Making Science and Technology Attractive to Girls

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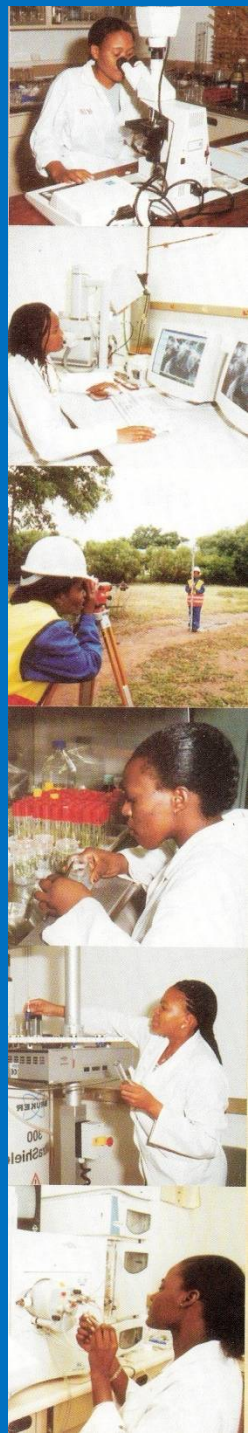
Botswana



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?

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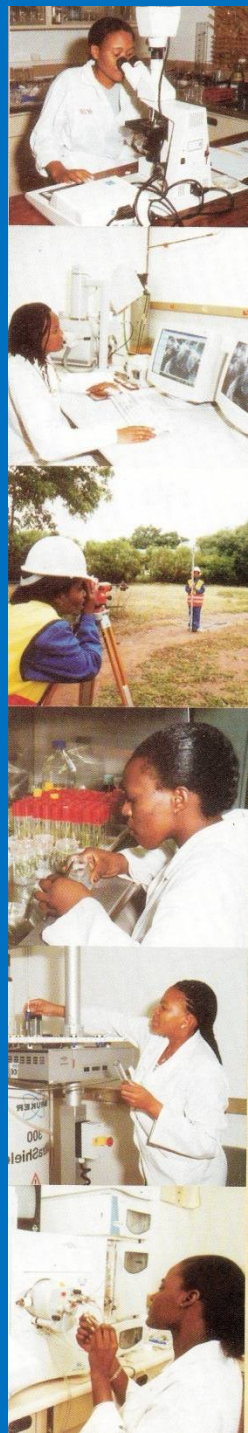


Women as Scientists
Historical Perspective

- **Traditionally – Woman in brewery, baking;**

  (fermentation technology)

- **Traditional Medicine;**

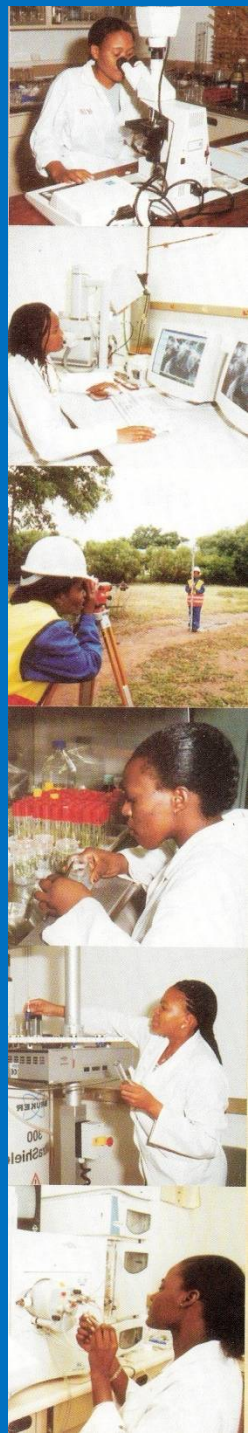
  (indigenous knowledge systems and midwifery)

- **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.

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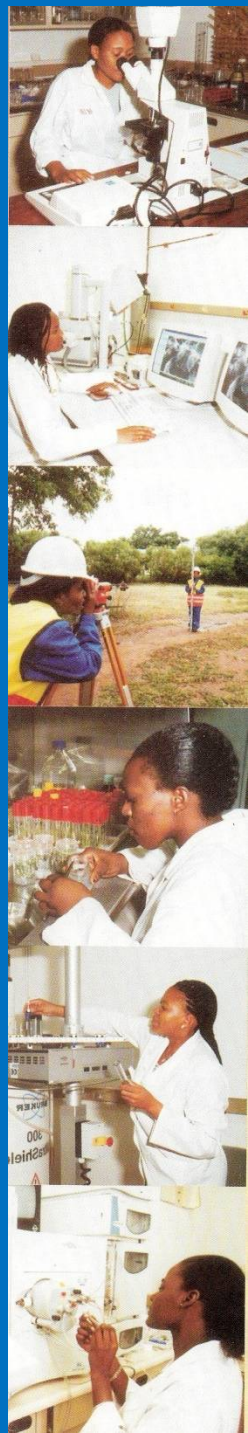
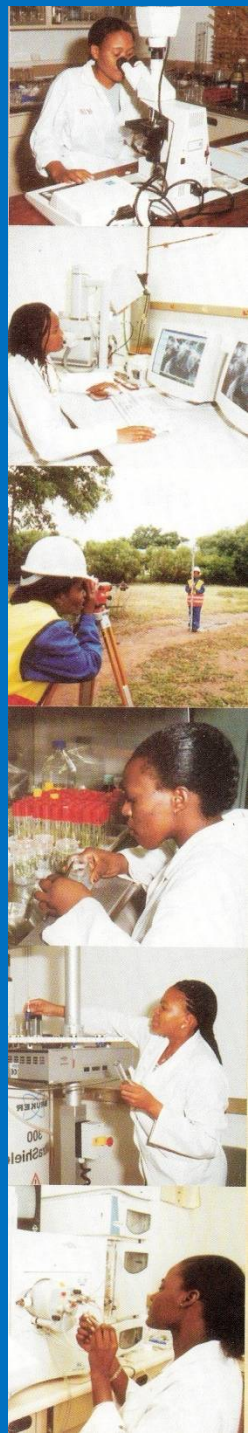
- **Chemistry**: M. Curie – 1911; I. Juliot-Curie 1935; D. Crawford Hodgkin 1964; A.E. Yonah 2009.
- **Physics**: G. Goeppert-Mayer 1963; M. Skodowska 1903
- **Medicine**: G.T. Cori 1947; R.S. Yalow 1977; B. McClintock 1983; R. Montalcini 1986 G.B. Elion 1988, C. Nusslein-Volhard 1995; E.H. Blackburn & C.W. Greider 2009.



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.

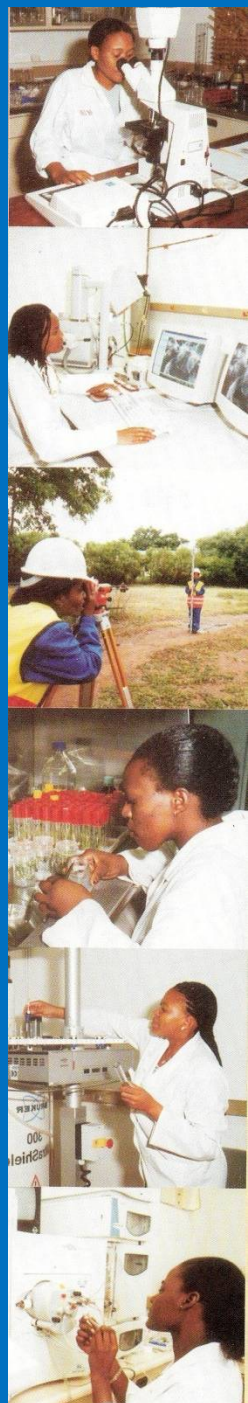


Women as Scientists?

Variability theories.

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

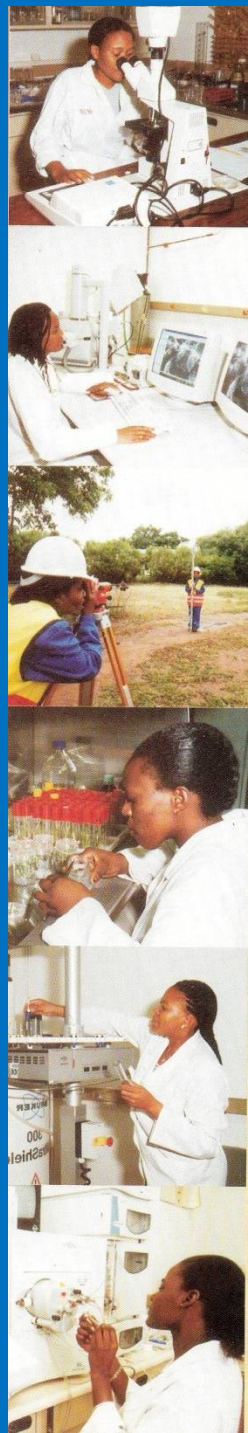
No scientific proof advanced, to date.



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);

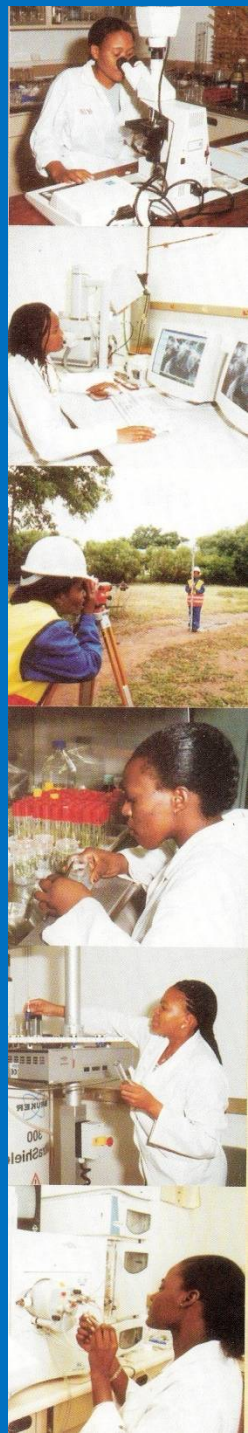
Humanity's largest brain drain.



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.

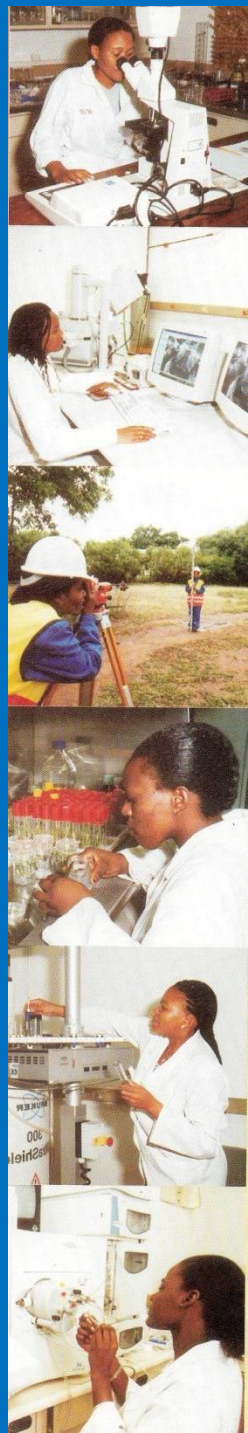
Worse in patriarchal societies.



What hinders Girls from STEM-1

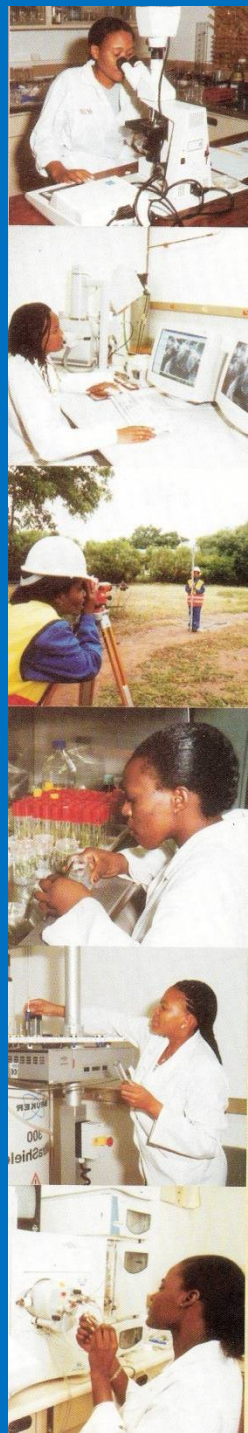
- A disenabling environment;
  - -legislation or poor monitoring,
  - -Education system- access, curricula, teaching material,
  - -Teachers' and parents' poor support,
  - -sexual harassment and violence.

- Multiple roles of girls/women;



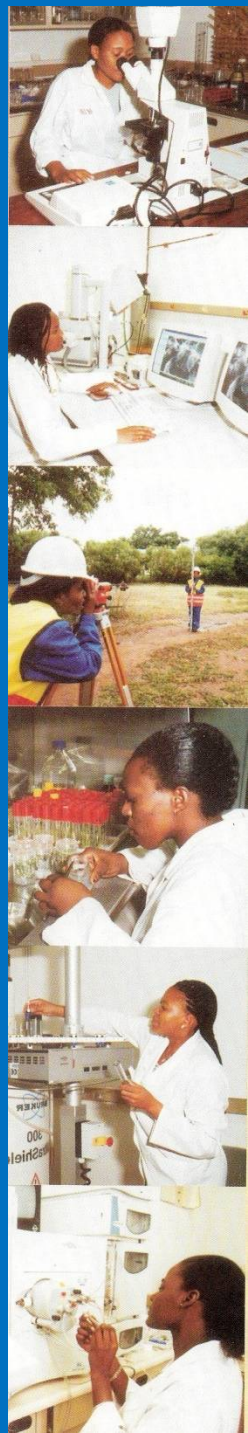
What hinders Girls from STEM-2

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



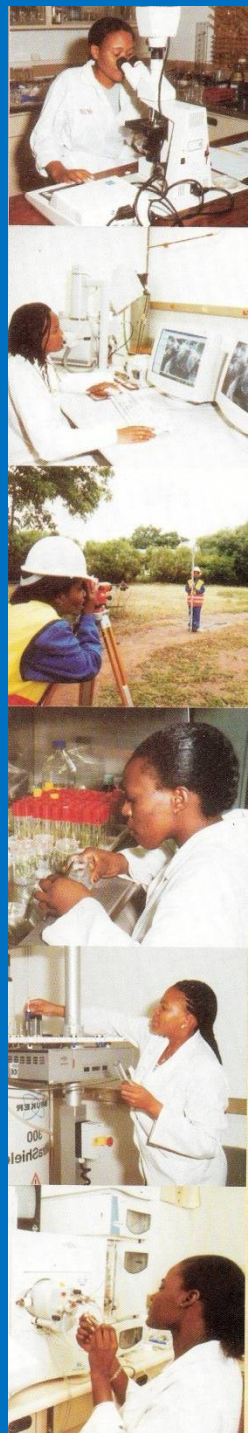
Narrowing the Gap – Botswana schools .

- 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.



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

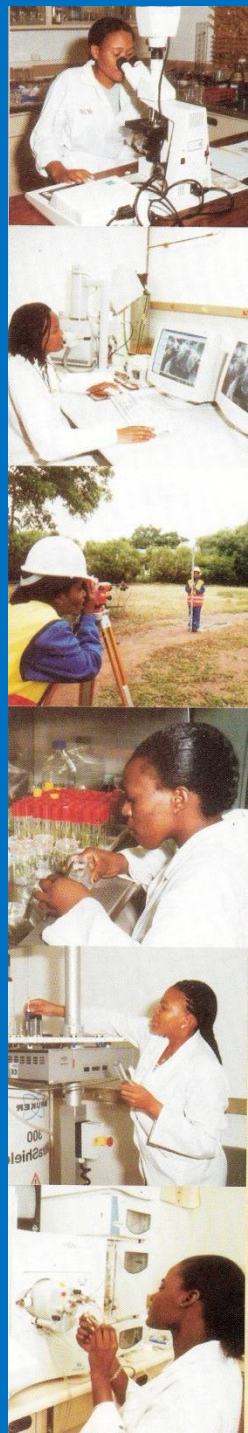
- **Start early – at home, pre-school, primary, secondary, tertiary;**
- **Educate and popularise STEM- repair the "leaky pipeline", the attrition rate in STEM;**
- **Use a comprehensive approach that includes all stakeholders;**
- **Reduce the gender inequality index- to remove constraints.**
- **Lobby for change in legislation and support.**



Broad Strategies – get all involved!:

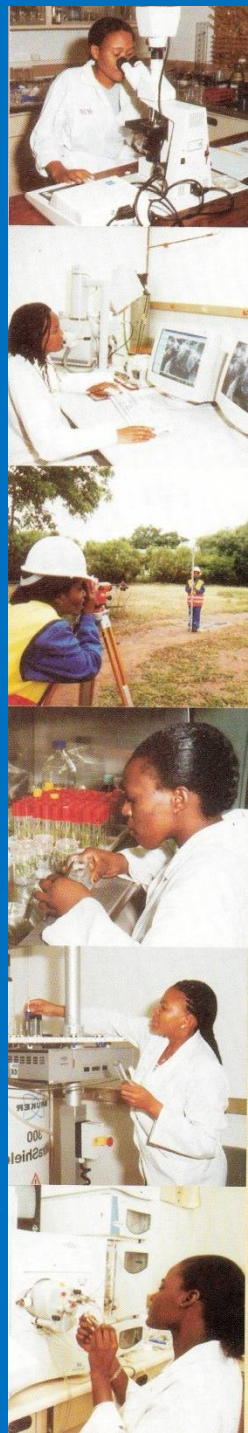
- International bodies-

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



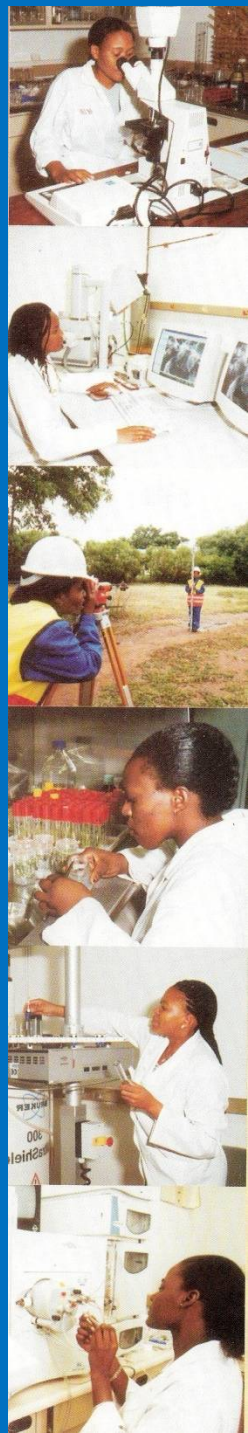
NATIONAL STAGE.

- **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.

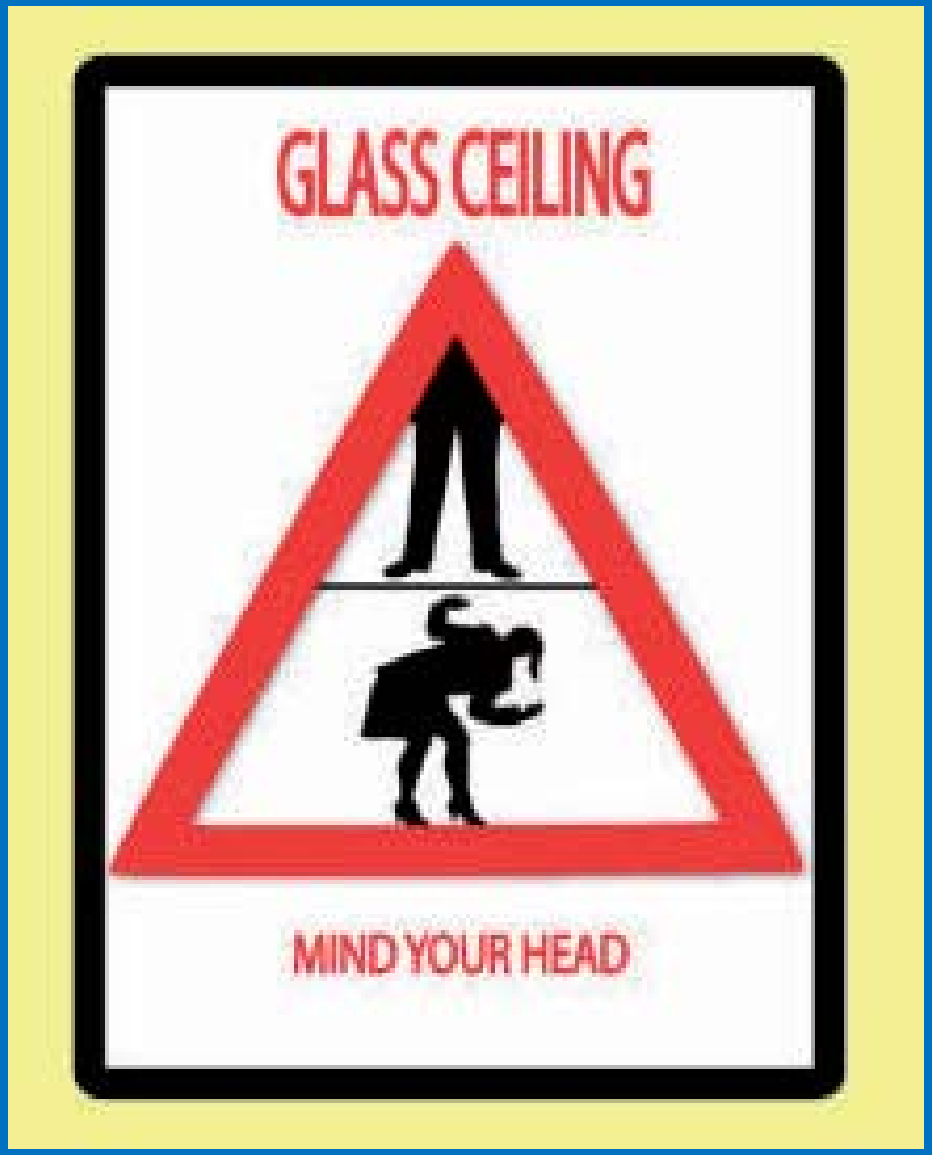


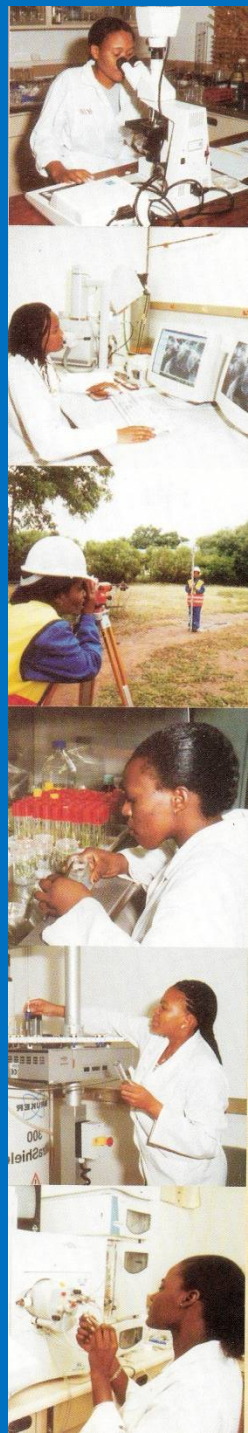
NATIONAL STAGE -cont.

- **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.



Let us Change :





The ideal.