Making Science and Technology Attractive to Girls

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OUTLINE OF PRESENTATION.

• Can women do Science, Technology, Engineering and Mathematics (STEM)?
• Why Science?
• What are women’s challenges?
• What can we do to get girls to STEM?
Women as Scientists
Historical Perspective

• Traditionally – Woman in brewery, baking;
  (fermentation technology)

• Traditional Medicine;
  (indigenous knowledge systems and midwifery)

• Food production and preservation;
  (Agriculture and post harvest technology)

• Basketry, weaving and traditional home design;
  (Mathematics, Geometry and Chemistry)
Women as Scientists
Nobel Prize Laureates.

- **Physics**: G. Goeppert-Mayer 1963; M. Skodowska 1903
The Science Gender Gap

• Real and worldwide phenomenon;
• Degree varies depending on localities and culture;
• Common in schools, public sector STEM careers;
• Research and Development output of girls;
• ICT/internet usage by girls.

Narrowing in some countries but global pace slow.
Women as Scientists?

Variability theories.

• an **innate** difference between girls and boys’ STEM ability that affects differences in achievement and participation.
• Biological – genetic, hormonal, structural;
• Psychological.

No scientific proof advanced, to date.
STEM and Development.

- Knowledge based economy;
- R&D critical for cutting edge innovation;
- Innovation – continuous and leads to improved competitiveness of products globally;
- Global marketplace requires productive sector based on quality, novelty and diversity;
- National Survival depends on harnessing of all productive human resources (men and women);

Humanity’s largest brain drain.

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Why the lag? – Stereotypes.

• Socio-cultural norms – affect Attitudes, beliefs, aspirations, self assessment;
• ‘Stereotype threat’ influences individual performance, national sex differences;
• Gendered labour division - results in gender gaps in STEM interest, participation level and performance;
• May be due to bias – implicit and explicit.

Worse in patriarchal societies.

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What hinders Girls from STEM-1

• A disenabling environment;
  - legislation or poor monitoring,
  - Education system- access, curricula, teaching material,
  - Teachers’ and parents’ poor support,
  - sexual harassment and violence.

• Multiple roles of girls/women;
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What hinders Girls from STEM-2

• Lack of Role Models, Mentors;
• Fear to handle equipment;
• Lack of motivation, self esteem and encouragement, ;
• Reproductive health challenges – teenage pregnancies;
• poverty, violence, harassment .

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Narrowing the Gap – Botswana schools.

• Primary: generally slightly more girls– out perform boys in Science, Social science, Mathematics, English, Setswana;

• Junior Secondary: girls marginally out perform boys in Mathematics, boys better than girls in integrated science;

• Senior Secondary: male learners generally lead in performance in Physics, Chemistry and Biology, Mathematics.

• University (FOS-2004): enrolment- 1044 males and 340 female learners, 646 males in Physics and only 340 girls in Physics.

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Positioning Women for Equity in STEM-breaking the glass ceiling.

• **Start early** – at home, pre-school, primary, secondary, tertiary;

• **Educate** and **popularise STEM**- repair the “leaky pipeline”, the attrition rate in STEM;

• **Use a comprehensive approach** that includes all stakeholders;

• **Reduce the gender inequality index**- to remove constraints.

• **Lobby for change** in legislation and support.

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Broad Strategies – get all involved!:

• International bodies - UN, Commonwealth, regional bodies (AU, SADC) etc – Declarations, commitments, guidelines, systems;
• NGOs - experience and networks - government/people link;
• CBOs – outreach capabilities - grassroots involvement.

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NATIONAL STAGE.

• Legislation – Government policies on equal access to education/training, hiring, promotion, retention and in STEM programs specifically and provision of infrastructure;
• Institutional determination/commitment;
• Society/family/individual commitment to STEM;
• Publicise disaggregated statistics on women’s participation in STEM;
• Educational activities – open day, science fairs, competitions, field trips, science clubs; science clinics.
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NATIONAL STAGE - cont.

• **Education** – using all mass media – radio, TV, press, internet-social networks;
• **Curriculum** – inclusive even at teacher training level;
• **Funding** girls’ education and awards;
• **Research** – cutting edge and include women’s specific needs/challenges;
• **Positive affirmative action**;
• **Career** guidance and counselling, mentorship, job shadowing, career books, women scientists’ biographies;
• **School visits** – inform, encourage, inspire, motivate on STEM and give them self confidence.
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Let us Change:

GLASS CEILING
MIND YOUR HEAD
The ideal.

Breaking the Glass Ceiling

MIND YOUR HEAD