

**REGIONAL CO-OPERATIONS**  
**SOME REFLECTIONS WITH RESPECT TO**  
**EASTERN AND SOUTHERN AFRICA**

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## THE BASIC SCIENCES:

MATHEMATICS

PHYSICS

CHEMISTRY

BIOLOGY

REGIONAL CO-OPERATION COMPLEMENTARY TO  
LONG-TERM DIRECTED SUPPORT TO BUILD ACTIVE RESEARCH GROUPS  
IN  
STRATEGIC AREAS CHOSEN BY DEPARTMENTS AND INSTITUTIONS

- MSc AND PhD PROGRAMMES NEEDS "STABLE" RESEARCH GROUPS AND REGIONAL CO-OPERATION COULD FURTHER STRENGTHEN SUCH PROGRAMS
- RESOURCE GROUPS TO ENHANCE BUILDING REGIONAL COMPETENCE AND RESEARCH CAPACITY
- MORE ADVANCED EQUIPMENT MADE AVAILABLE
- LESS RESEARCH OF THE VERY SAME NATURE BUT A HEALTHY SPREAD IN TOPICS

## OUTLINE

- WHEN DO REGIONAL CO-OPERATIONS START TO BE MEANINGFUL
  - SITUATIONAL ANALYSIS IN AFRICA SOUTH OF THE SAHARA
  - REGIONAL CO-OPERATIONS:
  - RESOURCE GROUPS\* (EXAMPLES)
  - NETWORKS\* (EXAMPLES)
- LINKS

## WHEN DO REGIONAL CO-OPERATIONS START TO BE MEANINGFUL?

STARTING FROM SCRATCH:  
CAREFUL PLANNING

A PROGRAMME TO STRENGTHEN THE LOCAL SCIENTIFIC ENVIRONMENT  
Equipment, consumables, periodicals, .....

CO-OPERATION PARTNERS CAREFULLY CHOSEN

REGIONAL RESOURCE GROUPS AN ASSET

AT THIS TIME A RATHER ONE-WAY DIRECTED ACTIVITY

BY THE TIME REGIONAL RESEARCH CAPACITY DEVELOPS

NETWORKS WILL START TO GROW IN IMPORTANCE

DO NOT FORGET THE INDIVIDUAL GROUPS CONSTITUTING THE NETWORK

## **SITUATIONAL ANALYSIS IN AFRICA SOUTH OF THE SAHARA; Some points**

### **FEW PhD HOLDERS:**

EASTERN AND SOUTHERN AFRICA; Sudan – Angola Namibia (but not South Africa)

17 countries more than 310 Million inhabitants

1 – 2 PhD holders per two Million inhabitants within each one of the disciplines

Mathematics, Physics, Chemistry and Biology

## SITUATIONAL ANALYSIS IN AFRICA SOUTH OF THE SAHARA; Some points

### YOUNG UNIVERSITIES:

Different stages of development;

- Only undergraduate education, few MSc/PhD holders, high dependence on expatriates
- Others with MSc and PhD programmes running for some time and most local staff PhD holders
- Expansion of the tertiary education adding new universities but few local academic staff
- Small governmental grants, high demand for outside support
- Science policies start to be formulated and strategic plans are being developed

## **SITUATIONAL ANALYSIS IN AFRICA SOUTH OF THE SAHARA; Some points**

### **SMALL DEPARTMENTS:**

- 10 - 20 academic staff, high teaching loads, limited time for research
- Limited possibilities to recruit new staff members
- Skewed age profile, death of one person can be a severe handicap ....
- Maybe a second job needed
- Less and less students want to take up academic careers
- Internal brain drain
- Only 2 - 3 research activities possible in experimental fields

## **SITUATIONAL ANALYSIS IN AFRICA SOUTH OF THE SAHARA; Some points**

### **STUDENT SITUATION:**

- Pre-university: Limited access to textbooks and experiments, maybe teachers lacking
- Proper background (an extra introductory year, domestic regional centres)
- Local fellowships for MSc and PhD studies not available
- High drop out of female students

## SITUATIONAL ANALYSIS IN AFRICA SOUTH OF THE SAHARA; Some points

### CRUCIAL EQUIPMENT:

- Lack of equipment could limit the possibility of publishing in "good" journals
- Co-operation partners outside the region

Example:

No XRD for materials science in Eastern Africa

Transmission Electron Microscope, TEM available in Tanzania

Scanning Electron Microscope, SEM in Kenya, but not suitable for materials Science

Mass spectrometry facilities limited

Nuclear Magnetic Resonance, NMR, limited

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## SITUATIONAL ANALYSIS IN AFRICA SOUTH OF THE SAHARA; Some points

### GREAT NEED

- Install equipment at institutions with capacity to handle and maintain
- Training of technicians and scientists
- Regional asset
- Procurement procedures important

## **REGIONAL CO-OPERATION**

### **RESOURCE GROUPS:**

- RESPONSIBILITY TO ASSIST MSc AND PhD STUDENTS FROM OUTSIDE  
THE OWN UNIVERSITY
- MORE ADVANCED EQUIPMENT
- BETTER ACCESS TO INFORMATION

## REGIONAL CO-OPERATION

**TAN:01/2; Univ. of Dar es Salaam**

**Condensed Matter Physics; Materials science for solar energy conversion**

- IPPS support started 1976; training
- Beginning 80'ies; also equipment
- Small grant to explore the possibilities for regional co-operation 1986
- Started to take MSc and PhD students from the region
- College on Thin Film Technology, 1990

## REGIONAL CO-OPERATION

**TAN:01/2; Univ. of Dar es Salaam**

**Condensed Matter Physics; Materials science for solar energy conversion**

- 4 Local PhD degrees
- 8 LocalMSc degrees
- 8 PhD degrees to regional scientists doing all or part of the work in Dar es Salaam
- $\geq 9$  MSc " " " " " " " "
- 9 colleges; about 200 young scientists from 12 countries besides Tanzania
- IPPS: Totally 10.9 Million SEK; About 30% to regional co-operation

## REGIONAL CO-OPERATION

### NETWORKS

**ESARSWG**; Eastern and Southern Africa Regional Seismology Working Group

- Seismological events know no borders
- Formed 1993 with the aim to:
- Monitor seismic events of the East Africa Rift System and produce bulletins
- Enhance capacity building; First 2 regional MSc students graduated from Addis Ababa Univ. 2008
- Plan and conduct joint research activities

## REGIONAL CO-OPERATION

- **MSSEESA**; Materials Science and Solar Energy Network for Eastern and Southern Africa
  - Initiated 4 years back by IPPS supported groups in Kenya, Tanzania, Uganda and Zambia
  - Complementary work
  - Strengthen MSc and PhD programmes
  - MSc and PhD programmes to be recognized by all universities involved
  - Recognized by respective country
  
- **EAUMP**; East African Universities Mathematics Programme  
Dept. of Mathematics at Univ. of Nairobi, Univ. of Dar es Salaam and Makerere Univ. to:
  - Introduce new areas of mathematics
  - Run joint MSc and PhD programmes

## ENDING REMARK

- ❑ SCIENCE CAN NOT DEVELOP IN ISOLATION
- ❑ SUPPORTING AGENCIES SHOULD HAVE THE POSSIBILITY TO INTEGRATE SUPPORT TO INDIVIDUAL GROUPS, INCLUDING RESOURCE GROUPS, WITH NETWORKS

## ENDING REMARK

- ❑ POSSIBILITIES FOR INTERNATIONAL CO-OPERATION ESSENTIAL
- ❑ WEAK SCIENTIFIC ENVIRONMENTS;
- ❑ Individual countries may have the possibility only to have a few research activities
- ❑ Taking the whole region into consideration may change the picture and make
  - ❑ the research work more diversified and competitive
- ❑ A strength to be able to conduct activities within the region

## ENDING REMARK

- ❑ THIS NEEDS PLANNING AND ECONOMICAL SUPPORT. HOWEVER,
- ❑ THE BUILDING UP OF RESEARCH CAPACITY COULD BE SEVERELY HINDERED AND SLOWED DOWN BY STRICT COUNTRY REGULATIONS WITH RESPECT TO WHERE SUPPORT CAN BE GIVEN.

THANK YOU