ADEA Inter-Country Quality Node on Mathematics and Science Education

Ministerial Conference on Inter-Country Quality Node on Mathematics and Science Education

Date: May 2015

Venue: Mombasa, Kenya

Concept Note
December 2014

Theme Mathematics and Science Education for catalyzing Africa's Development

Organizers & Partners

Ministry of Education Science and Technology, Kenya; Association for the Development of Education in Africa (ADEA); World Bank, and Japan International Cooperation Agency (JICA), Centre for Mathematics, Science and Technology Education in Africa (CEMASTEA)

1. BACKGROUND

1.1. Mathematics and Science Education in Africa

The United Nations Rio 20+ Declaration: *The Future We Want* (United Nations, 2012)[1], recognized 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 labor market mobility that Partner States are seeking because the labor markets are increasingly demanding modern knowledge and skills, readiness to take initiatives, and ability to solve problems and innovate products and processes.

[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://wwwwds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2011/11/15/000386194_20111115233228/Rendered/PDF/655070WP00PUBL0ion0discussion0paper.pdf. [Online]. Accessed 1 February 2013

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 science, mathematics and technology (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).

1.2. 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 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 sought 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.

The WGMSE was hosted and coordinated by the Centre for Mathematics, Science and Technology Education in Africa (CEMASTEA) in Nairobi, Kenya on behalf of Kenya's ministry responsible for education and training while Japan International Cooperation Agency (JICA) was WGMSE's Lead Agency. It worked 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

[3] UNESCO (2010). Science Report. Retrieved from

Ministers of Education Organization-Regional Centre for Mathematics and Science Education (SEAMEO-RECSAM) and education professionals.

1.3. Achievements of WGMSE

WGMSE sought to contribute to ADEA's high level objective of 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, 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.

WGMSE has also created a network of trainer of trainers (TOT) by training mathematics and science educators from 27 countries at CEMASTEA and by using CEMASTEA 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. 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 have organized 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 CEMASTEA. 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 brought 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 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 CEMASTEA. In order to continue supporting the African countries through training at CEMASTEA, JICA and the Government of Kenya upgraded the institution's training facilities at a cost of over US$5million.

1.4. Challenges facing WGMSE

In spite of its achievements, WGMSE was faced with several changes, one of which is inadequate funding. As WGMSE, it had only one development partner, JICA, supporting its activities. JICA has continued as ICQN-MSE partner but will only support the training of Anglophone countries at CEMASTEA. This means that Francophone countries will no longer benefit from the ICQN-MSE training programmes at CEMASTEA in spite of the great needs that still remain. Similarly, JICA will no longer support the third country expert service that CEMASTEA provided to various countries starting training programmes. Moreover, in spite of participating countries demonstrating commitment to support activities implemented by CEMASTEA to improve the quality of mathematics and science, the annual subscriptions are only nominal. Inadequate resources has hampered documentation of the valuable experiences that participating countries have accrued over the years, analyzing them and distilling appropriate policy recommendations to inform African Governments on how to improve mathematics and science education other challenge.

1.5. Conversion of WGMSE into an ICQN

In order to address the challenges facing WGMSE, the Working Group was converted into an Inter-Country Quality Node (ICQN) at the ADEA Steering Committee Meeting in Tunis, in May 2014. 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. This arrangement also has the potential to promote capacity building by continuously utilizing 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.

1.6. Objectives and Activities of the ICQN-MSE

It is proposed that for the strategic period 2014-2017, ICQN-MSE should adopt 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 3.4Promote 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

1.7. 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:

1.7.1. Capacity-Building and Networking

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

i. Continental Training Programme

ICQN-MSE implements capacity building programmes through CEMASTEA with funding from JICA and the Government of Kenya. The training programmes aim at contributing to the development of human resources that can promote the advancement of Africa's development. Through this programme, over 1,600 key trainers from 27 African countries have been trained in the process. In addition to the regular training programmes, customized courses have also been undertaken to address specific needs of a requesting country.

ii. Technical Workshops

In addition to training at CEMASTEA and exchange of expertise, technical workshops are organized to provide forums for technical staff of the country-based programmes to share experiences on these interventions. Three such workshops have been held in

Swaziland, Kenya and Zambia. The workshops have shown a 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 2013 workshop held in Lusaka, Zambia brought together 150 participants from 26 countries that included teachers, teacher educators, and education policy makers. They studied Zambia's school-based continuous professional development; learning what works well or what does not.

iii. Technical Expert Services

Besides training at CEMASTEA, JICA's south-south cooperation third country expert service has supported some 17 African countries to put in place country-based training programmes for their mathematics and science teachers. These country-based programmes are run by the key trainers prepared by CEMASTEA. To date, some 218 experts from CEMASTEA have been dispatched on such missions to support formulation of training programme, facilitation of training, programme management, monitoring and evaluation and stakeholder sensitization.

1.7.2. 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 mobilizing essential resources to organize:

iv. International policy dialogue forums
v. Technical Exchange Visits

1.7.3. Analytical Work

ICQN-MSE shall conduct research on innovative methods and approaches for effective delivery of mathematics and science education and for popularizing the subjects. It will also document the valuable experiences that participating countries have accrued over the years, analyzing them and distilling appropriate policy recommendations to inform African Governments on how to improve mathematics and science education other challenge.

1.8. Strengthening the role of CEMASTEA as a Mathematics and Science Resource Centre for Africa

This would be done by:

i. Publication of materials already developed under WGMSE
ii. Collection and storage for use of relevant materials from across Africa and other parts of the world
iii. Publication and distribution of ICQN-MSE newsletter

1.8.1. 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.

1.9. Roles and Responsibilities of Key Stakeholders and Partners

The ICQN-MSE implements its activities under the guidance of ADEA Bureau of Ministers and the Steering Committee in line with ADEA Charter for ICQNs.

2. Objectives of the Conference

The main goal of this conference will be to assist governments of participating African countries to formulate appropriate country frameworks for improving the quality of Mathematics and Science Education. The objectives of the conference will be to:

1. To share experiences, approaches and strategies on improving mathematics and science education from various countries
2. To identify best-practices for adaptation/adoption in individual country's unique national contexts
3. To identify means and ways of exploiting the existing capacity in mathematics and science in Africa that has been created over the past decade
4. To define:
    a. the roles of the ICQN-MSE;
    b. the management structure of the ICQN-MSE
    c. the roles and responsibilities of ICQN-MSE member countries
    d. the modalities for partnering and networking on ICQN-MSE activities

All countries of Africa are invited to the conference. Also invited are diverse global and regional inter-governmental organizations, international non-governmental organizations, development agencies, private companies and foundations. International experts will also participate.

Altogether, with the national participants from Kenya, nearly 110 participants are expected to attend the forum and other related events taking place in Nairobi from May 2015. Apart from participating, countries will be requested to share their rich experiences in dealing with promoting mathematics and science education. To be invited to the conference from are the 15 Cabinet Ministers responsible for education in the 15 countries that are already implementing country-based capacity building programmes for mathematics and science teachers. Invited also are delegates, one each from the 54 African countries.

The working languages for the workshops will be English and French, with simultaneous translation provided. Working documents will also be available in both languages.

4. Proposed Programme

Date		Events
DAY 1	09:00 - 10:30	Opening ceremony
	10:30 – 11:00	Coffee break and launching of Exhibitions
	11:00 12:00	Key note address:
	12:00 - 13:00	Concurrent sessions on sharing experiences, approaches and strategies on improving mathematics and science education from various countries
	13:00 - 14:00	Lunch Break
	14:00 – 15:00	Concurrent sessions on sharing experiences, approaches and strategies on improving mathematics and science education from various countries
	15:00 - 16:00	Group presentations ((20 minutes presentation and 10 minutes Q&A) x 2 economic communities)
	16:00 - 16:30	Coffee break
	16:30 - 18:00	Group presentations ((20 minutes presentation and 10 minutes Q&A) x 3 economic communities)
DAY 2	08:30 - 10:30	Identification of • best-practices for adaptation/adoption in individual country's unique national contexts • means and ways of exploiting the existing capacity in mathematics and science in Africa that has been created over the past decade
	10:30 – 11:00	Coffee break
	11:00 - 13:00	Identification of • best-practices for adaptation/adoption in individual country's unique national contexts • means and ways of exploiting the existing capacity in mathematics and science in Africa that has been created over the past decade
	13:00 – 14:00	Lunch Break
	14:00 - 16:00	Group discussions on: • roles and responsibilities, management structure of the ICQN-MSE and the modalities for partnering and networking
	16:00 – 16:30	Coffee Break
	16:30 – 18:00	Group presentations ((20 minutes presentation and 10 minutes Q&A) x 3 economic communities)
	19:00	Reception/Cocktail
DAY 3	08:30 – 09:30	Group presentations ((20 minutes presentation and 10 minutes Q&A) x 2 economic communities)
	09:30 – 10:30	Wrap-up and way forward
	10:30 – 11:00	Coffee Break
	11:00 – 12:30	Closing Ceremony
	12:30 – 13:30	Lunch Break
	13:30	Tour

5. Expected outcomes

From the discussions on knowledge and experiences shared by countries, regions, organizations and individuals as relevant to teacher policy issues, the following outcomes are expected:

1. Experiences, approaches and strategies on improving mathematics and science education from various countries shared
2. Best-practices for adaptation/adoption in individual country's unique national contexts identified
3. Means and ways of exploiting the existing capacity in mathematics and science in Africa that has been created over the past decade identified
4. Roles and responsibilities, management structure of the ICQN-MSE and the modalities for partnering and networking defined

6. Dates and venue

Dates: May 2015

Venue: Nairobi Kenya

Association for the Development of Education in Africa

Proposed Budget

Activity	Task	Item	No. of participants/ quantity	Unit cost(US $)	Frequency(years/ Months/weeks/ days/ times)	Frequency	Sub-Total US$
Conference Activities	Air travel	Cabinet Ministers	15	3000	1 time	1	45000
		Other Delegates	54	2000	1 time	1	108000
	Airport pick-up and drop-off	Cabinet Ministers	15	120	2 times	2	3600
		Other Delegates	6	60	2 times	2	720
	Local travel	Cabinet Ministers	1	200	1 time	1	200
		Other Delegates	3	135	1time	1	405
	Bed and Break Fast	Cabinet Ministers	15	300	1 time	5	22500
		Other Delegates	54	175	1 time	5	47250
	Conference package	All	110	50	3 times	3	16500
	Dinner allowance	Cabinet Ministers	15	100	4 days	4	6000
		Other Delegates	96	50	3 days	3	14400
	Hire of conference facilities and audio equipment	Conference facility package(1)	1	1200	3 days	3	3600
	Airtime service	Airtime package(1)	6	20	1 time	1	120
	Internet service	1 bundle (250 MB)	2	20	1 time	1	40
	Translation services in conference	Translation package(1)	1	10,300	1 time	1	10,300
	Conference bag and documents	bag	110	25	1 time	1	2,750
		documents	1	1,000	1 time	1	1,000
		stationery	110	3	1 time	1	330
Pre-conference Preparations and post-	Lunch allowance	Secretariat(10)	10	30	1 time	1	300
	Subsistence Allowance	Secretariat (1 PS, director CEMASTEA, director Policy)	3	175	4 days	4	2100
	Subsistence Allowance	Secretariat(7)	7	175	8 nights	8	9800

Activity	Task	Item	No. of participants/ quantity	Unit cost(US $)	Frequency(years/ Months/weeks/ days/ times)	Frequency	Sub-Total US$
conference activities	Stationery	2 pens, a pencil, document wallet, writing materials	10	3	1 time	1	30
	Travel and Transport	1 PS, director CEMASTEA, director Policy	3	300	2 times	2	1800
		Drivers (subsistence allowance)	2	50	12 days	12	1200
		Fuel	2	500	1once	1	1000
	Hire of conference facilities	Meeting room(1)	1	50	7 days	7	350
	Airtime	Air time for coordination of the task	9	20	1 time	1	180
	Internet service	1 bundle (250 MB)	9	5	1 time	1	45
	Translation of documents	Programme (2pages)	2	300	1 time	1	600
		Conference Concept Note (13pgs)	13	300	1 time	1	3900
		Key note speech(10 pages)	10	300	1 time	1	3000
	Media coverage	for the whole conference period	2	1000	2 media houses X 2	4	8000
	Group photo and Video coverage	for the whole conference period	1	1000	1 time	1	1000
	Report Publications		1	1000	1 set of 500 copies	1	1000
GRAND TOTAL							**317,020.00**