INTERNATIONAL PARTNERSHIPS FOR IMPROVING SCIENCE EDUCATION

Sharing Good Practice in Science Education through North – South – South & South-south Cooperation

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## **Global Challenges**

- Agriculture increasing food production and food security
- Biodiversity
- Climatic change global warming
- Health and new diseases
- Human settlement
- Water sufficient and clean water











### Special attention

- Total number of countries 195 +1
- Most vulnerable
  - Least developed countries (LDCs) 49 (33 in Africa)
  - Landlocked developing countries (LLDCs) 32
  - Small island developing states (SIDs) 39
  - Countries in conflict and post conflict situations
- Middle income (92)
  High income 74



## **Issues of Developing Countries**

- Poverty and hunger
- Health
- Education
- Water and sanitation











#### UN Sustainable Development Goals

- 1. End poverty in all its forms everywhere
- 2. End hunger, achieve food security, improve nutrition, and promote sustainable agriculture
- Ensure healthy lives and promote well
   being for all ages
- 4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all
- 5. Achieve gender equality and empower women and girls
- 6. Ensure availability and sustainable management of water and sanitation for all
- Ensure access to affordable, sustainable, reliable, modern energy for all
- 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

- 10. Reduce inequality within and among countries
- 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- 12.. Ensure sustainable consumption and productive patterns
- 13. Take urgent actions to combat climate change and its impacts
- 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainable manage forests, combat desertification, and halt and revert land degradation and halt biodiversity loss
- 16. Promote peaceful and inclusive societies for peaceful development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- 7. Strengthen the means of implementation and revitalise the global partnership for sustainable development

#### Role of Science, Technology and Innovation

- STI as key drivers of economic growth and development
- Innovative capability as major factor for competitiveness, productivity and moving to high income economies







### Role of Science, Technology and Innovation

- For developing countries innovation as a means to keep up with developed countries
- Science and technology are critical for least developed countries to reduce poverty in a rapid and sustainable manner and to harness innovation for development (DG UNESCO)



DEVELOPMENT DEPENDS ON

- TRAINED SCIENCE SPECIALISTS
- WELL-TRAINED MIDDLE LEVEL MANPOWER
- SCIENCE LITERATE SOCIETY



HUMAN RESOURCE IN SCIENCE









### Education

 Education at the heart of development
 Learning creates and transfers capability
 UN SDG GOAL NO. 4 "TO ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFE-LONG LEARNING OPPORTUNITIES"

### Statement by IRINA BOKOVA – DG UNESCO



"It is through quality education, through culture, and through science, that the least developed countries will be able to achieve their development goals and defend their rights."

> Irina Bokova Director-General of UNESCO



# Development of human resource for 21st century

#### Six Critical Skills for 21<sup>st</sup> century

- Creativity and innovation
- Critical thinking and problem solving
- Communication & Collaboration
- ICT (Information, media and technology) literacy
- Life & Career Skills (flexibility & adaptability, initiative & self direction, social and cross-cultural skills, productivity and accountability, leadership & responsibility)



collaborate

### Issues in science education for developing Countries

- Declining Interest
- Poor performance of pupils in mathematics and natural sciences from developing countries in International Assessments
  - TIMSS
  - PISA
- Ineffective pedagogy
   *Physical Infrastructure Teachers*

### IBSE - renewed pedagogy

It is a process of developing understanding which takes account of the way in which students learn best, that is, through their own physical and mental activity. It is based on recognition that ideas are only understood, as opposed to being superficially known, if they are constructed by students' through their own thinking about their experiences. In the classroom these experiences include direct observation and investigation of materials and phenomena, consulting information sources such as books, experts, the internet and discussion with others in which ideas are shared, explained and defended. This learning will involve the development and use of skills of observation, raising investigable questions, planning and conducting investigations, reviewing evidence in the light of what is already known, drawing conclusions and communicating and discussing results.

## **IBSE Skills Component**



- Interpreting data
- Hypothesising
- Experimenting

- creative thinking
- Problem Solving

OECD : Development Cooperation Report 2015: Making Partnership as Effective Coalitions for Action

 Partnerships as powerful drivers of development

### UN Sustainable Goal 17:

 Revitalize the global partnership for sustainable development







### UN SDG Goal 17.6

□ 17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism

#### South-South Cooperation - Definition

#### Figure 1: Map of the Global Divide: North and South



The Brandt Line clearly shows the North-South Divide. Source: www.pbs.org (Retrieved February 15, 2011 from <u>http://www.pbs.org/wnet/wideangle/episodes/land-of-wandering-souls/a-developing-</u> world-view/3407/attachment/wa img landwander map intro/)

...a broad framework for collaboration among countries of the South in the political, economic, social, cultural, environmental and technical domains. Involving two or more developing countries, it can take place on a bilateral, regional, subregional or interregional basis. Developing countries share knowledge, skills, expertise and resources to meet their development goals through concerted efforts. Recent developments in South-South cooperation have taken the form of increased volume of South-South trade, South-South flows of foreign direct\_\_\_ investment, movements towards regional integration, technology transfers, sharing solutions and experts, and other forms of exchanges...

(United Nations Office for South-south Cooperation

#### South-South Cooperation

- Developing countries encouraged to share resources, technology and knowledge for
  - Economic progress
  - Development



Examples : (project aid , technical cooperation )

 Bilateral countries (China, India.
 Republic of Korea, Brazil, Kuwait, Turkey, Saudi Arabia, UAE, Venezuela, Malaysia )



Institutions (Islamic Development Bank (IDB),
 JICA, Arab Bank For Economic Development in Africa )

### South-South Cooperation -Basic Elements

- sharing of knowledge and experience, training, technology transfer, financial and monetary cooperation and in-kind contributions.
- Vehicle for knowledge sharing
- Enables countries to apply lessons taken directly from experience of others to inform own policies and programmes
- The South-South cooperation agenda and South-South cooperation initiatives must be determined by the countries of the South

#### Triangular Cooperation

Collaboration in which traditional donor countries and multilateral organizations facilitate South-South initiatives through the provision of funding, training, and management and technological systems as well as other forms of support is referred to as **triangular cooperation**.

(United Nations Office for South-south Cooperation)



International Science, Technology, Innovation Centre for South-south Cooperation under the Auspices of UNESCO (ISTIC)



- ISTIC as a platform for south-south cooperation
- Inaugrated in 2008 under auspices of UNESCO
- CATEGORY 2 UNESCO Centre:
  - Funded by Government of Malaysia
  - Contribute to UNESCO's strategic programme objectives
- International platform to facilitate networking, collaboration, sharing of experiences....





#### **ISTIC Priority Programmes**

STI Policy for Development, emphasizes national STI Policy formulation implementation and monitoring, including the role of women

- Inquiry Based Science Education (IBSE) and Science, Technology, Engineering and Mathematics (STEM) Education
- Women in STI
- Maintenance of Infrastructure
- Accreditation and Mobility of Engineers and Technicians
- Technopreneurship



### ISTIC - STEM / IBSE AGENDA

- ASSURING THE SUPPLY PIPELINE OF CREATIVE AND DISCERNING STI PROFESSIONALS
- Capacity Building
  - Enhancing interest in science among students
  - Enhancing quality of science teaching
  - Development of 21<sup>st</sup> century skills among students
- Sharing of resources



### Model of Cooperation

North – South La main a la Pate and ISTIC ■ IAP SEP GC North – South – South La main a la Pate - ISTIC & SEAMEO QITEP La main a la Pate – ISTIC, SEAMEO - RECSAM & **MOE MALAYSIA** South – South ISTIC & Future University Sudan ISTIC and the Academy of Sciences Malaysia

#### ISTIC - La main a la Pate Partnership an example of North - South Cooperation

- Collaboration between North country / organisation and south country / organisation
- Technical cooperation
  - Expertise
  - Advice
  - Resources





POUR L'ÉDUCATION À LA SCIENCE

#### STEM – IBSE PROGRAMME FOR 2014 eg of North-South- South

Training Workshop on Inquiry-Based Science Education (IBSE) forTeacher Trainers from Asia-Pacific 17 - 22 November 2014 Yogyakarta, Indonesia (North- South-South Cooperation)







#### IBSE - Programmes 2015 (North \_ South -South Cooperation)

- ASM/ISTIC/IAP SEP "International Science, Technology, Engineering & Mathematics (STEM) High Level Policy Forum in Evidence Based Science Education in Developing Countries 26 – 27 MAY 2015
- Training Workshop on Innovative Teaching and Learning Through Inquiry-Based Science Education (IBSE) for Teacher Trainers 25-30 October 2015
- Developing Thinking Skills Through IBSE for Science Education for Sustainable Development – 9-13 November 2015 Bogor, Indonesia

#### **IBSE – Programmes 2015**

www.istic-unesco.org

ASM/ISTIC/IAP SEP "International Science, Technology, Engineering & Mathematics (STEM) High Level Policy Forum in Evidence Based Science Education in Developing Countries 26 – 27 MAY 2015



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www.istic-unesco.org



Asia and the Pacific
Africa
Latin America & Caribbean
North America & Europe

Male Female

#### ISTIC – La main a la Pate Partnership an example of North – South Cooperation

www.istic-unesco.org



Translation of Resources from French into English

#### ISTIC – La main a la Pate Partnership an example of North – South Cooperation



www.istic-unesco.org

#### La Main a la Pate Mirror Website in English "I do, I discover"



#### **ISTIC - IBSE COLLABORATION**

www.istic-unesco.org



### **ISTIC - IBSE Regional Focal Points**

www.istic-unesco.org

- Future University of Sudan for African states
- SEAMEO RECSAM for Asia-Pacific Region
- SEAMEO QITEP for Asia Pacific Region







### National initiatives arising from participation in ISTIC's Programmes MOETIMOR - LESTE

MOE – INDONESIA



### Challenges

- Cost
- Support from superiors / national leaders
- Transferability of practice
  - Local environment / culture
  - Teacher culture
  - School ethos
  - Examination pressure

### Conclusion

- Partnership fosters experience based action
- Emphasis on importance of learning from experience
- Sharing of knowledge
- Representation of lessons and good practice
- North- South-south cooperation as an important vehicle for the above, enables countries to apply lessons from others to inform own policies and programmes

