



**A CONCEPT PAPER ON
THE TRANSFORMATION OF THE WORKING GROUP ON
MATHEMATICS AND SCIENCE EDUCATION (WGMSE)
INTO THE INTER-COUNTRY QUALITY NODE ON
MATHEMATICS AND SCIENCE EDUCATION
(ICQN-MSE)**

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EDUCATION IN AFRICA (CEMASTE A)**

1. MATHEMATICS AND SCIENCE EDUCATION IN AFRICA

The United Nations Rio 20+ Declaration: *The Future We Want* (United Nations, 2012)¹, recognised Mathematics and Science Education as pillars for economic growth and national development being the foundations for Science Technology and Innovation (ST&I). ST&I are considered critical elements in a world that is increasingly becoming knowledge-based. Furthermore as the World Bank (2011)² argues, science and mathematics skills form the foundation for the regional integration and labour market mobility that Partner States are seeking because the labour markets are increasingly demanding modern knowledge and skills, readiness to take initiatives, and ability to solve problems and to innovate products and processes.

However, the UNESCO Science Report (2010)³ notes that in spite of Africa being replete with natural resources, intellectual capital and indigenous knowledge and culture, it is nevertheless at a comparative disadvantage with regard to overall development because of low investment in ST&I and adoption of a short-term view of human development. Similarly, the midterm review of the African Union's 2nd Decade of Education Plan of Action (2006-2015) identified lack of Science and Mathematics knowledge as one of the outstanding challenges to be resolved. It noted that Africa has the lowest enrolment and graduation in science and math; a fact compounded by lack of SMT teachers at secondary and higher education with the supply on the average being half of the demand. This scenario calls for urgent action which the Association for the Development of Education in Africa (ADEA) in collaboration with the Government of Kenya and Japan International Cooperation Agency (JICA) has boldly taken up in the recent past through the Working group on Mathematics and Science Education (WGMSE).

2. THE WORKING GROUP ON MATHEMATICS AND SCIENCE EDUCATION (WGMSE)

ADEA seeks to promote education in African through providing a network and a unique forum for policy dialogue for African education and training ministries, educational experts and international partners. It also seeks to translate expert knowledge into concrete recommendations and frameworks to inform African governments of the required paradigm

¹ United Nations (2012). Resolution No. 66/288: The Future We Want. [Online]. Available from:

² The World Bank (2011). A Regional Exploration of Pathways towards Harmonization of Math and Science Curriculum in the East African Community: Discussion Paper. [Online]. Available from: http://www.wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2011/11/15/000386194_20111115233228/Rendered/PDF/655070WP00PUBL0ion0discussion0paper.pdf. [Online]. Accessed 1 February 2013

³ UNESCO (2010). Science Report. Retrieved from

shifts, policy changes, and actions required to transform education and training. ADEA also initiates targeted interventions on the most pressing thematic areas that impact the development of critical knowledge, skills, and qualifications.

It was in this regard that ADEA launched the Working Group on Mathematics and Science Education (WGMSE) in November 2004 to provide targeted intervention to address the challenges facing mathematics and science education in Africa. In aligning its objectives to the wider ADEA Strategy, WGMSE seeks to:

- 1) Strengthen individual, institutional, and societal capacities to advance teaching and learning of these subjects
- 2) Promote regional cooperation on mathematics and science education through a program of activities approved by the Steering Committee of ADEA.

2.1. The Structure of WGMSE

The WGMSE is hosted and coordinated by the Centre for Mathematics, Science and Technology Education in Africa (CEMASTEAM) in Nairobi, Kenya on behalf of Kenya's ministry responsible for education and training. CEMASTEAM provides WGMSE Coordinator, necessary facilities, staff and running costs. Japan International Cooperation Agency (JICA) is WGMSE's Lead Agency. WGMSE works with ministries responsible for education, collaborating institutions such as the Strengthening Mathematics and Science Education in Africa (SMASE Africa) Association, members of the Africa Principals Convention, the South-East Asian Ministers of Education Organisation-Regional Centre for Mathematics and Science Education (SEAMEO-RECSAM) and education professionals.

2.2. Achievements of WGMSE

Through the 2008-2012 Strategic Medium Term Plan (SMTP), ADEA sought to among others attain the high level objectives seeking to contribute to advancing of policies, strategies, practices, and programs that promote critical knowledge, skills, and qualifications and to develop and promote African-led education and training solutions that address national and regional needs. Consequently, WGMSE aligned its activities to contribute to the achievement of the objectives. In collaboration with SMASE-Africa, WGMSE has held nine regional conferences since 2005 which provided forums for education stakeholders from over 27 African countries to chart way forward for sustaining their collaborative efforts aimed at enhancing the quality of mathematics and science through capacity-building and policy advocacy. It also briefed the Caucus of Ministers of Education during the ADEA Triennale in

February 2012 Burkina Faso and the COMEDAF and the April 2012 COMEDFA V in Abuja Nigeria on the mathematics and science capacity-building programmes for Africa.

WGMSE has also created a network of trainer of trainers (TOT) by training mathematics and science educators from some 27 countries at CEMASTEAM and by using CEMASTEAM staff to offer south-south cooperation expert service to several countries in Sub Saharan Africa on construction of sustainable INSET systems. Through this programme supported by the Lead Agency JICA and Host Ministry in Kenya, over 1,500 TOTs were trained (see table 1 and 2 in the Annex). Over 100 expert service missions were dispatched to over 10 countries. Expertise provided was on the areas of INSET project formulation, facilitation, management, monitoring and evaluation and stakeholder sensitization.

Besides capacity building and exchange of expertise, WGMSE in collaboration with SMASE-Africa and Swaziland, Kenya and Zambia have organised Technical Workshops for technical level INSET Providers. These workshops aim at sharing challenges and interventions they are taking in their countries towards the sustainability and improvement of the implementation of ideas learnt during training at CEMASTEAM. Three workshops have been held in Swaziland, Kenya and Zambia. The technical workshops have high potential for influencing technocrats in adopting/adapting strategies, practices and programmes that promote cultivation of scientific core skills and knowledge among participating countries. For example, the workshop held in June 2013 in Lusaka, Zambia bringing together 150 delegates from 26 African countries that included practitioners in teacher professional growth activities, teacher educators and education officers/ policy makers. The participants committed to using the concepts from the workshop for improving MSE in their countries.

In addition to the capacity-building initiatives, a lot of technical exchange has also occurred between African countries. Over 10 high level delegations from other African countries conducted study missions to Kenya to learn from the country's experience on the implementation in Kenya. These included ministerial delegations and Principal Secretaries from Angola, Malawi, Mozambique, Federal Republic of Nigeria, Senegal and Uganda. Besides visits to Kenya, delegations from Rwanda, Swaziland, and Senegal have also visited Zambia which has displayed an exemplary initiative on school-based continuous professional development.

As a result of these activities, 17 countries namely Angola, Malawi, Uganda, Nigeria, Burkina Faso, The Gambia, South Sudan, Ethiopia, Zambia, Ghana, Rwanda, Kenya, Sierra Leone, Niger, Mozambique, Botswana and Senegal are already implementing country-based

INSET programmes for their teachers through the support of WGMSE Lead Agency JICA and CEMASTEА. In order to continue supporting the African countries through training at CEMASTEА, the Lead Agency JICA and the Government of Kenya have upgraded the institution's training facilities at a cost of over US\$5million.

WGMSE has also worked with the Ministry of Education, Science and Technology Kenya to strengthen SMASE-Africa network as a single African platform to share the challenges and come up with solutions in teaching and learning of Mathematics and Science. This was done by inviting all African countries to join the SMASE-Africa network and make it a strong and vibrant association with support from all African governments and prevailing on Kenya's Minister for Education to accept to officially patronise the network. The Minister wrote to all other Ministers responsible for Education in Africa to support the network.

CEMASTEА staffs who implement WGMSE's training programmes also received further training in Japan on lesson study, INSET management and evaluation, mathematics and science lesson evaluation, and on improvement of science and mathematics in primary education. They now form a pool of staff with capabilities for the benefit of Africa as a whole. The coordination of WGMSE was also strengthened when the Minister for Education of Kenya designated a long-serving and experienced CEMASTEА staff as the WGMSE Coordinator.

2.3. Challenges facing WGMSE

In spite of its achievements, WGMSE has faced several challenges. Key amongst these are:

- 1) The WG has only one agency JICA supporting its activities which undermines the sustainability of the WG in case the agency's priority areas change
- 2) The blurred line between WGMSE's activities and the Lead Agency's other activities supporting MSE in Africa:
 - a. supports several bilateral activities within African countries and there is a blurred line between these bilateral activities and WGMSE
 - b. Some of the activities that WGMSE implement are also implemented by the lead agency under the auspices of SMASE-Africa Association
- 3) WGMSE does not receive funding for any of its activities from ADEA secretariat. All its activities have been funded by the Lead Agency JICA and the Kenya's ministry responsible for education through CEMASTEА
- 4) ADEA and CEMASTEА have no hosting agreements stipulating the roles, responsibilities and obligations of both parties.

- 5) WGMSE activities have been concentrated around capacity building with little being dedicated to analytical work. Its advocacy has also targeted senior officials from ministries responsible for education rather than the top decision makers at the level of ministers and permanent secretaries.

3. WAY FORWARD: CONVERSION OF WGMSE INTO AN ICQN

In order to address the challenges facing WGMSE, it is proposed that it be converted into an Inter-Country Quality Node (ICQN). ADEA has nine working groups intended to devote their attention to the specific identifiable education interventions for which they were established and have a large degree of flexibility in structure and operation. However, as earlier as 2003, ADEA had called into question the effectiveness of this arrangement in supporting countries in the design and implementation of key recommendations. This was evident from the fact that knowledge, strategic frameworks and key recommendations emerging from ADEA's evidence-based policy dialogue were rarely translated into policies and implementation frameworks at the national level.

It was for this reason that the concept of inter-country quality node (ICQN) was mooted as follow-up mechanism for 2003 ADEA Biennale. An ICQN is considered a more potent option for promoting implementation at national level because it is a unique arrangement where countries facing similar challenges come together with strategic partners who have expertise in a specific field to promote dialogue, collective learning and space for collaborative action. This has a great potential for promoting ownership of the learning around which the ICQN is built which is critical since quality improvement is a national affair. The arrangement also has the potential to promote capacity building by continuously utilising existing capacity while developing new through the process of collaborating states and partners learning in and from action, practice and experience as well as learning together, with and through one's peers. In this regard ICQNs also foster and develop synergies by actively bringing together strategic development partners involved in a strategic area.

ICQNs are constituted by grouping a certain number of countries along a set of criteria such as shared challenges and themes; the six regions currently represented in ADEA (Southern Africa, Central Africa, West Africa, East Africa, North Africa and Indian Ocean); current educational initiatives (SACMEQ, PASEC); other lines (such as the Lusophone countries) or Africa's regional economic communities (SADC, ECOWAS, CEMAC, etc.). A champion country takes the lead and convenes other countries around a thematic area that

presents a common challenge then ADEA Secretariat and Working Groups and other strategic and funding development partners facilitate the initial launch of the ICQN.

3.1. Justification for an ICQN on Mathematics and Science Education (ICQN-MSE)

Led by Kenya

The foregoing provides a strong basis for believing that conversion of WGMSE into ICQN-MSE will enhance its effectiveness in improving mathematics and science education in the participating states. This is because there is already in existence a strong set-up for a mathematics and science ICQN that is being led by Kenya whose history goes back to the year 2001. Kenya, being faced with a perennial challenge of low student achievement in mathematics and science at secondary school level, initiated in 1998 a project known as Strengthening Mathematics and Science in Secondary Education (SMASSE) with the support of JICA. Starting as a pilot in selected regions of the country, the project design and implementation showed significant potential to impact positively on teacher classroom practices early in its initial stages.

Realising that other African countries had similar challenges and that some had similar initiatives but without positive success, the Kenyan project team with the support of JICA decided to bring together in 2001 some 11 countries from Eastern, Central and Southern Africa to create a platform around which they would create synergy in addressing mathematics and science challenge. Soon afterwards, Western Africa joined the initiative and the Strengthening of Mathematics and Science Education in Africa (SMASE-WECSA) Association was born. This initiative which has been transformed into SMASE-Africa currently brings together 35 countries with 27 of them being officially registered members of the Association whose governments pay an annual subscription fee. Kenya hosts the secretariat of this Association at CEMASTEIA in Nairobi. SMASE-Africa is a close partner of the WGMSE and have jointly organised several activities since the launch of WGMSE.

SMASE-Africa already presents an arrangement where African countries with perceived challenges in mathematics and science education have coalesced around one of them, Kenya, to develop mitigative measures. Indeed, several of these countries through this resultant learning have initiated country-based programmes modelled after Kenya. The countries have adopted or adapted the initiative based on their unique national circumstances. Indeed to support WGMSE and SMASE Africa, JICA has upgraded and refurbished facilities at CEMASTEIA at a cost of over US\$5million.

3.2. Objectives and Activities of the ICQN-MSE

It is proposed that for the strategic period 2014-2017, ICQN-MSE adopts the mission of ADEA and the strategic objectives but with specific reference to mathematics and science education. Thus the main aim of ICQN-MSE would be “to serve as an open and flexible pan-African forum to inform and facilitate the transformation of mathematics and science education to contribute to Africa’s accelerated and sustainable development”

SO 1: Advance policies, strategies, practices, and programs that promote critical knowledge and skills in mathematics and science

SI 1.1: Inform the development of effective policies, strategies, practices, and programs

SI 1.2: Advise African governments in implementing national mathematics and science policies and strategies

SI 1.3: Provide technical support for the scale-up and replication of innovative pilot programs

SI 1.4: Contribute to national and regional efforts to monitor critical mathematics and science skills development

SI 1.5: Foster gender-sensitive approaches

SI 1.6: Promote the integration of values into the center of mathematics and science education

SO 2: Develop and promote African-led education and training solutions to address national and regional needs

SI 2.1: Advance the science and mathematics education agenda of AU’s Second Decade of Education and other select regional and continental initiatives

SI 2.2: Facilitate greater inter-country collaboration and regional integration

SI 2.3: Promote greater awareness and application of existing African solutions in mathematics and science education

SI 2.4: Advise African governments in designing and implementing African-led solutions for improving mathematics and science education

SO 3: Foster greater utilization of relevant ICT to accelerate the transformation of mathematics and science education approaches and outcomes

SI 3.1: Engage technology and education stakeholders in dialogue to identify executable ICT solutions for improving mathematics and science

SI 3.2: Advise African governments in implementing ICT integration in mathematics and science education policies and strategies

SI 3.4 Promote ICT integration policies and strategies in mathematics and science education that target marginalized groups and populations

SO 4: Leverage a diverse, sustainable partner network

SI 4.1: Diversify partner-base to integrate new voices and experiences into mathematics and science education policy dialogue

SI 4.2: Engage African diaspora to contribute to the development of mathematics and science education in the continent

SI 4.3: Increase technical participation from network partners to expand ICQN-MSE's reach

SI 4.4: Increase financial support from network partners

SO5: Strengthen organizational capacity and effectiveness

SI 5.1: Develop and continuously improve the ICQN's core business processes

SI 5.2: Institutionalize and foster positive internal culture in the ICQN

SI 5.3: Maximize effectiveness of human capital in the ICQN

SI 5.4: Improve collaboration and decision-making with other ADEA components

3.3. Proposed Activities to Achieve the Objectives Of the ICQN-MSE

ICQN-MSE shall develop and strengthen systems for supporting teachers to provide quality mathematics and science education through

3.3.1. Capacity-Building and Networking

ICQN-MSE shall work with Lead Country, ADEA and other stakeholders to mobilise resources for the following capacity-building programmes previously organised and conducted by WGMSE:-

- i. Third Country Training Programme,
- ii. Technical Workshops,
- iii. Third Country Expert Services and

3.3.2. Advocacy and Networking

ICQN-MSE shall seek to promote the development, dissemination and application of policies that enhance mathematics and science education among member countries by mobilising essential resources to organise:

- iv. International policy dialogue forums,
- v. Technical Exchange Visits

3.3.3. Analytical Work

ICQN-MSE shall conduct research on innovative methods and approaches for effective delivery of mathematics and science education and for popularising the subjects.

3.4. Strengthening the role of CEMASTEAs as a Mathematics and Science Resource Centre for Africa

This would be done by:

- vi. Establishment of a website dedicated to ICQN-MSE
- vii. Publication of materials already developed under WGMSE,
- viii. Collection and storage for use of relevant materials from across Africa and other parts of the world
- ix. Publication and distribution of ICQN-MSE newsletter

3.4.1. Establish Other Regional Centres of Excellence in mathematics and science Education across the continent

ICQN-MSE in collaboration with the African Union and ADEA shall identify potential countries to host other centres of excellence and provide technical expertise to such countries.

3.5. Roles and Responsibilities of Key Stakeholders and Partners

The ICQN-MSE shall implement its activities under the guidance of ADEA Steering Committee which shall define the annual working plans and other strategic orientation. A Joint Coordinating Committee (JCC) comprising the Lead Country, ADEA Secretariat, Partner Agencies, CEMASTEAs and SMASE-Africa Association shall be responsible for results and Performance Based Management of the ICQN. The ICQN shall be run on a day-to-day basis by a Secretariat lead by a Coordinator appointed by the Lead Country in consultation with Joint Coordinating Committee. The Lead Country shall be responsible for providing basic infrastructure and facilities to house the ICQN at CEMASTEAs as it did for WGMSE. ADEA Secretariat and Partner Agencies will be responsible for raising funds necessary for running the

Secretariat and conducting the ICQN activities. ADEA Secretariat and Lead Partner Agencies shall also be responsible for monitoring and evaluation of implementation of ICQN activities.

3.6. Monitoring, Evaluation and Reporting

Aligned to ADEA's results-oriented approach, ICQN-MSE will implement an outcome-based Performance Measurement Plan (PMP) to conduct effective performance measurement. In ICQN-MSE context, impact-level data will measure the results of African governments' or other partners' efforts. The data will be tracked and monitored by the countries and partners while ICQN-MSE will use it to inform its strategic planning efforts. ICQN-MSE PMP will focus on the high-level outcomes that can be attributed either directly or indirectly to its work. The PMP will focus on the outcome and output levels, as these will provide the ICQN with the most useful data for measuring its own performance and progress. ICQN will define at least one performance measure for each of its SIs and SOs.

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ANNEXES

Table 1: Activities for Spread of Good Practices from CEMASTEAM-Kenya

Nature of Activity	Country/ Organization	Date	Category of Personnel Sensitised
Principals' W/shop	Malawi	12/09/05	Principals
	Uganda	12/09/2005	National Trainers
	Uganda	21/08/2005	OJT for National Trainers SESEMAT
OJT	Nigeria	26/08/2006	State trainers
	Uganda	27/08/2006	National trainers
Visits to CEMASTEAM	NEPAD	22/06/2004	Prof. Mboya and another
	Malawi	5/07 2004	JICA Malawi
	Honduras	13/09/2004	JICA
	Uganda	6/12/2004	Permanent Secretary and others
	Nigeria	14/02/2005	Director Education and others
	Egypt	21/02/2005	JICA Project
	Malawi	10/04/2005	PS Education, Principal DCE
	Nigeria	1/05/2005	Directors of Teacher T. Colleges
	Uganda	24/04/2005	Uganda SESEMAT
	Senegal	6/06/2005	PS Education
	AU	4/12/2006	Head of Education Division
	Mozambique	6/03/2007	PS Education
	Angola	6/03/2007	Assistant Minister MOE
	AU	8/03/2007	AU commissioner for Human Resources, Science and Technology
	Benin	18/06/2007	Director
	Burkina Faso	28/06/2007	PS Education
		2013	Ministerial delegation
Malawi	22/07/2007	PS Education	
Gabon	2010	PS Education Gabon	

Table 2: Dispatches of Third Country Expert Service and Study Teams from CEMASTEAM to other Countries (2003-2007)

Country/ Project Period	Dates of Assistance	Areas of Technical Assistance	Outputs
Malawi (SMASSE Malawi: Oct 2004 Sept 2007)	31 st March – 3 rd April 2003	National Workshop for TOT: <ul style="list-style-type: none"> • Sensitisation of Core Trainers on ASEI/PDSI • INSET Curriculum development 	<ol style="list-style-type: none"> 1. Conducted sessions on ASEI/PDSI 2. Trained Core Trainers on INSET curriculum development 3. Developed draft curriculum from needs survey report
	July 10 th – Aug 27 th 2005	INSET for Core Trainers: <ul style="list-style-type: none"> • Needs Assessment, • Curriculum development, • Implementation • M&E 	<ol style="list-style-type: none"> 1. Conducted survey on the capacity and needs of core trainers 2. Developed training curriculum for Core Trainers 3. Conducted training for Core Trainers on planning, implementation and evaluation of INSET 4. Made recommendations based on the observations with respect to quality, management and

Country/ Project Period	Dates of Assistance	Areas of Technical Assistance	Outputs
			sustainability.
	27 th Nov – 29 th Dec 2005	INSET for Classroom Teachers implemented by Core Teachers <ul style="list-style-type: none"> Finalising of preparations Facilitation Evaluation and way forward 	<ol style="list-style-type: none"> Reviewed write-ups, programmes and evaluation tools developed by Core Trainers Made observations, gave recommendations/advice with respect to planning and implementation of INSET
	Nov 19 th – Dec 23 rd 2006	INSET implemented by Core Trainers for secondary MS teachers <ul style="list-style-type: none"> Administration, Implementation M&E during Regional 	<ol style="list-style-type: none"> Sensitisation of key education stakeholders on ownership, sustainability and need for INSET policy. Ensuring adequate preparation for INSET Quality control (polishing up) of manuals Development and use of instruments on ability of core trainers to implement INSET
	4 th –10 th Feb 2007	Providing Feedback on INSET	Giving reports on 2006 TCE mission observations and recommendations to various stakeholders as well as a Joint Co-ordinating Committee Meeting
	March	Impact Survey of TCTP	Assessment of the extent of ex-trainees practice of ASEI / PDSI teaching methodology
Niger (SMASSE Niger Project; Oct 2006 – Aug 2009)	6 th –15 th March 2006	JICA Study Mission <ul style="list-style-type: none"> Project Formulation Project Design Matrix 	Project Design Matrix
	3 rd – 9 th June 2006		
	29 th –31 st Jan. 2007	Stakeholder Sensitisation Workshop and Preparation for National INSET	Provided advice on quality control of training manuals and INSET preparedness with respect to facilities and resource
	23 rd Feb – 21 st March 2006	National INSET for Regional Trainers	<ol style="list-style-type: none"> Helped to develop M&E instruments Observed INSET sessions Did data analysis and interpretation
Rwanda (Envisaged SMASSE- Rwanda for Nov 2007)	24 th Feb – 3 rd March 2007	Preliminary appraisal mission on project formulation for a SMASSE-type project	Provision of technical advice and guidance based on Kenyan experience during preparations of Records of Discussion (RD)
	7 th -11 th and 19 th - 24 ^h March 2006	Baseline Survey	<ol style="list-style-type: none"> Development of Survey Instruments Advice on survey design and logistics Analysis and interpretation of data
	13 th -19 th May 2007	Impact Survey	Assessment of the extent of ex-trainees practice of ASEI / PDSI teaching methodology
Nigeria (SMASE Nigeria; Sept 2006 – August 2009)	19 th – 24 th June 2005	Stakeholders' Workshop	Sensitisation on ASE/PDSI and development of funding strategies for the then proposed SMASE-Nigeria Project
	26 th -29 th Oct 2005	On the Job Training at CEMASTEA on Needs Survey	Preliminary guidance on development of survey instruments
	9 th Oct – 5 th Nov	Baseline Survey Project Design	<ol style="list-style-type: none"> Development of questionnaires Preparations for and conduct of survey

Country/ Project Period	Dates of Assistance	Areas of Technical Assistance	Outputs
	2005		3. Formulation of Project Design Matrix 4. Sensitisation of Stakeholders
	Aug 2006	OJT on Monitoring and Evaluation and Development of INSET, Curriculum, Schedules and Training Manuals	1. Observation of SMASSE-Kenya District INSET 2. Hands-on M&E of District INSET 3. Development of INSET manuals
	15 th Nov – 9 th December 2006	1. Preparations for, implementation and M&E of Cycle 1 of National INSET for State Trainers and State INSET for Core Teachers 2. Stakeholder Sensitisation	1. Technical input and quality control of development of INSET handouts 2. Preparations for cycle 1 of National INSET 3. M&E of National INSET 4. Development/Adaptation of M&E instruments 5. Session Facilitation during National INSET 6. Advice on preparations for cycle 1 of State INSET 7. Advice on effective management of INSET implementation for sustainability
	14 th Feb – 15 th Mar 2007	Preparations for Cycle 2 of National INSET for State Trainers	1. Technical input and guidance into the development of Cycle 2 INSET programme, training manual and handouts 2. Advice on effective management of INSET implementation for sustainability 3. Advice on preparation of INSET and M&E Reports
Uganda (SESEMAT: Secondary Science and Mathematics Teachers' Project;(2005-2008)	Aug 21 st – Sept 17 th 2005	OJT at CEMASTE on: 1. M&E 2. Development INSET Curriculum 3. Development of training manuals 4. Stakeholder Sensitisation	1. M&E of District Level INSET (Field observations and Discussions) 2. Development of M&E instruments 3. Development of INSET Curriculum 4. Development of Programmes and write-ups for cycle 1 of National INSET for Key Trainers 5. Participation in Principals' Workshop
	12 th – 23 rd Dec 2005	M&E of INSET	1. M&E of cycle 1 of National INSET for Key Trainers 2. Advice on effective management of INSET implementation for sustainability 3. Training National Trainers on M&E of INSET
	28 th Nov – 1 st Dec 2006	INSET material development	Quality control and technical input into refining of INSET programme and training manual/write-ups for cycle 2 of national INSET for Key Trainers
	11 th – 22 nd Dec 2006	M&E of INSET	1. M&E of cycle 2 of national INSET for Key Trainers 2. Advice on effective management of INSET implementation for sustainability
Zambia (SMASTE Zambia)	26 th – 31 st January 2003	Stakeholder Sensitisation	Facilitation of workshop sessions to introduce SMASSE Kenya to educationist in Zambia Provision of technical advice on further development of SMASTE Zambia Demonstration of ASEI/PDSI Lessons
Senegal	23 rd - 26 th	Project Formulation	Consultative tripartite discussion on the proposed

Country/ Project Period	Dates of Assistance	Areas of Technical Assistance	Outputs
	Jan 2007		mathematics and science education project
	6 th -21 st May 2007	Preliminary appraisal mission on project formulation for a SMASSE-type project	Provision of technical advice and guidance based on Kenyan experience during preparations of Records of Discussion (RD)
Burkina Faso	6 th -21 st May 2007	Preliminary appraisal mission on project formulation for a SMASSE-type project	Provision of technical advice and guidance based on Kenyan experience during preparations of Records of Discussion (RD)
Burundi	9 th -11 th Nov	Stakeholder Sensitisation	Paper presentation on ASEI/PDSI during the launching of SMASSE-WECSA Burundi Chapter
	30 th April- 1 st May	Study on the Status of SMASSE in Burundi	Assessing progress made by SMASSE-WECSA Burundi chapter Sensitising Minister of Education on SMASSE-WECSA activities

TABLE 3. Third Country Expert Service by CEMASTE A Staff (2009-2010)

Countries receiving Expert Service	No of Experts Dispatched by CEMASTE A
13 Countries (Angola, Burkina Faso, Malawi, Niger, Nigeria, Rwanda Sierra Leone, Senegal, Sudan, Swaziland, Tanzania, Uganda and Zambia)	64
8 Countries (Angola, Burkina Faso, Niger, Nigeria, Rwanda, Senegal, Sudan and Tanzania)	18
8 Countries (Angola, Burkina Faso, Niger, Nigeria, Rwanda, Senegal, Sudan and Tanzania)	20

Source: CEMASTE A

Table 4: Summary of TCTP courses conducted by CEMASTE A (2004-2006)

Country	Number of Participants							TOTAL
	Regular Jan/Feb 2004	Regular Nov/Dec 2004	Regular Nov/Dec 2005	Specialised Dec 2005 (Apr for Malawi)	Anglophone 2006	Franco phone 2006	Specialised 2006	
1. Benin	-	-	8	-	-	-	-	8
2. Botswana	-	5	-	-	7	-	-	12
3. Burkina Faso	-	-	7	-	-	7	-	14
4. Burundi	-	8	-	-	-	8	-	16
5. Cameroon	-	-	5	-	-	5	-	10
6. Cote d'Ivoire	-	-	5	-	-	-	-	5
7. Ethiopia	-	4	3	-	-	-	-	7
8. Gambia	-	-	10	-	-	-	-	10
9. Lesotho	8	-	-	-	8	-	-	16
10. Madagascar	-	4	4	-	-	-	-	8
11. Mauritius	-	5	-	-	-	-	-	5
12. Malawi	2	11	-	32	13	-	6	64
13. Mozambique	8	-	-	-	8	-	-	16
14. Niger	-	8	-	-	-	23	-	31
15. Nigeria	-	6	18	-	5	-	-	29
16. Rwanda	6	2	-	15	-	20	-	43

Country	Number of Participants							TOTAL
	Regular Jan/Feb 2004	Regular Nov/Dec 2004	Regular Nov/Dec 2005	Specialised Dec 2005 (Apr for Malawi)	Anglophone 2006	Franco phone 2006	Specialised 2006	
17. Senegal	-	3	5	-	-	21	-	29
18. Seychelles	-	6	2	-	-	-	-	8
19. Sierra Leone	-	-	4	-	8	-	-	12
20. Sudan	-	-	-	19	-	-	18	37
21. Swaziland	-	8	-	-	8	-	-	16
22. Tanzania	-	7	2	-	5	-	-	14
23. Uganda	2	6	15	-	5	-	-	28
24. Zanzibar	-	-	7	-	-	-	-	7
25. Zambia	10	-	-	35+2 observers	5	-	40	90
26. Zimbabwe	6	2	-	-	6	-	-	8
27. Ghana	-	-	-	-	8	-	-	8
Total	42	85	95	69	72	86	64	545
No. of Participating Countries	7	15	14	3	12	6	3	27

Table 5: TCTP Courses (2007-2012)

Type of Training	Target Group	Numbers trained
2008 Anglophone Regular	12 Anglophone countries	83
2008 Francophone Primary	3 Francophone countries	31
2008 : Anglophone Primary	7 Anglophone countries	50
2009 Anglophone Regular	Angola,(8) Botswana(8), Cameroon(4), Ethiopia(9), Gambia(8), Malawi(10), Mozambique(7), Tanzania(8), Uganda(7) and Zanzibar (8).	76
2009 TCTP 12 Francophone Primary	Benin, Burkina Faso, Burundi, Cameroon and Senegal	32
2010 Anglophone Regular	Teacher Educators from 12 Anglophone countries: Angola (8) , Botswana (8),Cameroon (4) , Gambia (8), Lesotho (4), Malawi (11), Mozambique (3), Namibia (8) Swaziland (4), Tanzania (8), Uganda (8), Zanzibar (8)	82
2010 TCTP 14 Anglophone Primary	Ghana (6), Nigeria (8), Rwanda (8), Sierra Leone (8), Southern Sudan (8), Swaziland (8) and Zambia (6).	52
2010 TCTP 15 Francophone Primary	Teacher Educators from 7 Francophone countries: Benin (4), Burkina Faso (5), Burundi (4), Cameroon (3), Mali (4), Niger (5) & Senegal (5)	30
2010 Anglophone Customised	Teacher Educators from 10 Anglophone countries: Ethiopia (6), Ghana (6), Lesotho (4), Mozambique (3), Nigeria (6), Rwanda (6), Sierra Leone (6), Southern Sudan (5), Swaziland (4) and Zambia (4).	49
2011 Anglophone Regular	Teacher Educators from Botswana, Ethiopia, Ghana, Mozambique, Namibia, Nigeria, Sierra Leone, South Sudan, Swaziland, Zambia and Zimbabwe	62
2012 Francophone Primary	Teacher Educators from 6Francophone countries: Benin, Burkina Faso, Burundi, Mali, Niger & Senegal (5 participants from each country)	30
2012 Anglophone Primary	Teacher Educators from 12 Anglophone countries: Angola, Cameroon, The Gambia, Malawi, Rwanda, Tanzania (8), Uganda	52

Type of Training	Target Group	Numbers trained
	(8), Zanzibar (8)	
2012 Anglophone Regular	Anglophone speaking Primary school educators from 12 countries namely, Botswana, Ethiopia, Ghana, Lesotho, Mozambique, Namibia, Nigeria, Sierra Leone, South Sudan, Swaziland, Zambia and Zimbabwe.	72
2012 Francophone Primary	Teacher Educators from 7 Francophone countries: Benin, Burkina Faso, Burundi, Mali, Niger, Senegal and Djibuti	31
2012 Anglophone Advanced Course	Teacher Educators from 8 Anglophone countries: Angola, Cameroon, Gambia, Malawi, Rwanda	51
TOTAL TRAINED		783

TABLE 6: Customized training courses conducted by CEMASTEА (2008-2011)

Course	Year/Month	Country	Duration	No of Participants
Stakeholders Strategic Workshop	2008/Aug	Southern Sudan	2 Weeks	31
Introduction of ASEI/PDSI	2009/Jan-Feb	Southern Sudan	4 Weeks	74
WS for INSET System in Kenya	2009/Feb-Mar	Senegal	1 Week	17
WS for INSET System in Kenya	2009/Mar	Mali	1 Week	9
2009 Customised Southern Sudan		Southern Sudan		74
2011 OJT- INSET Trainers of trainer		South Sudan		4
TOTAL				209

Source: CEMASTEА

TABLE 7. African countries working with CEMASTEА to implement country-based programmes to strengthen mathematics and science

Country	Description of country-based capacity building programme
1) Uganda	<ul style="list-style-type: none"> Name of Programme: Secondary Science and Mathematics Teachers National Expansion Plan (SESEMAT NEP) Period: Phase 1: 2005-2008; Phase 2: Aug 2008-Aug 2011 Reported Outcomes/impact: There is a slight improvement in Uganda Certificate of Education in M&S last year. More students have opted for science combinations at Advanced level.
2) Kenya	<ul style="list-style-type: none"> Name of Programme: SMASSE Project since 1998 that has created system for 20,000 Secondary MS Teachers established with National INSET Centre (CEMASTEА). SMASE Project (2009-2013) targets 60,000 Primary MS teachers trained on ASEI/PDSI approach and further capacity development for CEMSTEА. Reported Outcomes/Impact: Through the influence of INSET activities of SMASE, Kenya enacted in 2012 a law that has made continuous professional development of all teachers compulsory.
3) Rwanda	<ul style="list-style-type: none"> Name of Programme: Strengthening Mathematics and Science in Secondary Education Project (SMASSE Rwanda) Period: [Feb. 2008-Jan. 2011] Reported outcomes/impact: Increase in the number of students who choose M&S subjects as electives has been recognized. (70% of students entering in Public Higher Learning Institutions should do Science/Technology according to the Government Policy). Attitude of teachers has changed as professionals.
4) Ethiopia	<ul style="list-style-type: none"> Name of Programme: National Pilot Project for Strengthening Mathematics and Science Education in Ethiopia (SMASEE) Period: Jan. 2011
5) Malawi	<ul style="list-style-type: none"> Name of Programme: The Project on Strengthening of Mathematics and Science in Secondary Education (SMASSE INSET Malawi) Phase 2 Period: Phase 1: Sep. 2004-Sep. 2007; Phase 2: Aug. 2008-Aug.2012]

Country	Description of country-based capacity building programme
	<ul style="list-style-type: none"> • Reported outcomes/impact: There is improvement on students' performance in national examinations. The teaching and learning approach used in SMMASE has generated considerable interest in M&S among the students and more students are enrolling in the subjects for examinations
6) Ghana	<ul style="list-style-type: none"> • Name of Programme: Project for Strengthening the Capacity of INSET Management (INSET Management Project) • Period: Phase 1: Dec. 2005-Nov. 2008; Phase 2: Jun. 2009-Mar. 2013 • Reported outcome/impact: Teacher motivation to teach the subjects has been enhanced. Pupils' interest in M&S has increased based on their attendance in class and readiness to do projects.
7) Senegal	<ul style="list-style-type: none"> • Name of Programme: Senegal PREMST Project Phase I Project period: three year pilot project • Target: 10,310 elementary school teachers in three pilot regions of Louga, Fatick and Thiés out of the 11 regions in Senegal. 11 national trainers offer training to 50 Regional Trainers from the three pilot regions who in turn train a total 345 local trainers in their respective regions • Period: 2008-2010
8) Niger	<ul style="list-style-type: none"> • Name of Programme: Project on Strengthening Mathematics and Science in Secondary Education in Niger (SMASSE Niger) Phase 2 • Period: Phase 1: Oct 2006 to Oct 2009; phase 2: Mar 2010 to Sep 2013 • Reported Outcome/impact: Improvement of test results: 2006(11.93%), 2007(19.62%), 2008(30.6%), 2009(41.45%), 2010 (31.35%)
9) Burkina Faso	<ul style="list-style-type: none"> • Name of Programme: Project for Improvement of INSET Training of Math and Science Teachers in Primary Education (SMASE Project) Phase 2 • Period: Phase 1: Jan. 2008-Jan. 2011; Phase 2: Jan. 2011-Jan. 2015
10) Zambia	<ul style="list-style-type: none"> • Name of Programme: Strengthening Mathematics, Science and Technology Education (SMASTE) School-based CPD Project Phase 2 • Period: Phase 1: Oct. 2005-Oct. 2007,; Phase 2: Feb. 2008-Feb. 2011 • The impact assessment report indicates that there was a marked improvement in general performance and also in the quality of results for M&S from the time the SMASTE project was introduced in Central Province as compared to the non-target provinces
11) Mozambique	<ul style="list-style-type: none"> • Name of Programme: Strengthening of Primary Education in Gaza Province in Mozambique (MSE INSET Project) • Period: Jul. 2006-Jul. 2009
12) Southern Sudan	<ul style="list-style-type: none"> • Name of Programme: Strengthening Mathematics and Science Education in Southern Sudan (SMASSESS) • Period: Nov. 2009-Dec. 2011
13) Nigeria	<ul style="list-style-type: none"> • Name of Programme: Strengthening of Mathematics and Science Education in Nigeria Project (SMASE Nigeria) Phase 2 • Period: Phase 1: Aug. 2006-Aug. 2009; Phase 2: Jun. 2010-Jul. 2013 • Report outcome/impact: Active participation of the children during class lessons has been achieved
14) Botswana	<ul style="list-style-type: none"> • Name of Programme: Project for Improvement of INSET Training of Math and Science Teachers in Primary Education (SMASE Project) Phase 2 • Period: [Phase 1: Jan. 2008-Jan. 2011; Phase 2: Jan. 2011-Jan. 2015]

Source: 10th SMASE-WECSA Anniversary Brochure