

How to promote North-South cooperation on education in sustainability science?

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Sustainable Development & Sustainability Science

- **Sustainable development** dictates that the future demands must be deliberated when setting any decisions about the present on the basis of ecosystem conservation, economic feasibility and social equity.
- **Sustainability science** is an integrated approach building a truly sustainable society through research and education for the sake of generating knowledge, technology, and innovation.
- **Agenda 21** accepted science and technology involvement in sustainable development as its theme, and that was adopted thereafter by Rio de Janeiro Summit in 1992.

Sustainability Science

- **Generates**, disseminates and mobilizes knowledge, technologies and innovations to attain sustainability in deviated cultures.
- **Calls for** networking and integrated agenda of natural and social sciences, humanities and arts.
- **Pressures** aspires for new validated holistic skills at global and ethical conceptions in all disciplinary of education to support individuals and communities in shaping their own future and to support integrative leadership.
- **Moves** forwards and clarifies concepts on research in natural sciences and humanities for a new adaptive behavior of human societies.
- **Renders** future coated by peace, human dignity and sustainable development, crossing social segments related to gender and/or cultural affiliations.
- **Uses** science to resolve international urgent issues and leads to a global truly sustainable society.

North-South cooperation on education in sustainability science

- **Policies** and strategies furthering scientific cooperation between North and South always move **forward at the same** time with sustainable development.
- **Sustainability science** aims to strengthen cooperation between North and South as a critical driver for how science gets done.
- **Policy** forecasters and makers emphasized the insufficiency of North-South share in science that adversely impacted Southern countries in African sub-Saharan and Islamic world.
- **As** scientific expertise in South countries **continues grow** and critical economic, environmental and social problems **became more global in scope**, it is likely that North-South scientific cooperation would be exaggerated.

- **North-South cooperation** should continue to advance its modest beginnings, by focusing on building basic scientific capacity of the society.
- **Some Southern countries** such as Brazil, China and India initiated unique opportunities for North-South cooperation in science and education to achieve sustainable science approach.
- **Northern countries** are now strengthened by e-learning, as the internet afforded an excellent tool to exchange experiences and learn from each others.
- **Advanced courses** and lectures developed by world-class universities should be made available free of charge to anyone, anywhere and at any time making use of the internet.
- **Today**, at least potentially, we are at the dawn of a new era in global science in which scientific capacities are reaching beyond the United States and Europe to Asia, Latin America and Africa.

Current Status of Education in sustainability science in some southern countries

- **Most southern countries** too often view science as a luxury that only northern countries could afford its high expenses.
- **Some southern countries** are now displaying a growing proficiency in science and technology associated with a primary obligation to their economic and social well-being. For instance, China is now a world leader in nanotechnology, India in information technologies and computer software, Brazil in space science and technology.
- **Over the past few years**, a number of African countries including Nigeria, South Africa, Tanzania, and Uganda had unprecedented science capacity building programs in education and research that have helped advance their agenda for sustainable development.
- **Bilateral and institutional** cooperation in sustainability science in education are now witnessed in China, India Brazil, Turkey, UAE, Malaysia, as well as by Islamic development bank and Arab bank for development in Africa.

- **Nigeria** raised its budget for science three-folds over the past five years and launched its first remote sensing satellite in 2003. It is now planning to launch a communications satellite in collaboration with China.
South Africa, installed the largest single optical telescope in southern hemisphere.
Tanzania doubled its budget for science and technology last year.
Uganda set up an ambitious program for building centers of excellence in science, technology and innovation.
Egypt significantly increased the budget allocated for scientific research and is now starting the construction of nuclear plant for generating energy in Burg-el-Arab in cooperation with Russia.

- **Intergovernmental organizations** in S&T such as NEPAD in Africa and COMSTECH in Islamic world served as both public advocates and strategic policy centers for scientific research and education evolution in southern countries.
- **Today, South-South cooperation**, build up by TWAS, came out as a powerful force for change in southern countries due to growing scientific capabilities of research centers and universities in some southern countries such as Brazil, China and India. These three countries have now universities and research centers capable of meeting the requirements of not only for their own scientists, but also for scientists from other southern countries.
- **TWAS** played a key role in the transformation of scientific knowledge and innovation originated in the North, where 80% of all active scientists live and work, to the south.
- **During the past two decades**, TWAS significantly supported South-South cooperation in scientific research and education.

Mainstreaming of sustainability science in education

- **Challenges** tackling mainstreaming sustainability science in education must be efficiently confronted.
- **Mainstreaming** of sustainability science in education requires many specific actions **to be taken** by local governments.
- **Attainment** of mainstreaming sustainability science in all education stages requires not only integrating key ideas in existing curriculum but also **a new systemic view** of sustainability science leading to true social changes in the society.
- **Mainstreaming** sustainable science in education needs to renovate itself in a long-lasting and ambitious process that requires strong leadership and abundant time.
- **Development** of the necessary interfaces between science, policy and society help in advancing **mainstreaming** of sustainability in terms of knowledge, adaptive management and societal learning as well as providing scientific stands to policy and decisions makers in the civil society.
- **Still**, many countries are not investing what is needed to bridge the gaps required to achieve mainstreaming of sustainability science in education.

Bad/best practices and lessons learned

- **Over the past few years**, a number of African countries including Nigeria, South Africa, Tanzania, and Uganda have embarked science capacity building programs in education and research that have helped advancing their agendas for sustainable development.
- **Structuring knowledge** and networking are a prerequisite step in the efforts to acquire a comprehensive view of sustainability issues which are both complex and interconnected.
- **Better understanding** of the links between social, economic, and biophysical systems is urgently needed.
- **Improve our understanding** of factors triggering North-South cooperation on education in sustainability science is a must.
- **Full understanding** of science sustainability implications avoids unintended consequences.

- **Mainstreaming partnership** for education should involve all concerned national foundations.
- **Encourage** capacity building program to confront challenges and constrains related to North-South cooperation on education in sustainability science.
- **Apply** the current state of scientific knowledge to achieve both short-term continuity and long term ecological integrity.
- **The scientific community** in southern countries must actively convince both decision-makers and the public at large that science plays a vital role in a society's well-being.
- **Prominent merit** scientists should advise their governments on critical policy issues related to scientific research and education.
- **North scientific communities** should be encouraged to devote part of the research and education agenda to critical problems facing southern countries.

To uplift scientific capabilities in northern regions, it would also be necessary to provide more support for UN organizations such as UNESCO, FAO and WHO that has focused on issues of education and sustainable development

A broad framework for collaboration among countries in the political, economic, social, cultural, environmental and technical domains is now urgent.

Democracy and good governance might have moral reasons for helping southern countries in building their research and education capacities.

Southern countries are expected to take ownership and establish a national framework for achieving the UN 17 goals of sustainable management.

Optimum mechanisms for open data and knowledge sharing

- **Sharing** knowledge and experience, training, technology transfer, financial and monetary cooperation and in-kind contributions.
- **Developing** skills for science education for sustainable development.
- **Intensifying** programs in training on innovative teaching and learning.
- **Sharing** responsibility in both South-South and North-South cooperation, in education and research might be the best way to ensure success.
- **Ease** free access to latest scientific knowledge and R&D out puts. As scientific research advances at an ever faster pace in Northern world, the gap between South and North countries is expanding.

- **The best ways** for building successful initiatives in North-South cooperation in education and research is through the enactment of political reforms based on sincerity, transparency and liability.
- **On the international front**, a sustained commitment from both donor nations and international financial institutions is essential to ensure that all nations participate in the world of science movement and that all nations enjoy the benefits of science-based development.
- **Most** significantly is uplifting the scientific capabilities of the 77 countries that are lagging in science and technology. To achieve this goal, it is necessary to establish and support a number of regional and/or international centers of excellence in these countries. Such centers would act as a magnet and attract talented students and researchers, and therefore facilitate fruitful regional and international cooperation in research areas relevant to poor countries.

Northern world's 'research monopoly' initiated a biased research agenda that is heavily biased towards challenges of particular importance and interest to the north, but of **little** consequence to the south.

Science sustainability programs are still lacking satisfying experience in the south.

Political strength in the Southern implementing institutions is still feeble.

Incompetent participation and/or complete absence of NGO's.

Limited institutional mandate.

Restricted available budgets.

Lack of proper indicators for sustainable management.