monitoring									
<p>Purpose:</p> <p><i>The capacity of STM/INSET-trained teachers for delivering STM (skills, contents) is improved for upper primary/JSS in the project areas</i></p>	<p>By Year 5, the following number of upper primary and JSS STM/INSET-trained and practicing teachers have the capacity to deliver STM according to project performance standards*</p> <table border="0" data-bbox="444 1022 546 1533"> <tr> <td></td> <td>Science</td> <td>Mathematics</td> </tr> <tr> <td>Upper Primary</td> <td>60%</td> <td>70%</td> </tr> <tr> <td>JSS</td> <td>60%</td> <td>70%</td> </tr> </table> <p>(* Note: Performance standards could include measures of communication skills, class management, and willingness to continue to teach)</p>		Science	Mathematics	Upper Primary	60%	70%	JSS	60%	70%	<ul style="list-style-type: none"> - Questionnaire - Investigation of lesson notes - Observation of Classroom activities - Mid-term baseline in science and mathematics 	<p>MOE/GES provide continuous and effective support for the INSET Programme</p> <p>Favourable teacher-pupil ratio is maintained</p> <p>Guardians continuously support children education on STM</p>
	Science	Mathematics										
Upper Primary	60%	70%										
JSS	60%	70%										
<p>Output 1:</p> <p>The existing STM education at upper primary/JSS is reviewed & recommendations reflected in the Project Design</p>	<p>STM/INSET activities truly reflect the recommendations arising out of the baseline survey done in Year 1</p> <p>Majority of the stakeholders understand the importance and challenges of STM education by end of Year 2</p>	<ul style="list-style-type: none"> - PDM - STM baseline survey results dissemination seminar questionnaire 	<p>(Applicable to all Outputs)</p> <p>MOE/GES provide continuous and effective support for the INSET Programme</p> <p>District Education Directorates in the project areas have the resources to support school-based INSET</p> <p>Majority of TTC STM tutors are retained by the end of Year 5</p>									

<p>Output 2: <i>Structured INSET established in Akuapem North District linked with School-based INSET</i></p>	<p>At least 90% of newly-recruited teachers have received INSET induction training</p> <p>All headteachers in the district, Circuit Supervisors, and District Teachers Support Team (DTST) received INSET orientation by the end of the Project</p> <p>At most 70% of curriculum leaders in the district received INSET training by the end of the Project</p> <p>Lessons for a workable model on managing INSET is available for manualization</p> <p>Resource Center in Akuapim North District functional</p>	<ul style="list-style-type: none"> - STM/INSET training schedule - STM M&E Report 	
<p>Output 3: INSET Programme replicated in other Project Areas</p>	<p>Adequate number of STM tutors are in place in the Project Areas by Year 3</p> <p>Starting Year 3, TTC tutors in other Project Areas, together with TED Counterparts and administrative personnel, are providing INSET to teachers at levels acceptable to the Project</p> <p>At most 700 teachers received INSET in Tamale and Akrokerrri between January 2003 and February 2005</p> <p>District Education Directorates and TTCs in Akrokerrri and Tamale perform their agreed roles in structured INSET by the end of the Project</p>	<ul style="list-style-type: none"> - STM/INSET training schedule - STM M&E Report 	
<p>Output 4: Institutionalization of INSET supported and policy advocacy implemented</p>	<p>Structured INSET Manual available to MOE/GES</p> <p>Issues on INSET institutionalization available for MOE/GES pursuance of INSET policy</p>	<ul style="list-style-type: none"> - STM M&E report 	

<p>Output 5: Awareness-creation and information-sharing on STM promoted</p>	<p><i>Students' interest in STM in the Project Areas maintained at 80%</i></p> <p>Students in Project areas applying practical STM skills in daily life (e.g. home and surroundings) increase from 62% in Year 1 to 70% in Year 5</p> <p>At most 60% of INSET-trained teachers find STM newsletter useful</p>	<p>- STM M&E Report</p>	
<p>Output 6: Monitoring and Evaluation of INSET regularized</p>	<p>Decisions on project direction and activities are based on timely outputs from Monitoring and Evaluation activities</p> <p>Appropriate baseline information available for the end of project evaluation*</p> <p>(* A mid-term baseline survey is necessary to ensure a more accurate data on critical Project indicators. Methodologies to be used shall be an improvement over the first baseline survey)</p>	<p>- Minutes of Meetings Mid-Term Baseline Report</p>	



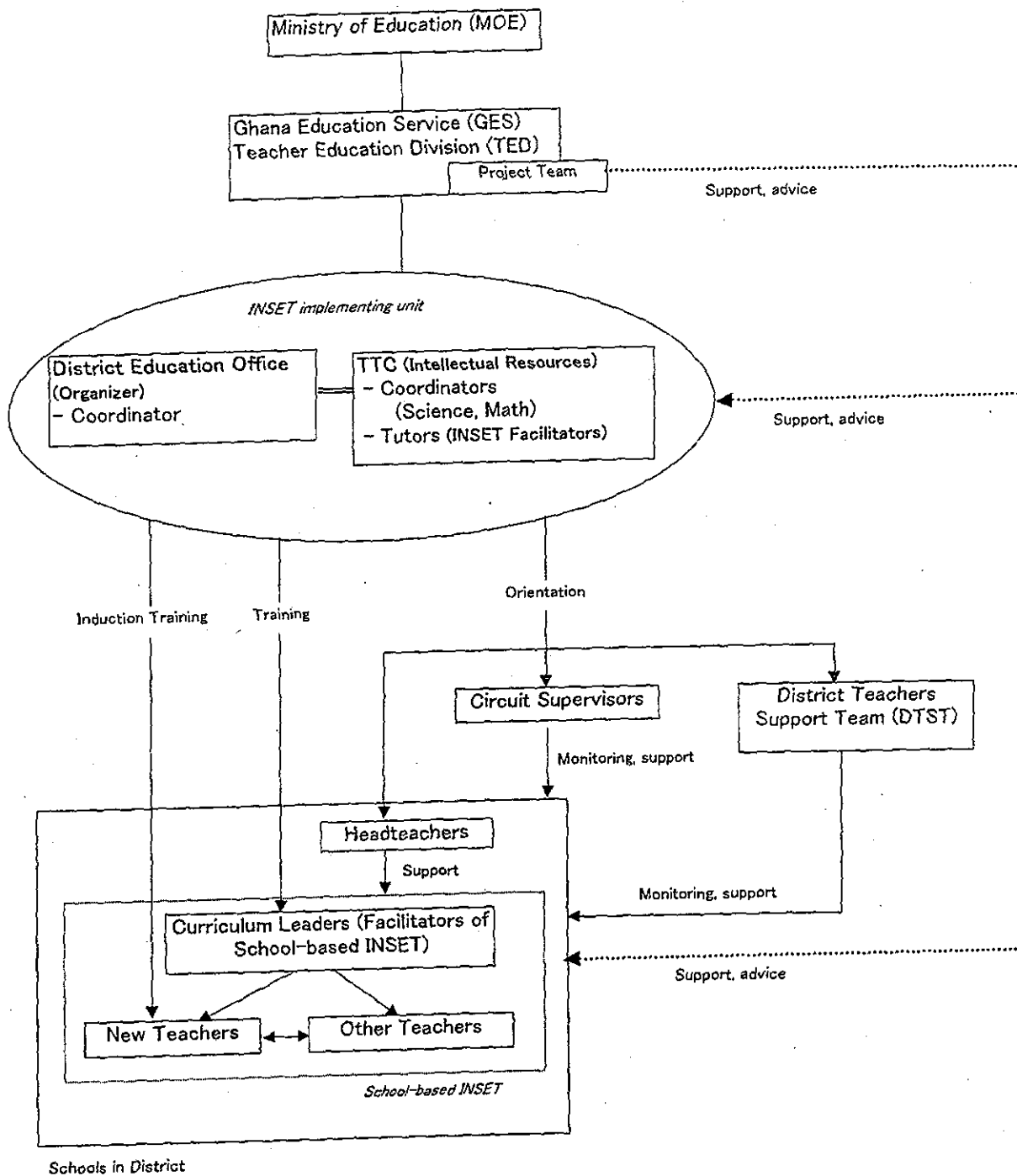
STM PROJECT

Revised Plan of Operation

(January 2003 - February 2005)

Activity	Time Frame												Milestone Targets	Responsible Units		
	2003				2004				2005							
	I	II	III	IV	I	II	III	IV	I	II	III	IV				
Output 4: Institutionalization of INSET supported (and policy advocacy implemented).																
Revision of INSET manuals (Technical & Administrative)																Committee?
Developing of School-based INSET manuals (Technical & Administrative)																Committee?
Organize seminars / national workshops for TED/GES, Districts & TTCs																Project Team
Produce and disseminate issue papers																Project Team, TED, Universities
Issue paper on distance learning																
Issue paper on promotion																
Issue paper on accreditation																
Submit proposals for possible institutionalization of INSET																Project Team, TED
- Determination of Management, organizational aspects of INSET (Roles & relationship)																
National seminar on INSET institutionalization																TED, STM Project
Output 5: Awareness-creation and information sharing on STM promoted																
Newsletter production and distribution																STM Counterparts and Experts/Administrative staff
Organizing STM fair																STM project/TTC tutors

Chart of Structure for INSET Implementation



2. PLAN OF OPERATION によるプロジェクトの進捗状況

ガーナ共和国小中学校理科教育改善計画 PLAN OF OPERATION による 2000 年 3 月～2001 年 3 月のプロジェクトの進捗状況

活動	進捗状況												
	2000						2001						
	3	4	5	6	7	8	9	10	11	12	1	2	3
1-1) ベースライン調査計画策定、データ収集	---	***	***	***	**	---	---	---	---	---	---	---	---
1-2) ベースライン調査データ分析	---	***	***	***	---	---	---	---	---	---	---	---	---
1-3) ベースライン調査の結果発表セミナー開催	---	---	---	---	---	---	---	---	*	---	---	---	---
1-4) プロジェクト全体のモニタリングと評価	---	---	---	---	---	---	---	---	---	---	---	---	---
2-1) 現職教員研修の計画策定	---	---	---	---	---	---	---	---	---	---	---	---	---
2-2) 現職教員研修実施を進めるための a 地区 TTC 教官の教育	---	---	---	---	---	---	---	---	**	---	---	---	---
2-3) 実践的理科教育のための現職教員研修の実施	---	---	---	---	---	---	---	---	---	---	---	---	---
2-4) a 地区への理科教科教材提供	---	---	---	---	---	---	---	---	---	---	---	---	---
2-5) 現職教員研修参加者のフォローアップ	---	---	---	---	---	---	---	---	---	---	---	---	---
2-6) 現職教員研修のモニタリングと評価	---	---	---	---	---	---	---	---	---	---	---	---	---

1-1) ベースライン調査準備は4月に始まり、国内コンソーシアムにより作成された質問紙やテストを基に準備が進められた。データ収集は5月から7月にかけて3地区で実施された。

1-2) データの分析作業及び報告書作成は、作業の量が予想以上に多かったために、時間がかかった。特に理科テストの詳細分析については、専門家が中心となって作業が行われた。また、この時期にベースライン調査支援として短期専門家の派遣があった。

1-3) ベースライン調査セミナーは、当初12月に開催する予定であったが、12月初旬の総選挙を避けて、11月に実施された。セミナー支援短期専門家派遣があった。

1-4) プロジェクト全体のモニタリングと評価計画策定のために、PCMワークショップを開催し、PDMの見直しが行われた。短期専門家の指導により評価モニタリング計画が策定された。

2-1) 現職教員研修 INSET の計画策定は11月中旬から本格化した。9月に短期専門家来ガ時に行ったワークショップや、ベースライン調査の結果などから、研修の内容と実施方法について検討が重ねられた。

2-2) 8月から9月にかけて広島大学、福岡教育大学で個別特設研修が実施されて、8名のTTC教官が研修に参加した。11月には帰国した教官による報告会が実施され、TTC内で研修などを行う計画が発表された。アクロポンPTCでは校長と個別特設研修に参加した教官により日本での研修経験を中心として、TTC教官及び郡の教員を対象としたセミナーが開催された。他のTTCからの参加者による同様の活動についても、これから活性化する必要がある。

2-3) 予定より1か月程度早く2月6日よりアクロポンでINSETを開始、4月6日に第一回の研修が完了した。研修開始に合わせて短期専門家2名が派遣された。

2-4) INSET に合わせて教材の配布を行う準備を行った。教官が授業の準備などに使う教具や、シラバス、参考書など、教官が研修参加中、児童・生徒が使うために理科教科のプリント教材を用意した。

2-5) フォローアップのために研修に参加した教員のいる学校の訪問、教員活動センターの活用などについて計画を策定中。

2-6) 研修に参加した教員の意見を集める方法、前項(2-5)を活用しての活動などのモニタリングと評価計画を策定中。

----- 計画 ***** 実施

3-1) a地区のTTC 教員の教育										3-1) アクロケリ、バガバガ TTC でも、早い時期に活動に参加してもらうために、TTC 教員のアクロポンの研修参観などを計画。
3-2) b地区での実践的理科教育のための現職教員研修の実施										3-2) アクロポンの活動を見て、アクロケリ、バガバガの教官たちが同様の活動の計画づくりをできるような方向に導く。
3-3) 現職教員研修参加者のフォローアップ										3-3) 西アダダシ郡、タマレ郡教育事務所及びアクロケリ、バガバガの教官の意見を聴取中。
3-4) b地区の現職教員研修のモニタリングと評価										3-4) アクロポンのモニタリングと評価計画などを参考とする。
3-5) 現職教員研修制度化への働きかけ										3-5) 研修の制度化については、既に教師教育局 (TED) の教員養成計画に、本プロジェクトの活動計画が反映される形となった。本来ならばプロジェクトでの実施例から政策提言に結びつけるはずであったが、早い時期に計画に貢献する結果となった。
4-1) 現行の教育実習の分析										4-1) ベースライン調査の一部として、教育実習についての調査が行われた。現行の教育実習は短期間であり、現場の教員による指導は皆無に等しい。
4-2) 理科の教育実習を改善する計画策定										4-2) ベースライン調査結果及び短期専門家の助言などから計画策定を始めた。GES では教員養成課程の見直しを行っており、IN-IN-OUT という2年間の座学に1年間の教育実習を併せた教員養成課程を実施する方向で準備を進めている。この過程にはプロジェクトからも数々の面で貢献している。
4-3) 現職教員研修と教員養成を関連させるための計画策定										4-3) 前項 (4-2) と同様に、セミナーなどを通じてGES の計画へ貢献した。今後更にプロジェクトでの実践から貢献していく必要がある。
5-1) 教員の学習グループなどの情報提供										5-1) 教員の学習グループなどのための情報提供を計画。アクロポンの現職教員研修活動センターが完成すると、研修参加者同窓会や教員グループの自主的研修活動などを実施することにより、この活動が一層活性化することが期待できる。
5-2) プロジェクトニュースレターの発行										5-2) プロジェクトニュースレターの発行は予定より遅れた。INSET の状況を広く知らせるために2001年からは定期的に発行する。ニュースレター第2号を準備中。
5-3) 科学フェアなど教師と生徒のための催しの開催										5-3) 10月にはGES 展示会で、教材や実験などの展示とデモンストラーションを実施して好評を博した。今後も、プロジェクトとして開催する催しものに加えて、このような機会にプロジェクトからも積極的に参加することとする。3月末から4月初めには日本から訪問中の小中学校教員によりアクロポンの理数科フェアを開催した。

計画

実施

ガーナ共和国小中学校理科教育改善計画 PLAN OF OPERATION による 2001 年 4 月～2002 年 3 月のプロジェクトの進捗状況

活動	2001												2002			進捗状況	
	4	5	6	7	8	9	10	11	12	1	2	3					
	---	***	---	***	---	***	---	***	---	***	---	***					
1-4) プロジェクト全体のモニタリングと評価	---	***	---	***	---	***	---	***	---	***	---	***	---	***	---	***	1-4) モニタリング計画に沿って、研修を受けた教師のモニタリングが継続された。2002 年 3 月に短期専門家の指導により、評価モニタリング計画が策定された。
2-1) 現職教員研修の計画策定	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2-1) 研修を続けながら、研修の内容と実施方法について検討が重ねられた。研修の内容及び実施方法に改善が加えられた。
2-2) 現職教員研修実施を進めるとの a 地区 TTC 教員の教育	---	---	---	*	---	---	---	---	---	---	---	---	---	---	---	---	2-2) 7 月から 9 月にかけて広島大学、福岡教育大学で個別特設研修が実施され、8 名の TTC 教員が研修に参加した。今回はアクロポロンからの参加者が 4 名となった。
2-3) 実践的理科教育のための現職教員研修の実施	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2-3) アクロポロン地区で研修が続けられた。5/8～5/31、6/12～7/5、10/2～10/25、11/6～11/29 で、計 240 名の教師が研修に参加した。
2-4) a 地区への理科教材提供	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2-4) 教員が授業の準備などに使う教具や、シラバス、教科書などを研修後に持ち帰れるように準備した。この内容については徐々に改善が加えられた。また、教員が研修参加中に児童・生徒が使うために、理科教材のプリント教材を用意し研修に先がけて配布した。
2-5) 現職教員研修参加者のフォローアップ	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2-5) フォローアップのために研修に参加した教員のいる学校の訪問を行った。
2-6) 現職教員研修のモニタリングと評価	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2-6) 研修に参加した教師の授業を研修の前と後で比較するモニタリングを開始した。モニタリングのための査定表も改善を加えている。

----- 計画 ***** 実施

<p>3-1) b 地区の TTC 教官の教育</p> <p>3-2) b 地区での実践的理数科教育のための現職教員研修の実施</p> <p>3-3) 現職教員研修参加者のフォローアップ</p> <p>3-4) b 地区の現職教員研修のモニタリングと評価</p> <p>3-5) 現職教員研修制度化への働きかけ</p>	---	---	---	---	---	---	---	<p>3-1) 国別特設研修には、タマレとアタレから2人ずつTTC教官と教育事務所 INSET 調整員が参加した。昨年タマレで始めた。</p> <p>3-2) タマレでの研修は継続。9月にはアタレで校長説明会・ワークショップ、10月には研修が開始した。タマレでの研修は最初の3回は前半と後半を継続して実施していた。しかし、研修効果を考えると、前半と後半の間に4週間ほどあけた方がよいとの結論から変更した。10月のアタレでの研修に合わせ、理科・数学2名の短期専門家派遣があった。</p> <p>3-3) 研修に参加した教師のアンケート調査などを継続して行った。中間評価のために質問紙調査に加えて「フオーカスグループ討論」などのデータを収集。</p> <p>3-4) モニタリングツールを使って授業のモニタリングなどを続けた。</p> <p>3-5) 教師政策ペーパーなどに現職教員研修の提言などを行った。現職教員研修制度化への働きかけとしてケネディセンターとサセックス大学のセミナーなどへの支援を行った。</p>
<p>4-3) 現職教員研修と教員養成を関連させるための計画策定</p>	---	---	---	---	---	---	---	<p>4-3) PTCの教員養成課程の学生に対するセミナーなどを行った。十分な活動をしているとはいえない。</p>
<p>5-1) 教員の学習グループなどのための情報提供</p> <p>5-2) プロジェクトニュースレターの発行</p> <p>5-3) 科学フェアなど教師と生徒のための催しの開催</p>	---	---	---	---	---	---	---	<p>5-1) リソースセンターの活用を計画。</p> <p>5-2) プロジェクトニュースレターは8月、11月に発行された。通常の配布に加えて、8月のボルトタケジヤビでの1日研修での配布及び11月にアタレで開催されたブックフェアでの配布などが行われた。</p> <p>5-3) 4月には理科フェアを開催した。また、8月にはSTEMEクリニックのための活動などを行った。</p>

..... 計画 ***** 実施