

**MINUTES OF MEETING
BETWEEN
THE JAPANESE PREPARATORY STUDY TEAM
AND
THE AUTHORITIES CONCERNED OF
THE GOVERNMENT OF THE REPUBLIC OF UGANDA
ON
JAPANESE TECHNICAL COOPERATION
FOR
SECONDARY SCIENCE AND MATHEMATICS TEACHERS (SESEMAT)
NATIONAL EXPANSION PLAN**

The Japanese Preparatory Study Team (hereinafter referred to as “the Team”), organized by Japan International Cooperation Agency (hereinafter referred to as “JICA”) headed by Mr. Shinichi Ishihara, visited the Republic of Uganda from 21st to 23rd May 2008 in order to discuss the design of the national expansion plan of Secondary Science and Mathematics Teachers (hereinafter referred to as “SESEMAT”) National Expansion Plan with the authorities concerned of the Government of the Republic of Uganda (hereinafter referred to as “the Ugandan authorities”).

As a result of the discussions, both the Ugandan authorities concerned and the Team agreed upon the matters referred to in the document attached hereto.

Kampala, 23rd May 2008



Mr. Francis X.K. Lubanga
Permanent Secretary
Ministry of Education and Sports
The Republic of Uganda



Mr. Shinichi Ishihara
Leader
Japanese Preparatory Study Team
Japan International Cooperation Agency
Japan

ATTACHED DOCUMENT

ATTENDANCE LIST

The meetings were held between the Ministry of Education and Sports (hereinafter referred to as “MoES”) and the JICA Team on 21st and 23rd May 2008 in Kampala. The participants are listed below.

MoES

Mr. Francis X.K. Lubanga	Permanent Secretary
Mr. Yusuf Nsubuga	Commissioner, Secondary Education Department
Mr. John M Agaba	Assistant Commissioner General Secondary Education, Secondary Education Department
Mr. Nsumba Lyazi	Assistant Commissioner Comprehensive Secondary Education, Secondary Education Department
Mr. Kadu Buyisi	Principal Education Officer, Teacher Education Department
Mrs. Mary Ntete	Senior Education Officer, Secondary Education Department

Japanese Preparatory Study Team

Mr. Shinichi Ishihara	Director, Basic Education Division II, Human Development Department, JICA Headquarters
Mr. Tatsuhiro Mitamura	Senior Programme Officer, Basic Education Division II, Human Development Department, JICA Headquarters

JICA Uganda Office

Mr. Takehiro Susaki	Resident Representative
Ms. Aya Arakawa	Project Formulation Advisor

SESEMAT Programme

Mr. Tsuyoshi Okamoto	Technical Advisor, SESEMAT
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1. FOLLOW-UP OF THE RECOMMENDATIONS MADE BY THE JOINT FINAL EVALUATION TEAM

The Joint Final Evaluation Team on SESEMAT pilot project made the recommendations to the Uganda side, as documented in the Minutes of Meeting signed on 15th February 2008.

The MoES and the Team discussed the follow-up of the recommendations and the findings were as follows:

1.1 Institutionalization of INSET system at the national and district level

MoES shall implement and institutionalize in-service training including SESEMAT Programme as a part of comprehensive teacher education and training system (Teacher Development and Management System, TDMS). The final draft of the Strategic Plan for Secondary Education in Uganda 2008-2018 has been already developed in April 2008 and is to be approved by the cabinet.

Regarding to the budget, the INSET budget has been allocated under the regular and permanent vote (Development of Secondary Education) in Mid-Term Budget Framework (MTBF), which is sufficient for the implementation of SESEMAT National Expansion Plan.

1.2 Further internalization of ALEI-PIEI approach for the quality education

MoES has developed guidelines for the development of training curriculum that will be implemented in the pilot districts in December 2008. The following aspects should be focused in the subsequent training curriculum:

- Lesson Study;
- Assessment and evaluation;
- Training in the second teaching subject; and
- Any other needs identified from monitoring.

1.3 Strengthening of monitoring and evaluation

Monitoring and evaluation of the SESEMAT activities shall be continuously strengthened. The findings of the monitoring and evaluation should be regularly shared with all stakeholders including head teachers in order to enhance the quality of education.



2. PROGRAMME DOCUMENT

The MoES and the Team agreed upon the Programme Document as attached in ANNEX. The accessibility of JICA personnel to the target areas shall be subject to JICA security regulations.

3. DURATION OF THE PROGRAMME

The duration of the Programme is to be three (3) years from August 2008 to August 2011. The commencement of the Programme is subject to the progress of preparation by both parties.

4. JICA EXPERTS

JICA shall dispatch a long-term Technical Advisor. For the development of post-cycle-three curriculum, JICA also shall send a short-term expert at the early stage of the implementation.

5. WAY FORWARD

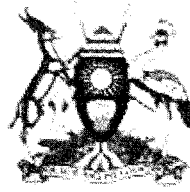
The MoES and the Team discussed a time framework toward signing of the official agreement (the Record of Discussions), which shall lead to the inception of the SESEMAT national expansion plan and agreed as follows:

- 5.1 The Record of Discussions for the SESEMAT National Expansion Plan shall be discussed and then signed not later than 10th July 2008.
- 5.2 The MoES and JICA shall take proper measures to start the SESEMAT National Expansion Plan from August 2008.



ANNEX.

Programme Document for Secondary Science and Mathematics Teachers (SESEMAT)
National Expansion Plan



The Republic of Uganda

Programme Document for
Secondary Science and Mathematics Teachers (SESEMAT)

National Expansion Plan

The Ministry of Education and Sports

May 2008

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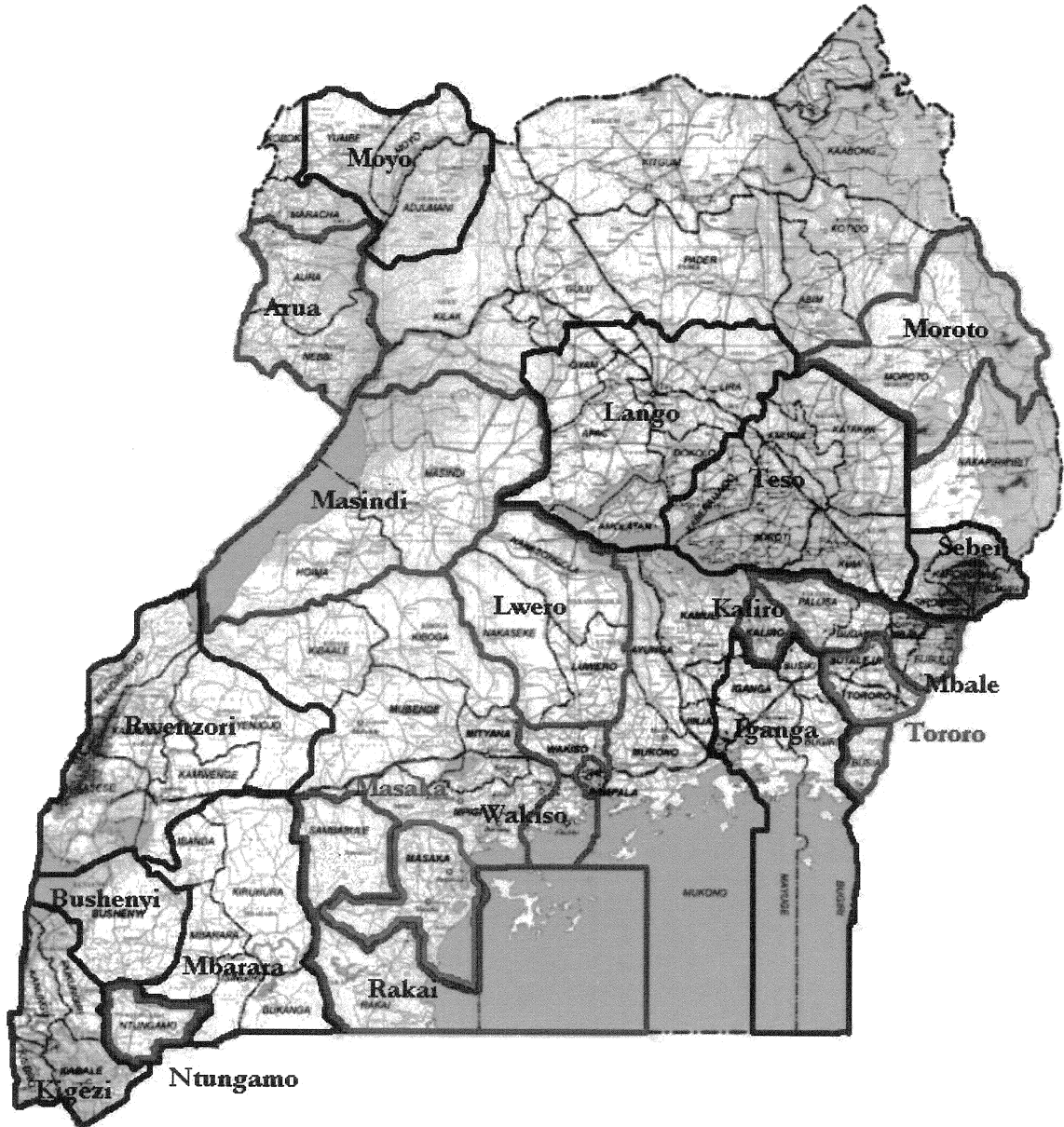
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SESEMAT Target Areas



	Period	Districts/Regions	
Pilot	August 2005 to July 2008	Tororo/Butaleja, Masaka	
Pilot Expansion	August 2007 to July 2009	Moyo, Lango, Teso, Sebei, Iganga, Mbarara, Bushenyi, Kigezi, Rwenzori	
National Expansion	August 2008 to July 2011	SESEMAT Region	Districts
		Mbale	Mbale, Pallisa and Busia
		Luwero	Luwero, Nakaseke and Nakasongola
		Arua	Arua and Nebbi
		Masindi	Masindi and Hoima
		Rakai	Rakai, Sembabule and Kalangala
		District: Wakiso, Kaliro, Ntungamo, Moroto	

Table of Abbreviations

ALEI/PIEI	Activity/Experiments, Learner-centred, Encouragement, and Improvisation / Plan, Implementation, Evaluation and Improvement
DAC	Development Assistance Committee
DC	District Centre
DIS	District Inspector of School
DMC	District Management Committee
DT	District Trainer
ESSP	Education Sector Strategic Plan
GOJ	Government of Japan
GOU	Government of Uganda
INSET	In-Service Training
JICA	Japan International Cooperation Agency
MoES	Ministry of Education and Sports, Uganda
MoFPED	Ministry of Finance, Planning and Economic Development
MTBF	Medium Term Budget Framework
NC	National Coordinator
NT	National Trainer
NTC	National Teacher's College
OECD	Organization for Economic Co-operation and Development
PEAP	Poverty Eradication Action Plan
PTC	Primary Teacher's College
PRESET	Pre-Service Education and Training
PS	Permanent Secretary
R/D	Records of Discussions
SED	Secondary Education Department
SMASE-WECSA	Strengthening of Mathematics and Science Education in Western, Eastern, Central and Southern Africa
TED	Teacher Education Department
TPD	Teacher Professional Development
UNEB	Uganda National Examinations Board
USE	Universal Secondary Education



Executive Summary

Programme Title: Secondary Science and Mathematics Teachers (SESEMAT) National Expansion Plan
Country: The Republic of Uganda
Overall Goal: To improve secondary students' performance in Science subjects (Physics, Chemistry and Biology) and Mathematics in the target areas
Programme Purpose: To improve teaching ability of Science and Mathematics teachers at secondary level in the target areas
Coverage: 5 regions (13 districts) and 4 districts
Duration: 3 years (FY2008-FY2011)
Target Groups: <ul style="list-style-type: none">➤ 2,500 secondary school teachers of Science and Mathematics➤ 400 secondary school administrators➤ All district administrators (District Education Officers, District Inspectors of Schools) in the target area➤ 180 Primary Teacher's College (PTC) tutors and 30 National Teacher's College (NTC) lecturers of Science and Mathematics
Outputs: <ul style="list-style-type: none">➤ A number of teachers trained through In-Service Training (INSET);➤ School and parental support for teaching and learning of Mathematics and Science enhanced; and➤ Institutionalised INSET system strengthened.
Activities: <p><i>For Output 1,</i></p> <ol style="list-style-type: none">(1) To select target areas where 2,500 teachers of Mathematics and Science are deployed in total.(2) To identify 120 District Trainers (three trainers per subject/centre).(3) To conduct National Training for the District Trainers.(4) To conduct District Training.(5) To conduct monitoring and evaluation.(6) To conduct training abroad for core trainers.(7) To conduct training for PTC tutors and NTC lecturers of Science and Mathematics.(8) To review the INSET curricula.(9) To provide technical support to INSET in the pilot districts.(10) To organise lesson demonstration competitions.(11) To conduct international technical exchange with various institutions. <p><i>For Output 2,</i></p> <ol style="list-style-type: none">(1) To provide head teachers with sensitisation and school management workshops.(2) To organise sensitisation workshops for DEOs.(3) To publish Student Vocation Guides.



For Output 3,

- (1) To establish District Training Centres in the target areas.
- (2) To provide the centres with basic equipment, machinery, educational materials necessary for the training.
- (3) To incorporate the SESEMAT INSET with comprehensive quality assurance programme for secondary education sub-sector.

Structure:

The programme is to be implemented by the Ministry of Education and Sports (MoES).

(1) Steering Committee

The Steering Committee chaired by the Permanent Secretary of the MoES shall take the highest authorities and responsibilities for the programme overall management and implementation.

(2) Coordination Unit/ National Coordinators

Teacher Education and Secondary Education Departments are in charge of coordination of the programme. National Coordinator, assisted by Assistant National Coordinator, appointed from Secondary Education and Teacher Education Departments respectively, shall exercise the coordination.

(3) National Trainers (NTs)

The MoES shall continue to deploy eight full-time National Trainers (two per subject: Mathematics, physics, chemistry and biology). NTs will implement trainings, monitoring and evaluation and other related activities.

(4) District Trainers (DTs)

District Trainers will be identified from experienced secondary teachers as part-time appointment. DTs will implement trainings at District level.

(5) Regional/District Management Committee

Regional/District Management Committee, consisting of a chairperson of Head Teacher Association in the region/district, District Education Officer in the region/district, representatives of head teachers and DTs, shall be responsible for the overall management and administration of the district trainings.

(6) Training Centres

National In-service Training Centre, established within Kololo Senior Secondary School in Kampala, will be the venue for the national trainings for DTs, PTC tutors and other programme activities. The venues for the district trainings (7 District Training Centres) will be identified amongst the schools and institutions in the target districts/regions.

Inputs:

(1) The Government of Uganda/Districts

- Salary and allowances for National Trainers (NTs);
- Accommodation and Transport Refunds for District Trainers (DTs), teachers, PTC tutors and NTC lecturers (No participation allowance for trainees paid);



- Allowance for DTs implementing district trainings;
- Office space and facilities necessary for the programme; and
- Utility (Electricity, Gas, Water).

(2) JICA

- Dispatch of one Technical Advisor;
- Dispatch of short-term experts if necessary;
- Training abroad for the SESEMAT core trainers and relating officials; and
- Equipment, machinery, educational materials necessary for programme activities.

Feasibility of the Programme:

(1) Relevance

The Government policies clearly articulates that there is critical need to address the teaching and learning of Sciences and Mathematics at secondary level in order to achieve national goals set in Poverty Eradication Action Plan (PEAP). Education Sector Strategic Plan (ESSP) prioritizes the strengthening of teaching force at secondary level through intensive in-service training. The Universal Secondary Education (USE) policy along with the compulsory Science subjects has created an enormous need for the quality enhancement at secondary level. The SESEMAT will contribute to not only the empowerment of the teaching force in secondary education but also the achievement of the national development goals.

(2) Effectiveness

The holistic approach that SESEMAT deploys is likely to achieve desirable outcomes as confirmed in the SESEMAT pilot phase. Also, the established INSET system will be able to provide effective and direct interventions not only for teachers of Science and Mathematics but also school administrators and other stakeholders. Furthermore, internal monitoring and evaluation structure in place shall ensure that all the interventions will be more effective than the ones under the pilot.

(3) Efficiency

Efficiency measures derived from the experience in the pilot phase shall be applied. For the selection of the target area and centre schools, MoES shall encourage districts to formulate a SESEMAT region where a regional training centre is to set up. This will reduce initial costs of setting up districts and regional centres and serve more teachers within the available resource envelopes. The utilisation of existing infrastructure and local resources will increase the efficiency of the programme. There is also a transparent mechanism of the funds, coupled with clear verifiable indicators.

(4) Impact

The combined interventions of INSET and other relevant activities under this expansion are expected to give more positive impacts than that of the pilot phase in terms of learners' attitudinal changes, professionalism among teachers and gender issues. As approximately 5,000 teachers will be trained under the expansion and pilot expansion, the synergy effect will produce a greater momentum toward the improvement of Science and Mathematics education by nation-wide technical




exchange among teachers.

(5) Sustainability

The Government of Uganda shall continue to cover the recurrent cost of trainings at national level under Medium Term Budget Framework (MTBF) of the MoES to ensure that the programme has financial sustainability. The sustainability at district level will be assured with the “first-ready-first-served” approach that worked highly effectively in the pilot expansion. The approach includes intensive sensitisation to foster self-help, voluntary application and close follow-up activities in the target areas.



1 Introduction

The Government of Uganda is committed to put in place measures and strategies to enhance competitiveness of the Ugandans in the ever-changing global economy through the promotion of Science and technology. For the achievement of her sustainable socio-economic development as outlined in PEAP, a focus should be on creating Science-literate work force through promoting Science and Mathematics education.

Nevertheless, the performance in Science and Mathematics at secondary level, as reflected in the national examinations, has been unsatisfactory for decades. This concern led to the establishment of Secondary Science and Mathematics Teachers' (SESEMAT) programme by the Ministry of Education and Sports (MoES) with technical assistance from the Government of Japan through Japan International Cooperation Agency (JICA) in August 2005. It was implemented as a pilot programme in the districts of Tororo, Butaleja and Masaka.

The SESEMAT aimed at improving the teaching and learning of Science and Mathematics through holistic approaches including provision of in-service training, sensitization for school administrators and institutionalisation of in-service training system.

The positive impacts such as positive attitudinal change of teachers and improvement of pedagogy have been observed on the ground. Due to those positive outcomes and high demands for the quality enhancement in secondary education, the MoES expanded the target areas to 38 districts throughout the country from August 2007, from which 2,000 secondary Science and Mathematics teachers are benefited.

Although a quarter of all secondary Science and Mathematics teachers are served under the pilot and pilot expansion programmes, it is a challenge for the Government to extend the positive impacts to the rest of the country. In addition, there is an urgent need to enhance the quality of secondary education because of the Universal Secondary Education (USE) policy.

To address the challenges and strengthen Science and Mathematics education, MoES has decided to implement the national expansion of the SESEMAT programme.



2 Overview of Education Sector

2.1 Primary Education

The Government has made a significant progress in the primary education. Since the inception of Universal Primary Education (UPE) in 1997, the net enrolment ratio for Primary education has stood at more than 90% and the number of enrolled primary pupils rapidly increased from 2.9 million in 1996 to over 7.4 million in 2007.

2.2 Secondary Education

To meet the acute demand for secondary education and sustain the success of the UPE, the MoES is implementing Universal Secondary Education (USE) policy. USE aims at the equitable provision of quality post-primary education and training to all Ugandan students who have successfully completed Primary Leaving Examination. The policy includes covering non-boarding expenses for students enrolling in Government-aided schools, recruitment of teaching staff, curriculum review, classroom constructions and procurement of Science materials.

The USE policy has improved the access to secondary education. The enrolment of Senior One students in 2007 significantly rose to 246,400 from 208,900 in 2006, which was 18% increase.

3 Situational Analysis on Mathematics and Science Education

3.1 Current status on Science and Mathematics Education

It is not overstated that the realization of quality secondary education depends on the quality of Science and Mathematics education in which a majority of learners have difficulties. The performance in the subjects, as reflected by high-stake examination, has been unsatisfactory especially for decades comparing to other subjects.

Overall performance on the Uganda Certification of Education (UCE) indicates that the majority of the candidates failed to achieve the expected level of mastery of Science and Mathematics subjects. A half of the candidates failed in the Science subjects (Physics, Chemistry and Biology) and Mathematics, while less than 30% and 20% failed in 2002 and 2003 respectively (Fig. 1). This shows that the performance in Science and Mathematics lag behind the ones in other subjects. Unfortunately, the trend persists for a long term as shown in the graphs below (Fig. 2).



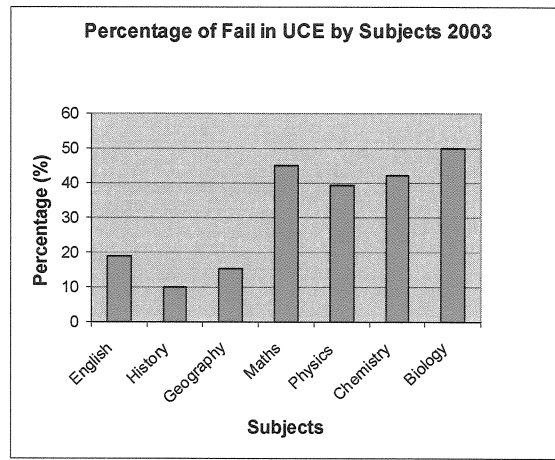
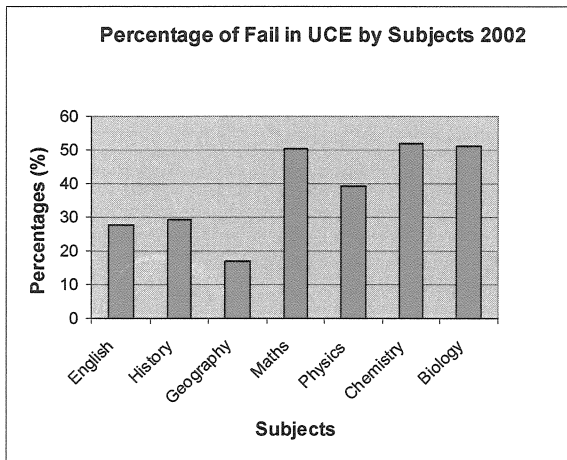


Figure 1. Subject Comparison of Fail Percentage in the UCE

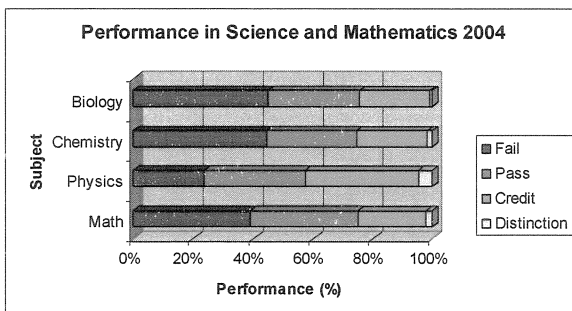
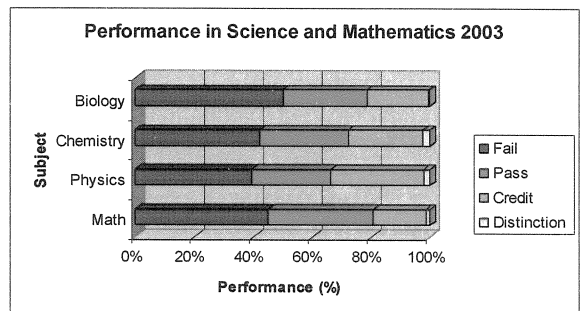
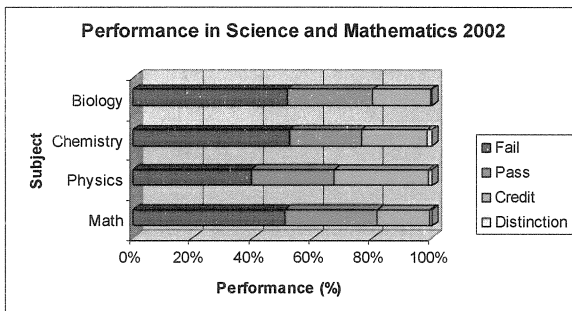
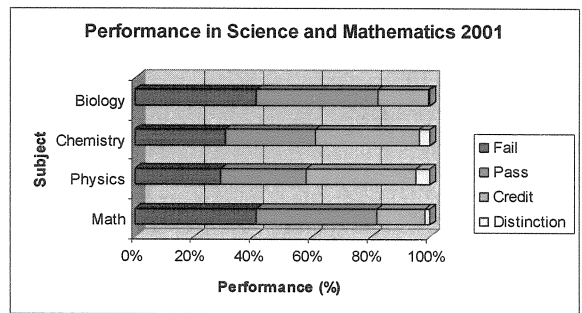
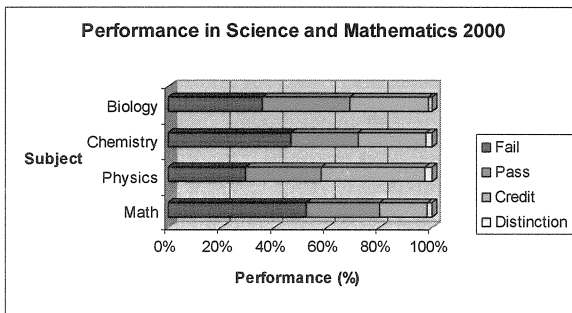


Figure 2. UCE Performances in Science and Mathematics

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A study conducted by the Uganda National Examinations Board (UNEB) shows that 40% of secondary students did not achieve the expected mastery in Mathematics. This study endorses the widely-held view that the quality of secondary education is an urgent issue to be addressed.

The findings stated above indicate that strengthening of Science and Mathematics education will considerably contribute to the entire quality of secondary education. Thus, it is necessary to identify determinant factors on the quality of teaching and learning of the subjects. The causes of the unsatisfactory performance in the subjects are discussed in the following sections.

3.2 Baseline Survey on Secondary Science and Mathematics Education

The Ministry of Education and Sports (MoES) and Kyambogo University conducted a qualitative study to find out determinant factors in Science and Mathematics teaching and learning in 2003.

The study identified weaknesses in classroom practices. Current teaching practice is largely teacher-centred, and dominated by factual materials and dictation of notes. It was further noted that teachers hardly focus on the learners' needs, preferences, individual differences and experiences.

It was also found out that a majority of teachers have never updated their teaching skills and subject knowledge since their completion of tertiary education and professional training. In addition, where materials and facilities are available, those resources are underutilized because teachers are not familiar how to conduct experiments with resource available. This clearly indicates that the hardware such as laboratories and chemicals would be nothing unless the software, that is, teachers are trained to carry out hands-on activities utilising those resources.

3.3 Classroom Observation Study

Classroom observations were conducted regularly by the SESEMAT monitoring unit during the project pilot phase in both pilot districts of Masaka and Tororo/Butaleja and non-pilot districts of Kapchorwa and Rukungiri. The data was collected using Classroom Observation and Student Participation Instruments developed by SMASSE project.



The mean scores of the Classroom Observation and Student Participation Instruments (shown in Table 1 and 2 respectively) which were extracted from the Study in October 2005 indicate that dominant teaching approach is teacher-centred, theory-oriented and little improvisation while learning is relying heavily on rote and dictation. Also, there was no statistically significant difference among the districts. This suggests that, regardless of geographical location, teaching approach on the ground is almost uniform: teacher-centred and theory-oriented (Chalk-and-Talk approach) are common teaching methods.

In sum, current lesson practice is ineffective to tap on learners' cognitive aspects. The Table 1 and 2 depict the current trends in schools.

District	Biology	Chemistry	Physics	Mathematics
Tororo	0.5356	1.1375	0.8075	0.7125
Kapchorwa	0.7328	0.9688	1.2797	0.8859
Masaka	0.6454	1.4729	0.8875	0.9452
Rukungiri	0.6016	0.6016	0.6406	0.7125

Table 1. Mean Scores of Lesson Observation

(The scores mean that 0<1: traditional "chalk-and-talk"; 1<2: slight learner involvement; 2<3: learner involvement and activity-based; 3<4: highly learner-centred and activity-based teaching.)

District	Biology	Chemistry	Physics	Mathematics
Tororo	0.1250	0.2417	0.1917	0.1043
Kapchorwa	0.1354	0.21875	0.1042	0.0625
Masaka	0.2708	0.3542	0.3056	0.1111
Rukungiri	0.1250	0.2083	0.2604	0.0833

Table 2. Mean Scores of Student Participation

(The scores mean that 0<1: passive learning; 1<2: slight learner participation; 2<3 intermediate learner participation; 3<4 high learner participation in high-order thinking.)

3.4 *Determinant Factors on the Performances in Science and Mathematics*

The studies above identify several factors responsible for the poor performance and show that the learning process is more complicated and interrelated than one would think. The factors are categorized into pedagogical, school administrative and institutional aspects and shown below.

Pedagogical factors

- Poor content mastery
- Inadequate practical skills and innovativeness
- Teacher-centred approaches

- Poor planning and evaluation of lessons
- Lack of Professionalism among teachers
- Underutilization of available resources

School Administrative factors

- Inadequate support to classroom teachers
- Inability to provide a conducive learning environment

Institutional Factors

- Lack of continuous in-service training system
- Lack of experience-based promotional ladders of teachers
- Inappropriate tasks and modes of the national examinations

For better learning outcome, there is the necessity to improve classroom practice and school administration and to establish continuous professional development system.

4 Impact of SESEMAT Pilot Phase

To address the challenges in Mathematics and Science Education described in the above section, the SESEMAT project has been implemented since August 2005. The impact of in-service training of the SESEMAT was measured in terms of: (1) teachers' attitudinal change and (2) teachers' lesson delivery and learners' participation in the lessons.

4.1 Teachers Attitudinal Change

Pre-and-post evaluations were conducted to measure the trainees' attitudinal change. The analysis shows that there are statistically significant differences among all the batches of teachers, as shown in the Table 3 below.

Period	Date	Mean Score	
		Before	After
Pilot 1st INSET	January 2006	2.6352	3.1835*
Pilot 2nd INSET	January 2007	2.7384	3.0832*
Expansion 1st INSET	September 2007	2.5445	3.1351*

Table 3. Teachers' attitude before and after INSET

(* indicates statistically significant differences)

The teachers who have consistently undergone SESEMAT trainings have shown positive attitudinal change towards their professions.



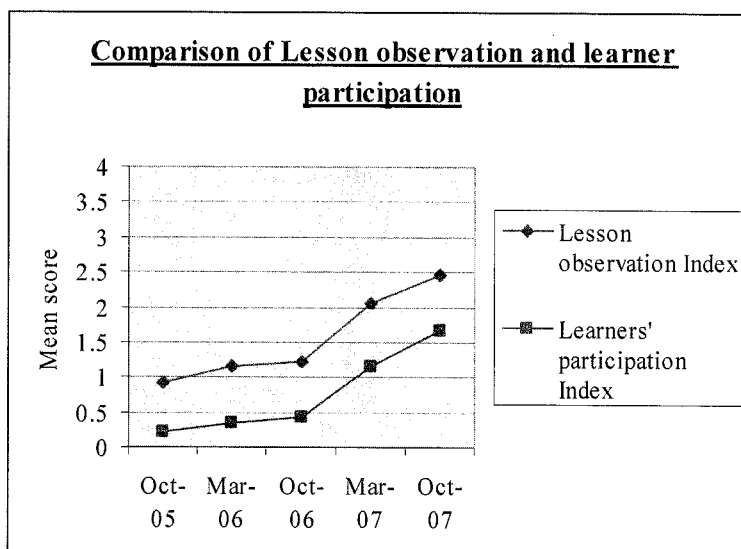

4.2 Teachers' delivery of lessons and Learners' Participation

To find out the impact of the training on the actual teaching and learning of Science and Mathematics, continuous classroom observations were conducted since the inception of the SESEMAT. The Table 4 below shows the overall mean scores.

	Date	Lesson observation Index	Learners' participation Index
Baseline	October 2005	0.91	0.22
After first Cycle	March 2006	1.15	0.34
After first follow-up	October 2006	1.21	0.43
After Second Cycle	March 2007	2.06	1.16
After Second Follow-up	October 2007	2.46	1.66

Table 4. Mean Scores in lesson observation and learners' participation indices

All the mean scores are plotted with time in the graph below.



The graph indicates that SESEMAT trained teachers are shifting from “chalk-and-talk” to activity-based and learner-centred approach. As of October 2007, the set target scores in lesson observation index of 2.3 were achieved while that of learners' participation of 1.8 is almost attained. Also, mean scores at “After Second Follow-Up” in both indices are significantly higher than those of baseline. In sum, the results show that the INSET rendered positive impacts on classroom practices, which will be expected to improve learners' understanding.

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4.3 Implications

Those findings stated above show that the INSET caused teachers' positive attitudinal change and a pedagogical shift from "chalk-and-talk" to "activity-based and learner-centred." Although the further lesson practice is required to enhance the quality of teaching and learning, the SESEMAT pilot phase has achieved the expected outcomes, which will lead to better learners' performance in the subjects in future.

As for the sustainability of the SESEMAT, the cost sharing was agreed upon among all the stakeholders and is implemented appropriately. In addition, other measures including the utilization of existing facilities within secondary school system and proper administrative and management structure in place ensures cost-effective implementation of in-service training. In other words, the cascading INSET system, including human resource, organizations and finance, has been established under the SESEMAT. It is, therefore, concluded that the established modality during the pilot phase is workable for its national expansion.

5 Rationales

The national expansion of the SESEMAT is to fulfil the following policy priorities and needs on the ground:

5.1 Education Sector Development Policy (ESSP) Priority

The Education Sector Strategic Plan (ESSP) 2004-2015 articulates the necessity of establishment of continuous in-service training to ensure the quality education (Sub-objective 2.2 and Strategies b). The expansion of the SESEMAT programme aligns with the ESSP objectives and strategies. This would be the first step toward institutionalization of in-service training as part and parcel of the requirements of teacher professional development and in line with comprehensive plan for secondary education.

5.2 Necessity of Quality Enhancement in USE

As the Government is improving the access to secondary education through the USE policy, there is also an enormous need for the quality enhancement at secondary level. The lesson learnt from previous experience, particularly from the UPE policy, is that expansion of education access should be implemented together with quality assurance measures. Since Science and Mathematics are challenges as discussed earlier, it is indispensable to provide quality assurance measures for the subjects.



Well-trained teaching staff, who utilise available resources to facilitate learning process and help learners unleash their potential, is crucial for quality education as well as infrastructural and material inputs. For this purpose, the SESEMAT has already been in place and proved effective for quality teaching.

5.3 Compulsory Science at Secondary Level

The MoES made all Science subjects (Physics, Chemistry and Biology) compulsory from January 2006, through which more Ugandan youngsters are expected to be equipped with scientific knowledge and thinking. This initiative creates a huge need to strengthen teaching capacity of Science and Mathematics.

5.4 High Demand from Stakeholders to INSET

The tangible progress made by the SESEMAT attracts more attentions from stakeholders including teachers and school administrators throughout the country. Teachers and head teachers perceive the need to teach Science and Mathematics effectively because the Government policy makes Science and Mathematics compulsory. As the baseline surveys show, teachers have strong demand for continuous training opportunities because most of them have never attended any in-service training since their pre-service training.

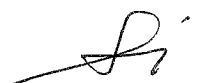
6 Strategies of the Programme

In order to address the challenges and to meet needs at various levels as stated above, Ministry of Education and Sports (MoES) intends to expand the SESEMAT programme nationwide. The programme aims at improving the teaching ability of Science and Mathematics teachers in secondary schools, by which learners' performance in the subjects is expected to be improved. To achieve the goal, SESEMAT has the following three strategies.

6.1 Holistic Promotion of Pedagogical Paradigm Shift at Classroom Level

Since teaching is the most crucial factor in learning process, classroom practice should be more effective, efficient and sensitive to learners. Thus, the SESEMAT developed its pedagogical principles for effective teaching and learning referred to as ALEI/PIEI approach.

To realise the shift at classroom level, the SESEMAT shall primarily provide secondary teachers of Science and Mathematics, National Teacher's College (NTCs) lecturers and



Primary Teacher's College (PTC) tutors with in-service training (INSET), through which teachers will be exposed to the new paradigm and its practice. The established cascade-approach in the pilot phase will be utilised for the national expansion.

In addition to INSET, alternative measures that will be complementary to the INSET shall also be taken in order to disseminate the effective teaching further and create more sense of professionalism among teachers. The classroom teaching, where the training effects will emerge, has been intact and hidden for a long time. The closed nature of the classroom teaching still hinders teachers from implementing effective lessons.

For the actualisation of effective teaching, the SESEMAT training, therefore, should be coupled with various approaches derived from different fields such as business administration, marketing, organisational psychology, cognitive science, religions and so forth. A holistic approach will enable teachers to link the training with actual classroom teaching and to reflect their practices through open and constructive interactions with their colleagues.

International exposure and perspectives will help our professional practitioners strengthen the pedagogical shift. Thus, the SESEMAT shall continue to provide opportunities to exchange the Ugandan experiences with other African counterparts through the network of SMASE-WECSA.

6.2 Creating Enabling Environment for Classroom Teachers

Given that administrative support is crucial for the quality education, school administrators including head teachers should be sensitised and equipped with proper management skills in order that they will become able to provide an atmosphere conducive to quality learning and teaching.

Also, learners should be given ample opportunity to widen their perspectives and become self-driven in learning. Motivated learners can actively participate in lessons and create classroom dynamism toward effective teaching and learning.

6.3 Strengthening of Institutionalised INSET System

For the realisation of positive impacts on learners' performance, it is necessary to strengthen the established INSET system under the pilot phase in three domains: (i) policy and administration; (ii) training contents and (iii) infrastructure.

The enrichment of the INSET implementation policy is required. For the curriculum



review of the secondary education is to take place, it is significant to incorporate the induction training of the new curriculum into the INSET system. Also, this will lay a foundation to expand the INSET to subjects other than Science and Mathematics.

To provide quality training, SESEMAT shall continue to update its training curriculum and contents and develop courses that are relevant to actual needs and contemporary issues. In addition, new district centres will be established and provided with equipment necessary for the SESEMAT activities.

7 Design of the Programme

The expansion of the SESEMAT programme is planned as follows:

7.1 Programme Purpose

To improve teaching ability of Science (Physics, Chemistry, and Biology) and Mathematics teachers at secondary level in the target areas.

7.2 Overall Goal

To improve secondary students' performance in Science subjects (Physics, Chemistry, and Biology) and Mathematics in the target areas.

7.3 Duration

The national expansion of SESEMAT will be three years from August 2008.

7.4 Coverage

Under the SESEMAT expansion, 2,500 teachers of Science and Mathematics in both Government-aided and private secondary schools will be trained. In addition, 180 tutors of Science and Mathematics at PTCs and 30 lecturers of the same subjects at NTCs will be provided training customised for their needs.

In the pilot districts of Tororo, Butaleja and Masaka, the established INSET shall be autonomously organised without direct financial support from the MoES and development partners. However, the SESEMAT shall continue to provide technical assistance in the development of training curriculum and monitoring and evaluation.



SESEMAT shall also continue to implement provide the pilot exp 36 districts (covering about 3000 Science and Mathematics teachers), through the continuous implementation of the INSET, the Supper Science and Mathematics Contests and other Programme activities.

7.5 Target Areas

The selection of the new target areas were made according to the following criteria.

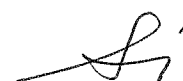
- SESEMAT target areas are not necessarily identical to administrative boundaries.
- Any area or region will be qualified as the candidate areas if it fulfils the following requirements:
 - The area or region shall establish a functional District (Regional) Management Committee for the management and administration of the SESEMAT activities in the district or region.
 - The area or region shall agree to make sufficient financial contributions (Ush. 1,000 per term per student) for the activities and to indicate clear modalities of how it will mobilise such resources.
- The target areas will be determined on a “first-ready-first-served” basis.
- Geographical balance and accessibility of the area or region also are considered.

After a sensitisation workshop held in March 2008, 17 districts applied and formulated 5 regions as follows:

- Mbale Region (Mbale, Pallisa and Busia districts)
- Luwero Region (Luwero, Nakaseke and Nakasongola districts)
- Aura Region (Nebbi and Arua districts)
- Masindi Region (Masindi and Hoima districts)
- Rakai Region (Rakai, Sembabule and Kalangala districts)
- Wakiso district
- Kaliro district
- Ntungamo district
- Moroto district

7.6 Infrastructure

To accommodate 2,500 teachers in the districts and regions stated above, 8 District Training Centres will be established (each centre will have accommodation capacity for 250 trainees), utilising existing facilities at public institutions, which is the same modality as the pilot phase.



Renovation works on residential area such as dormitories and bathrooms may be required in order to lodge teachers during the trainings. Also, security enforcement measures will be taken to store equipment and materials securely. Regional or District Management Committees shall be responsible for taking necessary measures for infrastructure.

7.7 Beneficiaries

The SESEMAT national expansion is targeting the following categories of the beneficiaries:

- 2,500 secondary school teachers of Science and Mathematics;
- 400 secondary school administrators (Head Teachers, Chairpersons of Board of Governor, Treasures);
- All district administrators (District Education Officers, District Inspectors of Schools) in the target areas; and
- 180 PTC tutors and 30 NTC lecturers of Science and Mathematics.

7.8 Training Curriculum

The training curriculum and materials developed by the SESEMAT pilot phase will be modified and used for the expanded districts/regions.

The curriculum was designed to enhance positive attitude, to address their needs introduce and actualize ALEI/PIEI approach at classroom level. The curriculum consists of three cycles intended to be accomplished in three years. The first cycle deals with attitudinal change of teachers. Hands-on and minds-on activities are discussed at the second cycle. The third cycle focuses on actualization of learner-centred and activities-based (ALEI-compliant) lessons.

The training is conducted on a two-tier cascade system. First, District Trainers are trained at the national INSET centre in Kampala. Then they train their fellow teachers at district level.

7.9 Outputs

The expected outputs are as follows:

- (1) A number of teachers trained through INSET;
- (2) School and parental support for teaching and learning of Science and Mathematics enhanced; and
- (3) Institutionalised INSET system strengthened.



To measure the outputs above, indicators described in the Log-frame or Programme Design Matrix (see Appendix 1), which are modified from the one for the pilot phase, will be applied.

7.10 Activities

To achieve the outputs, the following major activities are planned.

For Output 1,

- (1-1) To select target areas where 2,500 teachers of Science and Mathematics are deployed in total.
- (1-2) To identify 120 District Trainers (three trainers per subject/centre).
- (1-3) To conduct National Trainings for the District Trainers.
- (1-4) To conduct District Trainings.
- (1-5) To conduct monitoring and evaluation.
- (1-6) To conduct trainings abroad for core trainers.
- (1-7) To conduct trainings for PTC tutors and NTC lecturers of Science and Mathematics.
- (1-8) To review the INSET curricula.
- (1-9) To provide technical support to INSET in the pilot districts.
- (1-10) To organise lesson demonstration competitions (*Super Science and Math Teachers Contest*).
- (1-11) To conduct international technical exchange with various institutions.

For Output 2,

- (2-1) To provide school administrators with sensitisation and school management workshops.
- (2-2) To organise sensitisation workshops for DEOs.
- (2-3) To publish Student Vocation Guides.

For Output 3,

- (3-1) To establish District Training Centres in the target areas.
- (3-2) To provide the centres with basic equipment, machinery, educational materials necessary for the trainings.
- (3-3) To incorporate the SESEMAT INSET with comprehensive quality assurance programme for secondary education sub-sector.



7.11 Monitoring and Evaluation

INSET monitoring and continuous classroom observations, as carried out in the pilot phase, will be conducted for this phase as well. The same instruments as administered under the pilot phase will be utilised. All the monitoring and evaluation exercise will be performed by the Monitoring and Evaluation unit at the SESEMAT national centre.

7.12 Inputs

To implement the planned activities, the Government of Uganda through the Ministry of Education and Sports and the Government of Japan through Japan International Cooperation Agency (JICA) will provide the following inputs.

(1) The Government of Uganda/Districts

- Salary and allowances for National Trainers;
- Accommodation and Transport Refunds for District Trainers (DTs), teachers, PTC tutors and NTC lecturers (No participation allowance for trainees paid);
- Allowance for DTs implementing district trainings;
- Office space and facilities necessary for the programme; and
- Utility (Electricity, Gas, Water).

(2) JICA

- Dispatch of one Technical Advisor;
- Dispatch of short-term experts if necessary;
- Trainings abroad for SESEMAT core trainers and relating officials; and
- Equipment, machinery, educational materials necessary for programme activities.

7.13 Important Assumptions

- All positions of National Trainers are filled.
- Influx and out-going of the teachers of secondary Mathematics and Sciences in the pilot districts is minimised.
- The socio-economic situation of the target area will not rapidly decline.

7.14 Administration

The Ministry of Education and Sports shall implement the programme, being the Permanent Secretary as the Programme Director, and co-ordinated by the Departments of Secondary Education and Teacher Education with technical assistance from JICA. The organisational structure is shown in Appendix 4.



7.15 Steering Committee

The Steering Committee chaired by the Permanent Secretary of the MoES shall take the highest authorities and responsibilities for the Programme management and implementation.

The roles and functions of Steering Committee shall be:

- To provide overall management and administration of the programme;
- To finalise the Annual Plan of Operations based on the progress and financial reports submitted by the National Coordinator;
- To evaluate the overall progress of the programme; and
- To exchange views on any major issues arising from or in connection with the implementation of the programme.

The Steering committee consists of:

- The Permanent Secretary of MoES;
- Director of Education;
- Commissioner Teacher Education;
- Commissioner Secondary Education;
- Commissioner Education Planning;
- Heads of the Uganda National Examinations Board, National Curriculum Development Centre, Education Standard Agency, Education Service Commission;
- Representatives of JICA;
- Technical Advisor; and
- A representative of Donor community.

Kampala-based members will not receive allowances. However, there is need for a small budget to cater for logistics particularly travel. This needs to be supplemented by a supervisory budget to cater for field travels for committee members.

7.16 Coordination Unit/National Coordinator

Teacher Education Department (TED) and Secondary Education Department (SED) are in charge of coordination of the programme. The SED shall take lead in the overall coordination of the SESEMAT and the In-service training component while the TED will take charge the Pre-service training component. The unit will be managed by National Coordinator and Assistant National Coordinator appointed by the Permanent Secretary. They shall collaboratively develop the Annual and Quarterly Activity work plans. The Quarterly Activity Work plans shall be used to access funds.



National Coordinator, assisted by Assistant National Coordinator, appointed from the SED and TED respectively, shall have the following roles and responsibilities:

- To coordinate the programme;
- To prepare and develop Annual and Quarterly work plans;
- To initiate the requisitions for the GoU funds for the implementation of any activities;
- To develop and defend Budget Statement Proposal; and
- To support and supervise the National Trainers.

7.17 Technical Advisor

JICA shall dispatch a long-term Technical Advisor. Short-term experts may be dispatched if the necessity arises. Technical Advisor will have the following roles and responsibilities:

- To advise to the Programme Director, National Coordinators, and National Trainers on the implementation and management of the programme;
- To assist the National Coordinators in developing Annual and Quarterly work plans;
- To advise the Ugandan counterpart personnel on subject matters; and
- To advise the Ugandan counterpart personnel technical aspects of the monitoring and evaluation.

7.18 National Trainers (NTs)

The MoES shall continue to deploy eight full-time National Trainers (two per subject: Mathematics, Physics, Chemistry and Biology). The roles and responsibilities of the National Trainers shall be:

- To organise and conduct the training sessions in their respective subjects;
- To develop training curriculum, manuals, any related instruction materials;
- To collaboratively develop the Annual and Quarterly work plans;
- To collaboratively monitor and evaluate the programme;
- To carry out relevant research; and
- To support and supervise the District Trainers.

7.19 District Trainers (DTs)

District Trainers (DTs) will be identified from experienced secondary teachers as part-time basis. At least two District Trainers per subject will be assigned to a District/Regional Centre (ideally three per subject/centre). The roles and responsibilities of DTs shall be:



- To organise and conduct the district training sessions in their respective subjects;
- To collaboratively develop the Annual and Quarterly work plans;
- To collaboratively monitor and evaluate the programme;
- To support and supervise classroom teachers; and
- To make the progress to the District Management Committee.

7.20 Regional/District Management Committee

Regional/District Management Committee shall consist of a chairperson of Head Teacher Association in the region/district, District Education Officer (DEO) in the region/district, representatives of head teachers and DTs.

The roles and responsibilities of the District Management Committee shall be:

- To raise sufficient funds for the district/regional activities of SESEMAT;
- To provide overall management and administration of the District Training;
- To report to National Coordinator the accountabilities for the funds raised; and
- To evaluate the progress of all the SESEMAT activities in the region or district.

7.21 Training Centres

National In-service Training Centre, established within Kololo Senior Secondary School in Kampala, will be the venue for national training for DTs, PTC tutors and other programme activities. District/Regional Centres, where District/regional training takes place during school holiday, will be identified as mentioned earlier.

7.22 Budget

For the implementation of the SESEMAT national expansion, a cost sharing principle between Ministry of Education and Sports, Districts and JICA will be set as follows:

Bodies	Cost-sharing items
MoES	- Recurrent cost for all activities at national level including salaries and allowances of National Trainers; - full-board accommodation for National Trainings and utilities.
Districts/ Regions	- Recurrent cost for all activities at district or regional level including transport for teachers; - full-board accommodation for DTs and teachers; and - allowance for DTs conducting trainings.
JICA	- Dispatch of one Technical Advisor; - Dispatch of short-term experts if necessary; - Cost for out-of-country trainings for core trainers and related officials; and - Development cost for equipment, machinery and materials necessary for the trainings and other relevant activities.

Based on the cost-sharing principle, the estimated contributions by the three parties are shown below (For the details, refer to Cost Analysis in Appendix 4).

(UGX)	FY2008	FY2009	FY2010	Total
MoES	250,988,000	250,988,000	250,988,000	752,964,000
District	327,200,000	327,200,000	327,200,000	981,600,000
JICA	615,000,000	407,000,000	407,000,000	1,429,000,000
Total	1,193,188,000	985,188,000	985,188,000	UGX 3,163,564,000

(Note: The cost of the dispatch of the JICA experts is excluded in the table shown above.)

The funds from the Government of Uganda will be released from the Ministry of Finance, Planning and Economic Development (MoFPD) by the basis of the agreed Annual and Quarterly work plans on a monthly basis.

The funds from the Government of Japan, through JICA, will be disbursed according to the Annual and Quarterly work plan and transmitted into JICA programme account in a commercial bank within Uganda.

7.23 Accountability

The MoES, MoFPED and JICA are to share the implementation roles of the programme to ensure that adequate and timely flow of funds to the ultimate users and accountability for those funds both in terms of outputs and proper accounting are expedited.

For the funds from the GoU, the National Coordinator shall establish his accountabilities through the Commissioner of Secondary Education, while the Accounts Section of MoES will be responsible for receiving and analysing accountabilities of funds released to the programme. The section will be responsible for keeping all books of the GoU accounts for the programme and ensuring that regular financial audits are done in time.

The National Coordinator shall submit monthly and quarterly narrative progress and financial reports to the offices of the Permanent Secretary and the Commissioner of Educational Planning. These are to be submitted together with all necessary documents of accounts and statements for verification by internal auditors of operations and expenses made. No separate financial and Programme audit shall be done. The audit process shall fit within the existing MoES audit arrangements.

JICA Technical Advisor is responsible for the accountability of the JICA programme account and shall report to JICA Headquarters in accordance with the laws and regulations in force in Japan.

7.24 Procurement

All procurement of the goods, works and services financed by the GoU and JICA shall be in accordance with the Government of Uganda Procurement and Disposal Act and the laws and regulations in force in Japan respectively.

The National Coordinator shall initiate the procurement process of goods and services financed by the GoU through the Contracts Committee of the MoES. Procurement and Disposal and Construction Units of the MoES shall be responsible for any activities that fall under their jurisdiction.

8 Feasibility of the Programme

8.1 Relevance

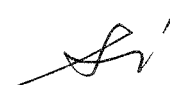
The Government policies clearly articulates that there is critical need to address the teaching and learning of Sciences and Mathematics at secondary level in order to achieve national goals set by Poverty Eradication Action Plan (PEAP).

In the PEAP, the quality assurance is one of the priority areas on which the Government shall work. Education Sector Strategic Plan (ESSP) prioritizes the strengthening of teaching force at secondary level through intensive in-service training. The expansion of SESEMAT will help the Government achieve the policy goals.

In addition, the Universal Secondary Education (USE) policy along with the introduction of compulsory Science subjects has created an enormous need for the quality enhancement at secondary level. As discussed earlier, current teaching and learning approaches of Science and Mathematics are obstacles to improve the quality secondary education. The necessity to strengthen the Science and Mathematics education is of paramount importance. In-service training provided by the SESEMAT will contribute to not only the empowerment of the teaching force in secondary education but also the achievement of the national development goals.

8.2 Effectiveness

The holistic approach that SESEMAT utilises including strengthening pedagogy at classroom level through in-service training, capacitating school administrators and institutionalisation of INSET is likely to achieve desirable outcomes as confirmed in the SESEMAT pilot phase.



Also, the established INSET system will be able to provide effective and direct interventions not only for teachers of Science and Mathematics but also school administrators and other stakeholders. Furthermore, internal monitoring and evaluations structure in place shall ensure that all the interventions will be more effective than the ones under the pilot.

8.3 Efficiency

Efficiency measures derived from the experience in the pilot phase shall be applied. For the selection of the target area and centre schools, MoES shall encourage districts to merge them and formulate a region. This will reduce initial costs of setting up districts and regional centres and serve more teachers within the available resource envelopes.

As the findings of the pilot phase evaluation, the maximum utilisation of existing infrastructure and local resources increased the efficiency of the programme. This modality will remain as the major efficiency scheme under the national expansion.

Within the programme, there is a transparent mechanism of how the funds for the programme shall be monitored. This is coupled with clear verifiable indicators that shall reflect the outputs and be constantly used to ascertain if the programme is on the track.

8.4 Impact


The combined interventions of INSET and other relevant activities are expected to give more positive impacts than the pilot in terms of learners' attitudinal changes, professionalism among teachers and gender issues.

Since the SESEMAT will serve about approximately 5,000 teachers under the national expansion and pilot expansion, the synergy effect, that is, larger teaching force involved, will produce a greater momentum toward the improvement of Science and Mathematics education by nation-wide technical exchange among teachers. The programme will have no negative environmental impact.

8.5 Sustainability

The Government of Uganda shall continue to cover the recurrent cost of training at national level under Medium Term Budget Framework (MTBF) of the MoES to ensure that the programme has financial sustainability.

The sustainability at district level will be assured with the "first-ready-first-served"



approach that worked highly effectively in the pilot expansion. The approach includes intensive sensitisation to foster self-help, voluntary application and close follow-up activities in districts.

Appendices

Appendix 1. Programme Design Matrix

Appendix 2. Plan of Operations

Appendix 3. Tentative Schedule of Implementations

Appendix 4. Budget Analysis

Appendix 5. Administrative Structure

Appendix 6. The training structure of SESEMAT Programme

