

1 Executive Summary

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| Project Title: Secondary Science and Mathematics Teachers Project (SSMTP) |
| Country: The Republic of Uganda |
| Overall Goal: To improve secondary students' performance in Mathematics and Science subjects (Physics, Chemistry, Biology) in the pilot districts |
| Project Goal: To improve teaching ability of Mathematics and Science teachers at secondary level in the pilot districts |
| Coverage: Tororo and Masaka Districts |
| Duration: 3 years (2005-2008) |
| Target Groups (1) Over 600 Secondary school teachers of Sciences and Mathematics (2) Over 200 Head Teachers and Chairpersons of BoGs and PTA (3) DEOs, DISs, Local Council (LC5 and LC3) (4) 20 NTC Lecturers and 20 PTC tutors |
| Outputs (1) A number of teachers trained through In-service Training (INSET) (2) School and parental support for teaching and learning Mathematics and Sciences enhanced (3) INSET system institutionalised |
| Activities (1-1) To recruit National Trainers (NTs) (1-2) To conduct training for NTs in Japan or Third countries (1-3) To conduct a baseline survey on secondary Mathematics and Science education and teacher education (1-4) To develop training curriculum, materials, monitoring and evaluation tools (1-5) To identify District Trainers (DTs) from the Secondary schools in the pilot districts (1-6) To conduct National Training for District Trainers (DTs) (1-7) To conduct District Training at District Training Centres (1-8) To conduct monitoring and evaluation (2-1) To provide Head Teachers, Chairpersons of BoGs and PTA with school management training (2-2) To organise sensitisation workshops for Chairpersons of Local government (LC5 and LC3) (2-3) To publish newsletters on activities of the project (3-1) To establish National INSET Centre in Kampala and District Training Centres in the pilot districts (3-2) To provide the centres with basic equipment, machinery, educational materials necessary for the training (3-3) To institutionalise the training in conjunction with the ESC |
| Structure: The project is to be implemented by Ministry of Education and Sports. (1) Steering Committee The Steering Committee chaired by the Permanent Secretary of the MoES shall take the highest authorities and responsibilities for the project overall management and implementation. It will consist of MoES officials, JICA Representatives, and |

Representative of Donor Community.

(2) Coordination Unit/ National Coordinators

Teacher Education and Secondary Education Departments are in charge of coordination of the project. 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 recruit four full-time National Trainers (one per subject: Mathematics, Physics, Chemistry, and Biology). NTs will implement training and related activities.

(4) District Trainers (DTs)

District Trainers will be identified from Secondary teachers and institutes as part-time basis. DT will implement training at District level.

(5) District Management Committee

The District Management Committee, chaired by District Education Officer, consisted of Chairperson of Head Teacher Association of the district, District Inspector of Schools, Representatives of Head Teachers, Classroom Teachers, and Chairperson of PTA will be in charge of Management of District Training.

(6) National In-service Training Centre/District Centres

National In-service Training Centre (NITC) will be established in Kampala as the venue for National Training. District Centres, where District Training will be taken place during school holiday are tentatively identified.

Inputs

(1) GoU

- Salary and Allowances of NTs
- Accommodation and Transport Refunds for DTs and trainees
- Allowance for DTs implementing district training
- Office space and facilities necessary for the project
- Utility (Electricity, Water, Gas)

(2) JICA

- Technical Advisor
- Short-term experts if necessary
- Operation costs for training and workshops/seminars
- Equipment, machinery, educational materials necessary for the project activities

Feasibility of the Project

Relevance

There is critical need to address teaching and learning of Sciences and Mathematics at Secondary level in order to achieve national goals set by the Poverty Eradication Action Plan (PEAP) and Education Sector Strategic Plan (ESSP). The project also reflects serious needs from Secondary teachers. Since poor performances in Mathematics and Sciences are obstacles to quality Secondary education, In-service training aiming at the strengthening of Mathematics and Science teachers will

contribute to not only the empowerment of the teaching force in Secondary education but also the achievement of the national development goal.

Effectiveness

The project primarily aims at improving classroom practices of Mathematics and Sciences, which is the most crucial and desired element in education, through in-service training. In addition, the project targets a creation of enabling environment where Mathematics and Science teachers shall easily obtain support from Head Teachers, Local administration, and community. Institutionalization of the INSET, which is one of the outputs of the project, shall provide a continuous system for professional development.

Efficiency

There is a transparent mechanism of how the funds for the project shall be monitored, coupled with clear verifiable indicators. Also, the project will utilize existing facilities and local resources in order to increase the efficiency. Some training will be implemented in Third countries. The unit cost of training in Third countries is lower than the one in Japan.

Impact

Improvement of Teachers will lead to learner's attitudinal change toward Sciences and Mathematics and provide them with better learning environment for higher achievement in these subjects. Gender-sensitive programme to be developed by the project will reduce the gender bias in the Uganda community. Also, the project shall act as a springboard for institutionalisation of entire INSET programme for Ugandan teachers.

Sustainability

The Government of Uganda shall cover the recurrent cost of training such as salaries and allowances for the full-time National Trainers, Accommodation, and Transport Refunds for trainees. In addition, the sustainability is assured at the policy level.

2 Introduction

Since 1980's to date, there has been public outcry about very low achievements made by students in Sciences, Mathematics, and English Language at this key stage of Secondary Education. Performance in Sciences (Physics, Chemistry, Biology) and Mathematics was very poor at the Uganda Certificate of Education (UCE); so the Government of Uganda (GoU) had to come up with some interventions.

During the same period of 1980s to date, there were many secondary schools either constructed or some primary schools being upgraded to a secondary school status due to the increasing demand for secondary education. With increased number of secondary schools, it meant increased demand and supply of secondary school teachers. Hence the GoU had to respond to this critical need by establishing ten National Teachers Colleges

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to produce the urgently required teachers in 1980s.

3 Background of the Project

3 - 1 Overview of Education Sector

3 - 1 - 1 Primary Education

The Government of Uganda has realized significant progress particularly in the education sector and especially in Primary education. Since the inception of Universal Primary Education (UPE) in 1997, the net enrollment ratio for Primary education has stood at more than 86% and the number of enrolled primary pupils rapidly increased from 2.9 million in 1996 to over 6.7 million in 2004.

3 - 1 - 2 Secondary Education

The Government of Uganda is facing the unprecedented demand for secondary education and the need to deal with huge bulge of primary leavers. To tackle the challenge, Ministry of Education and Sports (MoES) developed “the Policy and Costed Framework for the expansion of Post-Primary Education and Training (PPET)” in 2002. The Cabinet approved it in 2003. MoES now is implementing the policy in constructing new secondary schools, rehabilitating existing schools, recruiting teachers and so forth.

3 - 2 Situational Analysis on Mathematics and Science Education

Africa, as a continent, has continued to lag behind in Science and Technological developments compared to other continents such as Europe, Asia, and America. Uganda, as a country, is not exception especially in the areas of scientific and technological advancement with human resources. Among the many factors identified for this absurd situation for Uganda are teachers, attitudes, physical facilities, curricula, and lack of financial resources.

As the UPE bulge graduates into Secondary education, Science and Mathematics teachers are experiencing the challenges of bigger numbers of students per class. Yet the facilities for any effective instructions of these students remain wanting in the areas of Sciences and Mathematics.

The attitudes of students, parents, some teachers, and any other stakeholders towards Mathematics and Sciences has remained negative and therefore this calls for an aggressive approach to sensitise the populace of Uganda about these subjects.

Though the Government of Uganda, through her Ministry of Education and Sports, has made recognisable efforts to ensure that quality education is delivered, Science and Mathematics Education, with the bigger numbers of students per class, limited

instructional materials in place, Science and Mathematics teachers not facilitated to acquire, review, and upgrade their subject contents and pedagogy of teaching, slow-paced evolving curricula with a number of curriculum mismatches, and limited physical facilities, remain a big challenge.

The challenges mentioned above contribute a lot of the continued registered poor performance in the subjects. The Uganda National Examinations Board (UNEB) results of O-level since 1980's have continued to reveal poor performance of students in Mathematics, Chemistry, Biology, and Physics. Yet the demand for Science and Mathematics students has continued to grow in the Ugandan Universities and other Tertiary Institutions. The average failure rate of Non-Science subjects on the Uganda Certificate of Education (UCE) is 10-20%. However, the failure rates for Science subjects are more than 40% up to 60%.

The trend is found in PTC Grade III leaving examinations. According to the 2002/03 results, most PTC students passed Non-Science subjects with almost 90% or higher pass rate while 83% passed for Sciences and only 37% passed for Mathematics. This results in wastage of scarce resources. The problem is due not only to students but also to teaching staff.

The situation becomes worse when the focus is placed on females. Many girl students have negative attitudes toward Sciences and Mathematics. It is thought that there is socio-cultural bias in favour of males for Science learning. The majority of those who failed in the UCE Sciences and Mathematics are females. The number of female teachers in secondary schools, especially for Mathematics and Physics, is very low. In Mathematics and Sciences, the ratio between female and male teachers is 1:5. In order to accomplish one of the Millennium Development Goals (MDGs), "by 2005, eliminating gender disparity in both Primary and Secondary education", gender-sensitive programme is crucial.

The dissatisfactory performances mentioned above indicate that there is an observed need to address inefficiencies and inadequacies of the teachers of Sciences and Mathematics so that the students can make higher achievements. When students start making commendable and comparable achievements in Sciences and Mathematics, like in Arts/Humanities, then this is likely to change the observed trend in Universities and other Tertiary Institutions where 85-87% of the Tertiary Education enrolments are in the Arts/Humanities. Good foundations in Sciences and Mathematics for such students could eventually enable them to study both Sciences and Arts/Humanities at Tertiary levels. The Ugandan Education system may achieve an increasing enrolment in Sciences and Mathematics to a level of 30% by 2015.

3 - 3 Government Policy

The current policy frameworks promote the international goals of achieving Education for All (EFA). The Education Sector Strategic Plan (ESSP) emphasizes the need for competent women and men to achieve its development goals. Education has also been incorporated within the Poverty Eradication Action Plan (PEAP 2004) in recognition of the fact that well-educated population is crucial for the country to sustain social and economic development. Therefore, the focus has been on promoting education as a key tool in facilitating development.

Primary education has been the major target accounting for 65% of the current education budget while the other 35% is devoted to Post-Primary and Tertiary education. Post-primary education has received little attention yet the rapid enrolment in Primary education has caused a sharp rise in the demand of Post-Primary education particularly after the release of the first cohort of UPE graduates. The gross enrolment ratio is below the sub-Saharan average of almost 30%. The key challenges in Post- Primary education are access, equity, efficiency and quality.

Good quality Secondary education is critical in preparing the Ugandan youth in order to benefit from the ICT and knowledge revolution and compete favorably in the new globalised, knowledge based economy. The PEAP emphasizes the importance of the manufacturing and industry in promoting economic growth. Uganda is aiming at a path of economic development that will expand the country's ability to compete favourably in international markets. Secondary education provides opportunities to acquire attitudes, skills and competencies that enhance the ability to participate fully in society and take control of their learning at Tertiary level.

The Government has embraced the challenge of Post-Primary education and plans are underway to improve equity of access to Secondary schools and the quality and efficiency of education. The quality of Post-Primary education is a key challenge with regard to achieving sustainable development.

The general performance in Sciences and Mathematics both at O- and A- level has been very poor over the past years. Such high failure rates indicate a substantial proportion of students have not attained the Literacy, Numeracy and problem-solving skills and competencies needed. The poor performance in the subjects calls for special concern for policy makers because Science and Technology are key precursors for economic development. The purpose of school Science is not only to create future Scientists but also to create citizens who understand Science in ways that will enable them to participate intelligently in critical thinking, problem-solving, and decision-making about

how Science and Technology are used to change society. The Science curriculum is human- and society-focused, problem-centered, and responsive to local issues. Problems to be investigated are selected for their relevance to students' lives and are multidisciplinary in nature. The focus is on skill development in problem-solving and decision-making that are vital in poverty eradication which is the over riding goal in Uganda's development framework.

Science and Technology are very significant in transforming the world for the better for example decline in infant mortality, increased life expectancy, decrease of epidemics and disappearance of famines. These changes are attributed to technological revolution that is responsible for increasing productivity for competing in international trade and attaining sustainable economic growth. Therefore, educating large numbers of people in Science and Technology is a necessary condition for a country to acquire a competitively technological based industrial capacity that is stated in Uganda's development goals.

In response to this challenge, the MoES is planning to make Sciences compulsory at lower secondary level with effect from 2006 to provide a better balance between science and art subjects. Japan International Cooperation Agency (JICA) as a key development partner is collaborating with the Ministry to improve the teaching and learning of Sciences and Mathematics in Secondary schools. The Project will assist the Government to upgrade Pre-service and In-service training programmes and to develop education materials in the country. This will contribute to human resource development that is based on the manpower requirements of the national growth path. This will build an education system that contributes to Uganda's national development goals in the context of globalisation.

3 - 4 Initiatives undertaken by the Government

3 - 4 - 1 INSSTEP

In 1994, the Governments of Uganda and Britain signed a contract to establish the In-Service Secondary Teacher Education Project (INSSTEP) with goal of boosting the teaching and learning of Sciences, Mathematics, and English using the Teacher Resource Centres (TRCs) as the focal point of achieving this goal.

INSSTEP activities were (1) provision of books, equipment and other instructional materials, (2) In-Service Training, (3) management training for Head teachers, heads of departments, bursars, and Board of Governors (BoGs), (4) teachers' innovations and improvisational skills development.

During the implementation of the project, the TRCs were coordinated by the

Inspectorate of the MoES, and later they were prematurely passed over to districts for administration and management. This happened during the wave of decentralisation of Local administration where districts had to start managing their affairs. The most unfortunate part of this decentralisation was that while Primary education sub-sector and other sectors/sub-sectors were decentralised, Secondary Sub-sector remained at the centre. However, TRCs were pushed to districts' management and administration and found themselves under the districts which were much unprepared to accommodate them. Hence their roles and functions had to naturally wither away.

In the restructuring within the MoES, the coordination TRCs went to the Teacher Education Department. The facilitation under the new home, however, remained problematic. The department did not receive any funding for the continuity of TRCs. Although some TRCs are still functional, most of them were abandoned and have some equipment, textbooks, and materials under-utilised. It should be noted that TRCs were created for good reasons namely.

The lessons learnt from the INSSET/TRCs are that the project design did not emphasise the political and financial commitments which should have been given by the Ministry.

3 - 4 - 2 African Development Bank (ADB) Project

Another project, under ADB Education Project II, was established in July 2002 to address a number of challenges in the Ugandan Education system. The major focus of this project was to:

- (1) Construct/ rehabilitate primary school classrooms.
- (2) Provide facilitation for secondary and primary school curriculum reforms.
- (3) Construct/rehabilitate libraries and Science laboratories at Girls' Secondary schools
- (4) Sensitise the teachers about the Gender related issues in an endeavour to promote the Girl-child education with the bias of Sciences and Mathematics.

3 - 4 - 3 STEPUP

To produce and repair Science and Technology equipment locally, the Science and Technology Education Production Unit (STEPUP) under National Curriculum Development Centre (NCDC) was established in 1987 with support from British Overseas Development Agency (ODA) and the GoU counterpart funding. It provides training for Science and Technology teachers as well as laboratory technicians in handling and repairing this equipment. STEPUP, with support from ADB, have acquired heavy-duty machines, which could enable them to handle a big production.

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4 Strategy of the Project

The project has two components of In-service Training (INSET) and Pre-service training (PRESET) in order to make holistic and effective interventions to different beneficiaries (see Appendix 4 and 5).

4 - 1 INSET

In order to achieve the project objectives, cascade-approach will be utilised for In-Service Training. In this approach, National Trainers (NTs) will be trained first in Japan or third countries utilising Strengthening Mathematics and Science in Secondary Education–Western Eastern Central and Southern Africa (SMASSE-WECSA) Network and then District Trainers (DTs), who will be drawn from the pilot district, trained by NTs at the National In-service Training Centre in Kampala. DTs will train Secondary Mathematics and Sciences teachers in collaboration with the NTs and any other stakeholders at the District Training Centres. In the districts, secondary schools will be clustered and the cluster centres as District Training Centres will be identified. Also, direct interventions to existing secondary teachers and administrators will be made.

4 - 2 PRESET

Considering the shortage of Mathematics and Science teachers at Secondary level, it is necessary to make interventions to Pre-service training. For PRESET component, lecturers and tutors from selected NTCs and PTCs respectively will be trained and they will disseminate any skills and innovations to their college student teachers.

5 Design of the Project

5 - 1 Project Goal

To improve teaching ability of Mathematics and Science teachers at secondary level in the pilot districts

5 - 2 Overall Goal

To improve secondary students' performance in Mathematics and Science subjects (Physics, Chemistry, and Biology) in the pilot districts

5 - 3 Coverage and Duration

The project will start with pilot districts of Tororo and Masaka. The selection of the pilot districts was done according to the UCE results in Mathematics and Sciences, geographical balance, the level of teacher qualification, and accessibility.

The project will fully be implemented after three years of piloting phase from 2005. Phase One shall be evaluated and evaluation report shall be used for the Phase Two of the Project. Phase Two of this project shall cover more districts than it has been in Phase



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One. Costing of activities shall always be reviewed periodically.

5 - 4 Beneficiaries

The Project is targeting the following categories of beneficiaries:

- (1) Over 600 Secondary school teachers of Sciences and Mathematics
- (2) Over 200 Secondary School Administrators: Head teachers, Chairpersons of BoGs and PTAs (Parents)
- (3) District Administrations: District Education Officers (DEOs), District Inspectors of Schools (DISs), Chairpersons of Local Council (LC5 and LC3)
- (4) 20 NTC Lecturers and 20 PTC Tutors

5 - 5 Outputs

The Project will have three outputs:

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

5 - 6 Activities

To achieve the outputs, major activities are planned as follows:

- (1) A number of teachers trained through INSET
 - (1-1) To recruit National Trainers (NTs)
 - (1-2) To conduct training for NTs in Japan or third countries
 - (1-3) To conduct a baseline survey on secondary Mathematics and Science education and teacher education
 - (1-4) To develop training curriculum, materials, monitoring and evaluation tools
 - (1-5) To identify District Trainers (DTs) from the Secondary schools in the pilot districts
 - (1-6) To conduct National Training for DTs
 - (1-7) To conduct District Training at District Training Centres
 - (1-8) To conduct monitoring and evaluation
- (2) School and parental support for teaching and learning Mathematics and Sciences enhanced
 - (2-1) To provide Headteachers, Chairpersons of Board of Governors (BoGs) and PTAs with school management training
 - (2-2) To organise sensitisation workshops for Chairpersons of Local Council (LC5 and LC3)
 - (2-3) To publish newsletters on activities of the project

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(3) INSET system institutionalised

(3-1) To establish National INSET Centre in Kampala and District Training Centres in the pilot districts

(3-2) To provide the centres with basic equipment, machinery, educational materials necessary for the training

(3-3) To institutionalise the training in conjunction with the ESC

5 - 7 Inputs

To implement the planned activities, the Government of Uganda and JICA will provide the following inputs.

(1) Government of Uganda

-Salary and allowances for National Trainers,

-Accommodation and Transport Refunds for District Trainers (DTs) and Teachers
(No participation allowance for trainees paid)

-Allowance for DTs implementing district training

-Office space and facilities necessary for the project

-Utility (Electricity, Gas, Water)

(2) JICA

-Technical Advisor

-Short-term experts if necessary

-Operation costs for training and workshops/seminars

-Equipment, machinery, educational materials necessary for project activities

5 - 8 Important Assumptions

-The Government of Uganda maintains the policy to promote Mathematics, Sciences, and technology at all level of education.

-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 pilot districts does not rapidly decline.

5 - 9 Administration

The Ministry of Education and Sports shall implement the project, being the Permanent Secretary as the Project 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.

5 - 9 - 1 Steering Committee

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

The roles and functions of Steering Committee shall be:

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

The Steering committee consists of:

- The Permanent Secretary of MoES
- Director of Education;
- Heads of departments of MoES;
 - Commissioner Teacher Education
 - Commissioner Secondary Education
 - Commissioner Education Planning
 - Commissioner Career guidance and counselling
- Kyambogo University (In-service training);
- School of Education, Makerere University;
- Heads of the Uganda National Examinations Board, National Curriculum Development Centre, Education Standard Agency, Education Service Commission;
- Chairperson of Secondary Head Teachers Association;
- Representatives of JICA office;
- JICA Technical Advisor;
- 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.

5 - 9 - 2 Coordination Unit/National Coordinator

Teacher Education (TED) and Secondary Education departments (SED) are in charge of coordination of the project. SED will take lead in the overall coordination of the Project and In-service training component while TED will take charge Pre-service training component. The unit will be managed by a National Coordinator and Deputy Coordinator appointed by the Director of Education MoES. They shall collaboratively develop the Annual and Quarterly Activity work plans. The Quarterly Activity Work plans shall be used to access funds.

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

- (1) To coordinate the project;
- (2) To prepare and develop Annual and Quarterly work plans;
- (3) To initiate the requisitions for the GoU funds for the implementation of any activities;
- (4) To develop and defend Budget Statement Proposal;
- (5) To support and supervise the National Trainers.

5 - 9 - 3 JICA Technical Advisor

JICA shall dispatch a long-term technical advisor. Short-term technical advisors may be dispatched if the necessity arises. The long-term advisor (JICA Technical Advisor) will have the following roles and responsibilities:

- (1) To advice to the Project Director, National Coordinators, and National Trainers on the implementation and management of the project;
- (2) To assist the National Coordinators in developing Annual and Quarterly work plans;
- (3) To advice the Ugandan counterpart personnel on technical aspects of monitoring and evaluation.

5 - 9 - 4 National Trainers (NTs)

The MoES shall recruit four full-time National Trainers (one per subject: Mathematics, Physics, Chemistry, and Biology). The roles and responsibilities of the National Trainers shall be:

- (1) To organise and conduct the training sessions in their respective subjects;
- (2) To develop training curriculum, manuals, any related instruction materials;
- (3) To collaboratively develop the Annual and Quarterly work plans;
- (4) To collaboratively monitor and evaluate the project;
- (5) To carry out Needs Assessments and any other relevant research;
- (6) To support and supervise the District Trainers.

5 - 9 - 5 District Trainers (DTs)

District Trainers will be identified from Secondary teachers and institutes as part-time basis. At least two District Trainers per subject will be assigned to a District Centre. The roles and responsibilities of the District Trainers shall be:

- (1) To collaboratively carry out Needs Assessment and any other relevant research;
- (2) To organise and conduct the training sessions in their respective subjects;
- (3) To collaboratively develop the Annual and Quarterly work plans;
- (4) To collaboratively monitor and evaluate the project;
- (5) To support and supervise classroom teachers;
- (6) To make the progress and financial reports to the District Management Committee.

5 - 9 - 6 District Management Committee

The District Management Committee, chaired by District Education Officer, consisted of Chairperson of Head Teacher Association of the district, District Inspector of Schools, Representatives of Head Teachers, Classroom Teachers, and Chairperson of PTA will be in charge of the management of District Training.

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

- (1) To provide overall management and administration of the District Training;
- (2) To report to the National Coordinator the accountabilities for District Training Account based on the financial reports submitted by the District Trainers;
- (3) To evaluate the progress of the District Training.

5 - 9 - 7 National In-service Training Centre/District Training Centres

National In-service Training Centre (NITC) will be established at Kololo Senior Secondary School in Kampala as the venue for National Training for District Trainers, training for selected NTC lecturers and PTC tutors, and other project activities. District Centres, where District Training will be taken place during school holiday are tentatively identified as follows:

Tororo District: Rock High School
NTC Nagongera
Bukedi College Kachonga

Masaka District: Masaka Secondary School
Sseke Secondary School
Bukulula Girl's Secondary School
Kako Secondary School

5 - 1 0 Monitoring and Evaluation

The National Coordinator, JICA Technical Advisor (TA), Education Planning Department (EPD), Secondary Education Department (SED), Teacher Education Department (TED), Education Standard Agency (ESA) shall be involved in the exercise of monitoring and evaluating activities carried out either per quarter or on half yearly basis. Tools and methods to be employed in the exercise shall always be agreed upon between TA, EPD and the interested Departments (SED and TED).

5 - 1 1 Budget

The Government of Uganda (GoU), through the MoES, will make the identified contributions over the period of three years. JICA will supplement the Government inputs in the form of project-type support. The initial year FY2005/06 will attract more funding than the following years. The contributions by the GoU and JICA are

shown below (For the details, refer to Detail Budget Analysis in Appendix 11).

| | Year 1 | Year 2 | Year 3 | Total |
|--------|-----------|-----------|-----------|-------------|
| JICA | \$708,580 | \$398,580 | \$398,580 | \$1,505,740 |
| MoES | \$157,340 | \$157,340 | \$157,340 | \$472,020 |
| Total | \$865,920 | \$555,920 | \$555,920 | \$1,977,760 |
| JICA % | 81.8 | 71.7 | 71.7 | 76.1 |
| GoU % | 18.2 | 28.3 | 28.3 | 23.9 |

(Note: The salary of JICA Technical Advisors is excluded from the figures shown above.)

In addition to the budget, the GoU shall make a provision in her budget to recruit at least one Science Teacher per subject namely; Physics, Chemistry, Biology and Mathematics in all the Government-aided Secondary schools in the two pilot districts.

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 project account in a commercial bank within Uganda. All payments for any activities under this project shall be done by cheques.

5 - 1 2 Accountability

The MoES, MoFPED and JICA Technical Advisor are to share the implementation roles of the project 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 route 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 project. The section will be responsible for keeping all books of the GoU accounts for the project and ensuring that regular financial audits are done in time.

JICA technical advisor is responsible for the accountability of the JICA project account and shall report to JICA Headquarters in accordance with the laws and regulations in force in Japan.

The National Coordinator shall submit monthly and quarterly narrative progress and financial reports to the offices of the Permanent Secretary and the Commissioner of

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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.

Monthly and quarterly progress reports shall be used by Monitoring and Evaluation Working Group of the MoES to prepare and submit bi-annual narrative progress and financial reports to MoFPED and JICA before releases for the next quarter are made.

No separate financial and Project audit shall be done. The audit process shall fit within the existing MoES audit arrangements.

5 - 1 3 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.

6 Feasibility of the Project

6 - 1 Relevance

The background of the project clearly reveals that there is critical need to address teaching and learning of Sciences and Mathematics at Secondary Schools level in order to achieve national goals set by Poverty Eradication Action Plan (PEAP) and Education Sector Strategic Plan (ESSP). In the PEAP, "primary and secondary education with a clear focus on quality" is one of the priority areas. Education Sector Strategic Plan (ESSP) prioritizes the strengthening of teaching force at secondary level through "intensive in-service training." In addition, the project has a consistency with the Government efforts to make all Science subjects compulsory at lower-secondary level from 2006.

The project also reflects serious pleas from Secondary teachers. The findings of the baseline survey conducted in October 2004 and the recommendations made from the First Consultative Workshop on 27th November 2004 show that overwhelming majority of Mathematics and Science teachers at secondary level calls for institutionalized in-service training in order to refresh their knowledge and to upgrade teaching skills and improvisation.



Since poor performances in Mathematics and Sciences are obstacles to quality Secondary education, in-service training aiming at the strengthening of Mathematics and Science teachers will contribute to not only the empowerment of the teaching force in Secondary education but also the achievement of the national development goal.

6 - 2 Effectiveness

The project primarily aims at improving classroom practices of Mathematics and Sciences, which is the most crucial and desired element in education, through in-service training. In addition, the project targets a creation of enabling environment where Mathematics and Science teachers shall easily obtain support from Head teachers, Local administration, and community. Institutionalization of the in-service training, which is one of the outputs of the project, shall provide a continuous system for professional development.

The implementing structure is a two-layer cascade approach in which direct interventions shall be made from time to time without diluting the essentials of the training contents. Furthermore, internal monitoring and evaluations shall be conducted to ensure that all the interventions will be effective.

6 - 3 Efficiency

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

The inputs from the Government of Uganda and JICA are sufficient for the planned activities. The project will utilise existing facilities and local resources in order to increase the efficiency. Some training for the National Trainers will be implemented in Third countries in whose context the participants will be more familiar than the one in Japan. Also, the unit cost of training in Third countries is lower than the one in Japan.

6 - 4 Impact

The project will change the teacher attitudes positively and improve pedagogy and the level of subject knowledge. It will lead to learner's attitudinal change toward Sciences and Mathematics and provide them with better learning environment for higher achievement in these subjects. Gender-sensitive programme to be developed by the project will reduce the gender bias in Uganda community. Also, the project shall act as a springboard for institutionalisation of entire INSET programme for Ugandan teachers.

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6 - 5 Sustainability

The Government of Uganda shall cover the recurrent cost of training such as salaries and allowances for the full-time National Trainers, Accommodation, and Transport Refunds for trainees under Medium Term Budget Framework (MTBF) of the MoES to ensure that the project has financial sustainability.

The Government policies such as the PEAP and ESSP clearly indicate that quality Science and Mathematics education is emphasised for the foundation of sustainable national development. The sustainability is assured at the policy level.

The project will aim at institutionalising the In-service training for teachers, which has longer term impact on the improvement of teaching and learning of Mathematics and Sciences.

6 - 6 Conclusions

The Project is relevant in the Ugandan context and is feasible to attain the Project Goal during the period of the first phase in terms of the five perspectives evaluated above.

7 Appendix

Appendix 1. Project Design Matrix (PDM)

Appendix 2. Plan of Operations

Appendix 3. Tentative Schedule of Implementations

Appendix 4. Organisational Chart

Appendix 5. Training Structure

Appendix 6. TOR of Steering Committee

Appendix 7. TOR of Coordination Unit/National Coordinators

Appendix 8. TOR of National Trainers

Appendix 9. TOR of District Trainers

Appendix 10. TOR of JICA Technical Advisor

Appendix 11. Detail Budget Analysis

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Appendix 1.

| Project Design Matrix (PDM) for Secondary Science and Mathematics Teachers' Project (SSMTP) Version 1.0 | | | |
|--|--|---|---|
| Narrative Summary | Verifiable Indicators | Means of Verification | Important |
| <p>(Overall Goal) To improve secondary student performance in Mathematics and Science subjects (Physics, Chemistry, Biology) in the pilot districts</p> | <p>(1) Student performance on achievement tests set by the project improved in the pilot districts (2) The UCE performance in Mathematics and Sciences improved in the pilot districts</p> | <p>(1) The Taskforce for Student Achievement Tests (2) Uganda National Examinations Board</p> | |
| <p>(Project Goal) To improve teaching ability of Mathematics and Science teachers at Secondary level in the pilot districts</p> | <p>By the end of the project phase 1, (a) The Lesson Observation Index obtained more than X on the 0-4 scale (b) The Student Participation Index obtained more than Y on the 0-4 scale (c) The Content/Pedagogy Index obtained more than Z on the 0-4 scale The target values "X", "Y", and "Z" are to be determined after baseline survey.</p> | <p>The Project Monitoring and Evaluation Reports</p> | <p>From Project Goal to Overall Goal The socio-economic situation of the districts does not rapidly decline.</p> |
| <p>(Outputs) (1) A number of teachers trained through the INSET (2) School and parental support for teaching and learning Mathematics and Sciences enhanced (3) INSET system institutionalised</p> | <p>(1) By the end of the project phase 1, (a) All the National Trainers completed training course in Japan or third countries (b) All the District Trainers (over 50) completed national training course developed by the project (c) All the Secondary Mathematics and Science Teachers (over 600) in the pilot districts completed the training course (d) 20 Mathematics and Science lecturers at selected NTCs completed the training course (e) 20 Mathematics and Science tutors at selected PTCs including one private PTC completed the training course (f) The INSET Evaluation Index (to measure attitudinal change) obtained more than "N" (on the 0-4 scale) (2) By the end of the Project phase 1, (a) All the Head Teachers, chairpersons of BoG and PTA in the pilot districts completed school management training (b) All chairpersons of local councils (LC5 and LC3) in the pilot districts undergone sensitisation workshops (3) By the end of the Project phase 1, (a) National Centre and District Centres established in the districts (b) All district centres passed Maintenance Inspection by the National Coordinator (c) The INSET course credited to Teacher Promotion Requirement set by the ESC The target figure "N" is to be determined after baseline survey.</p> | <p>The Project Monitoring and Evaluation Reports</p> | <p>From Outputs to Project Goal Most of the trained teachers remain in the district.</p> |

| | | |
|---|--|--|
| <p>(Activities)</p> <p>(1-1) To recruit National Trainers (NTs)</p> <p>(1-2) To conduct training for NTs in Japan or third countries</p> <p>(1-3) To conduct baseline survey on secondary Mathematics and Science education and teacher education</p> <p>(1-4) To develop training curriculum, materials, monitoring and evaluation tools</p> <p>(1-5) To identify District Trainers (DTs) from the Secondary schools in the pilot districts</p> <p>(1-6) To conduct national training for District Trainers (DTs)</p> <p>(1-7) To conduct district training</p> <p>(1-8) To conduct monitoring and evaluation</p> <p>(2) To provide Head teachers, chairpersons of BoG and PTAs with school management training</p> <p>(2-2) To organise sensitisation workshops for chairpersons of Local government (chairpersons of LC5 and LC3)</p> <p>(2-3) To publish newsletters on activities of the project</p> <p>(3-1) To establish National INSET Centre in Kampala and District Training Centres in the pilot districts</p> <p>(3-2) To provide the centres with basic equipment, machinery, educational materials necessary for the training</p> <p>(3-3) To institutionalise the training in conjunction with the ESC</p> | <p>(Inputs)</p> <p>Ugandan side:</p> <ol style="list-style-type: none"> 1. Salary and Allowances of NTs 2. Accommodation and Transport Refunds for DTs and trainees 3. Allowance for DTs implementing district training 4. Office space and facilities necessary for the project 5. Utility (Electricity, Water, Gas) <p>Japanese side:</p> <ol style="list-style-type: none"> 1. Dispatch of a long-term expert 2. Dispatch of short-term experts if necessary 3. Training of Ugandan counterpart personnel in Japan and/or a third country 4. Provision of equipment and machinery necessary for the project 5. Expenses necessary for the implementation of the project | <p>From Activities to Outputs</p> <p>All positions of National Trainers are filled.</p> <p>(Pre-conditions) GoU maintains the policy to promote Mathematics and Science Education.</p> |
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Appendix 2.
Plan of Operation

Name: Secondary Science and Mathematics Teacher Project (SSMTP), Phase I

Project Purpose: To improve teaching ability of Mathematics and Science teachers at Secondary level in the pilot district

| Output | Activities | Target | 2005 | | | | 2006 | | | | 2007 | | | | 2008 | | | | Responsible Person in the Project Team | Actual input |
|--|---|--|------|----|-----|----|------|----|-----|----|------|----|-----|----|------|----|-----|----------------------|--|--------------|
| | | | I | II | III | IV | I | II | III | IV | I | II | III | IV | I | II | III | IV | | |
| 1. A number of teachers trained through the INSET | 1) To recruit National Trainers (NTs) | Four NTs (one per subject, Mathematics, Physics, Chemistry, and Biology) are recruited. | = | | | | | | | | | | | | | | | National Coordinator | | |
| | 2) To conduct training for NTs in Japan or third countries | The four NTs are trained in the area of contents, pedagogy, and monitoring and evaluation methods. | | | | | | | | | | | | | | | | | National Coordinator and TA | |
| | 3) To conduct baseline survey on secondary Mathematics and Science education and teacher education | A baseline survey is done in the pilot districts and other two districts. | | | | | | | | | | | | | | | | | Head of NTs | |
| | 4) To develop training curriculum, materials, monitoring and evaluation tools | Each academic department produces syllabi, curricula, monitoring and evaluation tools for the training. | | | | | | | | | | | | | | | | | Head of NTs | |
| | 5) To identify District Trainers (DTs) from the Secondary schools in the pilot districts | Two trainers per subject and centre are identified. | | | | | | | | | | | | | | | | | Head of NTs | |
| | 6) To conduct national training for District Trainers (DTs) | National training for DTs is conducted twice a year during school holiday. | | | | | | | | | | | | | | | | | Head of NTs | |
| | 7) To conduct district training | District training is conducted twice a year during school holiday. | | | | | | | | | | | | | | | | | Head of NTs | |
| | 8) To conduct monitoring and evaluation | Comprehensive INSET monitoring and evaluation report is published once a year. | | | | | | | | | | | | | | | | | Head of NTs | |
| 2. School and parental support for teaching and learning Mathematics and Sciences enhanced | 1) To provide Head teachers, chairpersons of BoG and PTAs with school management training | School management training is conducted twice a year. | | | | | | | | | | | | | | | | | National Coordinator Head of NTs | |
| | 2) To organise sensitisation workshops for chairpersons of Local government (chairpersons of LC5 and LC3) | Sensitisation workshop is organised once a year. | | | | | | | | | | | | | | | | | National Coordinator Head of NTs | |
| | 3) To publish newsletters on activities of the project | More than four newsletters are published a year. | | | | | | | | | | | | | | | | | Head of NTs | |
| 3. INSET system institutionalised | 1) To establish National INSET Centre in Kampala and District Training Centres in the pilot districts | One National Centre in Kampala and 7 centres in the districts are established. | | | | | | | | | | | | | | | | | National Coordinator Head of NTs | |
| | 2) To provide the centres with basic equipment, machinery, educational materials necessary for the training | Each centre is equipped with materials necessary for the training and passes maintenance inspection once a year. | | | | | | | | | | | | | | | | | National Coordinator Head of NTs | |
| | 3) To institutionalise the training in conjunction with the ESC | The training is credited as a part of promotion requirements. | | | | | | | | | | | | | | | | | National Coordinator | |

Appendix 3.

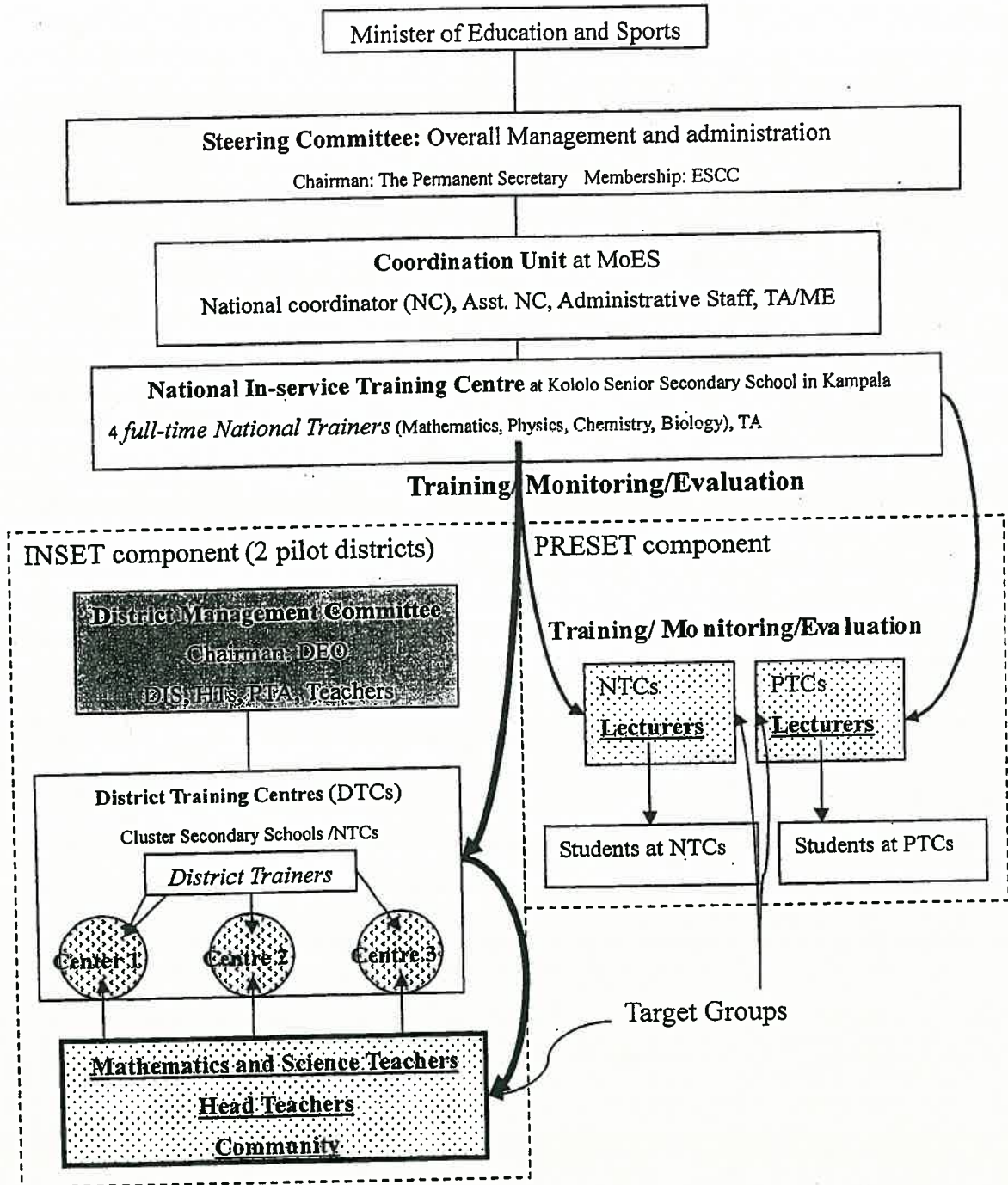
TENTATIVE SCHEDULE OF IMPLEMENTATION

PROJECT TITLE : Secondary Science and Mathematics Teacher Project (SSMTP), Phase I

| YEAR | IMPLEMENTATION | | | | | | | | | | | | | | | |
|--|----------------|----|-----|----|------|----|-----|----|------|----|-----|----|------|----|-----|----|
| | 2005 | | | | 2006 | | | | 2007 | | | | 2008 | | | |
| | I | II | III | IV | I | II | III | IV | I | II | III | IV | I | II | III | IV |
| I. PROJECT DURATION | | | | | | | | | | | | | | | | |
| II. INPUTS BY THE UGANDAN SIDE | | | | | | | | | | | | | | | | |
| 1. Building, offices, and other facilities | | | | | | | | | | | | | | | | |
| 2. Assignment of full-time National Trainers | | | | | | | | | | | | | | | | |
| 3. Salary of NTs | | | | | | | | | | | | | | | | |
| 4. PerDiem for NTs and staff | | | | | | | | | | | | | | | | |
| 5. Accommodation and Transport Refunds for DTs and Trainees | | | | | | | | | | | | | | | | |
| 6. Allowance for DTs implementing district training | | | | | | | | | | | | | | | | |
| 7. Utilities (Electricity and Water) | | | | | | | | | | | | | | | | |
| III. INPUTS BY THE JAPANESE SIDE | | | | | | | | | | | | | | | | |
| 1. Technical Advisor | | | | | | | | | | | | | | | | |
| 2. Provision of equipment and machinery necessary for training | | | | | | | | | | | | | | | | |
| 3. Training for National Trainers in Japan or third countries | | | | | | | | | | | | | | | | |
| 4. Expenses necessary for the implementation of the project | | | | | | | | | | | | | | | | |
| IV. TRAINING | | | | | | | | | | | | | | | | |
| 1. National Training | | | | | | | | | | | | | | | | |
| 2. District Training | | | | | | | | | | | | | | | | |
| 3. Monitoring and Evaluation | | | | | | | | | | | | | | | | |
| IV. STEERING COMMITTEE | | | | | | | | | | | | | | | | |



THE STRUCTURE OF SSMTF

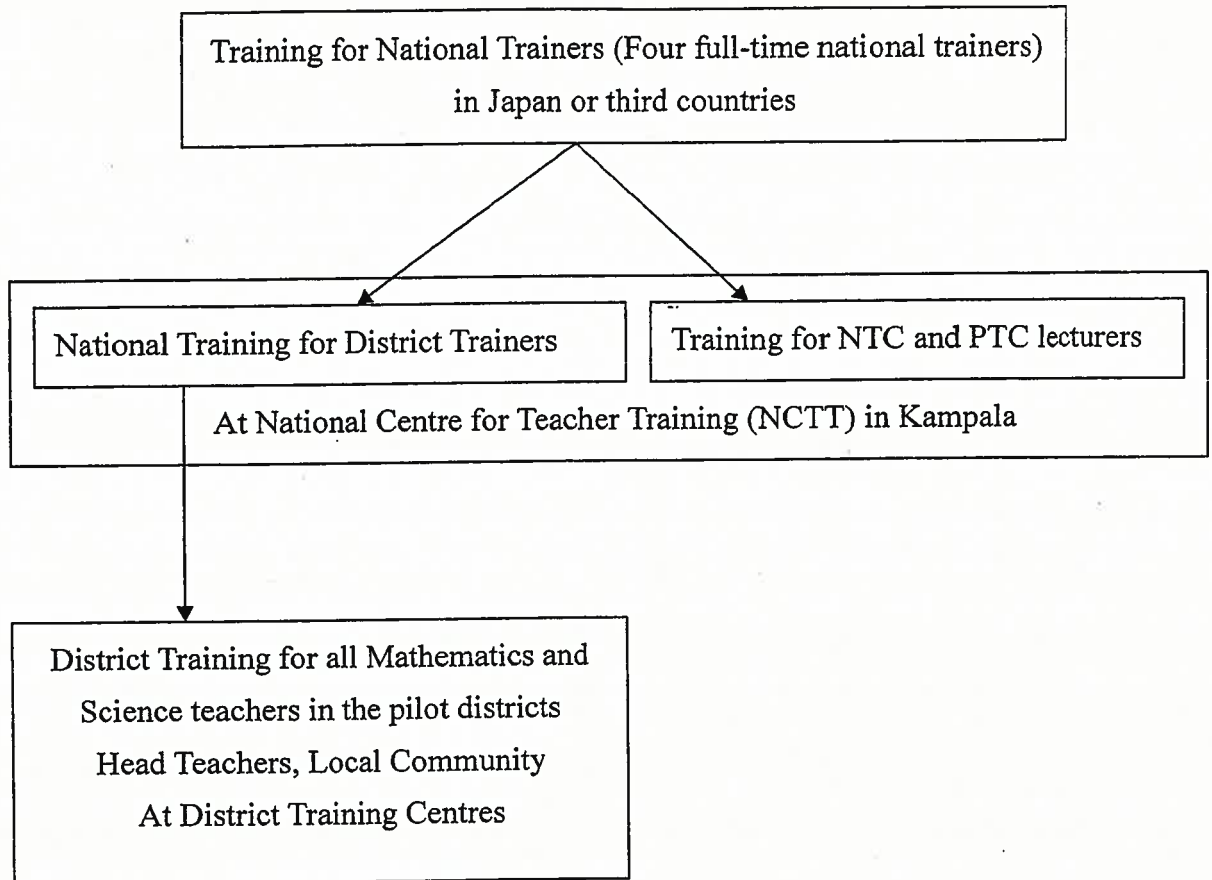


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Appendix 5.

The Training Structure of SSMTP



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Appendix 6.

Terms of Reference for Steering Committee

The Steering Committee chaired by the Permanent Secretary of the MoES shall take the highest authorities and responsibility for the Project implementation.

The roles and functions of Steering Committee shall be:

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

The committee consists of:

- The Permanent Secretary of MoES
- Director of Education;
- Heads of departments of MoES;
 - Commissioner Teacher Education
 - Commissioner Secondary Education
 - Commissioner Education Planning
 - Commissioner Career guidance and counselling
- Kyambogo University (In-service training);
- School of Education, Makerere University;
- Heads of the Uganda National Examinations Board, National Curriculum Development Centre, Education Standard Agency, Education Service Commission;
- Chairperson of Secondary Head Teachers Association;
- Representatives of JICA office;
- JICA Technical Advisor;
- A representative of Donor community.

Appendix 7.

Terms of Reference for Coordination Unit/National Coordinators (NCs)

National Coordinator, assisted by Assistant National Coordinator, appointed from the Secondary Education and Teacher Education Departments, shall have the following roles and responsibilities:

- (1) To coordinate the project;
- (1) To prepare and develop Annual and Quarterly work plans;
- (2) To initiate the requisitions for the GoU funds for the implementation of any activities;
- (3) To develop and defend Budget Statement Proposal;
- (4) To support and supervise the National Trainers.

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Appendix 8.

Terms of Reference for National Trainers (NTs)

The MoES shall recruit four full-time National Trainers (one per the subjects of Mathematics, Physics, Chemistry, and Biology). The roles and responsibilities of the National Trainers shall be:

- (1) To organise and conduct the training sessions in their respective subjects;
- (2) To develop training curriculum, manuals, any related instruction materials;
- (3) To collaboratively develop the Annual and Quarterly work plans;
- (4) To collaboratively monitor and evaluate the project;
- (5) To carry out Needs Assessments and any other relevant research;
- (6) To support and supervise the District Trainers.

Appendix 9.

Terms of Reference for District Trainers (DTs)

District Trainers will be identified from Secondary teachers and institutes as part-time basis. At least two District Trainers per subject will be assigned to a District Centre. The roles and responsibilities of the District Trainers shall be:

- (1) To collaboratively carry out Needs Assessment and any other relevant research;
- (2) To organise and conduct the training sessions in their respective subjects;
- (3) To collaboratively develop the Annual and Quarterly work plans;
- (4) To collaboratively monitor and evaluate the project;
- (5) To support and supervise classroom teachers;
- (6) To make the progress and financial reports to the District Management Committee.

Appendix 10.

Terms of Reference for JICA Technical Advisors (TAs)

JICA shall dispatch a long-term technical advisor. Short-term technical advisors may be dispatched if the necessity arises. The long-term advisor (JICA Technical Advisor) will have the following roles and responsibilities:

- (1) To advice to the Project Director, National Coordinators, and National Trainers on the implementation and management of the project;
- (2) To assist the National Coordinators in developing Annual and Quarterly work plans;
- (3) To advice the Ugandan counterpart personnel on technical aspects of monitoring and evaluation.

