



Association for the  
Development  
of Education  
in Africa

*Dialogue on education for leadership and change*



---

## Inter-Country Quality Node on Mathematics and Science Education (ICQN-MSE)

### 2015 Program and Budget

---

## TABLE OF CONTENTS

Executive Summary.....	3
Introduction.....	4
Narrative of Activities .....	7
performance Measurement .....	11
References.....	13
Annexes .....	15
1. Annual Work Plan By Strategic Objective.....	15
2. Expenditures And Financial Table .....	18
3. ICQN-MSE Staffing.....	19

## EXECUTIVE SUMMARY

The June 2014 ADEA Steering Committee Meeting approved the transformation of the Working Group on Mathematics and Science Education into the Inter-Country Quality Node on Mathematics and Science Education (ICQN-MSE). ICQN-MSE will therefore continue with the WGMSE's focus on promoting effective mathematics and science education for Africa's sustainable development.

Numeracy and cognitive skills involving observation, analysis, critical thinking, problem solving and decision-making are components of the common core-skills sets identified by the *Strategic Policy Framework for the Implementation of the 2012 Triennale Recommendations*. Consequently, the core of ICQN-MSE activities is capacity building for mathematics and science educators, particularly teachers, in a bid to promote effective pedagogy in these subjects. ICQN-MSE also conducts advocacy work and promotes networking and policy dialogue by bringing together high-ranking education officials from African countries through regional conference that has been so far organized on an annual basis.

ICQN-MSE Lead Country is Kenya. Kenya's Ministry of Education, Science and Technology coordinates ICQN-MSE through the Centre for Mathematics, Science and Technology Education (CEMASTE) in Nairobi. CEMASTE is also the host institution for the ICQN. During the June 2014 Steering Committee Meeting WGMSE's Lead Agency JICA pledged to continue supporting the ICQN-MSE activities.

In 2015 WGMSE activities will mainly revolve around ADEA's Strategic Objectives 1 and 2. This document details the activities and a narrative of sub-activities of the said SO1 and SO2 together with the financial implication thereof. The 2015 activities will be funded mainly by the ICQN-MSE.

## INTRODUCTION

### 1. Issue/Problem Statement

Numeracy and cognitive skills involving observation, analysis, critical thinking, problem solving and decision-making are components of the common core-skills sets identified by the *Strategic Policy Framework for the Implementation of the 2012 Triennale Recommendations*. These essentially are the elements of mathematics and science education. Provision of quality mathematics and science education is therefore critical to African continent's efforts to develop human capital necessary for its social and economic progress.

The World Bank (2011) observes that poor mathematics and science education in a country implies an industry starved of essential scientific and technical skills leading to lack of competitive edge for that country. In spite of this acknowledged importance of mathematics and science education the midterm review of the African Union 2<sup>nd</sup> Decade of Education (2006-2015) reveals that among the challenges that remain is lack of science, mathematics and technology knowledge. It notes that Africa has the lowest enrolment and graduation in science and math; a problem compounded by lack of SMT teachers at secondary and higher education with the average supply of such teachers being half of the demand. The UNESCO Science Report (2010) further affirms this grim picture in noting that in spite of Africa's natural resources, intellectual capital, indigenous knowledge and culture, it is disadvantaged by low investment in science technology.

Key among the solutions to this challenge is to strengthen teacher capacities to adopt pedagogies that can effectively nurture critical science and mathematical skills. In many African countries, teaching and learning of mathematics and science are prevalently teacher-centred chalk and talk. This is why ICQN-MSE's training programme has focused on the propagation of the Activity-Student-Experiment-Improvisation (ASEI) and Plan-Do-See-Improve (PDSI) paradigm.

The ASE-PDSI is a rallying call to African teachers of mathematics and science to abandon unproductive teacher-centre chalk and talk pedagogies to those that put children's learning and growth at the centre of the teaching and learning process. UNESCO

2010 Science report recommends that African countries should make science more interesting and attractive by adopting a more activity-oriented hands-on approach to teaching and learning rather than the currently emphasised rote memorisation. About 30 countries participate in the ICQ-MSE's training programme that has been offered annually since 2004. During the 2008-2012 Medium Term Strategic Period, approximately 1000 educators were trained. Additionally, through its Regional Conferences and Technical Workshops, the ICQN-MSE also facilitates policy dialogues among senior education officials and experience sharing among implementers of Africa countries on effective professional development of mathematics and science teachers.

The ICQN-MSE's partner JICA notes that these activities have provided a platform for sharing and exchange of knowledge and practical experience among participating countries resulting into the creation of practical wisdom for solving common challenges that these countries face (Ishihara, 2013). This practical wisdom has been accumulated with regard to enhancement of classroom practices and establishment of sustainable in-service training systems for mathematics and science teachers.

## **2. Global Objective**

In 2015, WGMSE will seek to promote science and mathematics education programmes that enhance effective acquisition of numeracy and cognitive skills involving observation, analysis, critical thinking, problem solving and decision-making; the basic elements of the common core-skills identified by the *Strategic Policy Framework for the Implementation of the 2012 Triennale Recommendations*.

## **3. Specific objectives**

Specifically, ICQN-MSE will seek to:

- 3-1 Improve mathematics and science education in Africa at the school level by strengthening individual, institutional, and societal capacities to advance effective teaching/learning of these subjects;
- 3-2 Develop teaching and learning materials for Mathematics and Science, and exchange such materials amongst its members and within the region.

3-3 Promote regional cooperation on mathematics and science education through a program of activities.

3-4 Promote networking and knowledge sharing among mathematics and science educators in Africa through the ADEANet

## NARRATIVE OF ACTIVITIES

In 2015, ICQN-MSE will implement the following activities under the Strategic Objectives 1, 2 and 5 as follows:

### **ADEA STRATEGIC OBJECTIVE 1: To advance policies, strategies, practices, and programs that promotes critical knowledge, skills, and qualifications**

1.1. The SO1's main thrust for ICQN-MSE 2015 Program will be to contribute to the realisation of the Strategic Initiative 1.1 of informing the development of effective policies, strategies, practices, and programs and Strategic Initiative 1.3 of providing technical support for scaling-up and replication of innovative practices and programs. In this regard, ICQN-MSE activities will mainly focus on facilitating the sharing of innovative experiences and dissemination of lessons learnt and experiences.

1.1.1. During 2015 ICQN-MSE will develop and disseminate in its portal in the ADEANet and through other means, documentation of innovative experiences, and policy briefs from lessons learnt from the work of WGMSE. This is practical wisdom that has been accumulated in the past 10 years in WGMSE collaborative work with the Strengthening Mathematics and Science Education in Africa (SMASE-Africa), a Pan-African network in 27 African. It includes innovative experiences and lessons learnt from member countries efforts in establishing and up-scaling sustainable teacher capacity development programmes.

1.1.2. Besides documentation of experiences, ICQN-MSE will also initiate a portal for mathematics and science teachers to share lessons and curriculum materials.

### **1.2. ICQN-MSE Activities**

ICQN-MSE will therefore specifically:

- 1.2.1. Prepare documentation of innovative experiences, and policy briefs
- 1.2.2. Upload documents and policy briefs
- 1.2.3. Initiate a teachers' portal
- 1.2.4. Publicise the portal

## **ADEA STRATEGIC OBJECTIVE 2: To develop and promote African-led education and training solutions that address national and regional needs**

2.1 The SO2's main thrust for ICQN-MSE 2015 Program will be to contribute to the realisation of the Strategic Initiatives of advancing the AU's Second Decade of Education and other regional and continental initiatives, facilitating inter-country collaboration and regional integration, promoting greater awareness and application of existing African solutions and advising African Government is designing and implementing African led solutions. In this regard, ICQN-MSE activities will mainly focus on Strategic Initiatives 2.1, 2.2 and 2.3 of providing technical support to the Second Decade of Education and other select regional and continental initiatives; promoting greater awareness and application of existing African solutions and facilitating greater inter-country collaboration and regional integration. During 2015 ICQN-MSE will therefore seek to carry out the following activities:

- 2.1.1 Organise and conduct Third Country Training Programme (TCTP) courses for mathematics and science educators from over 10 countries. TCTP is normally implemented in collaboration with JICA and CEMASTEPA and provides a forum for the educators to benefit from practical wisdom entailing innovative experiences and lessons learnt from various African countries' efforts to improve teacher classroom practice and to establish sustainable INSET systems. By providing a forum for participants to interact with each other over a period of three weeks, the training will also contribute to the creation of friendships among participants and hence contribute positively to the process of regional integration.
- 2.1.2 Officially launch the ICQN with a view to bringing on board its activities all interested African countries and potential development partners by organising and conducting an international conference.

### **2.2 ICQN-MSE Activities**

ICQN-MSE will therefore specifically:



- 2.2.1 Build capacity of mathematics and science educators through the execution of the following tasks:
  - 2.2.1.1 Assess needs of participating countries
  - 2.2.1.2 Develop training modules and materials for the 2015 courses.
  - 2.2.1.3 Conduct training sessions for primary and secondary level educators.
  - 2.2.1.4 Evaluate training.
  - 2.2.1.5 Prepare and disseminate training reports.
- 2.2.2 Officially launch ICQN-MSE and sensitise African countries and development partners on its activities through the execution of the following tasks:
  - 2.2.2.1 Develop a concept paper for the conference
  - 2.2.2.2 Engage potential partners to fund the conference.
  - 2.2.2.3 Conduct the conference.
  - 2.2.2.4 Prepare and disseminate conference report.
  - 2.2.2.5 Follow-up with potential partners on funding of ICQN-MSE activities

#### SI 5.1

### **ADEA STRATEGIC OBJECTIVE 5: To Strengthen organizational capacity and effectiveness**

5.1 The SO5's main thrust for ICQN-MSE 2015 Program will be to contribute to the realisation of the Strategic Initiatives 5.1 of developing and continuously improving core business processes. During 2015 ICQN-MSE will therefore seek to:

- 5.1.1 Establish the administrative and organisational structures of the ICQN-MSE
- 5.1.2 Secure human resource from African Union Volunteer Programme in liaison with ADEA Secretariat and Kenyan authorities.

#### **5.2 ICQN-MSE Activities**

ICQN-MSE will therefore specifically:

- 5.1.1 Form and operationalise ICQ-MSE committees

- 5.2.2 Operationalise ICQN-MSE Secretariat
- 5.2.3 Capacity-build ICQN-MSE Coordinator on research and preparation of policy papers under a partnership with WGEMPS
- 5.2.1 Develop TORs for Volunteers
- 5.2.2 Obtain necessary clearance and requirements for the Volunteers from Kenyan authorities
- 5.2.3 Receive and orientate the volunteers

## PERFORMANCE MEASUREMENT

In line with ADEA’s outcome-based Performance Measurement Plan (PMP) outline in the Medium Term Strategy (2013-2017), ICQN-MSE will conduct effective performance measurement to assess its progress towards achieving its objectives. WGMSE’s performance assessment will focus on the outcome and output levels to will provide it with the most useful data for measuring its own performance and progress and an overview of its contributions and a snapshot of its influence on its constituents.

ICQN-MSE outputs will be tracked as results of efforts and activities in the form of tangible or intangible products or services. Its outcomes will be tracked as specific changes in behaviour, attitudes, or experiences in the ICQN-MSE’s constituents as a result of its outputs. This will be done in spite of the realisation that ICQN-MSE is not the only entity influencing certain outcomes but with a view to indicating whether it has contributed to forward progress in its areas of intervention. Besides outcome and outputs, ICQN-MSE will track data at the activity and input levels to provide it with useful information on its day-to-day activities and help it assess its own performance within the larger strategic orientation.

The table below presents a summary of the strategic objectives and initiatives together with related activities as well as performance measures.

ADEA STRATEGIC OBJECTIVE 1:	To advance policies, strategies, practices, and programs that promotes critical knowledge, skills, and qualifications		
Strategic Initiative	Activity	Performance Measure	
		Output	Outcome
SI.1: Inform the development of effective policies, strategies, practices, and programs	1.1. Develop and disseminate in ICQN-MSE portal in the ADEANet and through other means, documentation of innovative experiences, and policy briefs from lessons learnt from the work of WGMSE 1.1.1. Prepare documentation of innovative experiences, and policy briefs 1.1.2. Upload documents and policy briefs	Number and quality of documents and policy briefs uploaded	The degree to which the ICQN-MSE’s outputs are reported as informative by participating countries as established through annual surveys

	1.2. Initiate a portal for mathematics and science teachers to share lessons and curriculum materials 1.2.1. Initiate a teachers' portal 1.2.2. Publicise the portal	<ul style="list-style-type: none"> <li>No. of teachers participating in the portal</li> <li>Number and quality of materials they upload</li> </ul>	The degree to which the portal is reported as useful by participating teachers as established through annual surveys
<b>ADEA STRATEGIC OBJECTIVE 2:</b>	<b>To develop and promote African-led education and training solutions that address national and regional needs</b>		
<b>Strategic Initiative</b>	<b>Activity</b>	<b>Performance Measure</b>	
		<b>Output</b>	<b>Outcome</b>
SI-1-4: Advancing the AU's Second Decade of Education and other regional and continental initiatives, facilitating inter-country collaboration and regional integration, promoting greater awareness and application of existing African solutions and advising African Government is designing and implementing African led solutions. In this regard, WGMSE activities will mainly focus on contributing to the Secretariat's effort to provide technical support to Second Decade of Education, hold regional events and to facilitate inter-African regional exchanges, highlight African-led solutions and facilitate inter-country collaboration for implementation of support	2-1 Organise and conduct Third Country Training Programme (TCTP) courses for mathematics and science educators from over 10 countries. 2-1.1 Assess needs of participating countries 2-1.2 Develop training modules and materials for the 2015 courses. 2-1.3 Conduct training sessions for primary and secondary level educators. 2-1.4 Evaluate training. 2-1.5 Prepare and disseminate training reports	1) An inventory of needs of participating countries 2) Relevant training manuals 3) At least 10 countries participate in the training 4) At least 100 participants trained 5) Training report	1) No. of participating countries that use ex-participants to implement country-based programmes 2) No. of countries that report inter-country collaboration based on the concepts and practices advanced through the TCTP at ICQN-MSE meetings and events 3) The degree to which ICQN-MSE the TCTP training are reported as useful by participating countries as established through annual surveys 4) No. of countries with implemented strategies that integrate concepts and practices advanced through the TCTP
	2-1 Officially launch the ICQN with a view to bringing on board its activities all interested African countries and potential development partners by organising and conducting an international conference. 2-1.1 Develop a concept paper for the conference 2-1.2 Engage potential partners to fund the conference. 2-1.3 Conduct the conference. 2-1.4 Prepare and disseminate conference report.	1) Concept Paper 2) At least 10 countries participate in the training 3) At least 100 participants trained 4) Conference report	1) No. of countries that become members of ICQN-MSE 2) No. of countries with implemented strategies that integrate concepts and practices advanced through ICQN-MSE

	2-1.5 Follow-up with potential partners on funding of ICQN-MSE activities		
<b>ADEA STRATEGIC OBJECTIVE 5:</b>	<b>Strengthen organizational capacity and effectiveness</b>		
<b>Strategic Initiative</b>	<b>Activity</b>	<b>Performance Measure</b>	
		<b>Output</b>	<b>Outcome</b>
To develop and continuously improve core business processes	5.1 Establish the administrative and organisational structures of the ICQN-MSE 5.1.1 Form and operationalise ICQ-MSE committees 5.1.2 Operationalise ICQN-MSE Secretariat 5.2.3 Capacity-build ICQN-MSE Coordinator on research and preparation of policy papers under a partnership with WGEMPS	ICQN-MSE Committees operating	<ul style="list-style-type: none"> <li>Effective and timely guidance for the implementation of ICQN-MSE activities as evident in minutes of meetings and reports</li> <li>Effective planning, implementation and reporting of ICQN-MSE activities as evident in activity reports</li> </ul>
	5.2 Secure human resource from African Union Volunteer Programme in liaison with ADEA Secretariat and Kenyan authorities 5.2.1 Develop TORs for Volunteers 5.2.2 Obtain necessary clearance and requirements for the Volunteers from Kenyan authorities 5.2.3 Receive and orientate the volunteers	No and qualifications of volunteers secured	<ul style="list-style-type: none"> <li>Level of improvement in the execution rate of planned ICQN-MSE activities</li> </ul>

## REFERENCES

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

UNESCO (2010). *Science Report*. Author: Paris

Ishihara, S. (2013). *JICA's Regional Cooperation in Mathematics and Science Education in Africa: Past and Future*. Keynote Address delivered on October 29, 2013 during the 13<sup>th</sup> SMASWECSA Conference held at Panafric Hotel, Nairobi.

ANNEXES

1. ANNUAL WORK PLAN BY STRATEGIC OBJECTIVE

Strategic objective 1

Advance policies, strategies, practices, and programs that promote critical knowledge, skills, and qualifications.

Strategic Initiative 1.1 of informing the development of effective policies, strategies, practices, and programs and Strategic Initiative 1.3 of providing technical support for scaling-up and replication of innovative practices and programs.

Activities	Expected results	Budget (US\$)			Lead responsibility	Month												Strategic partnerships	Comments	
	Outputs	Secretariat	WGs	Total		j	f	m	a	m	j	j	a	s	o	n	d			
1.1. Develop and disseminate in ICQN-MSE portal in the ADEANet and through other means, documentation of innovative experiences, and policy briefs from lessons learnt from the work of WGMSE	<ul style="list-style-type: none"> <li>Publications</li> <li>Knowledge sharing and networking among mathematics and science educators</li> </ul>	?	\$6,100		ICQN-MSE														1) Government of Kenya 2) JICA 3) Secretariat	Host institution CEMASTEVA has availed funding
1.2. Initiate a portal for mathematics and science teachers to share lessons and curriculum materials	<ul style="list-style-type: none"> <li>Lessons and curriculum materials uploaded</li> <li>Knowledge sharing and networking among mathematics and science educators</li> </ul>																			

**Strategic objective 2**

**Develop and promote African-led education and training solutions that address national and regional needs.**

Strategic Initiatives 2.1, 2.2 and 2.3 of providing technical support to the Second Decade of Education and other select regional and continental initiatives; promoting greater awareness and application of existing African solutions and facilitating greater inter-country collaboration and regional integration

Activities	Expected results Outputs	Budget (US\$)			Lead responsibility	Month												Strategic partnerships	Comments
		Secretariat	WGs	Total		j	f	m	a	m	j	j	a	s	o	n	d		
2.1 Organise and conduct Third Country Training Programme (TCTP) courses for mathematics and science educators from over 10 countries	1) Capacities of teacher trainers in member countries strengthened. 2) Enhanced friendship and collaboration among African mathematics and science educators		\$467,511	\$467,511	ICQN-MSE													1) JICA 2) Government of Kenya	In 2014 1) JICA contributed US\$370,200 2) GOK contributed US\$97,311 in kind
2.2 Officially launch the ICQN with a view to bringing on board its activities all interested African countries and potential development partners by organising and conducting an international conference	1) Number of African countries participating in ICQN-MSE activities increased 2) Number of partners supporting ICQN increased		\$153,000	\$153,000	ICQN-MSE													1) Secretariat 2) Partners (yet to be identified) 3) Government of Kenya	Secretariat to help identify potential partners to support the launch.



Strategic objective 5																			
Strengthen organizational capacity and effectiveness.																			
Strategic Initiatives 5.1 of developing and continuously improving core business processes																			
Activities	Expected results Outputs	Budget (US\$)			Lead responsibility	Month												Strategic partnerships	Comments
		Secretariat	WGs	Total		j	f	m	a	m	j	j	a	s	o	n	d		
5.1 Establish the administrative and organisational structures of the ICQN-MSE	1) ICQN-MSE Committees formed 2) Operational Secretariat			\$10,000	ICQN-MSE												1) Secretariat 2) Government of Kenya 3) DPs (to identified)	Expected from Secretariat	
5.2 Secure human resource from African Union Volunteer Programme in liaison with ADEA Secretariat and Kenyan authorities	Volunteers work for ICQN-MSE			\$10,000	ICQN-MSE												1) Secretariat 2) Government of Kenya 3) African Union Commission	Expected from Secretariat	

## 2. EXPENDITURES AND FINANCIAL TABLE

*1 January to 31 December 2015*

<b>Expenditures (US\$)</b>	
Strategic Objective 1	USD6,100
Strategic Objective 2	USD467,511
Strategic Objective 3	0
Strategic Objective 4	0
Strategic Objective 5	USD20,000
Strategic Objective 6	0
Strategic Objective 7	0
<b>Total ICQN-MSE Programs</b>	<b>USD493,611</b>
<b>Financing (US\$)</b>	
	<b>USD493,611</b>
Carried over from previous years	0
Maximum to be received from global basket (based on formula)	0
Restricted funds to ICQN-MSE through ADEA Secretariat:	0
1.	10,000
2.	10,000
3.	0
<b>Total Funds</b>	<b>USD493,611</b>
<b>Difference / Carry-over to next year</b>	
	0
Direct contributions to ICQN-MSE with no accounting by ADEA Secretariat	USD473,611

### 3. WORKING GROUP STAFFING

**1) ICQN-MSE Leader:**

Cabinet Secretary,  
Ministry of Education, Science and Technology,  
Jogoo House 'B'  
Haraambe Avenue,  
P.O. Box 30040-00100,  
Nairobi-Kenya  
[cs@scienceandtechnology.go.ke](mailto:cs@scienceandtechnology.go.ke)  
Telephone: +254-20-318581; Fax: +254-20-2251991

**2) ICQN-MSE Coordinator**

Patrick Aluma Kogolla,  
Coordinator; Academic Programmes and External Collaborations & Linkages,  
Centre for Mathematics, Science and Technology Education in Africa (CEMASTE),  
P. O. Box 24214-00502,  
**NAIROBI-KENYA**  
Email: [pkogolla@gmail.com](mailto:pkogolla@gmail.com)  
Tel: +254(0)20 882632 / 2044406  
Mobile: +254722250006

**3) Staff member:**

a. Jane K. Marete,  
Administration Officer,  
P. O. Box 24214-00502,  
**NAIROBI – KENYA**  
Email: [jane.marete@yahoo.com](mailto:jane.marete@yahoo.com) or [jane.marete@gmail.com](mailto:jane.marete@gmail.com)  
Tel. +254 20 26 33111/3873680  
Mobile: +254 724 253 440/721 287 172

b. Mercy Mbugua,  
Administrative Assistant,  
P. O. Box 24214-00502,  
**NAIROBI – KENYA**  
Email: [mbuguamercy@yahoo.com](mailto:mbuguamercy@yahoo.com)  
Tel. +254 20 26 33111/3873680  
Mobile: +254 733 803 447