



**National Program for
Strengthening Mathematics and
Science Education in Ethiopia
(SMASEE)**

***SMASEE Teacher In-Service
Education and Training (INSET)
Guidelines***

**National Mathematics and
Science Improvement Center,
Federal Ministry of Education
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ACRONYM

ASPI	<u>A</u> ctivity-based, <u>S</u> tudent-centered, <u>P</u> ractical work, <u>I</u> mprovisation and use of teaching and learning materials
CPD	Continuous Professional Development
CRC	Cluster Resource Center
CTE	College of Teacher Education
F/U	Follow-Up
GEQIP	General Education Quality Improvement Program
INSET	In-Service Education and Training
JICA	Japan International Cooperation Agency
LTs	Laboratory Technicians
M&E	Monitoring and Evaluation
M&S	Mathematics and Science
MOE	Ministry of Education
KTs	Key Teachers
NTs	National Trainers
PIEI	Plan-Implement-Evaluation-Improve
REB	Regional Education Bureau
RTs	Regional Trainers
SMASE	Strengthening Mathematics and Science Education Project
SMASEE	National Pilot Project for Strengthening Mathematics and Science Education in Ethiopia
T&L	Teaching and Learning
TDP	Teacher Development Program
WEO	Woreda Education Office
ZEO	Zonal Education Office

1. BACKGROUND AND RATIONALE

The *National Program for Strengthening Mathematics And Science Education in Ethiopia* (SMASEE) is an Ethiopian government education program. It originated in the *National Pilot Project for Strengthening Mathematics And Science Education in Ethiopia* hereinafter called “the Pilot Project”, which was a joint Project of the governments of Ethiopia and Japan, and was implemented from March 2011 to June 2014.

Before the Pilot Project began, the government of Ethiopia recognized the importance of laying down a firm scientific and technological foundation for socio economic development in Ethiopia. In this regard, the improvement of Mathematics and Science education was considered to be an urgent need. The government formulated new policies and strategies for strengthening Mathematics and Science education, such as the “Concept paper for Improving the Teaching and Learning of Science and Mathematics in Ethiopian Schools” (2010), “Strategies for Improving the Teaching and Learning of Science and Mathematics in Ethiopia” (2010) and “Action Plan for Improving the Teaching and Learning of Science and Mathematics in Ethiopia” (2010). However, student performance in Mathematics and Science subjects did not show the expected results.

Since the late 1990’s, the Japan International Cooperation Agency (JICA) has been supporting the establishment of sustainable In-Service Education and Training (INSET) programs in African nations. To date, the Strengthening Mathematics and Science Education (SMASE) model has been expanded to 14 African countries. The successful collaboration between African countries and JICA for educational development in the field of Mathematics and Science began in Kenya in 1998, with the SMASEE Kenya Project. In order to improve Mathematics and Science education in Kenya, the Project focused on teachers and their lessons in the classroom. The Project has established a sustainable INSET system, and has implemented training programs for all secondary Mathematics and Science Teachers in Kenya.

Encouraged by the success of SMASE Kenya, many African countries showed an interest in the improvement of basic education through INSET. In order to enable African countries to exchange skills, experience and issues in teacher education in Mathematics and Science, a Regional association, “SMASE-Africa” was established. The Ministry of Education of Ethiopia (MOE) became an official member of this association in 2007.

Through the MOE’s participation in the SMASEE Africa network, MOE officials became aware of the successful experiences of other African countries. As a result of this participation, and in order to fill the gap between MOE policy for Mathematics and Science education and implementation/results, the MOE submitted a proposal for technical cooperation with SMASEE to the government of Japan. Due to the efforts of both governments, a Pilot Project was implemented from March 2011 to June 2014, in selected Pilot Zones of the three target Regions (Table 1).

Table 1: Target Regions and Pilot Zones of the Pilot Project

Name of target Regions	Amhara	Oromia	Addis Ababa
Pilot Zone	North Showa	Arsi	Addis Ababa

The Pilot Project aimed to improve Mathematics and Science education in Ethiopia through the INSET teacher training system. During the three years of the Project period, the Project has established a model of the SMASEE INSET system for Grade 7 and 8 Mathematics and Science Teachers in the target Regions.

After three years of the Pilot Project's SMASEE INSET activities at the National, Regional and Local levels in the Pilot Zones, the government of Ethiopia decided to scale up the Project to the whole country, as a National INSET program. Thus, after the termination of the Pilot Project in June 2014, SMASEE INSET activities have been taken over by the MOE's National education program.

In order for the effective and efficient scaling up of SMASEE INSET activities, SMASEE guidelines were developed. The guidelines were based on the three years' experience of the Pilot Project, and were produced as final deliverables of the project. The guidelines are expected to be used by all regions in Ethiopia.

Photo 1: Physics Lesson



2. OBJECTIVES OF THE GUIDELINES

The guidelines are for all stakeholders involved in the planning and implementation of the National SMASEE program. The guidelines have the following two objectives.

- To describe a model of the SMASEE INSET system for grades 7 and 8 primary school Mathematics and Science Teachers
- To provide a guide for stakeholders on how to prepare and implement SMASEE INSET

In Section 3 of the guidelines, the experience of the Pilot Project is shared. In Section 4, the SMASEE INSET model is described. Lastly, in Section 5, the steps for preparing and implementing INSET are outlined.

Photo 2: 3rd year SMASEE National INSET



3. OUTLINE AND ACHIEVEMENTS OF THE PILOT PROJECT

The model of the SMASEE INSET system was established using the three years' experience of the Pilot Project.

3-1. OUTLINE OF THE PILOT PROJECT

The Pilot Project was an initiative of the Government of Ethiopia in collaboration with JICA. The three-year Pilot Project began in March 2011 and ended in June 2014. The target regions were Amhara, Oromia and Addis Ababa. Following the Project's master plan, a total of 272 Regional Trainers (RTs) and 1,936 Key Teachers (KTs; teachers chosen as representatives from school Clusters) were trained at the National and Regional level in the Pilot Zones mentioned in Table 1. The Project also assessed the KT's dissemination of the training contents to other primary Mathematics and Science Teachers at the Local level (Cluster and school).

The SMASEE INSET was conducted in three cycles. It aimed to develop the capacity of the teachers by shifting the teaching paradigm from a teacher-centered method to an activity-based/learner-centered approach. This approach is known as **ASPI-PIEI** (**A**ctivity-based, **S**tudent-centered, **P**ractical work, **I**mprovisation-**P**lan, **I**mplement, **E**valuate, **I**mprove). An **ASPI** lesson is realized through the **PIEI** process. It is an approach for the cultivation of students' cognitive skills and scientific thinking ability, and aims at building a strong base for Ethiopia's socio-economic development. The Project's goals and purposes are as follows.

Table 2: Project Goals, Purposes and Expected Outputs

Super Goal	The ability of Grade 7 and 8 Primary School Students in Mathematics and Science is improved.
Overall Goal	The ability of Grade 7 and 8 Primary School Mathematics and Science Teachers to conduct student-centered lessons is improved in target Regions.
Project Purpose	A model of the SMASEE INSET system for Grade 7 and 8 Primary School Mathematics and Science Teachers is established in target Regions.
Output 1	The bodies/units for implementing SMASEE at the National (Federal) and Regional levels are established and become functional.
Output 2	The ability of RTs and KT's to provide INSET is enhanced in Pilot Zones of targeted regions.
Output 3	A SMASEE INSET monitoring and evaluation (M&E) system is developed and is functioning.
Output 4	The basic foundation for the scale-up of SMASEE INSET is built.

3-2. ACHIEVEMENTS OF THE PILOT PROJECT

Many things were achieved during the three years of the Pilot Project. The following are the major achievements.

Achievement 1: A SMASEE implementation body, at National (Federal) and Regional levels (in target regions), was established and became functional.

The establishment of implementation bodies at Federal and Regional levels enabled the effective and efficient implementation of the Pilot SMASEE activities. The Federal implementation body, namely, the National Mathematics and Science Improvement Center, was established in August 2013.

At the Regional level, a SMASEE Case Team was established at the Oromia and Addis Ababa Education Bureaus. At the Amhara Education Bureau, Focal Persons were assigned.

As venues of SMASEE INSET, the MOE and the Regional Education Bureaus (REBs) of the target Regions established and equipped the National and Regional INSET Centers (Table 3) using existing facilities.

Table 3: List of SMASEE INSET Centers

No.	Name	Venue
1	SMASEE National INSET Center	National Mathematics and Science Improvement Center
2	Addis Ababa Regional INSET Center 1	Menilik Preparatory School
3	Addis Ababa Regional INSET Center 2	Addis Ketama Preparatory School
4	Amhara Regional INSET Center 1	Debre Birhan CTE
5	Amhara Regional INSET Center 2	Mehal Meda Secondary School
6	Amhara Regional INSET Center 3	Showa Robit Secondary School
7	Oromia Regional INSET Center 1	Asella CTE
8	Oromia Regional INSET Center 2	Bekoji Secondary School
9	Oromia Regional INSET Center 3	Abomsa Secondary School

To strengthen the management ability of each implementation body, the Pilot Project implemented INSET management workshops and trainings for education administrators. At the Federal level, three National INSET management workshops for Regional Education Administrators were conducted in March 2011, March 2012 and December 2013. At the Regional level (in target Regions), INSET management workshops for education administrators were held for the Zonal, Woreda and school levels in March and December 2013. The workshops were held 3 times in Amhara, 5 times in Oromia and 7 times in Addis

Ababa. These workshops enabled each Region to plan and implement a quality SMASEE INSET program at the Regional and Local levels.

It is also worth noting that each Region assigned a Focal Person at the Zonal and Woreda levels. For instance, Oromia Education Bureau assigned 350 SMASEE Focal Persons (for 30 Zones and about 320 Woredas) and Addis Ababa Education Bureau hired 90 Focal Persons (for 9 sub-cities and 81 Woredas), with more to be recruited. Oromia Education Bureau received the SMASEE quarterly reports from Zonal and Woreda SMASEE Focal Persons.

Achievement 2: Quality training contents and training modules were developed by Ethiopian human resources.

In May and June 2011, at the beginning of the Project, a baseline survey was conducted in order to: 1) assess the current situation of teaching and learning in Mathematics and Science education in primary grades 7 and 8; and 2) identify teachers' training needs.

Using the baseline survey results, in July 2011 the SMASEE National team of the MOE developed a three-cycle continuous training¹ curriculum (Table 4). The Project also developed a first-cycle training program, along with hand-outs, in September 2011, second-cycle program and hand-outs in August 2012, and third-cycle program and hand-outs in September 2013. In addition, SMASEE Monitoring and Evaluation (M&E) instruments were also developed to assess the quality of the training.

Table 4: SMASEE INSET Curriculum

	Cycle 1	Cycle 2	Cycle 3
Overall objective	To enable RTs to provide training and KT to actualize “active learning lessons” in Gr. 7 & 8 Mathematics and Science (M&S) lessons through effective lesson planning, use of appropriate teaching methods, facilitation and assessment skills, and effective use of teaching and learning (T&L) materials.		
Theme	Lesson planning and teaching methodology for “active learning” in M&S lessons.	Effective use of T&L Modules, facilitation and communication skills for active learning.	Maximize each student’s participation in M&S subjects.
Focus / emphasis	- Lesson planning - Teaching methods	- Use of T&L materials - Facilitation skills - Communication skills	- Active learning methods - Assessment skills for student learning - Improvisation and use of T&L materials

¹ In the Pilot Project, 3 cycles of the National and the Regional INSETs were implemented over 3 years (1 cycle per year). However, the frequency of the center based INSET will be decided depending on organizers.

Achievement 3: SMASEE INSET was implemented and human resources were developed.

By using the SMASEE INSET curriculum, program and hand-outs, the Pilot Project conducted the 1st cycle of National INSET; National Trainers (NTs) trained RTs in October 2011. Then RTs trained KTs at the Regional Training in November and December 2011. Following the above training method, the 2nd cycle of National INSET was held in October 2012, and the Regional INSETs were held in November and December 2013. The 3rd cycle of National INSET was done in October 2013 and the Regional INSETs were implemented from November 2013 to April 2014.

Table 5: Participants in SMASEE INSET from 2011 to 2013

National INSET	• 1st cycle N-INSET: 224 RTs (82 % of target) were trained. • 2nd cycle N-INSET: 270 RTs (99 % of target) were trained. • 3rd cycle N-INSET: 249 RTs (92 % of target) were trained.
Regional INSETs	• 1st cycle R-INSET: 1,937 KTs (100 % of target) were trained. • 2nd cycle R-INSET: 1,847 KTs (95 % of target) were trained. • 3rd cycle R-INSET: 1,040 KTs (54 % of target) were trained.

Achievement 4: The quality of SMASEE INSETs was assured using M&E instruments developed by the Project.

In order to assess quality of SMASEE INSETs, the Project developed nine M&E tools, which were used for the National and Regional INSETs. The tools consisted of two types which are a questionnaire type for trainees' self-evaluation and a checklist type for external evaluators.

Moreover, to assess the impact of the INSET in the classroom (after the INSET has taken place), the Project developed a lesson observation checklist and a standard matrix for lesson observation (rubrics), both of which can help stakeholders to conduct lesson observation more objectively. By using the above tools, the Project produced National and Regional INSET reports annually.

The logical framework of the Pilot Project, known as the Project Design Matrix, set objectively verifiable indicators to evaluate if the planned expected outputs were achieved or not. Table 6 shows one of the evaluation results – the level of the trainees' capacity development through National and Regional INSETs – obtained using the above-mentioned SMASEE M&E tools. Further detailed information is written in SMASEE INSET reports. Please refer to the National Mathematics and Science Improvement Center.

Photo 3: Questionnaires for Students



Photo 4: Lesson Observation



Table 6: M&E Results for the Level of Trainees' Capacity Development

Objectively Verifiable Indicators to assess level of trainees' capacity development	Achievement							
The ability of RTs and KT's to provide INSET are enhanced in: • <i>Trainees' Capacity Index</i> , obtained on a scale of $1 < x < 5$ with $x \geq 3.5$ as an acceptable mean, and • <i>Attitude Toward Mathematics and Science Index</i> , obtained on a scale of $1 < x < 5$ with $x \geq 3.5$ as an acceptable mean.			1 st year		2 nd year		3 rd year	
	Trainers (RTs)' Capacity Index		3.2		3.7		4.3	
	Trainees (KTs)' Capacity Index		3.5		3.6		4.4	
	RTs' Attitude Toward Mathematics & Science Index		Pre	Post	Pre	Post	Pre	Post
			2.9	3.4	3.1	3.7	3.8	4.2
	KTs' Attitude Toward Mathematics & Science Index		Pre	Post	Pre	Post	Pre	Post
3.0			3.4	3.1	3.8	4.0	4.3	
The ability of KT's in three target Regions will improve in: • Lesson Observation Index, obtained on a scale of $1 < x < 5$ with $x \geq 3.4$ as acceptable mean, and • Pupil Participation Index, obtained on a scale of $1 < x < 5$ with $x \geq 3.4$ as acceptable.			1 st year		2 nd year		3 rd year	
	Lesson Observation Index		2.7		3.0		3.5	
	Pupil Participation Index		3.5		3.6		3.6	

Photo 5: 2nd Year National INSET



4. THE SMASEE INSET MODEL

In this section, the SMASEE INSET model is introduced for all stakeholders involved in SMASEE INSET activities. INSET stakeholders such as the MOE, REB, Zonal Education Office (ZEO), Woreda Education Office (WEO), Cluster Resource Center (CRC) Supervisors and school administrators, who plan to implement SMASEE INSET, are expected to follow this training model.

4-1. TRAINING MODALITY AND STRUCTURE

The SMASEE INSET system is organized on a three-tier (National, Regional and Local) cascading system, wherein those first trained are required to train others. At the National level, NTs train RTs. At the Regional level, RTs train KT from all Clusters in the Region. Then at the Local level, KTs train and/or share training contents with other teachers. The training system and types are shown in Figure 1 and Table 7.

Figure 1: SMASEE INSET Cascading System

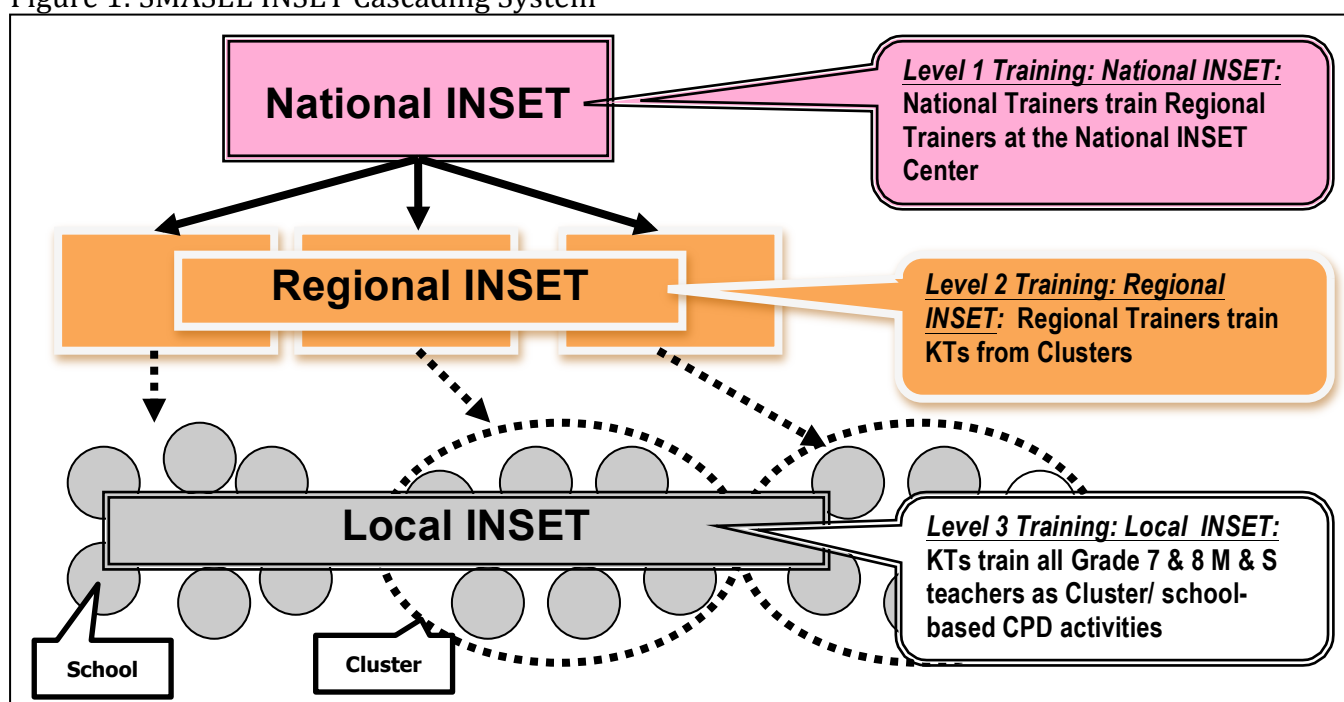


Table 7: Training Types

Level	Name of Training	Training Type
1	National INSET (NTs train RTs)	Center-based ready-made training at National INSET Center (5 days training contents x 3 cycles)
2	Regional INSET (RTs train KTs)	Center-based ready-made training at Regional INSET Centers (5 days training contents x 3 cycles)
3	Local INSET (KTs train other teachers/share training contents with other teachers)	Needs-based tailor-made training by prioritizing topics at Cluster and/or primary school (Local-level stakeholders need to plan training programs using attached SMASEE modules according to the needs of teachers.)

National and Regional INSET (Center-based INSET)

At the National and Regional level trainings, each trainee attends a five-day training session per cycle, for a total of three training cycles (5 days sessions x 3 cycles).

The National-level INSET is conducted by NTs for RTs. The Regional INSET is implemented by the RTs to KT, who are selected from schools in a Cluster.

Through the implementation of the Pilot Project, the following minimum requirements were set for the implementation of Center-based training.

Table 8: Minimum Requirements for the Center-based INSET

- To deliver the content of SMASEE INSET developed by the Pilot Project
- To ensure that INSET is a continuous program of 3 cycles
- To provide a trainer to trainee ratio of 1:25
- To set the maximum number of trainees at the National and the Regional INSET per cohort at 200 (50 per subject)
- To set the minimum number of trainers at the National and the Regional INSET per cohort at 8
- To establish Regional INSET Centers using existing facilities such as CTEs, preparatory schools and so forth

To establish the SMASEE structure, the following procedures should be followed (procedures can be modified according to the situation of the regions).

1. Each Region establishes at least SMASEE Coordinating Unit Under Deputy Bureau Head in the REB as an implementation body which is described in section 4-3.
2. The REB Coordinating Unit facilitates assignment of SMASEE Zonal and Woreda Performers in each Zone and Woreda.
3. For the National INSET, Regions need to select and send RTs from each Zone. The RTs will be expected to train KTs in their own Zones after the National INSET.
4. For the Regional INSET, the REB SMASEE Coordinating Unit needs to calculate the number of KTs based on the number of Clusters in each Zone; 4 KTs should be selected from each Cluster in each Zone. Therefore, the number of KTs is calculated at four times the number of Clusters.
5. The REB also needs to calculate the number of training cohorts based on the number of KTs in the SMASEE Zones. For instance, there are 760 KTs in the North Showa SMASEE Pilot Zone in Amhara; 760 divided by 200 (the maximum number of trainees per cohort at Regional INSET) equals approximately four. Therefore, four cohorts of training are needed in the North Shewa Zone in Amhara.
6. The REB SMASEE Coordinating Unit needs to decide the number of INSET Centers in the Zone. For example, during the Pilot Project, in the case of North Showa (Pilot Project in Amhara Region), in order to operate four cohorts of training, the Amhara Education Bureau SMASEE team decided to set up three INSET Centers using existing facilities; one of the three Centers organized INSET twice a year while the other two

Centers organized INSET once a year. In addition, it is recommended that each region establishes one permanent INSET Center for SMASEE INSET program. Table 9 shows the experience of the Pilot Project.

Table 9: Details of Training Structures in Target Regions

	Amhara	Oromia	Addis Ababa
SMASEE Zone	10	18	1
SMASEE Pilot Zone	1 (North Shewa)	1 (Arsi)	1 (Addis Ababa)
Number of CRCs and (Woredas) in Pilot Zone	190 (24)	192 (25)	102 (116)
Number of KT's in SMASEE Pilot Zone	760	768	408
Cohorts of Regional Trainings in Pilot Zone	4	4	2
Number of RTs in Pilot Zone	24	24	16
Number of RTs in SMASEE Target Regions	96 (8 RTs X 9 Zone + 24 RTs X 1 Pilot Zone)	160 (8 RTs X 17 Zones + 24 RTs X 1 Pilot Zone)	16 (16 X 1 Pilot Zone)
Number of Regional INSET Centers in Pilot Zone	3	3	2
Name of Regional INSET Centers in Pilot Zone	• Debre-Birhan CTE • Mehal Meda Sec. Sch. • Shewa Robit Sec. Sch.	• Asela CTE • Bekoji Sec. Sch. • Abomsa Sec. Sch.	• Minilik Prep. Sch. • Addis Ketema Prep. Sch.

Local INSET (Needs-based INSET)

At the Local level of training, KT's are expected to train other Grade 7 and 8 Mathematics and Science Teachers in their Cluster and/or at their own school, according to the needs of teachers, schools and Cluster. Thus, in the 3rd cascading level, training is categorized as "needs-based training"; Local-level stakeholders, such as WEO Focal Persons, CRC Supervisors, School Directors, KT's and so forth are expected to plan their own INSET program chosen from the contents of the SMASEE INSET modules (see Attachments 1 to 5). SMASEE Local-level training is expected to be implemented as a Continuous Professional Development (CPD) activity.

Table 10 shows the minimum requirements and suggested arrangements for Local INSET. These were established during the Pilot Project phase, after an assessment of the linkage between SMASEE KT's and other teachers at the Local level.

Table 10: Minimum Requirements and Suggested Arrangements for Local INSET

Minimum Requirements

- Trainers for Local INSET: KT's who are expected to have completed the SMASEE Regional INSET Cycles 1 to 3.
- The training must be based on local needs: KT's have to train and share SMASEE INSET training contents based on the needs of the Woreda, Cluster, school and teachers. More concretely, Local INSET stakeholders such as WEO, CRC Supervisors, School Directors, KT's and Teachers must choose the training contents and make their own training program from the attached SMASEE INSET modules, according to their needs.

Suggested arrangements for SMASEE Cluster INSET and SMASEE School INSET

- Training content: The content of the Local INSET should be selected from the attached INSET modules by stakeholders of Clusters and schools, according to their needs.
- Budget: The budget for training hand-outs and other implementation cost should be arranged by schools in the Cluster for SMASEE Cluster INSET and by each individual school for SMASEE School INSET. The WEO training budget can be used to purchase training materials. In addition, GEQIP school grant might be alternative budget sources for Cluster and School INSET.
- Duration: To implement SMASEE Cluster INSET, at least 4 days per year (6 hours x 4 days = 24 hours per year) are suggested for Local INSETs.
- Training materials: For both types of Local INSET, materials for general and practical activities need to be prepared, based on the selected session(s) from the attached SMASEE INSET modules.
- Training venue: For both Cluster and school INSET, school halls and classrooms need to be arranged for the general session. For practical activities, each subject needs to have rooms which enable trainers to conduct experiments.

4-2. TRAINING CONTENT

One of the comparative advantages of the SMASEE INSET is the high quality of the training content, which was developed during the Pilot Project by SMASEE NTs and Laboratory Technicians (LTs) with the technical support of Japanese experts.

The SMASEE INSET modules are composed of a set of five Modules (Attachments 1 to 5). The five Modules were prepared from the three-cycle SMASEE INSET for grade 7 and 8.

- Book 1: Active Learning in Mathematics and Science
- Book 2: Active Learning in Mathematics
- Book 3: Active Learning in Biology
- Book 4: Active Learning in Chemistry
- Book 5: Active Learning in Physics

Details of SMASEE INSET Modules and how to use them are written in the Preface of attached SMASEE INSET Modules.

In addition to training hand-outs, it is also necessary to consider training materials such as laboratory apparatuses, chemicals and so forth. The required training materials are listed in the Annex III of the attached SMASEE INSET Modules.

National and Regional INSET (Center-based INSET)

At the National and Regional level training (Center-based training), INSETs are conducted in a three-cycle in order to develop human resources (i.e. KT's), who train and share the training content with other Grade 7 and 8 Mathematics and Science Teachers at the Local level.

The National and Regional level INSETs are implemented using the same timetable. The timetables of the three-cycle INSET are shown in the preface of the attached SMASEE INSET Modules. The timetables also indicate which hand-outs are required for each session. The session numbers correspond to the book numbers (e.g. session 2.3 means session 2.3 of Book 2).

Local INSET (Needs-based INSET)

On the other hand, for the implementation of the Local level INSET (needs-based training at the Cluster and school level), it is suggested that Local-level stakeholders, WEO Performers, CRC Supervisors, School Directors, KT's and so forth, make their own training timetable by selecting the sessions according to the needs and interests of the Mathematics and Science Teachers, and the availability of venue, time and resources.

A list of sessions, which indicates whether or not the sessions require special materials (e.g. laboratory apparatus, chemicals, video and so forth), is provided in the preface of the attached SMASEE INSET Modules. The list also indicates whether special materials are needed and if the session requires more than 2 trainees. Local-level stakeholders can also refer to the sample training program (see the attached INSET Modules).

4-3. SMASEE INSET IMPLEMENTATION BODY AND STAKEHOLDERS

National Implementation Body

The National Mathematics and Science Improvement Center is the implementation and coordination body of the entire National SMASEE program. The role of the Center is as follows.

- To plan the National SMASEE program
- To develop training materials
- To coordinate all stakeholders for implementation of the National SMASEE program
- To implement the National INSET
- To monitor and evaluate National INSET
- To monitor and evaluate Regional and Local INSET
- To guide and supervise Regional INSET activities
- To provide National report
- To facilitate experience sharing at National, Regional and International level
- To assist establishment and operation of Regional INSET Centers

Stakeholders for the National INSET

- Trainers: NTs and LTs from the National Mathematics and Science Improvement Center
- Trainees: RTs, selected by each Region
- Organizers: National Mathematics and Science Improvement Center
- Supervisors: MOE officials
- Collaborators: Professional Societies, Teachers Associations and Universities

Regional Implementation Body

At the Regional level, the establishment of a SMASEE Coordinating Unit (minimum 4 persons from all mathematics and science subjects) is expected in the REB. The role of the REB SMASEE Coordinating Unit is shown below.

- To plan Regional SMASEE programs
- To adapt and prepare SMASEE INSET materials
- To coordinate all Regional stakeholders to implement Regional SMASEE programs
- To implement Regional INSETs
- To monitor and evaluate Regional INSETs
- To maintain Regional INSET center
- To guide and supervise Local INSET activities
- To provide Regional report to REB and National Mathematics and Science Improvement Center

Stakeholders for the Regional INSET

- Trainers: RTs who are trained by the National INSET
- Trainees: KT's selected from each Cluster in each Zone
- Organizers: REB SMASEE Coordinating Unit
- Supervisors: National Mathematics and Science Improvement Center members and REB SMASEE Coordinating Unit
- Collaborators: University and Colleges lecturers

Local Level Performers

At the Local level, it is crucial to assign and train a SMASEE Performer (mathematics or science specialist) in each Zone and at the Woreda level, to ensure the smooth implementation of Local-level SMASEE activities. The Performers are the link between the REB, and Cluster and School INSET. The following roles are expected for them.

- To deliver directions and information from the REB to schools and Clusters
- To make a Zonal and Woreda SMASEE INSET plan and organize training
- To guide and supervise Local-level INSET
- To monitor and evaluate Local-level INSET and report to the REB

Stakeholders for the Local INSET

- Trainers: KT's in each Cluster who are trained by the Regional INSET
- Trainees: Grade 7 and 8 Mathematics and Science Teachers in the schools and Clusters
- Organizers: WEO SMASEE Performer, WEO education officers, CRC Supervisors, School Directors, Vice Directors, Mathematics and Science Department Heads and KT's
- Supervisors: National Mathematics and Science Improvement Center members, REB SMASEE Coordinating Unit members, ZEO SMASEE Performers, WEO SMASEE Performers, WEO officers, CRC Supervisors and School Directors
- Collaborator: Parents Teachers Associations

4-4. SENSITIZATION

In order to run SMASEE program across the nation, all concerned administrators and stakeholders should be familiar with the program. Therefore, sensitization of SMASEE

activities has to be carried out at all the administration levels. Sensitization activities should contain following items.

- Current status (achievement and challenges) of M&S Education in Ethiopia
- Importance and needs of SMASEE program
- Outline of the SMASEE INSET program
- SMASEE INSET Plan
- So forth

4-5. MONITORING AND EVALUATION

The SMASEE INSET program aims to provide a high quality INSET at all levels. In order to achieve this, Monitoring and Evaluation (M&E) of the INSET is important. During the Pilot Project, 10 kinds of tools were developed to assess the quality of the training and the level of the trainees' capacity development (see table 11): 1. Lesson observation checklist, 2. Student participation questionnaire, 3. INSET session evaluation, 4. INSET session feedback, 5. INSET service feedback, 6. Session observation questionnaire, 7. Ability of trainers to implement INSET, 8. INSET checklist, 9. Pre-INSET evaluation, and 10. Post-INSET evaluation. These were utilized at the time of National and Regional trainings, as well as during the follow-up survey, to assess the training impact in the classroom. Using the above tools, the Pilot Project developed annual National and Regional reports for accountability purposes.

Table 11: Summary of M&E Tools of the Pilot Project

Name of Tool	INSET M&E by Evaluator	INSET M&E by participants	For classroom F/U M&E
1. Lesson observation checklist			•
2. Student participation questionnaire			•
3. INSET session evaluation		•	
4. INSET session feedback		•	
5. INSET service feedback		•	
6. Session observation questionnaire	•		
7. Ability of trainers to implement INSET	•		
8. INSET checklist	•		
9. Pre-INSET evaluation		•	
10. Post-INSET evaluation		•	

However, the M&E system* was too complicated for the Pilot Project members to implement, and the workload involved in disseminating and collecting questionnaires, keying in data, and analysing and writing reports was very heavy. Therefore, the SMASEE program has simplified the M&E system as described below². For the details of each questionnaire, see the attached M&E tools (Attachment 6).

Table 12: M&E tools of the SMASEE Program

Tool	Target	For what	User of the tools	Others
Checklist 1-a	For National and Regional INSET	Record of National and Regional INSETs	-National Mathematics and Science Imp. Center for National INSET M&E -REB for Regional INSET M&E	-Title, contents, number of training days, venue, trainer, trainee, and comments
Checklist 1-b		Quality of INSET		-Quality of INSET in terms of each session and service provided for INSET
Checklist 2	For Cluster and School INSET	Record of Cluster and school INSETs	-REB collects information through ZEO, WEO, Cluster and school	-Title, contents, number of training days, venue, trainer, trainee, and comments, -The information should be report from the grass-root level to the REB (bottom up).
Checklist 3	After Regional, Cluster and School INSET	Training impact on classroom	-National M&S Imp. Cnt. -Regional stakeholders (REB, ZEO, WEO, CRC Supervisor and School Director)	-The tool consists of Lesson observation checklist and standard matrix for lesson observation

Photo 6: 2nd Year Addis Ababa Regional INSET



² If the Region is interested in using these M&E tools of the Pilot Project, please contact the National Mathematics and Science Improvement Center. In addition, there is room for stakeholders to develop additional M&E tools on Table 12 M&E tools for SMASEE program.

4-6. SUMMARY OF INSET MODELS

A summary of the INSET model for each level is shown below (Table 13).

Table 13: Summary of SMASEE INSET Model

No.	Question	National INSET	Regional INSET	Local INSET
1	Who plans and implements INSET?	National Mathematics and Science Improvement Center	REB SMASEE Coordinating Unit, ZEO Performer	ZEO Performer, WEO Performer, CRC Supervisor, School Director, KTs
2	Who are the trainers?	NTs	RTs	KTs
3	Who are the trainees?	RTs who are selected by the REB. For the selection of RTs, the REB needs to select RTs from each Zone.	KTs who are selected from Clusters; 4 KTs should be selected by the ZEO and WEO Performers.	Grade 7 and 8 Mathematics and Science Teachers
4	What type of training?	Center-based ready-made training at National and Regional INSET Center (5-day training content x 3 cycles). RTs and KTs must participate in the 3-year cycle of continuous training.		Needs-based tailor-made training at the Cluster level and/or individual school level.
5	What kinds of training materials are needed?	National Mathematics and Science Education Improvement Center needs to develop training hand-outs and prepare other materials (From Attachments 1 to 5).	REB needs to adapt, copy training hand-outs and prepare other materials (From Attachments 1 to 5).	WEO and School Directors need to copy training hand-outs and prepare other materials based on the selection of sessions. (From Attachments 1 to 5).
6	What kinds of actions are expected of the trainees after the INSET?	RTs are expected to train KTs at Regional INSET.	KTs are expected to train and/or share contents with other teachers and actualize active learning in the classroom.	Actualize what the KTs and Mathematics and Science Teachers learned at the Local INSET in their classroom.

5. HOW TO PREPARE AND IMPLEMENT SMASEE INSET

In this section, step-by-step guidelines are provided for preparing and implementing center-based, ready-made INSET and needs-based, tailor-made INSETs. Guidelines are given for four categories (a) National INSET, (b) Regional INSET, (c) Local INSET 1: Cluster-based INSET and (d) Local INSET 2: School INSET.

5-1. SMASEE NATIONAL INSET

PREPARATION STAGE

STEP 1: REB establishes a SMASEE Coordinating Unit

First, each Region needs to establish a SMASEE Coordinating Unit under Deputy Bureau Head, which will become the focal point for linking with the National Mathematics and Science Improvement Center. The Coordinating Unit will be established in each REB to facilitate and take responsibility for both administrative and technical matters of SMASEE activities in the Region. Four fulltime officers should be assigned to the Coordinating Unit

The roles and functions are below.

- To plan the Regional SMASEE program
- To coordinate all Regional stakeholders to implement the Regional SMASEE program
- To implement Regional-level INSET
- To monitor and evaluate Regional INSET
- To guide and supervise Local INSET activities

STEP 2: The Regional SMASEE Coordinating Unit proposes ZEO and WEO Performer in the Region

After the establishment of the Regional SMASEE Coordinating Unit, the National Mathematics and Science Improvement Center will ask each Region to assign SMASEE Zonal and Woreda Performers in each Zone of the Region. SMASEE Zonal Performer in collaboration with SMASEE Woreda Performer will help REB SMASEE Coordinating Unit to select RTs (Step 3).

STEP 3: The Regional SMASEE Coordinating Unit selects RTs from each Zone

Each Region needs to select SMASEE RTs. A minimum of 8 RTs should be selected from each Zone by the SMASEE Coordinating Unit of each REB.

The roles and functions are as follows.

- To attend the trainings provided by NTs
- To organize and conduct (facilitate) Regional training for KT in their Zone
- To provide technical support for the KT to conduct at their Cluster and/or school
- To prepare and submit reports after conducting the INSET for KT
- To carry out regular communications with the REB SMASEE Coordinating Unit

The criteria for selection of RTs are as follows.

- Must have a minimum qualification of Bachelor Degree in Mathematics and Science

- Must be a professional in Mathematics and Science education with sufficient practical knowledge and skills
- Must have minimum of five years of teaching experience for a Masters Degree holder, eight years for a Bachelor Degree holder in Mathematics and Science (for emerging regions, selection can be situational)
- Must be computer literate

STEP 4: The National Mathematics and Science Improvement Center collects information from each REB SMASEE Coordinating Unit

The National Mathematics and Science Improvement Center collects the following information from each REB SMASEE Coordinating Unit.

- List of REB SMASEE Coordinating Unit members
- List of SMASEE Zonal and Woreda Performer
- List of RTs by Zone
- List of RTs who need to be trained at National INSET

Based on the assessment of the Regional needs (the number of RTs who need to be trained at National INSET from each Region), the National Mathematics and Science Improvement Center calculates the number of cohorts of the training using following formula.

- Number of cohort of 1st year (cycle) = total number of RTs divided by 200

STEP 5: National Mathematics and Science Improvement Center plans National INSET

Based on the results of the assessment in Step 4, the National Mathematics and Science Improvement Center plans National INSET, considering the following points.

- When are the National INSETs implemented?
- How many cohorts are needed?
- How much does one cohort of the INSET cost (Number of participants x per diem x training days + material cost (refer to Annex III material list))?
- How much budget is needed?

Ideally, Step 5 should be completed along with the budget preparation for the following financial year.

Step 6: The National Mathematics and Science Improvement Center sends an Invitation letter to each Region

The National Mathematics and Science Improvement Center must send an invitation letter to each Regional SMASEE Coordinating Unit at least 6 weeks before the INSET. The Regional SMASEE Coordinating Unit must forward those letters to the Zonal Performer; the Performer must then forward the letters to each RT.

Step 7: NTs prepares M&E checklists

NTs prepares M&E checklists (Attachment 6 SMASEE M&E Checklist 1-a and 1-b).

IMPLEMENTATION STAGE

Step 8: NTs train RTs at National INSET

One 5-day National INSET per cycle is implemented at the National INSET Center; NTs train RTs.

Step 9: NTs distribute and collect M&E tools

SMASEE NTs implement M&E for National INSET using SMASEE M&E tools; NTs distribute questionnaires to RTs to assess the quality of the training.

EVALUATION STAGE

Step 10: NTs write National INSET Report

SMASEE NTs record the implementation of the National INSET, and analyse and compile the results of the M&E. The Center submits the report to the Federal Ministry of Education and to share it with Regions as per their request.

Step 11: NTs revise existing INSET contents

Based on National INSET evaluation results, NTs revise existing INSET modules.

Step 12: NTs develop new training contents based on the needs

In addition, NTs develop new training contents based on identified needs in collaboration with the Regional Coordinating Unit.

Photo 7: INSET Content Development by NT



Photo 8: 3rd Year SMASEE National INSET



5-2. SMASEE Regional INSET

PREPARATION STAGE

Step 1: The Regional SMASEE Coordinating Unit, Zone and Woreda Performers confirm the list of RTs and calculate the number of KT's in each Zone

First, the Regional SMASEE Coordinating Unit must confirm the list of RTs from each Zone who participated in the SMASEE National INSET.

Next, the Coordinating Unit, Zone and Woreda Performers collect the number of KT's, based on the number of Clusters in each Zone. Four KT's (one teacher each of Mathematics, Biology, Chemistry and Physics) should be selected from each Cluster. Therefore, the number of KT's is calculated at four times the number of Clusters.

- The number of KT's = the number of CRCs X 4 persons

STEP 2: The Regional SMASEE Coordinating Unit calculates the number of training cohorts required for Regional INSETs

As the next action, the Regional SMASEE Coordinating Unit calculates the number of training cohorts that will be needed, based on the number of KT's in the Pilot Zones. For instance, there are 760 KT's in the North Shewa SMASEE Pilot Zone in Amhara. The maximum number of trainees per cohort at Regional INSET is 200. Therefore, four cohorts of training are needed in the North Shewa Zone in Amhara (760 divided by 200 equals approximately four).

The number of training cohorts = the number of KT's divided by 200

STEP 3: The Regional SMASEE Coordinating Unit calculates the number of Regional INSET Centers needed

The Regional SMASEE Coordinating Unit also needs to calculate the number of Regional training Centers needed in each Zone. The number of Regional INSET Centers required depends on needs and capacity of Zone and Regions. For instance, in the case that Zone A needs to organize four cohorts of INSET, the REB SMASEE Coordinating Unit could establish anywhere from one to four Centers, depending on the geographical situation.

STEP 4: The Regional SMASEE Coordinating Unit Identifies Regional INSET Centers

After completing Steps 1-3, the Regional SMASEE Coordinating Unit, in collaboration with the SMASEE ZEO Performers, decide the number of training Centers for the Zone. In the case of North Shewa in Amhara, the Pilot Zone of the Pilot Project, the Amhara Education Bureau SMASEE Coordinating Unit decided to set up three training Centers to operate four cohorts of INSET.

Existing facilities are used as Regional INSET Centers. Therefore, the Regional SMASEE Coordinating Unit members and the Zonal SMASEE Performers need to identify suitable facilities in each Zone, taking into consideration the geographical conditions and the availability of the following conditions for the facility.

- 1 hall being capable of receiving 200 participants
- 3 laboratories for Science subjects
- 1 Mathematics activity room

STEP 5: The Regional SMASEE Coordinating Unit plans Regional INSET

After completing Steps 1 to 4, the Regional SMASEE Coordinating Unit needs to plan Regional INSET, taking into consideration the following points.

- When will the Regional INSETs be implemented (date/time)?
- How many cohorts per Regional INSET Center?
- How much does one cohort cost: (Number of participants x per diem x training days) + material cost (refer to attached Modules)

Ideally, Step 5 should be completed during the budget preparation for the following financial year.

Step 6: The Regional SMASEE Coordinating Unit assigns RTs to each Training Center

Next, the Regional SMASEE Coordinating Unit allocates RTs who participated in the National INSET to each cohort and Regional INSET Center. A list of RTs should be sent to the National Mathematics and Science Improvement Center.

Step 7: The Regional SMASEE Coordinating Unit sends an invitation letter to each Zone

The Regional SMASEE Coordinating Unit must send an invitation letter to each Performer for each Zone at least 4 weeks before the INSET. Each SMASEE ZEO Performer will forward the letter to the Woreda Performer. Then, the WEO Performer must inform School Directors of the Regional INSET.

Step 8: The Regional SMASEE Coordinating Unit prepares M&E checklists

The Regional SMASEE Coordinating Unit prepares M&E checklists (Attachment 6 SMASEE M&E Checklist 1-a and 1-b).

IMPLEMENTATION STAGE**Step 9: RTs train KT at Regional INSET**

RTs give 5-days training per cycle to KTs at Regional INSET Centers.

Step 10: The Regional SMASEE Coordinating Unit implements M&E

The Regional SMASEE Coordinating Unit and ZEO Performer, in collaboration with RTs, implements M&E for Regional INSET using SMASEE M&E tools.

EVALUATION STAGE**Step 11: The Regional SMASEE Coordinating Unit writes Regional INSET reports**

The SMASEE Regional Coordinating Unit, in collaboration with ZEO Performers and RTs, records implementation of the Regional INSET, and analyses and compiles the results of the M&E taken from Regional INSET of each Zone. The Coordinating Unit submits the report to the National Mathematics and Science Improvement Center.

Step 12: The Regional SMASEE Coordinating Unit implements impact assessment on students' learning achievements

After completion of three cycles of SMASEE INSETs, it is recommended that the Regional SMASEE Coordinating Unit carry out impact assessment of SMASEE INSETs on students' learning achievements selecting appropriate tools and indicators.

Step 13: The Regional SMASEE Coordinating Unit develop new training contents according to the needs of the region in consultation with National Mathematics and Science Improvement Center

Based on SMASEE M&E results and identified needs, the Regional Coordinating Unit develops new training contents in consultation with National Mathematics and Science Improvement Center.

Photo 9: 2nd year Oromia Regional INSET



Photo 10: 2nd year Amhara Regional INSET



5-3. SMASEE Cluster INSET

NEEDS ASSESSMENT STAGE

Step 1: The WEO SMASEE Performer asks each CRC Supervisor about training needs

Before end of the academic year, each Woreda SMASEE Performer makes a request to each CRC Supervisor, asking them to identify the following training needs in the Cluster to be implemented in the coming academic year.

- What are the challenges in Mathematics and Science lessons?
- In order to overcome those challenges, what is the focus area of the training?

Step 2: The WEO SMASEE Performer and CRC Supervisor collect training needs from Grade 7 & 8 Mathematics and Science Teachers

The WEO SMASEE Performer and CRC Supervisor in collaboration with School Directors and Department Heads collect challenges in teaching and training needs from Grade 7 and 8 Mathematics and Science Teachers in the Cluster. Based on collected challenges and training needs, the CRC Supervisor identifies the training focus area of the Cluster for the school year (some focus area can be treated at School INSET).

PREPARATION STAGE

Step 3: The WEO SMASEE Performer prepares general Cluster INSETs plan

The WEO SMASEE Performer plans general Cluster INSETs plan in the Woreda based on the collected training needs. The detailed plan of each Cluster INSET will be prepared by each CRC Supervisor in collaboration with School Directors and KTs.

The SMASEE Cluster INSET plan must include the following points.

(Logistics)

- Schedule: The date and times of the training
- Trainers: A list of KTs in the Cluster and any other invited Trainers
- Trainees: Grade 7 and 8 Mathematics and Science Teachers in the Cluster
- Materials: A list of the necessary materials (some materials may be purchased others may be borrowed from nearby CTE, preparatory schools and secondary schools.)
- Budget: See Step 5
- Venue: One mathematics activity room and three science rooms which enable experiments

(Technical)

- Selection of contents: contents, program and hand-outs extracted from SMASEE INSET Module Book 1-5
- Task allocation

Step 4: The WEO and/or schools in the Cluster prepare INSET budget

Possible sources of budget are WEO training budget, contribution from schools in the cluster and so forth.

Budget must include the following items according to training contents;

- The training Modules of the selected sessions (copy of the hand-outs)
- General materials such as stationary (see attached modules)

- Special materials for practical activities such as laboratory apparatuses and chemicals (see attached modules)

Other items should be considered for budget preparation based on the situation and needs of the cluster.

Step 5: The WEO procures the materials

The required materials should be purchased by the WEO after budget arrangements are made; the SMASEE Performer follows WEO's procurement process of the materials. The WEO SMASEE Performer may borrow training materials from nearby CTE, Preparatory Schools, Secondary Schools and Cluster Center Schools.

Step 6: The WEO SMASEE Performer and CRC Supervisor send invitation letters to schools

The WEO SMASEE Performer and the CRC Supervisor send invitation letters to KT's and other Grade 7 and 8 Mathematics and Science Teachers.

Each School needs to give permission for KT's and other Grade 7 and 8 Mathematics and Science Teachers to participate in the SMASEE Cluster INSET.

Step 7: Assigned KT's review training content and prepare necessary training materials

WEO SMASEE Performers, CRC Supervisors and School Directors, inform KT's of task allocations. KT's confirm allocated tasks and review the corresponding training contents. In addition, KT's try out activities, prepare and arrange the necessary training materials, including improvised materials.

Step 8: The WEO SMASEE Performer prepares M&E checklist

The WEO SMASEE Performer reviews and prints the M&E checklist 2 (Attachment 6) for Local INSET. The checklist is used to collect information on the contents, number of training days, venue, trainer, trainee and comments. The results are sent to Zonal Performers and the Regional Coordinating Unit.

IMPLEMENTATION STAGE

Step 9: WEO SMASEE Performer, CRC Supervisor and School Director organize SMASEE Cluster INSET

According to the Local INSET plan, WEO SMASEE Performer, CRC Supervisor and School Director organize and coordinate SMASEE Cluster INSET.

Step 10: Assigned KT's train other Grade 7 and 8 Mathematics and Science Teachers in the Cluster

KT's train and/or share SMASEE training contents with other Grade 7 and 8 Mathematics and Science Teachers in the Cluster as per the plan.

Step 11: The WEO SMASEE Performer and CRC Supervisors complete the M&E checklist

The WEO SMASEE Performer and CRC Supervisor fill out the M&E checklist 2 (Attachment 6).

EVALUATION STAGE

Step 12: The WEO SMASEE Performer submits the M&E checklist to the REB SMASEE Coordinating Unit

The WEO SMASEE Performer sends the completed M&E checklist 2 to the REB SMASEE Coordinating Unit through the ZEO SMASEE Performer.

Step 13: The ZEO SMASEE Performer, WEO SMASEE Performer, CRC Supervisor and School Directors in the Cluster assess Grade 7 and 8 Mathematics and Science lessons

After the implementation of SMASEE Cluster INSET, the above-mentioned supervisors assess the trainee's lesson in the classroom using the lesson observation checklist. Based on the checklist (Attachment 6 checklist 3), the supervisors write a report and submit it to the REB SMASEE Coordinating Unit. Regular classroom assessment for trainees is recommended for improvement of the lessons.

In addition, the supervisors give feedback on the lesson observation to Grade 7 and 8 Mathematics and Science Teachers.

Step 14: Trainees record on Cluster INSET activities

Lastly, trainees of the SMASEE Cluster INSET record their own CPD portfolio.

Photo 11: Preparation for Local INSET



Box 1: Good experience of the Pilot Project (1): The case of Cluster activity in Lideta Sub-city

Inspired by the quality of the first-year SMASEE INSET in 2011, the Addis Ababa Education Bureau SMASEE Case Team started brainstorming on how to structure SMASEE activities to disseminate the training to all Grade 7 and 8 Mathematics and Science Teachers in the city.

As a first action, the Bureau implemented several sensitization workshops for administrators, such as Sub-city Education Officials, CRC Supervisors and School Directors, in 2011 and 2012. During these workshops, the Bureau SMASEE Case Team shared an outline of SMASEE and emphasized the importance of developing scientific human resources for building a strong base for socio-economic development in the city through improvement of Mathematics and Science education via SMASEE INSET. The stakeholders also discussed effective structures for cascading down SMASEE INSET.

Next, the Addis Ababa Education Bureau directed Sub-city and Woreda Education Offices to assign Focal Persons. In February and May 2012, 9 SMASEE sub-city Focal Persons and 104 SMASEE WEO Focal Persons were appointed, respectively.

The SMASEE Focal Person for Lideta Sub-city, after his appointment, began analyzing the reasons “why SMASEE activities had not been implemented at the local level”, in collaboration with WEO Officials. He realized that Sub-city stakeholders did not have much knowledge about SMASEE, even though Mathematics and Science education was one of Sub-city’s priorities in the education sector.

In June 2013, the Lideta Sub-city SMASEE Focal Person initiated a SMASEE sensitization workshop in Lideta Sub-city, using the Sub-city’s budget. A total of 124 stakeholders in the Sub-city, all WEO SMASEE Focal Persons, School Directors, CRC Supervisors and KTs, participated in the workshop. During the two-day workshop, SMASEE activities were introduced, and participants discussed how to implement SMASEE INSET in the sub-city. At the end of the workshop, all stakeholders agreed on the following: (1) Lideta Sub-city will copy 1st and 2nd year INSET Modules and distribute them (both soft and hard copies) to each WEO; (2) the WEO will copy training handouts and distribute them to the schools; and (3) all 10 Woreda in the sub-city will organize SMASEE content-sharing activities.

From October 2013, a two-day Woreda SMASEE INSET was implemented by each of the 10 Woreda. Training costs were shared by the sub-city and Woreda Education Offices. KTs were utilized as trainers and all Mathematics and Science Teachers in the Woredas participated in the training. The content areas were (1) lesson planning, (2) active learning, (3) laboratory techniques, and (4) lesson study.

After the provision of initial SMASEE contents as inputs to all primary Mathematics and Science Teachers in the Lideta, in October 2013, the sub-city decided to implement SMASEE Cluster INSETs in each of the sub-city’s five Clusters. Since then, each Cluster has been holding monthly half-day SMASEE Cluster INSETs, and INSETs have been done for each Mathematics and Science

subject group. The general procedure of SMASEE Cluster INSETs in Lideta is (1) to identify common challenges amongst teachers in the Cluster; (2) to refer to SMASEE training Modules to tackle identified challenges; and (3) to discuss how to overcome the challenges. KT's participate in the discussions as resource persons and facilitators.

These SMASEE Cluster INSETs have had an impact on other education activities in Lideta: The sub-city has implemented monthly Cluster activities for other primary subject teachers as well.

Photo 12: Chemistry Lesson



5-4. SMASEE School INSET

NEEDS ASSESSMENT STAGE

Step 1: The WEO SMASEE Performer, School Director and Grade 7 and 8 Mathematics and Science Teachers prioritize the improvement of Mathematics and Science on their CPD plan from SMASEE INSET modules

Before the end of the academic year, stakeholders who make the CPD plan prioritize Mathematics and Science education in their respective plans (the WEO CPD plan, the School CPD Plan and the teacher's individual CPD plan) from SMASEE INSET modules, to be implemented in the next academic year.

Step 2: School Director, Vice Directors, Mathematics and Science Department Heads and CRC Supervisor assess needs of SMASEE School INSET

School management and the CRC Supervisor assess School INSET needs through lesson observation with consideration of the following points related to Mathematics and Science education with Grade 7 and 8 Mathematics and Science Teachers in the school.

- What are the challenges in Mathematics and Science lessons?
- What should the training focus areas be in order to overcome these challenges?

Step 3: Mathematics and Science Department Heads and Grade 7 and 8 Mathematics and Science Teachers assess their own training needs

Mathematics and Science Department Heads should take a responsibility to gather all Grade 7 and 8 Mathematics and Science Teachers in the school in order to discuss their challenges in Mathematics and Science lessons in the classroom. Based on common challenges, they identify the training focus of the SMASEE School INSET for the school year in consultation with School Management.

Step 4: School Management identifies school training needs

Based on step2 and 3, School Management identifies school training needs.

Step 5: School Management submits written training needs of School INSET to the WEO Performer

After the discussion, School Management submits training needs of School INSET to the CRC Supervisor and/or WEO Performer.

PREPARATION STAGE

Step 6: The School Director and Vice Directors plan SMASEE School INSET

The school management plans SMASEE School INSET according to the need assessment stage (Steps 2 - 5). The plan is shared with CRC Supervisors and WEO Performer.

The SMASEE School INSET plan must include the following points.

(Logistics)

- Schedule: The date and times of the training
- Trainers: A list of KT's in the school or other schools in the Cluster and any other invited Trainers
- Trainees: Grade 7 and 8 Mathematics and Science Teachers in the school
- Material: A list of the necessary materials (Some materials may be purchased, others may be borrowed from nearby CTE, preparatory schools and secondary schools.)

- Budget: The budget for the training materials
- Venue: One mathematics activity room and three science rooms which enable experiments

(Technical)

- Selection of contents: contents, program and hand-outs extracted from SMASEE INSET Module Book 1-5
- Task allocation

Step 7: The School Management prepares INSET budget

Possible sources of budget for School INSET are school budget, including one from income generating activities. The Budget must include the following items according to training contents.

- The training modules of the selected sessions (copy of the hand-outs)
- General materials such as stationary (see attached modules)
- Special materials for practical activities such as laboratory apparatuses and chemicals (see attached modules)

Other items for training activities should be considered for budget preparation based on the situation and needs of the school.

Step 8: The School Management procures materials

Training materials should be procured by each School Management after budget arrangements have been made. The school may borrow training materials from nearby CTE, Preparatory Schools, Secondary Schools and Cluster Center School.

Step 9: The School Management requests that the WEO SMASEE Performer mobilize KT's in the Cluster

In case that there are no KT's at a school, the School Management must ask the WEO SMASEE Performer to find and send KT's from different schools in the Cluster and any other invited KT's.

In the case of the Pilot Project, Ankober WEO in North Showa Zone, Amhara, had a good experience of sharing KT's; Ankober WEO sent four KT's to satellite schools that did not have KT's in order to implement SMASEE School INSET.

In addition, the School Management needs to share the training schedule with all Grade 7 and 8 Mathematics and Science Teachers in the school.

Step 10: Assigned Trainers (KT's) review training contents

The School Director, Vice Directors and KT's allocate tasks for SMASEE School INSET. Assigned KT's review training contents. In addition, assigned KT's try-out activities prepare and arrange necessary training materials, including improvised materials.

Step 11: The WEO SMASEE Performer and CRC Supervisors prepares the M&E checklist

School Management request the attached M&E checklist 2 (Attachment 6) for Local INSET to collect information on the content, number of training days, venue, trainer, trainee and comments. The checklist is printed by the WEO SMASEE Performer and/or CRC Supervisor. Then the checklists are kept by CRC Supervisor and sent to School Management.

IMPLEMENTATION STAGE

Step 12: The School Management organizes SMASEE School INSET

According to the SMASEE School INSET plan, the school management (Director, Vice Directors and Mathematics and Science Department Heads), with the support of the CRC Supervisor and WEO Performer, organize and coordinate SMASEE Cluster INSET.

Step 13: Assigned KT's train other Grade 7 and 8 Mathematics and Science Teachers in the school

KTs train and/or share SMASEE training contents with other Grade 7 and 8 Mathematics and Science Teachers in the school as per the plan.

Step 14: The Management and/or CRC Supervisors fill the M&E checklist

The School Management and/or CRC Supervisor fill out the M&E checklist 2 (see Attachment 6), in consultation with WEO Performer.

EVALUATION STAGE

Step 15: The School Director submits filled M&E checklist to the WEO SMASEE Performer

The School Director sends the completed checklist 2 to the WEO SMASEE Performer. The WEO Performer is also expected to send the M&E results to the REB SMASEE Coordinating Unit through the ZEO SMASEE Performer.

Step 16: The School Management and CRC Supervisor assess Grade 7 and 8 Mathematics and Science lessons in their school

After the SMASEE School INSET, Grade 7 and 8 Mathematics and Science lessons in the classroom must be assessed using the lesson observation checklist (Attachment 6, SMASEE M&E checklist 3).

After filling out the checklist, the School Management confirms the result and reflects it on next School INSET. In addition School Management and the CRC Supervisor write a report and submit it to the WEO SMASEE Performer if need arises.

In the lesson observation, School Management and CRC Supervisors are expected to give immediate feedback to the teachers in the school.

The REB SMASEE Coordinating Unit collects the results through the WEO and ZEO SMASEE Performers in order to assess the improvement of teachers' lessons in Mathematics and Science.

Step 17: Teachers record on School INSET activities

Lastly, each teacher, the trainee of School INSET, records their own individual CPD portfolio. Teachers can use CPD portfolio format as well as sample (The Purpose and Content of Portfolios, MOE 2010) to record their SMASEE activities.

Box 2: Good experience of the Pilot Project (2): The case of SMASEE School INSET in Dera Number 1 Primary School, Arsi Zone

Dera Number 1 Primary School, which is located 50 kilometers northwest of Asella Town, in the only primary school in Dera Town, in Arsi Zone of Oromia Region.

At Dera Number 1 Primary School, several parents had informed the school that their children had a negative attitude toward Mathematics and Science lessons and that they considered those subjects the most difficult. The School wanted to improve the quality of Mathematics and Science lessons through Continuous Professional Development (CPD), but there were no resource persons with sufficient capability.

The school heard about the Pilot Project “SMASEE” from the Woreda Education Office.

In 2011, four Mathematics and Science teachers from the school were selected to participate in the 1st year SMASEE Oromia Regional INSET at Asella CTE. The teachers were trained as SMASEE KTs and learned active learning methods for Mathematics and Science education. In 2012 and 2013 the trainings continued and the four KTs acquired not only theoretical knowledge, but also practical teaching skills.

In 2011, after the KT’s participated in the 1st year Regional INSET, the school planned and implemented a one-day sharing activity; KT’s shared how to plan Mathematics and Science lessons with other Mathematics and Science Teachers at the school. Although this school-based training was only one day, trainees learned how to do lesson planning, which they had never done in the past.

After the 2nd year Regional INSET in 2012, the school added two more days of school-based INSET. This time, practical activities were introduced for each subject, and trainees were able to experience the lesson-study approach. To actualize the SMASEE School INSET, the school prepared training hand-outs, and supplied chemicals for science experiments by collecting donations from the community.

After the 3rd year Regional INSET, the Woreda SMASEE Focal Person decided to send KT’s from Dera Number 1 Primary School to train teachers in other Cluster schools.

Let’s enhance the quality of Mathematics and Science Education in our schools through SMASEE Program!