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University of Dar es Salaam

INCREASING WOMEN'S PARTICIPATION IN SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION AND EMPLOYMENT IN AFRICA

By

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HISTORY

- Girls were not allowed to go to school until much later; e.g. in Rwanda girls were allowed 34 years behind boys
- Even then, their school life was very much limited compared to that of boys
- The stereotyping of knowledge and skills continues to influence the education given even today and hence determines the occupation of men and women

HISTORY cont

- Efforts to bridge the gender gap go way back to 1940s, e.g. UN set up the Commission on the Status of Women in 1946
- Many SSA countries have shown commitment to gender equality since they attained independence (most got theirs in the early 1960's)
- SSA today are at different stages of addressing the gender gap at the political front and in education.

History cont

- At political front, some countries have achieved a lot.
 - For example, Rwanda has attained gender parity 56% of women legislators
 - SSA with 18.7% women in parliament is second to Europe with 21.4%
 - SADC countries have pledged to attain 50% women representations in parliament
 - Tanzania with 30.7% women representation now has committed to attain 50% in the October 2010 elections

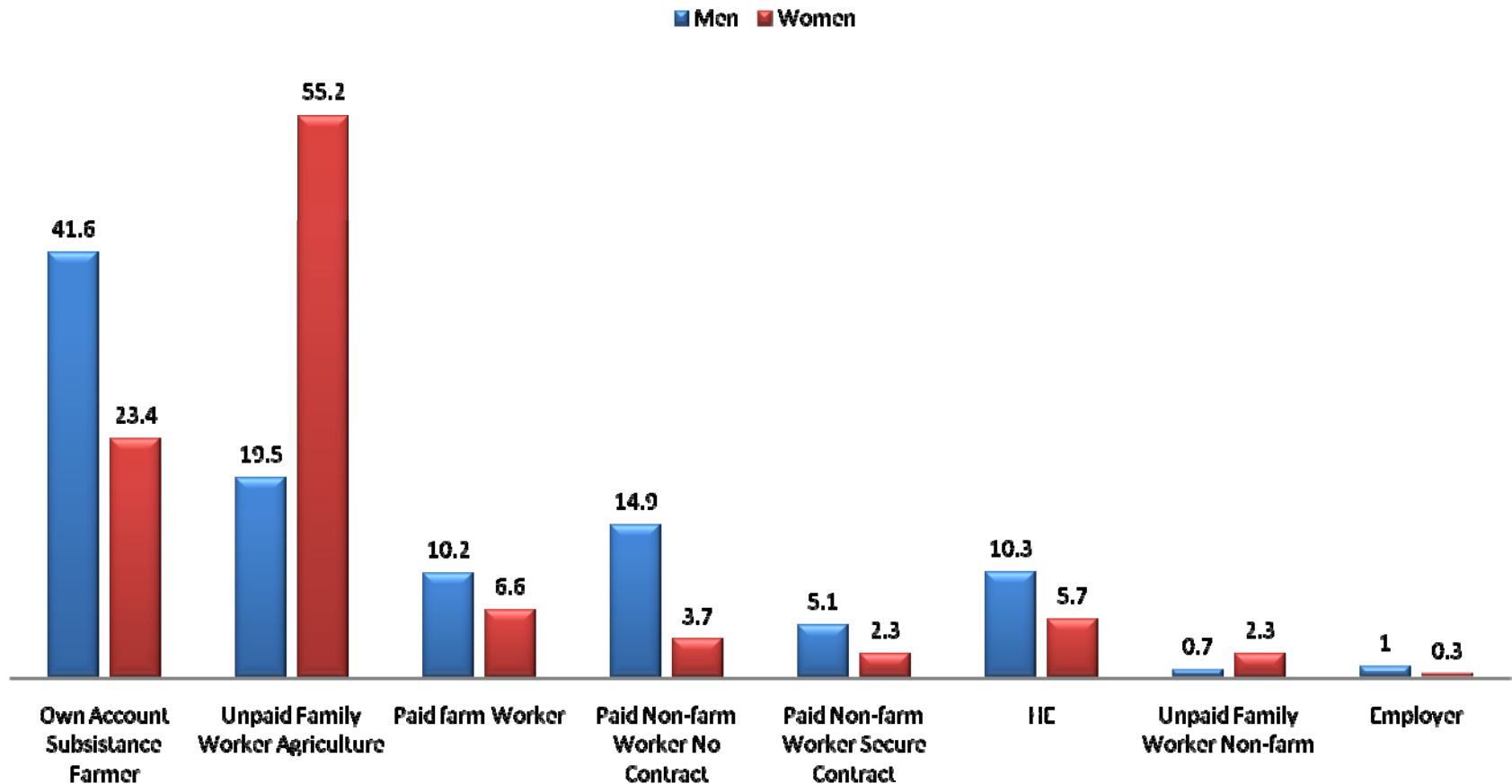
Gains in education

- some SSA countries have attained gender parity in primary and lower secondary schools
- in upper secondary and public tertiary education it is still a challenge.
 - e.g. Rwanda has reached parity in primary education (95.8% for girls and 94.7% for boys) and in private universities (52.7% for women and 47.3% for men).

However

- Primary and secondary completion rate is still a big challenge in SSA countries with more girls dropping out (on average)
- gender disparity in literacy rates are rising, e.g. rose from 45% in 1970 to 75% in 2005 in SSA
- Only 3 out of 40 countries in SSA had reached gender parity in literacy rate in 2005
- girls and women continue to be marginalised in Science, Mathematics and Technology Education (SMTE)

The gender disparities in education are reflected in the occupations of women and men. E.g. Main Occupation of Men and Women - Integrated Household Survey 2006, Rwanda



- We see that 57.5% women are in unpaid occupation while only 20.2% men work in unpaid occupations.
- Majority women 55.2% are in agriculture as unpaid family worker, while majority men, 41.6 %, also are in agriculture but as own account subsistence farmers.
- Women account for 18.3% of paid jobs while men account for 40.5%.
- As for occupation in Higher Education, men proportion is 10.3% and that of women is 5.7%.

INITIATIVES

Numerous initiatives have been undertaken to address gender disparities in SMTE

- international level – FAWE, ADEA, UNESCO (ANSTI, EFA),
- Regional level – AAU, IUCEF, NEPAD, AU including mechanisms to monitor progress to achieve EFA and MDG3,
- country level efforts – Science for girls programmes e.g. in FAWE member countries
- institutional level – e.g. Universities and Schools
- Civil Society level etc

INITIATIVES cont

- Numerous interventions have been carried out to test what works and what does not,
- recommendations have been made and some have been tried out at National level e.g. FEMSA project in 12 SSA countries
- a lot of literature is available on the various efforts, and the recommendations

SOME ACHIEVEMENTS

- gender policies, regulations and even laws at country level and at HEI level, have been passed
- special policies and programmes focusing on girls and women empowerment in education, are implemented
- policies focusing on specific gender related issues which affect progress of one gender such as gender based violence, re-admission of girls/ women students who drop-out due to pregnancy are implemented

ACHIEVEMENTS cont

- Gender sensitisations to create a gender friendly environment for both men and women undertaken.
- They have contributed to increased awareness amongst female secondary school pupils.
- In Rwanda for example, these efforts have resulted in the increase of women enrolled in universities from 1,283 in 1997 to 15,465 in 2006.

% women graduates in tertiary SMT among the surveyed 1,345 Nigerian women in 2009

| Years | 1980 and before | 1981 - 1990 | 1991 - 2000 |
|---|-----------------|-------------|-------------|
| % female who graduated in SMT in the period | 5% | 25% | 70% |

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- Gender mainstreaming started in 1994,
- initial ten years phase (1994 – 2003), focused on the quantitative aspect of gender equity, disaggregated data in everything,
- First Policy statement in 1996, revised policy in 2006, has specific policies (e.g. GBV),
- discrimination laws removed, does gender analysis of all its aspects annually to inform progress
- External institutional audit looks at gender
- gender dimension committee in 1996, gender centre in 2006,
- affirmative action in SMT started in 1997

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- notable increase in the women student enrolments and retention,
- below 15% in 2004 to about 50% in 2008 in non-science discipline
- 7% in 2004 to 28% in 2007/8 and above 30% in 2009/2010 in Science and Engineering (average).
- The second phase (2004 – 2013), is an outcome focused gender equality strategic plan to demonstrate equal treatment of women and men in policy-making, services, education (teaching, learning and research) and employment.

HOWEVER

- Women continue to lag behind men in HE and particularly in SMT education.
- Rwanda for example
 - girls' participation in Public HEI ranges between 25% and 27%
 - Participation in SMT subjects at Secondary School level ranges between 5% in Technical subjects to 40% in Biological and Chemistry subjects while in overall SMT subject, girls account for 35%.
- Targets to increase the number of women in SMT are generally very modest. For example Rwanda planned to promote women's SMT education with following targets:

Programme Support of the Education Sector Strategic Plan, 2006 - 2010

| Indicator | 2004 Baseline Level | 2008 | 2010 |
|--|---------------------------|------|------|
| % girls enrolled in Mathematics in Secondary School | 22 | 26 | 33 |
| % girls enrolled in Chemistry in Secondary School | 35 | 40 | 45 |
| % girls enrolled in 1 st year at Tertiary level | 20 | 25 | 30 |

HOWEVER cont

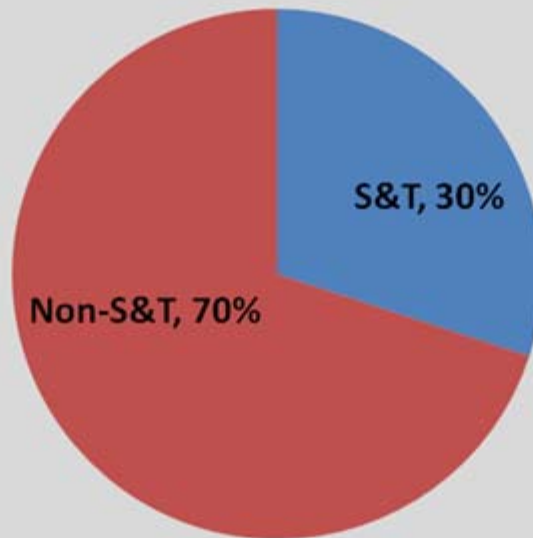
- In Higher Education, the average female enrolment continues to revolve around 30% of total students except for humanities and social sciences disciplines where gender parity is observed.
- Also stereotypes continue to manifest themselves.
- nursing and social work programmes tend to have large proportions of women even up to 95%
- Physics, Mathematics and Engineering programmes have low proportions below 10%.

Status of Gender Equality in Student enrolment in selected HEI in IUCEA

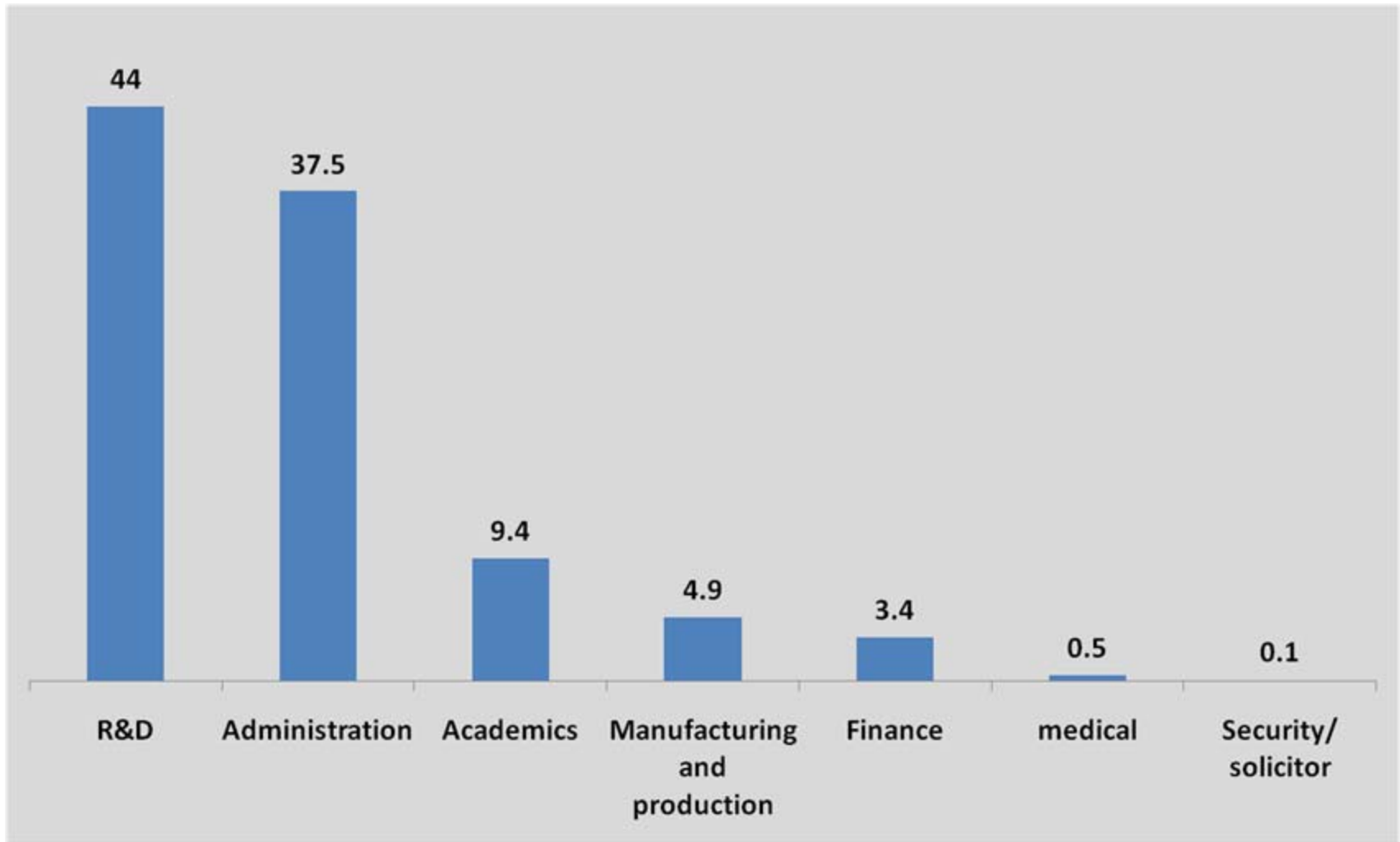
| HEI members of IUCEA | Total Students | Female Proportion of Total students | Female proportion of SMT Students |
|--|----------------|-------------------------------------|-----------------------------------|
| 10 Universities and Colleges in Kenya | 77,921 | 41% | 17% |
| 11 Universities and Colleges in Tanzania | 38,683 | 39% | 24% |
| 7 Universities and Colleges in Uganda | 21,467 | 51% | 18% |
| National University in Rwanda (NUR) | 12,796 | 29% | 27% |

WHAT HAPPENS AFTER GRADUATION?

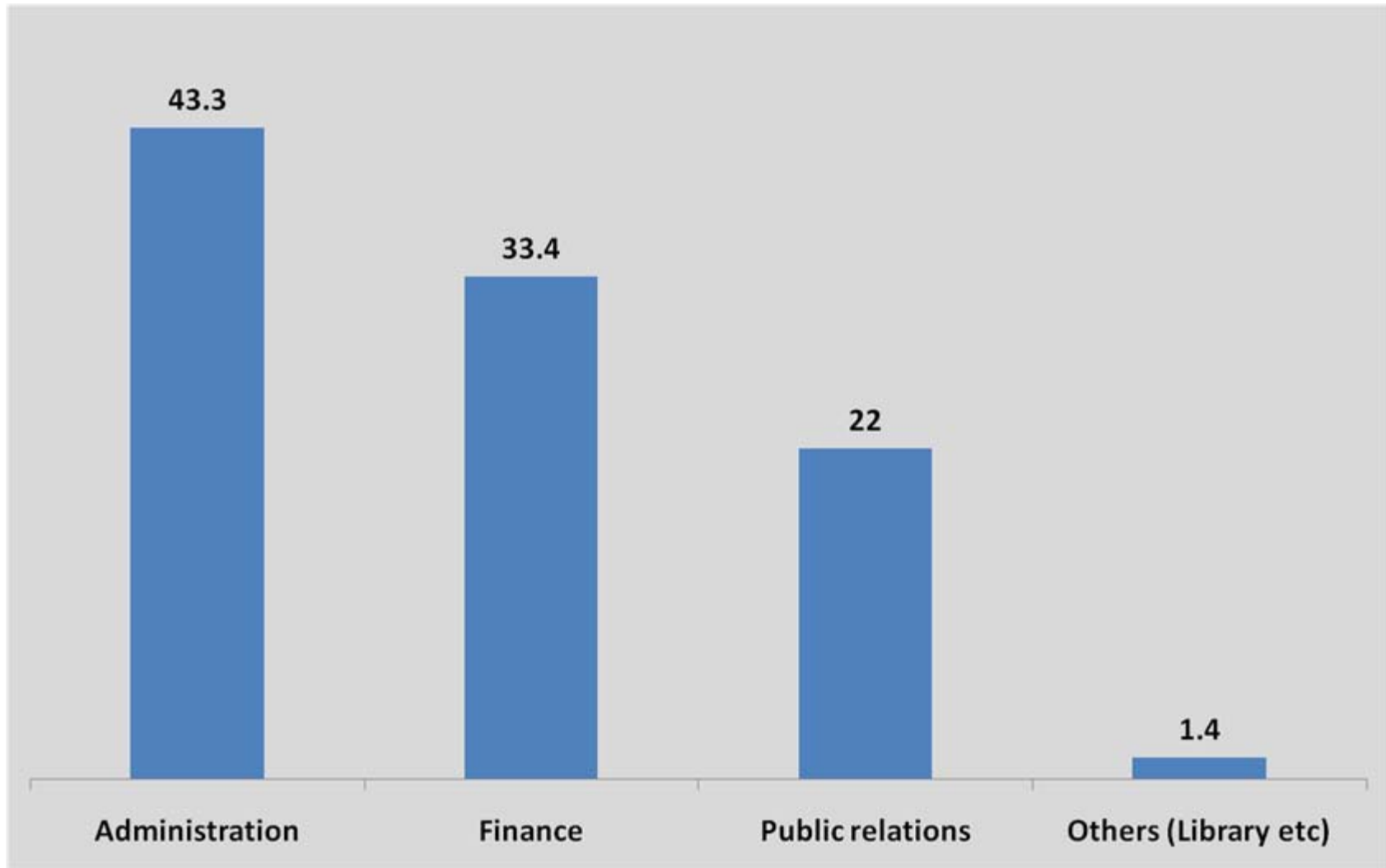
Survey of the 1,345 surveyed women graduates of SMT discipline, (Aderemi, 2009) show the areas where graduates employed



Those in S&T



Those in Non-S&T



Advanced Reasons

- Reasons given for not being in Science and Technology department
- not having an alternative because of limited mobility (40%),
- wanting a change in career (20%),
- career in Science and Technology was too demanding with poor pay (20%),
- abandoned Science and Technology for greener pastures or more attractive opportunities (20%)
- changed jobs on other domestic grounds (0.2%).
- Majority respondents (79%) said they knew more than 10 colleagues women graduates in Science and Technology who worked in non-Science and Technology departments.

Status of Gender Equality in Staff numbers in selected HEI in IUCEA

| HEI member of IUCEA | Total Staff | Female Proportion of Total staff | Female proportion of Academic Staff | Female proportion of Academic Staff in SMT |
|--|-------------|----------------------------------|-------------------------------------|--|
| 10 Universities and Colleges in Kenya | 5,766 | 32% | 11% | 3% |
| 11 Universities and Colleges in Tanzania | 5,047 | 33% | 16% | 7% |
| 7 Universities and Colleges in Uganda | 1,787 | 37% | 17% | 5% |
| National University in Rwanda (NUR) | 985 | 31% | 21% | 2% |

CHALLENGES IN EDUCATION AND EMPLOYMENT AND WAY FORWARD

The deep rooted social – cultural factors and widespread gender blindness continue to constrain women representation in governments, political parties, employment in general and in science and technology enterprises.

CHALLENGES cont

- Affirmative actions are not fully utilized, e.g.
 - inheritance laws exist in some countries but culture continues to prevent women from exploiting the opportunity
 - Access to micro-finance is provided (without collateral problems) but women hesitate to take them because when they do, the husbands abdicate all financial obligations and the burden to feed families falls of women alone
 - Scholarships for women postgraduate studies end up with men as women fail to balance their family obligations and studies

Challenges cont

- Women continue to be grossly under represented at Postgraduate level, and in HE leadership in SSA especially in SMT
- they do not take-up scholarships
- slow mobility as compared to male counterparts (takes 2 to 10 years longer for promotion)
- poor access to childcare (women in STM more affected)
- Work-Life balance

The Institutional Change and Community Change approach is needed

- In 2007, only 3 out of 89 Rwandese women had PhDs at NUR
- Most had a Masters but could not go on to do a PhD
- In 2008 I worked on introducing a flexible PhD programme for women;
- Started by I interviewing more than 43 out of the 55 women with masters
- I wanted to know why they did not go for PhD and where they would like to do it if given a chance

Institutional Change ...

Here are some of the reasons for the women not doing further studies

- insecurity in marriage (87%),
- they have young children and cannot leave them behind (64%),
- they did not want to do their PhD in Rwanda because of home chores (93%),

Institutional Challenges ...

- they did not want to do their PhDs in Europe or America because of lack of support at home and the foreign environment for their children (89%),
- they are carrying the burden of the family since their husbands are also studying (53%).
- Now we have a flexible system in place for women to do PhDs since 2009

Institutional change

- We are yet to see an environment at work place that is conducive for the reproductive years of the female Science and Technology workforce.
- Many policies are missing that protect men and women (pregnant, nursing, etc) in certain Science and Technology workplaces.
- Even where they exist many men and women are not aware of such policies and they are not enforced

THANK YOU