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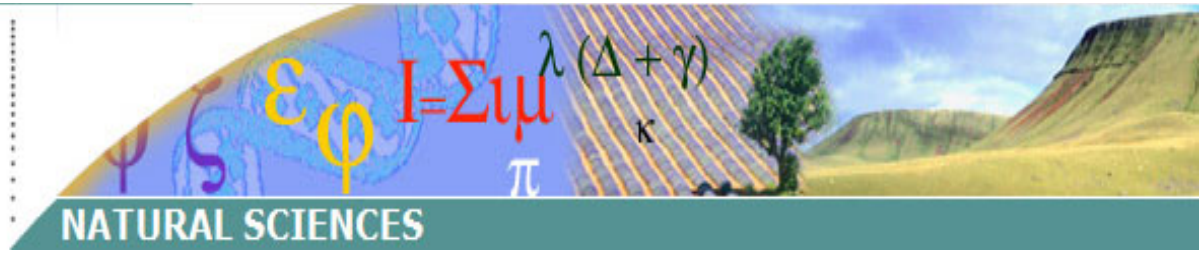

The Science, Technology and Innovation Policy Review Process at UNESCO

S. Nair-Bedouelle, Chief of Unit, AU/CPA Implementation
Division for Science Policy and Sustainable Developoment
UNESCO
1 April 2009, Mombasa, Kenya

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“On your shoulders rest the challenge of giving science a face that inspires our youth to seek our science, engineering and technology is part of that task.

But it requires more. It also means orienting science in a practical and visible way towards helping meet basic needs. It means recognising the intellectual challenge of applying knowledge to meeting such needs, rewarding achievements in that direction and celebrating them with the highest honours.”

President Nelson Mandela, Academy of Science
March 1996

Pace and scale of scientific developments

- Pace and scale of science at the frontiers has grown enormously: effects for the developing countries, infrastructures and society at large
  - Various –omics (genomics, proteomics, transcriptomics, etc) initiatives
  - Climate change and the environment
  - Systems biology: biology, chemistry, physics, mathematics, computer science, medical sciences: modeling life at its various levels
- Competitive Research teams, national and international level
- Revised Institutional infrastructures appropriate equipment and facilities
- Consequences: role for governments and funding agencies change

STI policy, evidence\data - house keeping

Do I need to invest in R&D or in Higher Education?

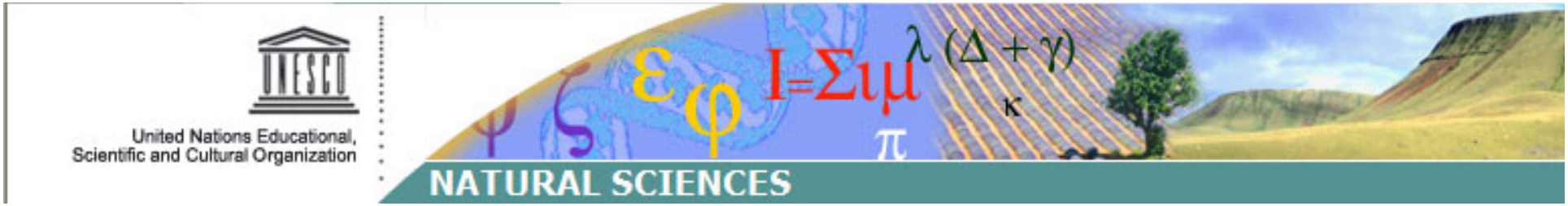
- Better know how much you are investing already
- What is a convenient and relevant measure?
- % of GDP? Number of graduates?

In which areas should I invest predominantly?

- In which areas am I already investing?
- Which are important national economic sectors, in mining, agriculture, industry, services, etc?
- Which are crucial public sectors, and what are national or regional peculiarities? (health, environment, utilities, defense,…)

Do I need to improve quality of higher education or research?

- Better know how you compare to other countries
- Are there sufficient links of universities and institutes to industry?



A systemic approach to STI policy

Four cornerstones for a knowledge-based society

- **Human capital**: A policy system to develop, retain and attract human capital
- **Knowledge and innovation**: A system to develop, acquire and adapt knowledge transfer into innovations, R&D systems evaluations
- **Institutions and incentives**: Public and private (e.g. banks) institutions, regulations and mechanisms that stimulate companies, universities, research institutes etc to function in support of the country,
- **Information infrastructure**: Investments in communications infrastructure, ICT tools and information sources – a must for international cooperation and “staying on top”

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- 0–100 per million
- 101–300 per million
- 301–1000 per million
- 1001–2000 per million
- 2001 per million and above
- Data not available

Source: UIS, September 2007

How many researchers are there? Researchers per million inhabitants, latest available year

Participatory approach

- Response to the request from country
- The role of UNESCO: facilitate the process, tools for analysis
- Role of the national consultants
- Role of an international consultant

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African Science Technology and Innovation Policy Initiative ASTIPI

Activities

- To date 18 African countries have made requests to UNESCO for assistance with the review / reformulation of their STI policy via governments and Heads of State
- Review existing policies- jointly with governments
- Re formulate national STI policies for those countries lacking STI policies
- Provide assistance with the monitoring and evaluation of existing and newly formulated STI policies (mid term reviews)
- Assist in the implementation of newly formulated and reviewed STI policies (scientific committees, science parks etc)
- Train STI policy specialists and analysts

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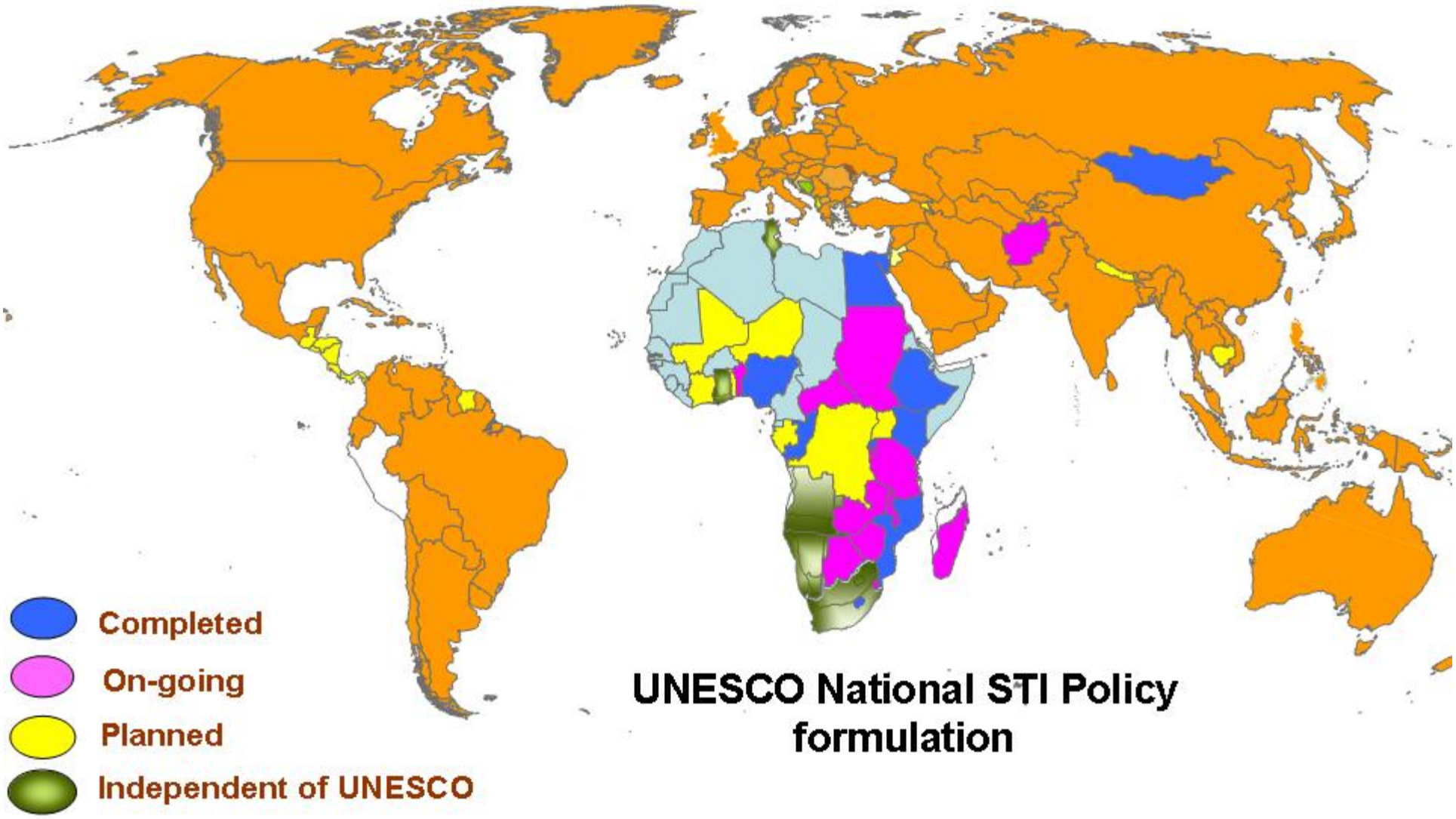

UNESCO National STI Policy formulation

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Science policy review / re formulation exercise

18-24 months

State of the art: international + national experts-3 mths

Inventory: analysis NRS

1st national consultation **(report to government)**
presentation of results, identify priorities, preparation of business plan, task force for every priority identified

Elaboration of a study for each priority

2nd consultation **(report to the government)**

National development plans
Economic development
Projects eg science parks...

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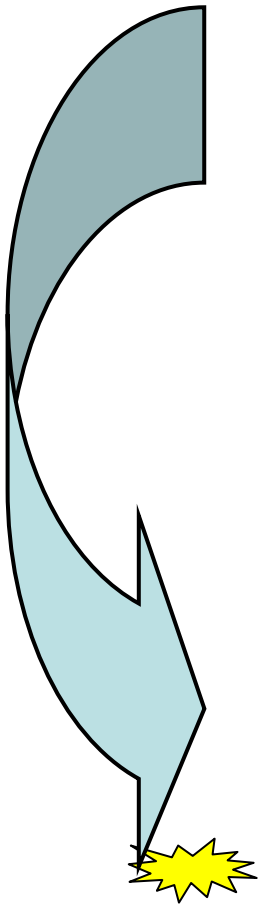
Science policy review / re formulation exercise

National Research System analysis



Contextualisation
Brief history of sciences
Governance of science and analysis of the science policies
Principal institutions (public and private, international or foreign)
Other entities/structures/supports for S&T
In put indicators on available human resources
Input indicators on financing activities in S&T
Output indicators, products of research (degrees, publications, IPRs …),
Innovation and university industry partnerships and strategies,
International scientific cooperation agreements and or others

STATUS REPORT

Institutions and incentives

- Societies function on basis of appropriate institutions and incentives to make people and organisations ‘tick’, cooperate or compete
- Wide range: competition authorities, autonomous universities, regulatory agencies, public support for public and private R&D, etc.
- Evidence-based approach is the norm: Monitoring & Evaluation, and efficiency of measures/interventions
- Measuring the inputs and outputs, outcomes

Human resources key to innovation policy

- Human resources problem = key issue for research funding agencies, national and international
- Includes mobility, international orientation, experience and incentives
- Includes stimulation of entrepreneurship during undergraduate and graduate education
- Includes collaboration with private sector to identify needs, incentives and motivations, prizes, grants etc

Excellence

- Focus on excellence has become key all over the world. How can governments and research funding agencies promote it?
- ***Individuals***
- ***Incentives***
- ***Institutions***

For this we need data on human resources

- Data on Higher Education:
- Data on employment and trends
- Data on secondary education = an essential indicator to start with

Innovation

- In economic terms: new product, new production process, new service, new infrastructure which are successfully marketed
  - Directly linked to economic development and growth
  - It takes a company innovate, because they are active and aware on the market.
  - Breakthrough innovations are important, so are smaller incremental innovations, consequences for growth
- ‘Market’ to be taken in wide sense: successful health care treatments, coastal protection methods, etc

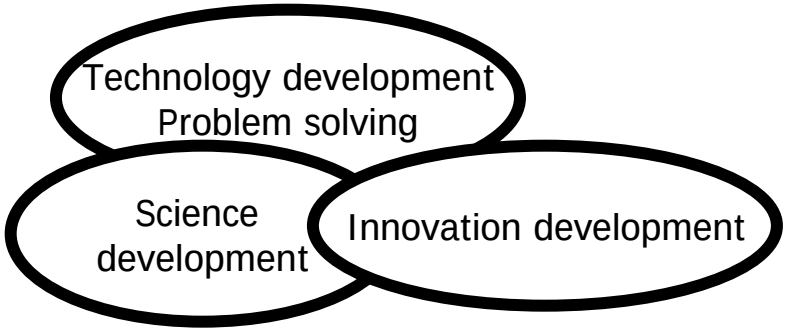
Key lessons from studying and practising STI policies (1)

- Why invest public money in academic research?
  - Knowledge economy = informed society
  - New instruments and methodologies, Skilled graduates, Professionial networks,
  - *Rationale for public investments is not only economic benefits*

    *technological opportunities for meeting daily needs

    *new networks, interactions and technological options: increased technological diversity and choices

- How is scientific and technological knowledge becoming useful? Innovation = 'networks' or the "innovation hub"
  - Institutional arrangements, incentives, awareness, communication
  - Evaluation and monitoring interventions
  - Program adjustments



Key lessons from studying and practising STI policies (2)

- *Perspective of institutes, societal arrangements*
- *Perspective of societal desirability/ acceptability/*
- **What is knowledge, what is information?**
- *'tacit' vs 'codified' knowledge*
- *Knowledge is 'know what', 'know why', 'know how', 'know who' and "know when"*

- **How to influence companies to invest more in R&D?**
  - *Taxes eg South Africa*
  - *Subsidies? "13%"*
  - *Interactions; networks- key to intenational arena.*
- **What do public administration and policy sciences tell?**
  - *New balance between central government and 'agencies'*
  - *Interactive policy making and participatory governance*
  - *Accountability of funding and expenditure*
  - *Benchmarking, best practices, ex ante and ex post evaluations*

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Why the need for mapping African STI capacity

Science policy measures and interventions should be evidence based

STI = driver of national economic development

A common African framework on existing STI capacity producing regular reliable statistics as well as reproducible indicators

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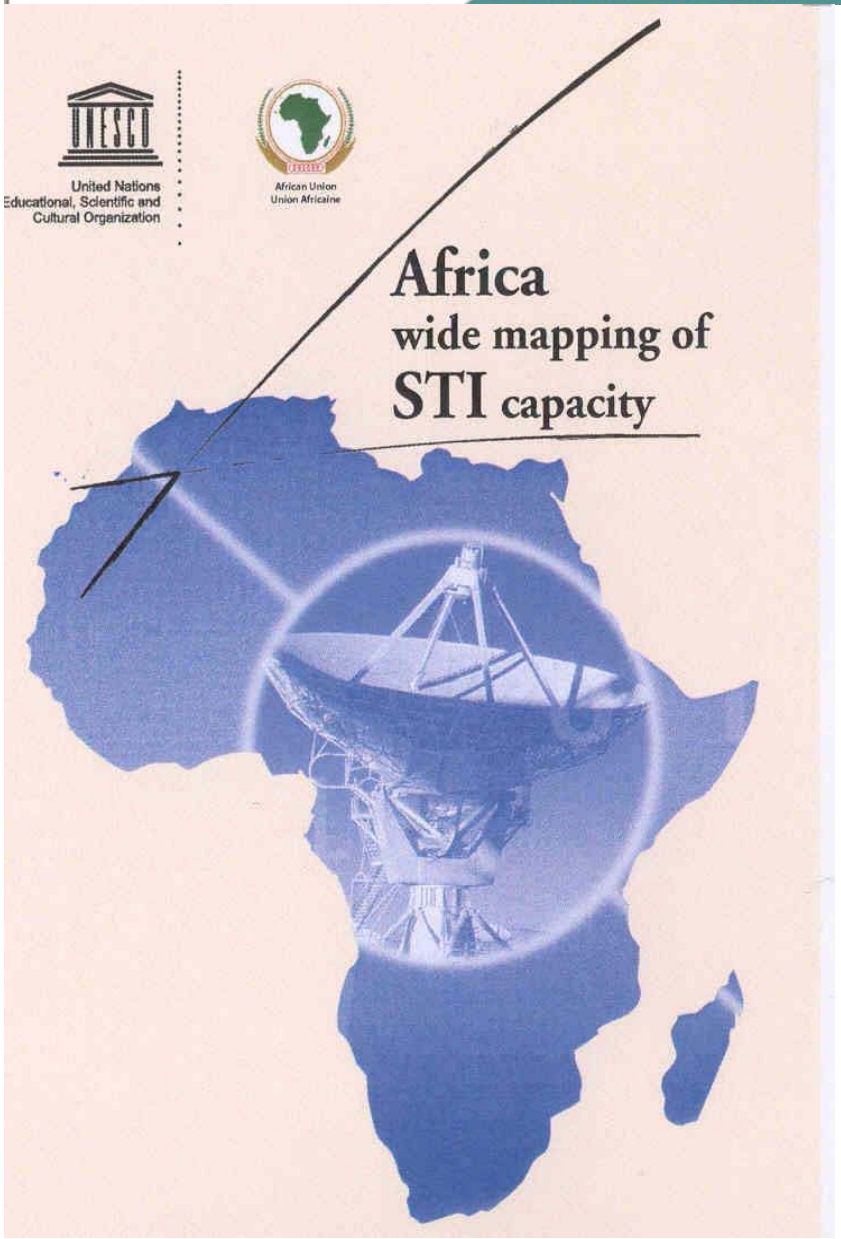

African Ministerial Council for Science and Technology (AMCOST 2003)

« urgency to build the continent's capacity to harness, apply and develop science and technology in order to eradicate poverty, fight diseases, stem environmental degradation and improve economic competitiveness »