



Mainstreaming Gender in Science Education



Workshop Report

27–28 May 2015

Hilton Hotel

Nairobi, Kenya

GenderInSITE

Gender in science, innovation, technology and engineering

iap SCIENCE
RESEARCH
HEALTH
the intracademy partnership

Abbreviations and Acronyms

AMCOST	African Ministers Conference on Science and Technology
EAS	Ethiopian Academy of Sciences
GenderInSITE	Gender in Science, Innovation, Technology and Engineering
IAP	Inter-Academy Partnership
IBSE	Inquiry Based Science Education
KNAS	Kenya National Academy of Science
MAST	Mauritius Academy of Science and Technology
NASAC	Network of African Science Academies
OWSD	Organization for Women in Science for the Developing World
SAYS	Sudanese Academy of Young Scientists
SEFP	Science Education Focal Point
SEP	Science Education Programme
SEWiST	Society of Ethiopian Women in Science and Technology
SNAS	Sudan National Academy of Science
STI	Science, Technology and Innovation
SWSO	Sudanese Women on Science Organisation
USNAS	United States National Academy of Science
Wfs	Women for Science

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Workshop Objectives

- Inform participants about NASAC activities on Science Education and Women for Science;
- Take stock of the relevant issues in mainstreaming gender in African science education curriculum;
- Exchange information on the value of academies in changing policy perspective so as to make science education gender neutral and mainstreamed;
- Create awareness on the mechanisms that will ensure retention of girls and women in pursuit of scientific careers; and
- Discuss the role of Inquiry Based Science Education (IBSE) in addressing the gender question in science.

Funding and Participation

Funded by the Inter-Academy Partnership (IAP) and the Academy of Science of South Africa (ASSAf) through its GenderInSITE project, the Workshop brought together the NASAC Science Education Programme (SEP) Focal Points and Women for Science (WfS) Working Group. The Organization for Women in Science for the Developing World (OWSD) representatives and members of several academies not serving in the SEP or WfS groups were also in attendance.

Participants Expectations

The participants expected to learn about efforts to mainstream gender in science and in science education. They hoped to discuss the best practices that academies can apply to mainstream gender in their activities to forward the agenda of African development in science, bring about development in science education, and make themselves more visible in science and technology.

The participants intended to glean ideas from the Workshop to use in developing collaborative work and also to draw an action plan to help members of NASAC mainstream gender in science including coming up with strategies to incorporate women at all levels of decision-making.

Overall Agreement by Participants

The term “Gender” includes both men and women. Gender mainstreaming therefore means ensuring that there is equal opportunity and fairness in adjudicating the roles and responsibilities that come with being either male or female.

Executive Summary

This report presents discussions held at a workshop held in Nairobi, Kenya on 27–28 May 2015, to discuss how mainstreaming gender in science education can be achieved in the African context. Funded by the Inter-Academy Partnership (IAP) and the Academy of Science of South Africa (ASSAf) through its GenderInSITE project, the Workshop brought together the NASAC Science Education Programme Focal Points, Women for Science Working Group, Organisation for Women in Science for the Developing World (OWSD), and members of the various science academies. The workshop had seven substantive sessions, and discussions were in the form of twelve Power Point presentations, nine plenary sessions, and group discussions. The group discussions comprised of a World Café activity, a talk show, and group deliberations.

SESSION 1: Opening and Welcome Remarks

Consisted of four opening speeches and three PowerPoint presentations.

Dr Yousuf Maudarocus, Vice Chair of NASAC, noted that the Workshop was a follow up of a meeting held in 2009 in Nairobi, during which national academies agreed to “increase the participation of women scientists in their activities/processes” to achieve gender equity. The KNAS’ Honorary Secretary, Prof. Ratemo Michieka reiterated this same message and recounted major regional conferences that build up the case for gender mainstreaming in science and technology. He said discriminatory social attitudes resulted to the marginalisation of women and girls in scientific activities. To correct this situation, the Government of Kenya, he noted, is keen to implement the national Constitution and Vision 2030, both of which are steering the country towards reversing gender-based inequalities. He urged participants to use the Workshop to generate workable recommendations and action plans.

On her part, Ms Jackie Olang, NASAC’s Programmes Director, reviewed the activities of NASAC in science education and women for science programmes. In this light, she outlined the roles of the Women in Science as well as the value addition expected to accrue from the Workshop. She went on to demarcate the roles of the Women for Science (WfS) Working Group and Science Education Programme (SEP) Focal Points. It was noteworthy that both groups shared concerns of gaining and retaining the girl-child’s interest in science education and pursuing scientific careers. WfS and SEP discussions in the past have proposed reforms to the pedagogical approach in teaching and learning of science. In this connection, she made the case for Inquiry Based Science Education (IBSE). Significantly, the chief objective of the workshop was to find a way for WfS and SEP initiatives to jointly help NASAC deliver more effectively for its members. She also acknowledged the financial contribution provided by IAP and ASSAf through GenderInSITE, which made holding the workshop possible.

In the keynote speech, Prof. Francisca Okeke, a member of the African Academy of Sciences (AAS) based in Nigeria, asserted that science, innovation, and technology were instrumental to the cultural and economic advancement of any nation. Given the role of culture in making for sustainable forms of development, culture needed to be integrated into the learning curriculum of science. Prof. Okeke enumerated several impediments to training of scientists in Africa and gave remedies. To fix these problems, critical investments in the quality and quantity of science teachers and in adoption of novel pedagogies, which stress learning by doing, were necessary. Moreover, the strategies required to enable Africa harness science in its development would be through encouraging indigenous scientific publications and effective application of information, communication, and technology.

In “Science Education/IBSE Enhances Gender Mainstreaming”, Dr. Michael Atchia (MAST) stated that women could realise gender mainstreaming in science through practical science education and greater political participation. The presentation called for changes in

the learning curriculum, specifically the use of IBSE in teaching science. Prof. Ahbor Dolly Ighoroje (WfS/OWSD), through her presentation titled “Women in Science Championing Gender Mainstreaming” highlighted the objectives and activities of the Organisation for Women in Science for the Developing world (OWSD). She also called on countries to bolster the participation of women in science and technology. Ms Dorothy Ngila (WfS South Africa), enumerated the activities of Gender in Science, Innovation, and Technology. The work of GenderInSITE was to improve the lives and livelihood of societies, in a gender-neutral manner, and inspire the contribution and leadership of women in science and technology.

SESSION 2: Experiences in Gender Mainstreaming in Academy Work

The goal of this session was to discuss what academies were doing to mainstream gender in their activities. Several country experiences were given. In Ethiopia, two strategies were used to stimulate the interest of women and girls in science education. An outreach in the form of specific programmes to motivate young school girls to visit research facilities, industries and the like, supported by the Ethiopian Government was conducted, and role modelling had, likewise, been employed. In Nigeria, proactive measures were taken to have more women admitted as Fellows. The Academy did this by requesting existing female Fellows to nominate fellow women. In Senegal, cultural shifts were seen as fundamental to the problem of gender inequality in science, hence the need to act on the harmful expressions of the patriarchal society in the country. The Government of Senegal started programmes that have availed extra resources for women to acquire or access equipment to learn science and to undertake internships. Additionally, the country has implemented IBSE.

In Sudan, there are efforts to increase access of girls to science education at university level and to enhance the capacity of women in undertaking science and technology. In addition, policymakers are being urged to increase career opportunities for women in scientific disciplines. In Zambia, gender mainstreaming was pursued through the application of IBSE. Initiatives by the Government of Zambia to improve investments in the education sector have resulted in more girls taking up science education.

SESSION 3: Addressing the Gender Question in Science Education

This session involved discussions on steps that could be taken to address gender in science education. Speaking on behalf of the ASSAf, Ms Dorothy Ngila, supported the use of IBSE. She also defined obstacles to its effective implementation that needed consideration. ASSAf published a policymakers’ booklet, which aims to advocate for the adoption of IBSE by policymakers in Africa. The booklet had various suggestions on activities science academies could engage in to promote IBSE. Dr Rassul Mussa gave the reflections of the Academy in Mozambique on measures that were taken to achieve gender parity in education. Cited were efforts to recognise scientific research and use evidence-based advice. For Kenya, Prof. Nicholas Twoli shared on reforms in the teaching of science education. He said that Kenyatta University is exploring new ways of looking at the learning curriculum, training of teachers in practical science instruction, and in better engaging female learners, who need more motivation.

In Zimbabwe, Ms Beaula Chipoyera said policies exist that require the strengthening of capacity in science, technology, and the allocation of more time to teaching of science.

SESSION 4: Group Discussions on Pertinent Issues

This was a group discussion. Participants formed three groups to discuss pertinent issues. *Group one* looked at the importance of mainstreaming gender in science education to maximise gender diversity in science. Cultural factors were a major determinant to gender inequality in science. Several recommendations were subsequently made. *Group two* looked at specific gender mainstreaming activities that science academies could implement.

Numerous recommendations were given, ranging from giving student awards, to resource mobilisation, to policy advocacy for more resources and the adoption of IBSE. *Group 3* looked at what NASAC could do to promote gender empowerment through science education at regional levels. Several possible action points were put forward.

SESSION 5: Gender Equality versus Empowerment through Science Education

Participants took part in a panel discussion, during which two questions were posed. The first one was how equality and empowerment can be addressed in both science education and scientific careers. Participants looked at the role of media in either perpetuating or hindering equality or empowerment. The impact of gender mainstreaming on the boy child was also addressed. The second question looked at whether IBSE resulted in gender empowerment, and what lessons could be learned from IBSE studies.

SESSION 6: Models for Integrating Gender Perspective into STI Policies for Education

Plenary discussions on what could be done to influence gender friendly policies at the national, sub-regional, regional, and continental levels. The main action contemplated was the value of engaging policymakers more effectively.

SESSION 7: Synergies that should be Leveraged

Group activity which focused on how to have a cross pollination of ideas and conversations between all participants around three questions. The first one was to elaborate on examples of gender mainstreaming actions that have worked and can serve as success stories for Africa: cases of Kenya, Tanzania, Nigeria, Sudan, and Mauritius. In question two, “How can science-advice and science-diplomacy help in ensuring gender mainstreaming is attained for science education”, was discussed. The third question was about the niche (unique role) that science academies explore/pursue singularly and collectively towards gender mainstreaming in science education. On this matter, several proposals were propounded.

Key Outputs

The Workshop developed numerous action points. Appendix 2 contains the list of the overall workshop recommendations. The Workshop also developed good practices that could be used as learning opportunities. Appendix 3 enumerates these cases. The Workshop was successful in meeting the expectations of the participants, who hoped to learn from existing good practices and to develop a plan of action to mainstream gender in science and develop strategies to incorporate women at all levels of decision-making.

SESSION 1: Opening Session

Moderator: Mrs Noel Abuodha

1.1 Opening and Welcome Remarks by NASAC and Local Academies

By: Dr Yousuf Maudarbocus – NASAC Vice-Chair and MAST President



In his comments, Dr. Yousuf Maudarbocus recounted the meaning of the term “mainstreaming”, which was first used in 1985 during the Third World Conference on Women in Nairobi. He clarified that the term “mainstreaming” values the diversity among men and women whilst aiming towards achieving gender equality.

Dr Maudarbocus lauded the OWSD, one of the largest organisations in the world that advocates for women in science (with a membership of over four thousand), for attending the Workshop. He took note, as well, of the participation of GenderInSITE, which seeks to promote the role of women in science, technology, and innovation (STI) and analyse how it can be used to improve the lives and livelihoods of women. During a workshop held in Nairobi in 2009, he noted that participants strongly recommended that national academies should increase the participation of women scientists in the activities undertaken by national academies.

1.2 By: Prof. Ratemo Michieka – KNAS Honorary Secretary



Prof. Ratemo Michieka echoed Dr. Maudarbocus comments on the importance of the term gender parity, which has been an issue of concern in international conferences, including the 1st Africa Region Conference of Women in Science and Technology held in Johannesburg in 2007. During this conference, the low participation of African women in all areas of science, technology, and innovation was a matter of concern, and member states were urged to create programmes to promote gender equity in science and technology. In a subsequent meeting held in Mombasa, Kenya in 2007, the African Ministers Conference

on Science and Technology AMCOST III, made an effort to embed gender parity. During the AMCOST Conference, stakeholders from national, regional, and international institutions adopted the ambition of securing Gender Mainstreaming in Science and Technology.

African women, Prof. Michieka lamented, were socially marginalised and locked out of decision-making processes. Discriminatory social practices, including limiting their access to education have left women deprived of opportunity to tap their potential. Despite the frustrating situation, women can fight and win. He cited the case of Prof. Wangari Maathai, the 2004 Nobel Prize Laureate. If women are to contribute fully to development, including in science and technology, then barriers to their social inclusion need to be removed.

The Kenya Government, Prof. Michieka further observed, is committed to gender mainstreaming at all levels, in line with demands in the Constitution of Kenya and directives of key policy documents, such as the Vision 2030. As part of its strategic plan, the Kenya Ministry of Education, Science and Technology has drawn initiatives and activities that focus on gender mainstreaming in science, technology, and innovation. Prof. Michieka cited the need for policy measures to deepen and sustain reforms in gender parity in science, technology, and innovation in Africa. In closing, he urged the Workshop participants to exhaustively deliberate on mainstreaming gender in science education and come up with workable recommendations and plans of action that will help make a difference.

1.3 By: Ms Jackie Olang' – NASAC Programmes Director

Ms Olang reviewed the activities of NASAC in science education and women for science programmes as well as delineated the value addition of the workshop. NASAC, she outlined, is an independent network for African Science Academies and exists to provide authoritative science advice for policy formulation in Africa. Its membership of national academies number twenty-one¹. Within this network, there is the African Academy of Sciences, a regional Academy whose membership is made up of individual scientists.



NASAC's main objectives are to:

- Facilitate the establishment of science academies
- Be the voice of science in Africa
- Strengthen existing academies
- Act as an independent platform for credible advice on thematic issues relevant to the continent.

Ms Olang then enumerated the activities of the Women for Science (WfS) Working Group and Science Education Programme (SEP) Focal Points. The former brings together women scientists from all over Africa to boost communication among women in science and facilitate the sharing of experiences and setting of priorities². Some of these priorities identified include:

- Ensuring gender capacity is built into science academies: ideally, women scientists need to be recognised within the structures of science academies;
- Ensuring networking opportunities exist to support and increase the profile of women scientists (most women scientists, who have great scientific accomplishments, are still not recognised); and
- Ensuring female pupils have role models in science to emulate.

Ms Olang said the SEP is served by focal points nominated by science academies, and its core function is to look at the education and science curricula to exchange both practical skills and technical knowledge with specific focus on Inquiry Based Science Education (IBSE). She outlined SEP's priorities as follows:

- Ensure the science curriculum at primary school level is conducive for learning;
- Ensure teachers who train science are scientists;
- Bring convergence between what the science teachers teach and what the scientists see as critical science; and
- Putting critical emphasis on the learning and teaching of science.

Inquiry Based Science Education is vital for making students more interested in studying the sciences.³ Since science advice for policy development is critical, there is a need to share ideas and support public involvement in science. There is need to create an opportunity for academies to interact through networking and ensure the voices of women scientists and education experts are reflected in the science curriculum and in scientific contributions. In delineating the work opportunities for the network, Ms. Olang said the following could be achieved:

- Inter and Intra networking among NASAC members and WfS organisations (e.g. OWSD);
- Mobilising of resources for NASAC and its members to undertake in-country SEP and WfS work;

¹ Cameroon, Ethiopia, Ghana, Kenya, Madagascar, Morocco, Mozambique, Nigeria, Benin, Burkina Faso, Senegal, Sudan, South Africa, Tanzania, Uganda, Zambia, Zimbabwe, Mauritius, Togo, Congo Brazzaville. The AAS (regional Academy) and Secretariat offices are located in Nairobi, Kenya.

² Most science academies have very few women members not just at the leadership positions but also as part of their activities.

³ The science education focal points made recommendations for a survey to be carried out that would determine where African countries and more specifically from NASAC membership are with regards to implementing IBSE within their respective school curricula. The survey is currently on going.

- Inspiring of members to improve communication beyond their academies – contact schools and policymakers;
- Appreciating stakeholder’s views (bottom-up consultation); and
- Developing doable and practicable follow-up actions in the short term.

The Women for Science Working Group and the Science Education Focal Point collaborate in making sure the girl child gains an interest in science education and in science as a career. Importantly, then, the overall objective of the workshop, she said, is to find a way where these two working groups can find convergence and help NASAC deliver better for its members.

1.4 Keynote Address

by Prof. Francisca Nneka Okeke – *African Academy of Sciences*

KEY QUESTION: *Can science education and gender empowerment foster socio-economic development in Africa?*



Prof. Francisca Okeke argued that science, innovation and technology, was the basis for the social and economic advance of any nation. If such advances with ecological preservation were implemented, countries would realise sustainable development. Prof. Okeke highlighted the role of culture in the realising sustainable development. As such, culture and innovation should be integrated into the science curriculum.

There was need, she argued, to be assertive and self-reliant in doing research because most remarkable scientific breakthroughs emanate from research driven by motivation, determination, perseverance, and patience, among others.

Prof. Okeke asserted that physics is the driving force and important index controlling major discoveries of modern man – energy, computer, laser, and communication technologies. She noted too that there were plausible links between climate change; an issue of global concern, and the earth’s magnetic field, as well as cosmic rays, which require fuller scientific inquiry.

She outlined several impediments to the training of scientists in Africa. A major challenge, she noted, has been the view that physics was hard to follow, abstract, and irrelevant. African students need to be persuaded that physics is rewarding, fun and useful in technological development. Having more science teachers, who are dedicated and committed, would spur interest in the subject. There is need as well to address how science is taught to encourage teachers and learners to gain competence in it and contribute to development in science and technology. Some of the strategies that could be employed include the following:

- Creating awareness in society on the importance of learning science in pushing forward civilisation and development through technology;
- Introducing science to children at primary school level;
- Giving students guidance and counselling in choosing their courses/subjects;
- Recruiting qualified teachers to teach science;
- Having workshops, seminars, science film classes, science drama sections, conferences, and so on;
- Creating awareness about science and scientists through the media; and
- Making society understand the role science can play in developing countries.

Prof. Okeke pointed to the role of empowerment and mentoring in getting more people to study science. The teaching of science, she said, must be lively including using tools and resources that will arouse the interest of students. The use of a novel or transformational teaching style would focus on experimentation, and not just theoretical exposition, with the shift in pedagogy holding the promise of cultivating interest in science. There will be need for more science publication by indigenous authors and greater use of Information Communication Technology (ICT) to interest people in science. Other approaches that could

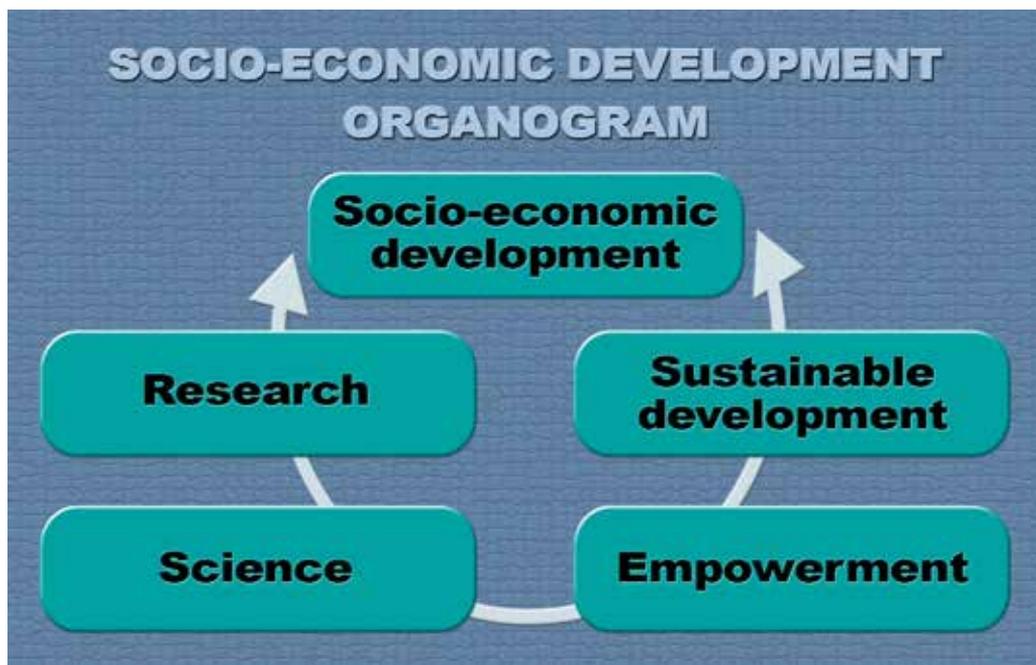


Figure 1: Socio-economic Development Organogram
 SOURCE: Prof. Okeke's PowerPoint presentation

be used to improve interest in science are through outreach efforts, such as workshops, seminars, and creating awards and scholarships.

With regards to policymakers, Prof. Okeke said; policymakers should consider science when drawing policies on science and technology. In conclusion, she noted with concern the fact that few women are participating in development of S&T. If changes outlined above are implemented, she is positive that the situation will improve.

Recommendations:

- There is need to revisit science curricula to enable it reflect African culture;
- Make use of locally available resources for science activities; and
- Employ dedicated and committed science teachers.

Plenary Discussion (Outcomes)

Challenge of Implementation of Workshop Outputs: Concerns were raised on what needs to be done to implement ideas emerging from the Workshop and how they can be dutifully implemented.

Need for an Afro-centric Mentality: African academies need to talk to each other to solve issues on the continent using locally available resources/materials.

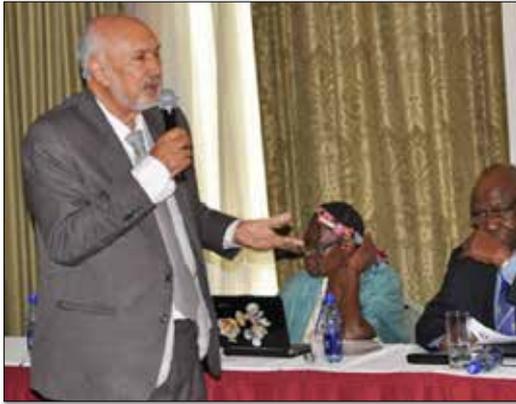
Challenge of Teaching Science: Effective teaching of sciences needs ample resources. Presently, the environment is one of deprivation, which often calls for improvisation in teaching or in doing scientific activities.

Emphasising Practical Research: The late Prof. Wangari Maathai exemplified practical science under the Green Belt Movement. Prof. Maathai combined her role in science with a career in politics.

1.5 Science Education/IBSE Enhances Gender Mainstreaming
by Dr Michael Atchia – Mauritius Academy of Science and Technology(MAST)

In his presentation, Dr Michael Atchia observed that mainstreaming gender and sciences can be positively attained through two approaches. The first one is practical science education, which is result-based (e.g., case of Prof. Wangari Maathai’s Green Belt Movement).⁴ The other one is politics: having more women in politics can make for better outcomes in gender equality. The shift in Mauritius, from a patriarchal society towards a more democratic society, had broadened the space and opportunities for women.

Dr Atchia noted that scientific innovation was gaining considerable attention worldwide. The searching questions then were as follows: (i) how many women are contributing towards



Dr. M. Atchia making his presentation

innovation and (ii) how much does the education system contribute towards innovation. In mainstreaming science education, there will be need to keep reviewing the school curriculum to better meet learning needs, and where necessary, integrate subjects within subjects. People need to be sensitised about IBSE, learning by doing. In IBSE, he noted that students learn through engaging in scientific-oriented questions. Learners prioritise evidence uncovered through experimentation and need to communicate their findings. In short, science education must be practical, and not just theoretical.

1.6 Women in Science Championing Gender Mainstreaming
by Prof. Ahbor Dolly Ighoroje – WfS/OWSD



For Prof. Ahbor Dolly Ighoroje, gender mainstreaming in science education would bring about balance to Science Education and Training and would be a fruit of good policy.⁵ In UNESCO’s “Women 2000 Agenda, gender equality primarily means parity in access to education.

The OWSD calls on all countries to increase the representation and creativity of women in science and technology, which would intensify economic growth, stimulate innovation, and achieve sustainable development. On this premise, science and technology needs to address the needs of women. Prof. Ighoroje

then broke down the objectives of the OWSD, which are as follows:

- Increasing the participation of women in developing countries in scientific and technological research, teaching, and leadership;
- Promoting the recognition of the scientific and technological achievements of women scientists and technologists in developing countries;
- Promoting collaboration and communication among women scientists and technologists in developing countries and with international scientific communities as a whole;
- Increasing access for women in developing countries to the socio-economic benefits of science and technology;

⁴ Research shows that girls in particular are better at subjects where there is a practical application. In Mauritius, girls perform better than boys in the final primary examinations (Girls 79% and boys 70%).

⁵ OWSD is playing a vital role in championing gender mainstreaming in science education and in increasing women’s access to and participation in science, technology, and development.

- Promoting participation of women scientists and technologists in the development of their countries; and
- Increasing the understanding of the role of science and technology in supporting women's developmental activities.

OWSD's activities involve the following:

- Improving access to educational, training, and professional development opportunities for women scientists in developing countries such as OWSD Graduate Scholarship and Fellowship;
- Recognising scientific excellence and other achievements of women scientists and technologists in developing countries such as the Elsevier's Awards for young female scientists;
- Enhancing opportunities and developing strategies for the participation of women in the development and utilisation of new technologies;
- Developing strategies for the participation and leadership of women in national and international science and innovation systems;
- Making science more responsive to the needs of society, especially those of women and women's developmental activities; and
- Promoting the involvement of women in harnessing science and technology for sustainable development.

Towards this end, OWSD seeks to:

- Create more National Chapters (NCs) and grass root chapters within NCs (focusing on Francophone countries)⁶;
- Improve on networking among members in the region;
- Create a strong regional database on female scientists;
- Consolidate the mentorship programme for girls in high school;
- Strengthen capacity building activities among women scientists;
- Promote research through south-south/global collaborations evident through scholarship awards;
- Encourage girl child education and training in science, mathematics and technology;
- Intensify advocacy to influence policies which promotes STEM among girls; and
- Intensify fundraising activities.

She cited the following as impediments towards gender mainstreaming:

- *Socio-cultural*: The culture of science is patriarchal, a worldview that explains the occupational segregation by gender and the glass ceiling phenomena in science. These cultural forces have led to the under-representation of women in scientific and policy-making fora and their participation in science and technology.
- *Low involvement of girls in science education*: There existed a tendency of girls to shun mathematics and physics; instead, they would rather train in education and the biosciences.
- *Gender bias in learning materials*: This has been seen in the phrasing of scientific vocabulary.
- *Misconceptions*: There is a perception that science and technology fields are a masculine domain.
- *Poor science education*: This applies to both primary and secondary school levels.

⁶ There are currently eighteen countries with National Chapters

1.7 GenderInSITE Activities
by Ms Dorothy Ngila – WfS-South Africa



Formally launched in 2009, OWSD South Africa is hosted by ASSAf. Its objectives are to:

- Promote the participation of women and girls in STI.
- Promote scientific and technological development.
- Facilitate access to opportunities for girls and women in STI.
- Popularise and promote STI for the general welfare of South Africa.
- Create linkages regionally, continentally, and globally to support SA STI internationalisation.

GenderInSITE

Gender in Science, Innovation, Technology, and Engineering (GenderInSITE) is an international initiative that raises awareness among decision-makers on the gender and SITE dimensions of development. Its approach to gender in SITE focuses on two aspects: the role of women and men in science, innovation, technology and engineering; and how SITE can be for women and men, or how it can serve women’s and men’s lives and livelihoods. ASSAf through the OWSD South Africa National Chapter implements activities of GenderInSITE southern Africa. UNESCO Africa and Latin America implement the focal point activities in Eastern Africa and Latin America respectively.

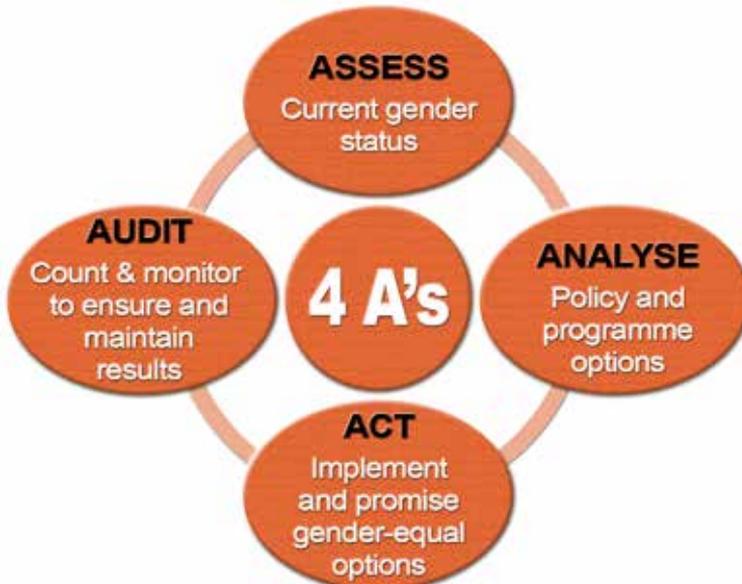


Figure 2: Gender Assessment
 SOURCE: Ms. Ngila’s PowerPoint presentation

Ms Dorothy Ngila gave the following objectives of GenderInSITE:

- Raising the awareness of policymakers in science institutions, academies and other decision-making bodies about the gender dimension of SITE for sustainable development;
- Demonstrating key issues and sectors how a gender analysis of SITE can improve development;
- Providing research and knowledge to inform policy and programming; and

- Promoting the use of gender assessment to reveal the differential impact of SITE on the lives of women and men.

Outlined below is the ranked proportion of women researchers in various regions in the world as outlined by Ms. Ngila.

1. 44% for Latin America and the Caribbean
2. 43% for Central Asia
3. 40% for Central and Eastern Europe
4. 38% for Arab States
5. 32% for North America and Western Europe
6. 29% for Sub-Saharan Africa
7. 20% for South and West Asia
8. 20% for East Asia and the Pacific

The African region was ranked sixth (29%), out of eight world regions. She also brought to the attention of the workshop participants that girls and women face both vertical and horizontal inequalities. Vertical inequalities refer to the fact that women are not advancing into leadership and decision making at the same rate as men are⁷ while horizontal inequalities refer to the fact that women and girls still lag far behind in engineering and technology and some other natural sciences in higher education.

In conclusion, she noted that GenderInSITE seeks to demonstrate how gender analysis of STI can lead to improved development. It highlights women's transformative role in development and shows how science and technology can support women and men. It emphasises women's contributions to science and promotes their leadership to SITE. She also highlighted a project where gender dis-aggregated data was being collected to reflect on women's participation in science academies. Finally, she reported that the strategic focus area of GenderInSITE was to work with the Southern Africa Development Community (SADC) and African science academies in implementing its activities.

Plenary Discussions (Outcomes)

Affirmative Action in Politics: In Mauritius, 30% of seats in the village and town councils are reserved for women. To make headways in academies, concessions or affirmative action might be desirable.

Gender-Friendly Selection Policies: In Kenya, the adoption of liberal admission criterion for specialised science courses has increased the enrolment of women in Sciences, Engineering, Architecture, Mathematics, Physics, Medicine, among other faculties. This approach is fair because the female students meet the minimum entry requirements of university education.

At the University of Dar es Salaam, in Tanzania, bridging courses (8 weeks) afford girls the opportunity to enter the Faculty of Engineering. This remedial action was taken in recognition of the difficulties girls faced balancing responsibilities at home and in schools. Following this move, some girls achieved high scores, above the minimum entry requirements. When the playing field is level, girls can match the performance of boys in science. An even playing field would include having boys and girls with equal access to teaching material and having female teachers in science. Once these structural challenges are dealt with, there will be no reason for lowering of admission marks for girls into university.

Pedagogical Considerations in Teaching Science: Science is made more interesting when taught practically. Still, practical teaching approaches are time consuming and could achieve their benefits of deepening learning at the cost of the breath of learning. This could be either an advantage or disadvantage to the curriculum.

⁷ About 17% of heads of universities in South Africa are men (as of 2011), while in the US the figure stands at 23% (as of 2006)

Aversion to Career in Science: In many African countries, girls prefer biological sciences to chemistry, physics, or maths, preferences that often reflect the biases of their parents. The inclination of girls in their preferences is slowly changing.

Barriers to Women's Participation in Academies: There is need to create incentives to spur more women to join research academies.

Low Science Contribution in Africa: Only 10% of science is being done in Africa. There is need to work together and pool resources to move Africa forward through science.

Key Considerations:

- What should be done to implement the resolutions made at this workshop?
- What can be done to address the constraints in girls accessing secondary education?
- We need to pay attention to the cultural and societal forces that define the problem of girls in relation to science education.

Recommendation: It is critical for African governments to fund science, technology, and research. In South Africa, the National Research Foundation funds primary research and is the key tool for funding research – the government has committed 1.5% of its GDP to research and development by 2020.

Session Conclusion

In summary, this session affirmed the pivot place science plays in development. It pinpointed the problems and opportunities related to mainstreaming gender in education.

SESSION 2: Experiences in Gender Mainstreaming for Academy Work

Moderator: Prof. Victor Gadzekpo, GAAS

AIM: To discuss what academies are doing to mainstream women in science using country experiences?

2.1 Ethiopian Academy of Science by Prof. Yalemtehay Mekonnen

Prof. Yalemtehay Mekonnen gave the experience of the Ethiopian Academy of Sciences (EAS) in encouraging the participation of women/girls in science, technology, and innovation. She also spoke about measures to reinforce the networking of Ethiopian women in science and technology fields. Thanks to the actions of the Ethiopian Government, the current ratio of females enrolled in universities is about 30 percent.



Launched in 2010, the Academy seeks, among other objectives, to enable women and other underprivileged and marginalised groups to participate in and benefit from scientific works and discoveries. Only (7.4%) of its Fellows (n = 145) and (3%) of its Associate Fellows are females. To grow its membership of young female scientists, the Academy established the Ethiopian Young Academy of Sciences in 2015, with a membership of 24 males and 3 female scientists.

On top of this, an affiliate of the Academy, the Society of Ethiopian Women in Science and Technology (SEWiST), encourages Ethiopian females to participate in national development through involvement in science, technology, research, and innovation.⁸

Programmes

SEWiST is involved in “the Girls Day”, which is held every year and supported by the Ministry for Science and Technology. This outreach effort seeks to encourage girls to join the sciences or engineering fields. In addition, SEWiST involves role models in the respective fields. SEWiST has held its first Annual Conference in the role of Science, Technology, Engineering, and Maths for Development in December 2014.

Challenges

Cultural hindrances and peer pressure are among some of the reasons young women are not ascending to the top of their professions.

Recommendation

There is need for a concerted effort towards mainstreaming gender and giving women more attention.

⁸ This was initiated by the country's Ministry of Science and Technology.

2.2 Nigerian Academy of Science by Prof. Oyewole Tomori



The Nigerian Academy of Science (NAS) is an offshoot of Science Association of Nigeria (SAN), which was established in the 1950s. Upon its establishment, the membership fellowship number was capped at 100 members, a rule that remained until 2009. The first female joined NAS in 1980, and the second member joined in 1997. Currently, the gender distribution of NAS is as follows (92%, $n = 194$) males and (8 %, $n = 16$) females. These figures suggest that science is not a career choice for most women, and majority of male fellows nominate fellow men into NAS, and the areas of specialisation in which women are underrepresented.

To improve gender balance, the Academy will seek-out eligible female candidates for nomination. Proactive action taken about the nomination of women, include sending emails to all female members to nominate one of their own as a Fellow.

2.3 Academie des Sciences et Techniques du Senegal by Prof. Yaye Ken Gassama



Prof. Gassama highlighted measures being taken to attain gender equity in science education. In Senegal universities, there are strong disparities between boys and girls ratio in science and technology (13–20% girls in science training). Girls tend to perceive mathematics and physics science as difficult or too theoretical, experiences that dampen their interest in the subject. To correct this pedagogical infirmity, Senegal has applied the IBSE pedagogical approach in 20 schools in rural and urban areas. Coupled with the training content, then, education in science and technology has been heightened. Although the

use of role models is powerful, it has been weighed down by the scarcity of well-known female scientists or engineers. The other measure being used is to create awareness on science education by using a National Caravan, an outreach effort that runs through different cities to create awareness in young people about science and technology and promote a scientific culture.

In 2012, at the National Agency for Applied Scientific Research, an 800-m² platform was created named ARESA BIOPOLE. The objective of the move was to encourage technological enterprise creation among young men and women from diverse backgrounds. Senegal has programs for women scientists: it allocates research grants that enable female practitioners to strengthen their scientific and technological capacity through internships and study trips abroad. It also allocates grants needed for acquiring scientific material and research equipment.

To fully mainstream gender, women need to fully participate at all decision-making levels. Other approaches required, to this end, include laws to deal with adverse cultural practices, which validate the discrimination of women. There would be need, too, for a practical approach to the teaching of science. The expected impact of these measures is to give girls and women more self-confidence, a greater say in the economy, and greater social recognition. These interventions are the basis for sustainable and equitable development.

2.4 Sudanese National Academy of Sciences by Prof. Fathia Abdel Mohamed

In Sudan, Prof. Fathia Abdel Mohamed noted that a survey carried out showed that at least (50%) of women are enrolled in scientific faculties, with the number of female students exceeding that of male students in the biological disciplines. However, the number of women doing engineering and technology remains low.



Approaches taken by SNAS:

- Encouraging women education by supporting programmes for women students before they join university.
- Encouraging women to take up scientific research in various fields of environmental sciences, ecology, and toxicology.
- Establishing and initiating activities that increase recognition of women in science education.
- Encouraging women to overcome cultural, social and other barriers that hinder their career advancement in both public and private sectors.
- Working on programmes that might proceed with women in science education through various public lectures, seminars, and workshops.
- Promoting and facilitating the participation of women in science and the capacity building for women in science and technology.

SNAS is working on programmes to inspire women to take up science education and do scientific research, through affiliations with organisations like the Sudanese Academy of Young Scientists (SAYS) and the Sudanese Women in Science Organisation (SWSO). It is creating learning projects for the development of organisation's resources and training women and young scientists in various scientific and academic careers. It is advising decision makers to increase career opportunities for women in various scientific disciplines.

2.5 Zambia Academy of Sciences by Ms. Chisha Chongo Mzyece

Ms. Chisha Chongo Mzyece talked about the approaches taken by the Zambia Academy of Sciences towards ensuring equal participation of females in science courses to include hosting the IBSE workshop for girls in 2012, which sought to promote female enrolment in science education. At this workshop, the IBSE policymakers' workbook was launched. This action should see the grounding of IBSE in Zambia. A study conducted in 2012 showed that the levels of inquiry in science education in Zambia were low because IBSE was not part of the curricula of many schools.



Tremendous efforts on the national level have been made by the Zambian government and the private sector through the construction of more universities and colleges. Through the growth of public and private institutions, the government has been refining the quality of that education. These actions have resulted in increased enrolment in higher education, including of girls.

Plenary Discussion (Outcomes)

Clarification on Goal of Attaining 40% Female Enrolment in Science Education in Zambia: There were concerns this figure was over ambitious, hence the need for clarification.

Obstacles to Women Thriving in Science: In Sudan, the number of male lecturers exceeds that of women seemingly because women as assistant professors stop publishing papers (to advance to associate professor) due to family responsibilities and because women are not aggressive in seeking research funding.

Involvement of Policymakers: The Ethiopian Academy holds workshops to disseminate the results of consensus studies. At these forums, policymakers are invited to attend and are briefed accordingly. Some of these consensus studies target primary education. Policymakers need to be involved in all stages of the process.

Monitoring Implementation of Recommendations: Academies should not just pass on the results of consensus report to the government; instead, they should monitor the government's implementation of reports.

Mental Shift among Girls: Girls need a renewal of mind in relation to their common belief that they are incompetent to succeed in learning maths, physics, or science. They need to be assured that they can succeed in these disciplines.

Session Conclusion

In wrapping up, this session presented the measures being taken by academies to realise gender mainstreaming in science activities. The session also elaborated the roles governments and academies can take, in this regard.

SESSION 3: Addressing the Gender Question in Science Education

Moderator: Dr Saimo-Kahwa Margaret, IUNAS

3.1 Academy of Science of South Africa by Ms Dorothy Ngila

The presentation highlighted a case study carried out by ASSAF focusing on IBSE for girls, which was finalised in 2012 and that led to the publication of a policymakers' booklet titled "Increasing Participation of Girls in Science in sub-Saharan Africa".



When IBSE is implemented in a gender sensitive manner, both boys and girls are afforded equal opportunities to ask questions and carry out investigations, and therefore their experiences in science education are improved. IBSE plays a critical role in both attracting girls into science and instilling a love of science. It works by relating science to practical activities. IBSE plays a critical role in encouraging uptake of science education for girls for the following reasons:

- It is learner centred;
- It focuses on developing information processing and problem-solving skills;
- It emphasises on "how we came to know what we know";
- Learners are involved in construction of knowledge;
- There is an assessment on progress of skill development and content understanding;
- There is use of resources beyond the classroom and school; and
- There is learning through experimentation.

Challenges in implementing IBSE for girls in sub-Saharan Africa:

- Girls lack science role models and mentors within their families and society at large;
- Poverty limits the ability of girls to access education; and
- Social and cultural factors discourage girls from taking up science subjects, and in some cases, keeps them from school altogether.

The Policymakers' Booklet provides policymakers with information on how IBSE can help increase the participation of girls in science and mathematics.⁹ The booklet contains the following three key messages for policymakers:

- Endorse the integration of IBSE into the school curricula and support pilot projects to introduce IBSE into schools;¹⁰
- Lobby for the implementation of IBSE in training institutions and approve financial and other resources for developing teachers in IBSE; and
- Lobby for gender mainstreaming in science and mathematics teaching, advocate for increased career guidance for girls on science careers and encourage the implementation of role modelling and mentoring programmes.

The booklet seeks to debunk some myths about science education for girls, some of which include the mistaken view that boys are smarter than girls, and that the latter cannot do well in science. To get girls interested in science, the booklet outlines the following approaches:

- Exposure to successful female role models and mentors in the STEM subjects;
- Structure science-related activities and experiments so that girls can explore, explain, extend, and evaluate their progress;
- Build girls' mathematical skills during early education; and
- Bring "girl-friendly" instructional resources to class.

⁹ A key product was a workshop that was held in Pretoria that brought together representatives from different academies from both Africa, Europe, Australia and America.

¹⁰ In South Africa, IBSE has been introduced especially where the science academy is based in Pretoria.

Key recommendations made in the booklet:

For Girls:

- Lobby for gender mainstreaming in science and mathematics teaching;
- Sensitise teachers on teaching methodologies and activities to ensure equal participation of girls and boys;
- Advocate for increased career guidance for girls in science careers; and
- Encourage the implementation of role model and mentoring programmes aimed at girls.

For Science Academies in Africa:

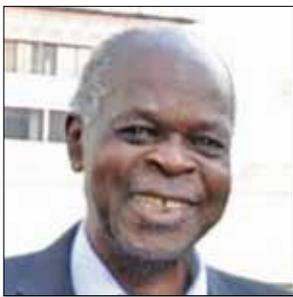
- Lobby governments to adopt IBSE;
- Assist governments in consolidating information on IBSE;
- Identify monitoring and evaluation mechanisms for implementing IBSE; and
- Provide evidence-based policy advice to governments on IBSE – its features, successful contextual implementation, advantages, and disadvantages.

3.2 Academy of Sciences of Mozambique by Dr. Rassul Mussa Nala



The Academy of Sciences in Mozambique has made great efforts in addressing the issue of gender imbalance in science education. It has promoted science education and the recognition of science research. It has also supported evidence-based advising of policymakers by scientists.

3.3 Kenyatta University by Prof. Nicholas Twoli



Prof. Twoli shared on how the Kenyatta University is approaching the teaching of student teachers and how the university is handling gender issues. The approaches being undertaken when teaching science are described below:

- The approach: Girls are more visual learners. To be effective, a teacher will therefore need to be more practical. Boys are responsive to most of the approaches e.g. lecture time.
 - Boys are better at learning science when teaching methods require thinking in space and relating the ideas, when using a lecture or expository method than girls.
 - Teaching girls needs to be visual and experimental – they prefer to see the evidence of any experiment.
- *Diligence (persistence):* Concepts of science can be difficult to absorb. Girls tend to be less resilient than boys, who are more likely than the former to keep trying and reflecting on the problem until they get answers.
- On training teachers, there is a focus on teaching in progression, from easy-to-hard to maintain interest and keeping the motivation of students high.
- *Gender sensitivity in use of motivation:* Unlike boys, girls need more motivation.
- *The science curriculum:* In Africa, most of it is based on the subject design (no other options). The curriculum has a broad span but limited choices of subjects. It should allow for learning general sciences for functional purposes, and not necessarily the hard science subjects.

- Family support is critical.
- *Training of science teachers in the way of application:* This approach requires universities to have adequate resources to reinforce this. Many universities may not have these kind of resources. Another aspect is the need for supporting resources towards improvising of skills like making models, mini labs, science kits, integrating information technology, and so on.
- *Mathematical ability in supporting science learning:* Mathematical ability is a function of learning science; what makes mathematics a function is the interpretation of the rule or concept and applying it.

3.4 Zimbabwe Academy of Sciences by Ms. Beaula Chipoyera

In Zimbabwe, the Gender Policy (2013–2017) aims to promote equal access to education for boys and girls and keep high retention rates of girls at all levels of education. In 2012, the Ministry of Science, Technology, and Development launched its 2nd Policy Position that has six major goals. The goal in Policy 1 is to strengthen capacity development in science, technology, and innovation. This means pupils in primary and secondary school should spend at least (30%) of their overall time studying subjects in science. Policy 2 calls for practical experiments that explore the background experience of students and encourage interest across gender.



Studies suggest girls in secondary school can perform as well as, if not better than, boys in chemistry, biology, and geography. The results showed, however, a significant drop in the number of girls or women at the tertiary level in science-related fields, such as engineering and natural sciences.

This gap widens more at the Masters and doctoral levels. These trends led to the Ministry of Science, Technology, and Development to embark on collaborative efforts to have initiatives that will help bring about an improvement in the uptake of science related subjects by girls at secondary level and subsequently science-related careers at the tertiary level especially in natural sciences and engineering.

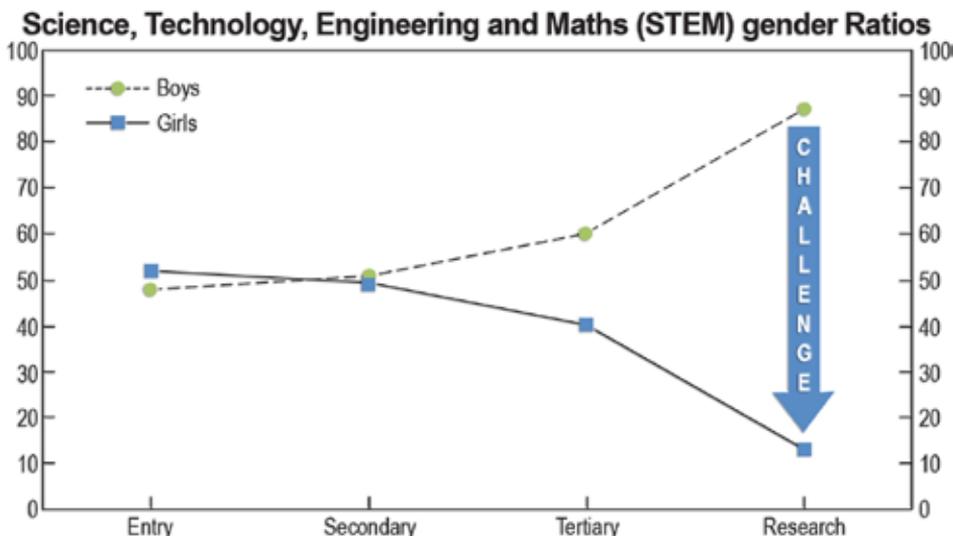


Figure 3: STEM gender ratios

SOURCE: Ms. Chipoyera’s PowerPoint presentation

Key Learnings:

- Girls need the confidence of parents and teachers to sustain an interest in science education.
- The introduction of science subjects needs to be introduced when learners are young.

Approaches towards increasing science participation:

- Scaling up of provincial competitions to recognise outstanding females in science subjects.
- The society for engineering technology in Africa has setup a foundation that is in 11 schools. In these schools, the teachers teach children practical engineering and how to build electronic models. Currently, there are more girls enrolled in this programme than boys.
- The Ministry of Primary and Secondary Education is introducing science subjects (biology, chemistry, and physics) at primary level.

Plenary Discussions (Outcomes)

Family and Vocational Tensions: When reflecting on career paths of women, there is need to look at the challenge women face balancing their family and vocational commitments, which make it harder for women to focus on their studies or research as related to men.

Justification for Pedagogical Approaches (Gender Differentials) in Teacher Training at Kenyatta University: The gender differences about learning are based on both biological and socialisation theory, though the former model is more applicable. The reflections on gender differentials flow from research and are supported by experience in training and through observation. Even so, these reflections may have limitations. In other research settings, studies show little differences in terms of impact in the use of gender-sensitive pedagogical approaches, especially at the primary or basic level. To understand better the causal mechanism, extra research in other environments would be welcome. Such investigations would establish the presence and significance or weight of confounding factors, such as gender, religion, and so on.

Gender and Curriculum: There is need to draw a curriculum to reflect the introduction of science education at the primary level.

Possibilities of Integrated Science in Kenya: The learning approach to be implemented in school has to start with an objective – what needs to be achieved or attained and this goal needs to be justified. The learning approach in Kenya is through subject design, and it is justified based on lessons drawn from other countries with a similar approach to learning. If a country is to develop scientifically or industrially, then it needs to embrace the subject design approach to learning. The integrated science approach is treated as a service curriculum. This approach should instead be geared to achieving high-tech or industrial development. Countries that had initially embraced integrated science are now moving towards the subject design approach because of these reasons.

Early Exposure to Science in Zimbabwe: This approach is immensely powerful. It will help participate in the development of women in science and technology in Africa. Other countries in Africa need to emulate this approach and hire curriculum specialists to draw suitable curricula for science courses in primary schools.

Role Modelling by Professional Women: Successful women scientists, who have made it in their profession, by balancing both family and professional life, need to share their experiences with young and upcoming women scientists.

Role of Parents in Science Education of Girls: Parents can be instrumental to encouraging girls to take up science education. In particular, mothers can be exposed to the nature and benefits of science education.

Progress on Application of Booklet: A pilot was done from 2013 to 2015 in Pretoria with a focus on implementing the IBSE approach in more than 10 schools in that area and focusing on both girls and boys. In 2015, a review of the project would be undertaken to outline the successes and lessons learnt in this regard.

Status of Free Education: In Mozambique, education is free up to the second level. Some universities provide free education.

Criterion for inviting women scientists to be members of the Academy in Mozambique: they need either to have a PhD or be honorary members.

Session Conclusion

This session enumerated the practical steps academies are taking to reform the manner in which science is taught. The section contains good practices on how to achieve better learning outcomes in science education.

SESSION 4: Group Discussion on Pertinent Issues

Moderator: Mr Christian Acemahl, USNAS

In this session, group discussions were held and participants discussed the following questions:

- Why is it important to mainstream gender in science education and maximise gender diversity in science?
- What specific gender mainstreaming activities can science academies implement?
- What can NASAC do to promote gender empowerment through science education at regional level?

4.1 Group Feedback

GROUP 1: *Why is it important to mainstream gender in science education and maximise gender diversity in science?*

RESPONSE: *To mainstream gender in science, it is vital to address the factors that lead to gender imbalance. Below are some of the factors:*

- Traditional cultural beliefs and practices: These factors underpin gender roles and manifest in the following cases: when parents unconsciously encourage girls to take courses of short duration so as not to miss marriage; when parents suggest that mechanical jobs are for boys; when parents elect to remove girls, rather than boys, from schools ostensibly because girls would get married;
- Traditional patriarchal societies perceive female children as minor contributors to the economy;
- Society perceives educated girls as uncontrollable. This attitude discourages girls from taking long courses and dissuades them from pursuing postgraduate studies. Such training opportunities are perceived as making women ineligible for marriage;
- Teachers discourage girls from taking up subjects such as mathematics or engineering on the ground that such subjects are masculine;
- Fellow male peers believe girls are unable to handle fieldwork and are best suited for “softer” work, such as working in the university or in a research institute; and
- School textbooks portray boys as role models in science while girls are portrayed as models in soft courses, such as teaching or nursing. Books should be gender inclusive, portraying both boys and girls favourably.

Recommendations:

There is need for the following:

- Robust policies that tackle the factors discouraging girls to take up science subjects;
- Learning manuals should motivate and encourage girls to take up science subjects;
- Teachers should be prepared to provide practical-based teaching. They should be motivated through better remunerations;
- More women in decision-making positions are required to facilitate the inclusion of girls into science;
- Culture to be integrated into science education;
- Science competitions that brings about value and have practical usefulness;
- Dedicated teachers who are equitably distributed by gender; and
- Provide young girls career guidance and motivational talks with female role models in science.

GROUP 2: What specific gender mainstreaming activities can science academies implement?**Recommendations:**

- Give awards to best students in science, female or male, at primary, secondary and tertiary levels;
- *Networking*: This can be promoted by establishing synergies between different academies with interaction held via the Internet. This approach will allow for experience sharing between academies and help advance science education.
- *Inter and Intra Collaboration of Women Scientists*: This can help strengthen the NASAC women science group and be a mechanism for individual research collaboration.
- *Resource for Mobilisation*: Academies can mobilise resources through (i) collaboration or strategic partnerships with key strategic global organisations, (ii) writing proposals, and (iii) Public Private Partnerships (PPP). These resources can be used by academies, and their partners, in implementing gender-mainstreaming programmes.
- *Women Chapters*: Academies should establish chapters/commissions or committees for women members to promote increased participation of women in science. These Chapters can be used to advocate for women participation in science and technology as well.
- *Equipment Provision*: Academies can champion or advocate for the provision of equipment by different stakeholders towards supporting universities, schools, and research institutions.
- Advocating for IBSE through championing it as best practice for teaching science, training teachers and inputting into school curricula as has occurred in Nigeria, Kenya, Sudan, Mauritius, Tanzania, and so on.
- Provide evidence-based studies that will come up with recommendations for policymakers.

GROUP 3: What can NASAC do to promote gender empowerment through science education at regional level?**Recommendations:**

- NASAC to recommend to all national academies to follow or pursue the policy of 30% positions to be filled by women, including encouraging more women to be nominated as fellows;
- Sensitise member academies on gender mainstreaming in science education through workshops or seminars to share ideas and highlight regional experiences or best practices;
- Engender current NASAC working document(s) on strengthening and establishing science academies;
- Compile a document on the importance of applying the gender lens in science education;
- Encourage academies to transform research into development – suitable for policies;
- Urge new academies to be gender sensitive from the onset;
- Encourage academies to facilitate admission processes of fellows/members to eliminate gender disparities – standardised guidelines for admission;
- Educate through the collection of gender disaggregated data and educate academies via gender budgeting;
- Showcase best practices in other countries outside of the continent, e.g. cases of the Chinese Academy of Sciences, Indian Science Academy, and the AAAS; and
- Assist in funding since some environments are not conducive for conducting or coordinating research, e.g. socio-cultural and infrastructure problems.

Plenary Discussion

Lagos Plan of Action: The OAU in 1980 issued the “Lagos Plan of Action” which stated that 1% of countries GDP should be allocated to science research.

The Guidelines on the Formation of Academies: If this document was mainstreamed it should provide guidance on the formation of new academies.

Session Conclusion

This session brought out discussions on why gender mainstreaming of science education and women in science is justified. Action points and recommendation needed to propel the effort to mainstream gender in science education and activities were also highlighted.

SESSION 5: Gender Equality vs Empowerment Through Science Education

This session took the approach of a “talk show” whereby panellists were selected from the audience and were engaged to discuss key issues. The host of the “talk show” was Mr Christian Acemah from USNAS.

QUESTION 1: *How can equality and empowerment be addressed in both science education and scientific careers?*

List of Panellists left to right:

Dr Rassul Mussa Nala – *Academy of Science of Mozambique*

Prof. Yaye Ken Gassama – *Academy of Science of Senegal*

Ms Chisha Mzyece – *Zambia Academy of Sciences*



RESPONSE:

QUESTION	RESPONSE
<p>(1) <i>How can equality and empowerment be addressed in both science education and scientific careers?</i></p>	<ul style="list-style-type: none"> i. There is need to have <i>positive attitude</i> towards gender mainstreaming because it is a protracted process and will involve many groups of people at all levels, including government, the education system, etc. A positive mind is therefore essential. Example – Senegal has a critical mass of young people in secondary school. Efforts are, therefore, being made in many areas for gender mainstreaming with programs for girls being introduced – initiatives are there, political will is there and good strategies exist. ii. There is need to address the cultural antecedents of social inequality. All need to be addressed as they influence the different roles of men and women. Without this being carried out effective empowerment may not be achieved. iii. Since the mind-set shift is very difficult, there is need to identify what can be applied to change mind-sets towards issues of gender differences. Parents and teachers need to tell girls that they can learn science. Such encouragement will give girls self-confidence to pursue science careers. This also means the mind-set of girls from a young age needs to be nurtured towards making them have positive perspectives towards life and sciences.

QUESTION	RESPONSE
	<ul style="list-style-type: none"> iv. Pursuing equality -this can be translated to mean exposing students to the same opportunities and resources, which would help bring the best out of them. v. Teachers need to be provided with tools, training and ample rewards for motivation purposes. vi. Recognition of achievement in science research, and the sharing of benefits of research. Researchers should be recognized in their contribution to communities and to women. vii. Empowerment of women and girls in science education and scientific careers: women and girls need to be encouraged that they can balance both family and a career in science. viii. Men are the decision makers and Policymakers. Fathers play a critical role in encouraging their sons and daughters, e.g. to take up science at school. Teachers in science education are most likely to be male than they are female. Their role in encouraging girls' participation in science education and taking up higher education should be defined. Policies need to be alive to the influential roles men and fathers play. There is need therefore for a strong statement to be drafted on the <i>male voice</i> in encouraging girls to take up science education. RECOMMENDATION: Role of men – dads are critical in encouraging their children to take up sciences. ix. There is need for economic power and recognition: This should be an index of successful mainstreaming. x. Girls need to be economically empowered to take charge of their own careers and make possible gender mainstreaming.
<p>(2) <i>What is the role of the media in perpetuating or hindering equality and empowerment?</i></p>	<ul style="list-style-type: none"> i. Empowerment is linked to visibility. How do we give visibility to research? There are 21 academies carrying out different forms of research and publication research. To give visibility to this research, NASAC may need to hire a research and publication officer to produce a compendium of all research done by the 21 academies in the continent. It will give a good reflection of who is doing what in terms of research and at the same time create visibility and help towards gender balance.
<p>(3) <i>In encouraging empowerment and equality in terms of opportunity and fairness for the girl child are we in the process endangering boy child?</i></p>	<ul style="list-style-type: none"> × For effective change to happen, efforts should be gender neutral.

In science education, equality seems to hinge on bringing on board parents, especially fathers, to encourage their children to be interested in science education. Concerning scientific careers, women need to be made to believe they can balance their family and vocational commitments effectively with adequate support.

QUESTION 2: Does IBSE result in gender empowerment? Lessons from IBSE studies undertaken as well as experiences of people engaged in IBSE.

List of Panellists left to right:

Prof. Yalemtehay Makonnen – *Ethiopian Academy of Sciences*

Dr Michael Atchia – *Mauritius Academy of Science and Technology*

Prof. Nicholas Twoli – *Kenyatta University*



RESPONSE:

QUESTION	RESPONSE
<p><i>Does IBSE (Inquiry Based Science Education) result in gender empowerment? Lessons from IBSE studies.</i></p>	<ul style="list-style-type: none"> • The answer is ‘Yes’, and this assertion is based on practical experience. <ul style="list-style-type: none"> – How is this done? Introduce IBSE (learning by doing) into the pedagogy of teaching. This leads to empowerment of both men and women; as such, it is not a gender issue. The other form of learning, “chalk and talk”, only empowers the teachers. – The modern way of teaching science involves people working in groups, making inquiries and learning by doing. – Empowerment helps a person to make use of his/her ability to achieve something. IBSE is therefore an approach towards empowering both men and women. • In principle, IBSE is effective in science education. In young people, it will bring about curiosity and interest in the subject. Basic knowledge is best internalized through practical experience. Gender mainstreaming will therefore help strengthen the boy and girl child towards having an open attitude and surface their strengths and capabilities. • IBSE is used in many developed countries because of its many advantages: (i) it is gender sensitive, (ii) it leads to better retention, (iii) it empowers an individual with skills resulting in economic benefits. • <i>Implications of IBSE:</i> (i) it is an expensive mode of learning in terms of training teachers and needed resources. It was launched in Kenya with great successes for several years but was discontinued because of its high running costs.¹ The dilemma facing developing countries is: can IBSE be sustained? • Curriculum development: Many African countries have gone with the decision to run with a programme that can be sustained albeit with continuous improvement. • How can IBSE address the gender question in science? Is there evidence?

Plenary Discussions (Outcomes)

Merit of IBSE: The traditional approach of teaching science education is problematic for girls in a number of ways some of which are about the way the curriculum has been developed and the pedagogical approach. When IBSE is adopted, it shifts focus from a teacher-centred approach to learner-centred one. Learning resources are made accessible to girls, which stimulates their interest in science education.

Cost-Benefit Analysis of Programme: If an approach can be found on how to sustain the programme, the benefits of the programme will certainly outweigh its costs. In the case of South Africa, the Academy has been implementing IBSE gradually for the last three years in township schools in Pretoria and Johannesburg. The costs of implementation involved transportation of ASSAf members to schools: this expense was unavoidable because these members were the ones involved in training the teachers (on a volunteer basis). Access to the schools was, however, guaranteed by government.

In terms of checking costs, the ASSAf members looked at what the children could bring to class from their environment for use during practical subjects. This approach helped bring down the cost of the programme. The Academy has been able to cater for the costs quite adequately through this approach. Another approach to counter the cost and make the programme sustainable would be to use existing programme but emphasise the pedagogical aspect.

Cultivating Support of Government to work with Academies to Achieve Change: Government support can be nurtured through effective use of the media to educate and inform the public on pertinent issues. Through the media, the government can be made to listen and support to the case academies are making. The buy-in of government ministries for IBSE could be won by making use of reliable and good evidence that shows the efficacy of larger programmes. This can be capitalised in countries where education reforms happen every so often. There is thus need for hard evidence. The Ethiopian Academy of Sciences carried out a study to examine the problem of elementary education in the country. The results pointed out the key issues and the successes achieved. Evidence-based consensus studies are, therefore, one way of sensitising policymakers as well as involving them in the processes.

Curriculum Implementation: The inquiry approach can have two options for implementation: through a pilot study or through existing programmes. The vision of the school of tomorrow is to start with an open-ended curriculum that is student driven (present in Japan) where both men and women have an equal chance.

Session Conclusion

The session discussions gave ideas on how gender equality and empowerment might be achieved in science education and scientific careers. The discussions also reviewed evidence about the efficacy of the IBSE. There is reason to believe using IBSE makes for better learning outcomes. The challenge facing African countries is, nevertheless, one of sustainability, given the higher costs needed to run this learning approach.

SESSION 6: Models for Integrating Gender Perspective into STI Policies for Education

This session involved a Plenary Discussion on what needs to be done to influence gender-friendly policies at the National, Sub-Regional, Regional, and Intercontinental levels. The following is the feedback on action to be taken:

LEVEL	ACTION
<i>Policy Level</i>	<ul style="list-style-type: none">• Involve Policymakers in debates at various forums so that they may learn and input insights into existing policies.
<i>National Level</i>	<ul style="list-style-type: none">• Highlight or consider gender as a cross cutting issues across all sectors in the country. Make planners aware about gender mainstreaming at all levels including at the community.
<i>Sub-Regional Level</i>	<ul style="list-style-type: none">• Ensure that there is numerical equality or gender balance about policy makers, which then would result in policies being gender friendly.
<i>Regional Level</i>	<ul style="list-style-type: none">• Policymakers need to be made aware of or sensitised to apply the gender lens.
<i>Intercontinental Level</i>	<ul style="list-style-type: none">• Many countries need to do a major educational reform.

SESSION 7: Synergies that should be leveraged

Moderator: Prof. Valemtehay Mekonnen, EAS

7.1 World Café Group Activity

The objective of this activity was to have a cross pollination of ideas and conversations between all participants around three questions. Each question had a separate table and an assigned facilitator to chair the conversations. Participants were expected to move around each of the three tables and contribute to the subject matter under consideration.

Discussions centred on the following three questions:

- Elaborate on examples of gender mainstreaming actions that have worked in your experience and can serve as success stories for Africa.
- How can science-advice and science-diplomacy help in ensuring gender mainstreaming is attained for science education?
- What niche (unique role) can science academies explore/pursue singularly and collectively towards gender mainstreaming in science education?

Participants Feedback

QUESTION	RESPONSE
<p><i>Elaborate on examples of gender mainstreaming actions that have worked in your experience and can serve as success stories for Africa</i></p>	<p>KENYA</p> <ul style="list-style-type: none"> • The project involved giving HP computers to high school students to integrate ICT in learning. The results of this project showed that (i) students were motivated to learning through the use of ICT leading to better exam performance, (ii) enrolment increased in choosing subjects of physics and chemistry by 20%, (iii) gains were recognised more in girl schools than in boy schools. • The impact of this project led the Kenyan Government to see that the integration of ICT in science teaching is positive because it increases achievement, motivation, and enrolment. This led to the expansion of the programme through provision of additional computers into the project. The government formed an institute “CEMASTER” to improve the teaching of science and mathematics in the country. • The government has instituted a policy that all schools should be encouraged to integrate ICT in science learning. <p>TANZANIA</p> <ul style="list-style-type: none"> • ISSUE: The number of girls attaining the cut-off points to study the sciences such as engineering was low. Remedial examinations were introduced so that if they passed then they would get admission to study engineering. This approach leads to an increased number of girls making the cut-off points and is accepted to study engineering. • This intervention was earmarked for girls as affirmative action to boost women in engineering. <p>NIGERIA</p> <ul style="list-style-type: none"> • Scientific demonstration workshops were organised regionally which eventually led to (i) teachers and students getting motivation in learning science, (ii) students have acquired skills and demystified the technologies and teaching aids – which are now being locally produced in schools.

QUESTION	RESPONSE
	<p>MAURITIUS</p> <ul style="list-style-type: none"> Parliament passed a law to make education compulsory from children aged 5–16 years. This has led to a 100% attendance. Environmental studies have been introduced to children aged between five and eleven years. For secondary school, a science subject is studied. This has resulted in all students being able to study science.
<p>How can science-advice and science-diplomacy help in ensuring gender mainstreaming is attained for science education?</p>	<p>SCIENCE DIPLOMACY</p> <ul style="list-style-type: none"> Science Diplomacy: This is using science as a tool in diplomacy, whereby scientists of different countries collaborate on a project hence bringing together two countries. Example: climate change discussions have brought many countries (even those who have political differences) around a discussion table. It can help countries learn and share best practices from each other and adopt it in gender mainstreaming. It can be used as a tool in dealing with issues in teaching, learning, and research by encouraging collaboration across states, regardless of gender. <p>SCIENCE ADVICE</p> <ul style="list-style-type: none"> This is the use of scientific evidence from research to inform policy choices or advice policymakers. It can be given directly or through the media. <i>Science-advice</i> and <i>science-diplomacy</i> can help in ensuring gender mainstreaming for science education is attained in the following ways: <ul style="list-style-type: none"> It can help provide the necessary scientific evidence based to a subject matter e.g. on (i) IBSE on gender mainstreaming for governments and policymakers to consider, (ii) on the quality of teachers running the IBSE programme, (iii) bringing together the role of indigenous languages to the fore of science education, (iv) bringing out the real issues of gender imbalances and providing practical solutions to those, and (v) providing a mechanism to promote gender mainstreaming across all levels.
<p><i>What niche (unique role) can science academies explore/ pursue singularly and collectively towards gender mainstreaming in science education?</i></p>	<ul style="list-style-type: none"> How academies can infuse gender mainstreaming in their mandate and how they structure their programmes especially to educate others on gender mainstreaming. By highlighting best practices, academies can provide evidence-based certification for gender mainstreaming. National academies should be visible in their respective countries to stakeholders and communities so that the role they play can be known. To encourage university research units to focus on gender mainstreaming in science education. Academies need to write proposals to funding bodies or request government to provide funding to implement IBSE. Having discussions with Parliamentarians on gender, science, technology, and innovation as well as in science education. NASAC can play the following roles: <ul style="list-style-type: none"> Communicate with the Council of Ministers at the AU level and get them to understand the importance of gender mainstreaming in science education. Carry out a survey of academies that promote gender mainstreaming in science education, and where this is not present, ensure implementation. Draw up a working document on guidelines for uniformity by academies in the area of gender mainstreaming in science education.

Plenary Discussion (Outcomes)

Best Practices: Makerere University has an affirmative action programme for girls at the time of their admission into university. Girls are given 1.5 bonus points towards their total points. This action has bumped up the number of girls joining the university including those studying science.

A fund that provides college fees for needy girls.

The university has a gender mainstreaming division whose objective is to gender mainstream all areas of the university – faculties or staff.

Session Conclusion

This session has outlined country cases of good practices that are likely to lead to gender mainstreaming.

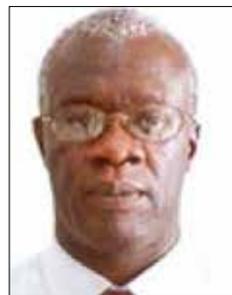
SESSION 8: Closing Session

Moderator: Prof. Nelson Sewankambo Vice-Chair, NASAC and President, UNAS

8.1 Closing Remarks by NASAC's Vice-Chair

Prof. Sewankambo challenged all academies present to ensure that they deliver on the workshop recommendations. He further urged all members of the academies present to ensure that they make the academies vibrant and well known in their countries and seen as the place to go to in order for science advice.

He urged all participants to reflect on the report that was discussed at the Annual Meeting of African Academies in Kampala (2014) that focused on mind-set shifts. This report he emphasised would be helpful towards mainstreaming gender in science education. As an example of gender mainstreaming, Prof. Sewankambo stated that Makerere University adopted this approach in the Faculty of Law and at one point (70%) of the students were female. In closing, he urged all participants to continue with the discussions on gender mainstreaming.



8.2 Vote of Thanks by Participants

Countries represented thanked the organisers for the very well organised and informative workshop. The following are some of their comments concerning the workshop:

“Recommendations made should be implemented”

“A great experience on learning different practices on the area of science education for purposes of forming links”

“Experiences shared will take Africa to the next level”

“An amazing workshop: Take up action points forward; let’s communicate electronically and start networking.”

“Academies should put in place gender mainstreaming towards changing the mind-sets of people that hinder girls in progressing in science.”

8.3 Vote of thanks by NASAC's Programme Director

In her concluding remarks, Ms Jackie Olang listed the following as her take home messages from the workshop:

Intentional action is paramount. All participants should resolve to change the systems – “the change I want to see begins with me”. She urged all participants (as individuals and as academies) to come up with the changes they would want to see and the recommendations to make it happen.

The existing feedback mechanism needs to be enhanced, e.g. through a form that each member can fill out showing what they have done with information received from the Gender Mainstreaming Workshop.

Ms Olang thanked the NASAC board members present, members of the Science Education Focal Point, the Women for Science Working Group, and each of the participants for making the workshop possible and successful. She called on all participants to keep alight the discussion on gender mainstreaming in science education.



Mainstreaming Gender in Science Education Participants Group Photo

Appendix 1: List of Participants

	NAME	COUNTRY OF ORIGIN	EMAILS
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23	Ms Chisha Chongo Mzyece	Zambia	<i>chischo83@yahoo.com</i>
24	Ms Beaula Chipoyera	Zimbabwe	<i>bchipoyera@gmail.com</i>
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26	Ms Karen Odongo	Kenya	<i>karenkimberly7@gmail.com</i>

Appendix 2: Overall Workshop Recommendations

ISSUE	RECOMMENDATIONS
<i>Approaches towards increasing participation of girls in science</i>	<ul style="list-style-type: none"> • Introduce mentoring programmes at the primary school level to enable young people harness sciences from an early age • Encourage empowerment of young people in pursuing science subjects – through, e.g. awards. • Recruit qualified and motivated science teachers. • Educating communities on the important role science plays in society.
<i>School curriculum and pedagogy of teaching</i>	<ul style="list-style-type: none"> • Identify challenges or reasons why schools in communities shun science education and come up with approaches of overcoming them. • Structure science activities and experiments so that girls can explore, explain, extend, and evaluate their progress. • Revolutionise science-teaching methods by adopting learning by doing approaches – science needs to be inquiry based and hands on. • Constantly review school curricula to make them more appropriate for learning science-taking cognizance of new areas of learning & research. • Include culture in the science curricular.
Role models	<ul style="list-style-type: none"> • Make known successful female scientists –role models as a way of encouraging younger girls to follow suit. • Create regional databases of women scientists for networking purposes between. academies • Appreciate the role of the media.
Advocacy	<ul style="list-style-type: none"> • Have in place advocacy activities towards influencing policies to promote STEM among girls. • Need for advocacy towards government for increased allocation of funds towards science research. • Engage regional bodies (EAC and ECOWAS) and continental bodies (AU) to identify the key focus areas and ensure that they support governments support academies. • Key role in encouraging academies to develop strategies for change in school curriculum in their countries. • Academies advocating for the application of the gender lens in science education policymaking and implementation.
NASAC to promote gender empowerment	<ul style="list-style-type: none"> • Sensitise member academies on gender mainstreaming in science education through workshops or seminars to share ideas and highlight regional experiences or best practices. • Engender current NASAC working document(s) on strengthening and establishing science academies. • A document on the importance of applying the gender lens in science education. • Encourage academies to transform research into development – suitable for policies. • Urge establishing academies to be gender sensitive from the onset. • Encourage academies to facilitate admission processes of fellows/ members to eliminate issues of gender disparities – standardised admission guidelines. • Educate through the collection of gender-disaggregated data and educate academies gender budgeting. • Highlight best practises in other countries outside of the continent, e.g. Chinese Academy of Sciences, Indian Science Academy, and AAAS. • Assist in funding since some environments are not conducive for conducting or coordinating research, e.g. socio-cultural and infrastructure problems.

ISSUE	RECOMMENDATIONS
<p><i>Approaches to be taken by Science Academies towards gender mainstreaming</i></p>	<ul style="list-style-type: none"> • Promote networking between academies. • Resource mobilization through collaboration or strategic partnerships, PPPs. Resources would be used to implement gender-mainstreaming programmes. <hr/> <ul style="list-style-type: none"> • Creation of women chapters in Academies to help promote and advocate for increased participation of women in science. • Academies can champion or advocate for the provision of equipment by different stakeholders towards supporting universities, schools and research institutions. • Advocating for Inquiry Based Science Education (IBSE) through championing it as best practice for teaching science, training teachers and inputting into school curricula. Example in Nigeria, Kenya, Sudan, Mauritius, and Tanzania. • Provide evidence-based studies that will come up with recommendations for policy makers.
<p><i>Recommendations made from talk show session</i></p>	<ul style="list-style-type: none"> • Appreciating the role of fathers in encouraging their children to take up sciences. • There is need for economic power and recognition: This should be an index of successful mainstreaming. • Girls need to be economically empowered to take charge of their own careers to make possible gender mainstreaming.
<p><i>Synergies to be leveraged</i></p>	<ul style="list-style-type: none"> • There are best practices around the continent that can be compiled by academies and NASAC. • Use science advising and science-diplomacy: <ul style="list-style-type: none"> – Countries collaborate on science education projects – Learning and adopting best practices from other countries – Exchange visits by science teachers between countries • Niche for Academies; convening power, consensus studies, develop guidelines for mainstreaming gender activities in science education.

Appendix 3: National Good Practices and Programmes

COUNTRY	GOOD PRACTICES / PROGRAMMES
<i>South Africa</i>	African governments should fund science, technology, and research. In South Africa, the National Research Foundation funds primary research. The government has committed 1.5% of its GDP to research.
<i>Ethiopia</i>	The Academy through the Society of Ethiopian Women in Science & Technology (SEWiST) is involved in “the Girls Day”, an outreach effort supported by the government that seeks to encourage girls to join the sciences or engineering fields.
<i>Nigeria</i>	<p>Scientific demonstration workshops were organised regionally which eventually led to greater interest in learning of science. Students have acquired skills and demystified the technologies and teaching aids – which are now being locally produced in schools.</p> <p>To improve gender balance, the Academy plans to nominate eligible female candidates. The Academy takes a proactive stance, which includes inviting its female members to nominate one of their own as Fellows.</p>
<i>Sudan</i>	<p>SNAS is working on programs to encourage women in science education and scientific research through affiliations with science organisations for youth and women.</p> <p>It training women and young scientists in various scientific and academic careers.</p> <p>It is advising decision makers to increase career opportunities for women in various scientific disciplines.</p> <p>Private schools started science project competitions in lower primary, an initiative the government has now picked up and included it in the country’s curriculum. This has led to young children, boys and girls, seeing science as fun both.</p>
<i>Zimbabwe</i>	Early Exposure to Science: This approach is immensely powerful. It will help participate in the development of women in science and technology in Africa.
<i>Uganda</i>	<p>Makerere University has an affirmative action programme for girls at the time of their admission into university. Girls are given 1.5 bonus points towards their total points. This has bumped up the number of girls joining the university including those getting to study science.</p> <p>There is a fund that provides college fees for needy girls.</p> <p>The university has a gender mainstreaming division whose objective is to gender mainstream all areas of the university – faculties and staff.</p>
<i>Kenya</i>	<p>The government has instituted a policy that all schools should be encouraged to integrate ICT in science learning. This step was taken following evidence of the positive impact of ICT in learning outcomes.</p> <p>The cut off point for admission for girls, who had attained the minimum qualification for entry to university, was lowered to increase the number of women taking science courses.</p>
<i>Tanzania</i>	To increase the number of girls who attained the cut-off points to study the sciences such as engineering, remedial examinations were introduced.
<i>Mauritius</i>	Environmental studies have been introduced to children aged between five and eleven years. For secondary schools, Integrated Science is compulsory for all for the first 3 years and at least one science subject later. This has resulted in all students being able to study science.

(Footnotes)

¹ *Initiated and supported by the British government this project was named School Science Project (SSP) and was piloted in 10 girl schools and 20 boys schools. The results of this project showed that girls obtained interest in science and begun performing better in the subject.*

² *It would be useful to capture more success stories from all over Africa.*



The Network of African Science Academies (NASAC) was established on 13th December 2001 in Nairobi, Kenya, under the auspices of the African Academy of Sciences (AAS) and the InterAcademy Panel (IAP).

NASAC is a consortium of merit-based science academies in Africa and aspires to make the “voice of science” heard by policy and decision makers within Africa and worldwide. NASAC is dedicated to enhancing the capacity of existing national science academies and champions the cause for creation of new academies where none exist.



As at December 2014, NASAC comprised of the following twenty-one members:

- African Academy of Sciences (AAS)
- Académie Nationale des Sciences, Arts et Lettres du Benin (ANSALB)
- Académie Nationale des Sciences du Burkina (ANSB)
- Cameroon Academy of Sciences (CAS)
- Académie Nationale des Sciences et Technologies du Congo, Brazzaville (ANSTC)
- Ethiopian Academy of Sciences (EAS)
- Ghana Academy of Arts and Sciences (GAAS)
- Kenya National Academy of Sciences (KNAS)
- Madagascar National Academy of Arts, Letters and Sciences
- Mauritius Academy of Science and Technology (MAST)
- Hassan II Academy of Science and Technology, Morocco
- Academy of Sciences of Mozambique (ASM)
- Nigerian Academy of Science (NAS)
- Académie Nationale des Sciences et Techniques du Sénégal (ANSTS)
- Academy of Science of South Africa (ASSAf)
- Sudanese National Academy of Sciences (SNAS)
- Tanzania Academy of Sciences (TAAS)
- Académie Nationale des Sciences, Arts et Lettres du Togo (ANSALT)
- Uganda National Academy of Sciences (UNAS)
- Zambia Academy of Sciences (ZaAS)
- Zimbabwe Academy of Sciences (ZAS)

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