PROMOTING MATHEMATICS IN AFRICA THROUGH THE AFRICAN MATHEMATICS MILLENIUM SCIENCE INITIATIVE (AMMSI)

by

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1. BRIEF HISTORY

1.1 Millennium Science Initiative (MSI)

- Formulated and fostered by the World Bank
- **Main Goal**: Promote S&T spearheaded by scientists in the Developing countries
- Administered by Science Initiative Group (SIG)
- Activities in South America and Asia: Brazil, Chile, Mexico, Vietnam etc

1.2 Science Initiative Group (SIG)

- Based in Princeton USA
- Chairman of the Board – Professor Phillip Griffiths
- Executive Administrator – Arlen Hastings
- SIG serves as facilitator and catalyst for establishment of country or regional MSI projects
- Website for more information:
  http://www.msi-sig.org/

1.3 World Bank/SIG Initiatives for Africa

- Meeting in February 2000
- Formation of African MSI Task Force
- Efforts culminating in a meeting in Kampala, Uganda in January 2002
- Priority areas established by the Kampala meeting for initial stage of African MSI:
  - ✓*Instrumentation & Information Technology*
  - ✓*Biotechnology*
  - ✓*Mathematics*

1.4 Formation of the African Mathematics Millennium Science Initiative (AMMSI)

- Writing Group constituted in January 2003 to prepare a draft proposal for the first 5 years of operation of AMMSI

Writing Group Members:

- ✓ Professor Wandera Ogana (Chairman), University of Nairobi, Kenya
- ✓ Professor Edward Lungu, University Botswana, Botswana
- ✓ Professor David Bekolle, University of Yaoundé 1, Cameroon
- ✓ Professor Sunday Iyahen, National Mathematics Centre, Nigeria
- ✓ Professor Leif Abrahamson, Uppsala University, Sweden
- ✓ Dr. Alan Anderson, USA

AMMSI Writing Group Proposal

- 5-Year proposal
- Balancing various activities subject to funding
- Forwarded to SIG in December 2003
- Submitted for funding consideration

1.5 AMMSI GOAL :

Nurture the next generation of African mathematicians and mathematical leadership.

2.

OBJECTIVES AND ACTIVITIES

2.1 The objectives of AMMSI are:

1) To strengthen the teaching and learning of university mathematics and its applications. **(Teaching and Education).**
2) To support research in mathematics and mathematics education, including interdisciplinary research in areas involving application of mathematics. **(Research).**
3) To enhance capacity in mathematics and its applications through linkages, networks and regional/international collaboration .**(Linkages and Networking).**

Contd.

4)To raise general awareness in mathematics and articulate publicly the importance of mathematics to modern nations **(Outreach and Public Education).**

5)To enhance the use of information and communications technology in the teaching, learning and applications of mathematics **(Information and communications Technology [ICT]).**

2.2 Advanced mathematics training and education in the African continent

- Activities meant to be carried out through existing tertiary institutions
- Postgraduate training (M.Sc./PhD; Tutorial Fellows/Graduate Assistants)
- Postgraduate Scholarships
- Postdoctoral fellowships
- In-service training and short courses for university lecturers
- Visiting lectureship programmes
- Acquisition of textbooks, electronic access to journals
- Regional access to postgraduate courses

2.3 Research in mathematics and mathematics education, including interdisciplinary research in areas involving application of mathematics

- Basic and applied research, with special emphasis on multidisciplinary projects
- Planning and design of research projects
- Participation in international research projects involving application of mathematics

Contd.

- Regional conference support
- Access to electronic communication and international journals
- Local and international research mentoring

2.4 Linkages and networking

- Necessary to leverage all available resources
- African Mathematical Union
- African Institute of Mathematical Sciences (www.aims.ac.za/)
- National/regional/international organisations
- Organization/attendance of professional meetings
- Databases and websites, “Clearinghouse of African Mathematics”
- Facilitate exchange of students and staff

2.5 Outreach and Public Education

- AMMSI Prize for excellence in research and distinguished contribution to mathematics
- The African woman in mathematics
- University/government/private sector interaction
- Public lectures and exhibitions that provide non-technical exposition of mathematics
- Mathematics Olympiads (National, Regional, International)

2.6 Information and Communication Technologies (ICT)

- ICT for university research: scientific literature, computing resources, fast internet access etc.
- ICT for university education: computer hardware and software, distance learning tools etc.
- ICT for schools: computers and other technologies etc.

3.ADMINISTRATIV E STRUCTURE

3.1 Distributed network with 5 regional offices, each run by a Regional Coordinator:

- Central Africa
- Eastern Africa
- Southern Africa
- Western Africa (Zone 1)
- Western Africa (Zone 2)

3.2 Programme Committee

Main functions are:

- To Formulate and design programme
- To Write project proposals for funding
- To Implement activities
- To Liaise with collaborating institutions

Current Members :

Professor Wandera Ogana (Chairman), University of Nairobi, Kenya, (Programme Director and Regional Coordinator, Eastern Africa)

Professor David Bekolle, University of Yaounde 1, Cameroon (Regional Coordinator, Central Africa)

Professor Edward Lungu, University Botswana, Botswana (Regional Coordinator, Southern Africa)

Professor Samwel Ilori, University of Ibadan, Nigeria (Regional Coordinator, Western Africa Zone 1)

Professor Mary Niane, Université GastLon Berger de Saint-Louis, Senegal (Regional Coordinator, Western Africa Zone 2)

Miss Petronilla Nduku Masila, (Administrator, AMMSI Programme Secretariat, Nairobi, Kenya)

3.3 Selection and Evaluation Committee

Main functions are:

- To select Fellowship candidates
- To select and evaluate research projects
- To evaluate the operations of AMMSI

Current Members:

- Professor Bernt Oksendal, University of Oslo, Norway (Facilitator)
- Professor Augustin Banyaga, Pennsylvania State University, USA
- Professor Hamidou Toure, University of Ouagadougou, Burkina Faso

3.4 Advisory Board

(Consultations to form are ongoing)

4.ACTIVITIES TO DATE

4.1 Introduction

- Funding from various sources for activities (since 2005)
- Agreement to operate as an autonomous programme of the African Academy of Sciences (March 2007)
- AMMSI conducts its activities through individuals in existing institutions
- Written research proposals in collaboration with others

4.2 Research/Visiting Fellowships

- Awarded 5 Fellowships each in 2005 and 2006
- Fellowship amount US $ 3,000
- Amount increased to US $ 5,000 in 2007
- Online applications implemented from 2007
- Experience on online applications
- 2007 Fellowships applications are being processed

4.3 Postgraduate Scholarships

- Awarded 54 and 57 partial scholarships during 2005 and 2006, respectively, with amounts ranging from US $ 300 to US $ 1,000
- Maximum scholarship amounts raised to US $ 2,000 from 2007
- Online applications implemented from 2007
- Experience on online applications
- 2007 scholarships applications are being processed

4.4 Support of Scientific Meetings

- Conference in Porto Novo, Benin
  - 10 – 17 August 2005
  - Representation Theory in Geometry and Physics
- Conference and Workshop in Nairobi, Kenya
  - 4 – 10 December 2006
  - General Conference followed by Mathematical Biology Workshop
- SAMSA Conference in Windhoek, Namibia, November 2007
- In 2008 to support a conference in Central Africa

4.5 Conference Support to Postgraduate Students

- Funding by the London Mathematical Society
- Each funding supports 2 – 4 postgraduate students
- Postgraduate students supported to attend the following:
  - Conference in Benin, August 2005
  - GIRAGA meeting, Cameroon, September 2006
  - SAMSA Conference, Botswana, November 2006
  - Conference & Workshop, Kenya, December 2006

4.6 Mentoring African Research in Mathematics (MARM)

- Funded by
  - ✓The Nuffield Foundation (from 2005)
  - ✓Also by The Leverhulme Trust (from 2006)
- Initially collaboration was only with UK mathematicians
- Collaboration extended to other European mathematicians from 2006

Contd.

- Main objectives:
  - ✓ Promote mentoring relationships between mathematicians in other continents and sub-Saharan African colleagues, together with their students.
  - ✓ Promote collaboration in mathematical research and in mathematics education
  - ✓ Create joint research projects and cultivate longer-term partnerships between institutions in Africa and those elsewhere

Contd.

- **First call for expressions of interest was in late 2005**
  - ✓11 institutions responded
  - ✓Following selected and are participating:
    - Addis Ababa University, Ethiopia
    - University of Buea, Cameroon
    - Kwame Nkurumah University of Science & Technology, Ghana

Contd.

- **Second call for expressions of interest made in mid-2007**
  - ✓12 institutions responded
  - ✓11 short listed
  - ✓Final decision being made on 5-6 institutions to be supported

5. SUPPORTING ORGANIZATIONS

5.1 Financial support

- Mellon Foundation
- Nuffield Foundation
- Leverhulme Trust
- US National Committee on Mathematics
- London Mathematical Society
- International Mathematical Union (IMU)

5.2 Office space, facilities, or general administrative support:

- Universite Gaston Berger, Senegal
- University of Botswana, Botswana
- University of Ibadan, Nigeria
- University of Nairobi, Kenya
- University of Ngaoundere, Cameroon
- Science Initiative Group (SIG)

5.3 Links and Partnerships

- African Academy of Sciences (AAS)
  - Autonomous programme of AAS
  - Administrative and financial services by AAS
  - Access to African Union countries
  - Joint projects by AAS and AMMSI
- Memorandum of collaboration with AESEDA
  - Alliance for Earth Sciences, Engineering & Development in Africa
  - Coordinated from Penn State University
- Committee member of 2iE

6. WHAT HAS BEEN LEARNT?

6.1 Positive

- Making a difference to professional careers through Fellowships
- Making a difference to academic future through Scholarships
- Enabling staff and institutions in different continents to collaborate through MARM

Contd.

- Providing opportunities for younger researchers to participate in conferences
- Many postgraduate appreciate the partial grants, even though small
- Enabled staff and postgraduate students to write and publish papers
- Provided stimulus for further collaboration

6.2 Room for IMPROVEMENT

- Limited funds, hence small scholarship awards, and lack of diversification of activities
- No major funding of research
- Implementation of online applications problematic in certain countries
- Administrative structure in 5 regions

Contd.

- Lack of strong secretariat – funding constraints
- Incorporating Anglophone-Francophone interaction in administrative structure
- Transfer of funds to awardees -- nightmare
- Slow response by institutions and individuals to announcements
- Slow submission of reports by awardees
- Communication problems – poor

SUMMARY &CONCLUSIONS

- Science and Technology (S & T) provide the tools to address local challenges in agriculture, health, energy and other fields, consequently stimulating innovations that fuel development and economic growth.
- In recognition of the significant role mathematics plays in advancing S & T, there was formed a programme called the *African Mathematics Millennium Science Initiative* ***(AMMSI)*****.**
- During the three years of its existence, AMMSI has awarded scholarships providing partial support to over 150 postgraduate students.

Contd.

- The main objectives of AMMSI include strengthening mathematics teaching, research and applications, and raising general awareness in the importance of mathematics for modern science and modern nations.
- In addition it has also awarded over ten Visiting/Research fellowships to enable staff members take leave from their home institutions and interact with students and staff in other universities.

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- AMMSI has also supported regional scientific meetings and promoted collaboration involving mathematicians from other continents, in order to stimulate training and research, and help build new multidisciplinary partnerships.
- There has been some positive experience for the AMMSI initiative but there is still room for improvement to enable AMMSI achieve most of its objectives

website :

http://www.ammsi.org

THANK YOU

END...