SOME SUGGESTIONS

by

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The views presented here are the participants’ and do not necessarily reflect the views and position of the United Nations or the United Nations Conference on Trade and Development.
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1.0 Introduction

The UN Millennium Project STI Task Force that Calestous Juma and I co-chaired was the only task force that had UNCTAD, UNCSTD, UNIDO and UNESCO represented in its membership. The intention of Calestous and myself was obvious. Not only could the STI Task Force leverage on the work of these UN organizations that are most closely engaged in Science, Technology and Innovation, we had great aspirations that they would provide the enabling UN framework in follow-up actions with respect to the recommendations of our Task Force report “Innovation: applying knowledge in development.”

With the launch of the UN Millennium Project Report and all its Task Force Reports by Kofi Annan in January 2005, the UN Millennium Project Task Forces were disbanded. Since then, I have lost touch with UNIDO. I have maintained very close relations with UNESCO, as WFEO is affiliated with UNESCO and its head office is within UNESCO. Although UNESCO must emphasize “Science” in its activities and initiatives to justify the “S” in its name, I do detect some significant shift from “Science” to “Science, Technology and Innovation (STI)”. I will describe some with which I am associated in more details later. But UNESCO will remain the bastion of “Science”.

It was with CSTD that Calestous and I placed high hopes that it would become the UN torch bearer in “Innovation” through the application of Science, Engineering and Technology (S.E.T) for development in general and for the MDGs in particular. Calestous has a long history of association with CSTD and felt that it was uniquely positioned. I was convinced by him and later on by our Task Force member, Susan Braynwain, the UNCTAD representative in UN New York. It is still my aspiration.
2.0 The Niche for UN Commission on Science and Technology for Development (CTSD)

The parent body of CSTD, namely the UN Conference on Trade and Development (UNCTAD), links two essential elements of economic growth i.e. “Trade” and “Development”.

I have persistently advocated that for developing countries to grow their economies through trade, they must possess the following pre-requisites:

- Basic infrastructure i.e. roads, schools, water, sanitation, irrigation, clinics, telecommunications, energy etc.
- Basic industries, namely small and medium enterprises (SMEs) for supply of goods and services to agricultural and natural resources exploitation industries and infrastructure implementation.

In other words, trade cannot flourish without:

- The physical connectivity of land, water, ocean and air transportation facilities, and
- The electronic connectivity of communications like telephone (mobile) for everyone and internet for the literate.
- The indigenous SMEs that underpins trade and commerce

Both infrastructure development and indigenous SMEs depend critically on the availability of trained human resources and associated enabling institutions. That is why our Task Force strongly advocates infrastructure projects and services as opportunity for technological learning. Our recommendation was endorsed by the UN Secretary-General in his Report to the UN Summit General Assembly 2005 “In larger freedom, towards development, security and human rights for all”.

Quote

To increase countries’ indigenous capacity for science and technology, including information and communications technology, Governments should establish scientific advisory bodies, **promote infrastructure as an opportunity for technological learning**, expand science and engineering faculties, and stress development and business applications in science and technology curricula.
In the months of 2005 leading up to the UN Summit General Summit of September 2005, the global development communities and UN agencies conducted many seminars and workshops in the cause of the MDGs. One important event was the “High Level Dialogue on Financing for Development” in New York, 27-28 June 2005. Susan Brandwayn lobbied very hard for a roundtable “Infrastructure Services as learning process to develop science, technology and innovation in developing countries” during the event. The premise was that “basic infrastructure services are a pre-requisite to development and wealth creation in developing countries. This is particularly important for least developed countries (LDCs), which so far have been marginalized from the benefits of scientific and technological advances because these generally require a minimum critical mass of technological capability – a minimum that they do not meet. There are infrastructure projects everywhere, including in the poorest countries. These projects, with the right planning framework, can serve to develop technological capabilities, and also to open the space for SME entrepreneurial development”. I met with Susan several times in New York and helped in drafting our proposal, which was embraced by UNCTAD in Geneva. The proposal was rejected by the event organizers as it was considered not sufficiently relevant to financing for development.

I still recall having lunch with Susan and the Chef de Mission to UNCTAD Director General in New York in September 2005 during the UN Summit General Assembly when it was agreed that infrastructure as an opportunity for technological learning would be the right platform for CSTD for the MDGs.

Then WSIS Tunis, November 2005, entrusted CSTD with a great deal of follow up action. ICT swept “infrastructure and technological learning” aside. I was deeply involved in the organization of the High Level Roundtable on ICT and Development in New York September 2005, leading to the establishment of the UN Global Alliance on ICT and Development (GAID) in WSIS Tunis. I introduced my MOSTI Minister to GAID in Tunis and helped to organize its launch in June 2006 in Putrajaya, Malaysia. In my considered opinion, there is only one ICT torch bearer in UN, i.e. GAID.

Therefore I return to my original advocacy for “infrastructure and technological learning” as a proactive way forward for CSTD. I reproduce the proposal in full in the Annex and commend the proposal for deliberation for this meeting, with the plea that CSTD should walk the talk.
3.0 Walking the Talk

The difficulty to shift the well entrenched paradigm of S.E.T organisations from holding talk shops as their action agenda cannot be underestimated!

To quote from my own experience in Kenya, the first annual international conference “African Science Academy Development Initiative: Improving Public Policy to Achieve the Millennium Development Goals in Africa: Harnessing Science and Technology Capacity” was held in Nairobi, November 7–8, 2005 with funding from the Melinda and Bill Gates Foundation through the US National Academy of Sciences. I argued at the Conference that it is very late in the day to explore the potential role of African science academies in development. If they really wanted to make meaningful contribution, they could offer their services in the implementation of any of the numerous national S.T.I. projects in the Poverty Reduction Strategies that many African countries have prepared at the behest of the World Bank. I do not know what impact my appeal made on the Conference and its ongoing initiative, as I have not been invited to participate again! However, I can report the situation in Kenya where I have been a member of the National Economic and Social Council of Kenya for the past three years. NESC is chaired by His Excellency M. Kibaki, the President of Kenya to help Kenya to fast track economic and social development. I have yet to see any input from either the Kenyan Academy of Sciences or the Institution of Engineers Kenya.

By stark contrast, Professor Jeffrey Sachs and his colleagues in the Earth Institute of Columbia University have walked the talk by establishing Millennium Villages in Africa and working together with the village communities to achieve all MDGs by 2015. www.millenniumpromise.org There are now 79 Millennium Villages across 10 African countries, serving almost 400,000 people. In the past year, the Millennium Villages have accomplished the following:

- Renovated or constructed 54 schools;
- Provided school meals for 66,537 students;
- Distributed 365,000 bed nets;
- Distributed 7,531 tons of seed and fertilizer;
- Renovated or constructed 14 health facilities;
- Constructed or rehabilitated 127 safe water points.
Now there is urgent need to promote trade with the increased crop yields from the Millennium villages, but there is little or no basic infrastructure, i.e. rural roads, electricity supply, irrigation facilities and internet access etc. The infrastructure implementation capacity and capability in Africa is either non-existent or woefully inadequate.

To quote another example from my Kenyan experience, there was a worsening famine due to drought in Kenya in 2003-2005, yet the 2004 and 2005 budget allocations for “water storage for irrigation” was under spent due to lack of indigenous implementation capacity. I suggested in NESC to make use of the military engineering units of the Kenyan armed forces. In any country, the military engineering units are amongst the best equipped for construction. This is little difference in disaster relief with respect to temporary access roads, Bailey bridges, jetties, temporary shelters, safe drinking water and electricity supply etc and the implementation of basic infrastructure in remote and rural areas. Yet, such invaluable capacity remains idle in a sea of need. NESC accepted my proposal. The Kenyan Ministry of Water and the Kenyan military have since come to agreement that the latter will act as sub-contractors in construction of small dams and in digging of bole holes. The Kenyan government has also directed all Ministries with approved infrastructure projects to engage the military, if the projects lack implementation capacity. Meanwhile, I have been to Washington DC several times to request the US Army Corps of Engineers (USACE) to offer advice and mentoring to Kenyan military engineering units with the objective with institutionalizing the engagement of military engineering units with the possible establishment of a Kenyan Corps of Engineers. I am glad to report that after some 18 months, ice breaking visit from USACE to Nairobi occurred April-May 2007. According to Sonya Sachs, the President of Liberia has made road construction the priority deliverable of her presidency. But there is no implementation capacity. I have passed on the message through Sonya that she could use her nascent military for infrastructure implementation with the help of USACE.

4.0 UNESCO and Malaysian Ministry of Science, Technology and Innovation (MOSTI)

I am fully aware of the resource limitations of UNCSTD in Geneva. I would therefore like to suggest UNSCTD could well make use of Malaysia as the hub for “infrastructure and technological learning” through ongoing initiatives that MOSTI has with UNESCO.
I cite the events leading to very close rapport between UNESCO and MOSTI Malaysia as examples of walking the talk.

4.1 Promotion of History of Islamic S.E.T.

Developing countries are facing the serious problem of declining enrolment in science courses in secondary schools and universities. I am particularly concerned about the negative attitude of male youth in Islamic countries, as they perceive S.E.T as western in their current anti-Western perspective.

In 2005, I approached UNESCO as WFEO president to promote the history of Islamic S.E.T. to let Muslim youth aware of their glorious S.E.T. heritage and encourage them to turn the S.E.T. rather than orthodox religious education. By a fortunate coincidence, UNESCO was mounting an impressive exhibition “Golden Age of the Arabic Sciences” in Paris 29 October 2005-19 March 2006. (www.unesco.org/pao/exhib/islam.htm). My proposal for an International Symposium on the History of Islamic Science, Engineering and Technology (HIST) during the Paris Exhibition was based on the premise that it was Islamic S.E.T with its algebra, astronomy, architecture and medicine etc that sparked the European Renaissance through Islamic Spain. I further asserted that history is most useful when it can be used to point the way to the future. In S.E.T, it is important to also highlight the eminent modern day Muslim scientists, engineers and technological industrialists that are carrying on the glorious Islamic S.E.T tradition. The Symposium should therefore feature eminent Muslim scientists and engineers as role models for Islamic youth.

HIST was successfully held in UNESCO, Paris 16-17 March 2006 as the closing event of the Paris Exhibition. The Symposium was strongly supported by the InterAcademy Panel (IAP), the InterAcademy Council (IAC), the World Islamic Academy of Sciences, the Academy of Sciences of the Developing World (TWAS), and WFEO. Most importantly, the Malaysian Minister of Science, Technology and Innovation, YB Dato Sri Dr. Jamaludin Jarjis threw the support of the Malaysian government behind this initiative. He was the keynote speaker at the Symposium.

Subsequently the baton was passed to MOSTI, Malaysia, who organised the “Excellence in Islamic Science, Technology and Innovation” in Kuala Lumpur January-February 2007. The Exhibition was visited by 300,000. An international Islamic STI Symposium was jointly organised in Kuala Lumpur by MOSTI and UNESCO in August 2007. The innovation at the Symposium was the inaugural
International Workshop for Young Muslim STI practitioners, thus bringing together historians, current role models and the future Muslim STI torch bearers. The initiative has now gathered momentum with several Islamic countries offering to UNESCO to host the 2008 Conference. www.issti.gov.my

The most important outcome of this interaction between UNESCO and Malaysia has been the agreement by Malaysia to host an UNESCO International South-South Centre for Science, Technology and Innovation in Kuala Lumpur at the request of UNESCO. The Centre will be the focus for STI South-South cooperation.

4.2 International STI Centre for South-South Cooperation under the Auspices of UNESCO

On being approached by UNESCO during HIST in Paris, MOSTI Minister agreed to the establishment of an International Centre for South-South Cooperation in Science, Technology and Innovation in Kuala Lumpur to be established under the auspices of UNESCO. UNESCO was urged to set up such a centre by the Doha Summit of G77 in 2005. Emphasis of the Centre would be on facilitating the integration of a developmental approach into national science and technology and innovation policies, capacity building in science and technology through providing policy advice and exchange of experience and best practices, and creating a problem solving network of centres of excellence in developing countries as well as supporting exchange of students, researchers, scientists and technologists among developing countries. The Centre was approved by UNESCO General Conference in October 2007 and will be launched during the World Congress on Information Technology (WCIT) in Kuala Lumpur, May 2008.

4.3 Consortium of Science, Technology and Innovation for the South (COSTIS)

The Consortium on Science, Technology and Innovation for the South (COSTIS) was launched by the Meeting of the Ministers of Science and Technology of the Group of 77 Member States held in Rio de Janeiro, Brazil, September 2006. COSTIS is supported by UNESCO and UNDP.

According to Mohamed H.A. Hassan, executive director of TWAS and interim COSTIS Executive Director, COSTIS' main focus will be to promote science-based economic development in developing countries and
Encourage international cooperation in science and technology. COSTIS will mobilize science, technology and innovation for development that address topics of critical concern, including the development of appropriate and affordable technologies for increasing access to safe drinking water, energy, and information and communication technologies.

Membership of COSTIS is derived from three main streams:

- Ministers of Science and Technology of G-77,
- Presidents of Academies of Sciences, Academia and STI Research Institutions,
- Captains of STI Industries and Corporations.

In my opinion, the most important message from COSTIS via TWAS is the reversal of the almost universal misconception that the necessary path to economic development in developing countries is through more emphasis and investment in science and scientific research. Through COSTIS, it is my hope that policy makers and the scientific and academic communities in developing countries will realize that knowledge per say does not create wealth. It is the application and commercialization of knowledge, scientific or otherwise, into useful devices, installations, services and systems that create wealth.

COSTIS will be holding its inaugural ministerial forum in May 2008 during WCIT in Kuala Lumpur.

5.0 S.E.T. Brain Drain from Developing Countries and Cross-Border Mobility of S.E.T Professionals

S.E.T human resources capacity building in developing countries faces the critical problem of brain drain.

Currently, there is a disturbing worldwide trend that enrolment in engineering courses in universities is declining. This has been particularly evident in developed countries with the related phenomenon of closure of engineering departments in universities and institutions of higher learning. The situation of science courses is no better. As a result, developed countries have been exercising the prerogative of the “Rich” by recruiting scientists, engineers and technologists from the developing countries.
Most developing countries thus suffer on three counts. First, they do not produce enough scientists, engineers and technologists for their own requirement as their education and training infrastructure is inadequate to cope with the growing demand. Secondly, they expend scarce hard foreign currency in sending their students for expensive S.E.T courses in developed countries. Thirdly, there is the constant S.E.T drain, usually the best and the brightest, to the developed countries.

In my opinion, solutions to overcome this critical shortage of S.E.T professionals in the developing world cannot be North-South but must be South-South. We must tap from those countries where large population and large geographical spread or both require the production of large number of S.E.T professionals to satisfy their own development needs. Such countries are South Africa, India, China, Mexico and Brazil to name but a few.

As example, there are more than 1.0 million engineering students in universities in China with some 600,000 graduating as engineers each year. Similar statistics also apply to India. To increase this number by 10% would not strain the engineering educational resources of China or India but would be of great help to other developing countries. When the engineering qualifications from the above-mentioned major producers of engineers and technologists are accepted first regionally and then worldwide, these countries will provide accessible and affordable engineering education and training facilities for students from other developing countries. It is thus very much a win-win situation for the whole developing world.

However the accreditation and certification barriers in developing countries against one another are formidable. To remove these, there would need to be international agreement of the accreditation of S.E.T educational qualifications and the certification of professional practice, leading to cross-border mobility. For example, in ASEAN, there is increasing political will to operationalize the ASEAN Engineers Register, leading to professional mobility across ASEAN. Malaysia is in the forefront of the initiative.

South-South mobility of engineers and technologists on the global scale can only be achieved through the World Trade Organisation (WTO), as WTO decisions are binding on member nations. Cross border mobility of professional engineers and related professionals are crucial elements of the WTO Agreements on Trade in Engineering and Construction Services. The General Agreements on Trade in
Services (GATS) are very much part and parcel of the WTO Doha Trade for Development agenda 2003-2006. Little progress has been made to date.

May I suggest that CSTD Geneva take up this important issue with WTO Geneva. I am sure Malaysia through the Board of Engineers Malaysia and the Institution of Engineers Malaysia will be willing to assist with their successful experience in ASEAN.

6.0 World Science Forum 2009

The first ever global science forum was the UNESCO-ICSU World Conference on Science (WCS), 1999, Budapest. Its voluminous document was endorsed by the UN General Assembly as the defining statement on Science for the 21st century. I recall the grandeur of the event and I remember scanning the document and noting that the word “engineering” occurred only five times and “engineer” not at all. As such, it can hardly be the defining document for STI and development.

Nonetheless, encouraged by the success of the WCS, the Hungarian Academy of Sciences initiated a series of events called “World Science Forum” taking place biannually in Budapest. As in 2001 UNESCO demarcated the 10th of November as “World Science Day”, a day dedicated to science and scientists, the biannual World Science Forum takes place on and around the 10th of November of every odd year. The first WSF, focusing on ‘Knowledge and Society”, took place 8-10 November 2003, whereas the second WSF on “Knowledge, Ethics and Responsibility” was held between 10-12 November 2005 in Budapest.

The 2007 World Science Forum “Investing in Knowledge: Investing in the Future” was held in Budapest 8-10 November 2007. I was invited to co-chair the session on “Science and the MDGs” the title of which was changed at my suggestion to “Science, Technology and Innovation and the MDGs: from policy to action”. Surprisingly ICSU was not a co-organiser. Instead TWAS was given the honour. I found a significant shift in the readiness of WSF to accept STI rather than sticking to “Science”. Mohamed Hassan spoke about COSTIS and its inaugural meeting in 2008 in Kuala Lumpur. The most significant decision of WSF 2007 was to organise a major global World Science Forum in 2009 as the “WCS+10”. I would strongly recommend that CSTD offers itself as a co-organiser to champion the cause of STI for development. This meeting would need to discuss what specific issues CSTD would like to put on the agenda of “WCS+10” and to lobby UNESCO and the Hungary Academy of Sciences.
urgently to put them in the programme. Additionally I would recommend CSTD undertake to organise specific sessions in WSF 2009, if not entirely under its own steam, then with member countries like Malaysia.

7.0 Conclusions

My prime suggestion for CSTD is to be the UN torch bearer of innovation through science, engineering and technology. The immediate focus can be infrastructure projects and services as opportunities for technological learning for developing countries. Malaysia could well be the hub through the international STI Centre and COSTIS. As for CSTD Geneva, they can take initiative for discussion with WTO on South-South mobility of S.E.T. professionals to address and redress the critical problem of S.E.T brain drain and for discussion with UNESCO and the Hungarian Academy of Sciences on STI input into “WCS+10”
ANNEX

High Level Dialogue on Financing for Development
New York, 27-28 June 2005

Proposal for a Roundtable Discussion
“Infrastructure Services as Learning Process to Develop Science, Technology and Innovation in Developing Countries”

Background

It has been accepted that without basic infrastructure services, development cannot occur in any developing country, especially the rural areas in the country. Without physical and electronic connectivity, the local economy is trapped in the closed environment. Trade with even its immediate environs is not possible, let alone trade and commerce with other parts of the country or export to other countries. It follows that without basic infrastructure services, the MDGs cannot be achieved for less developed countries (LDCs).

Donors have poured billions of dollars into infrastructure projects over the last few decades. However the outcome has hardly matched the massive investment. This can be attributed to the following reasons. Infrastructure projects simulate the local economy by creating wealth and employment in its environs. They are eagerly sought after by all politicians for their own constituencies. The locations, scales and sectors are frequently ill chosen, bowing to political considerations. Such major donor aided projects are also conditional upon their design, supply and execution by donor country companies and suppliers. The above combination of circumstances conspires to make infrastructure investments failing miserably to meet development objectives. Investment and aid in infrastructure projects have suffered as a result.

Yet LDCs need infrastructure for poverty alleviation and economic development. There is a revival of interest in development communities in infrastructure services as a prerequisite to economic development. This has been stimulated by the UN Millennium Project “Science, Technology and Innovation” Task Force. The recommendations in the STI Task Force Report “Innovation: Applying Knowledge in Development” January 2005 have been included in the UN
Secretary-General’s Report to the 2005 UN Summit General Assembly: “In larger freedom, toward development, security and human rights for all”.

A re-orientation of basic infrastructure services in LDCs must be made, away from the supply side of the alliance of donor conditionalities and local political considerations to the demand side of local development needs in line with the MDGs.

This would mean refocusing infrastructure services at the local level, using local human resources to build, operate and maintain simple installations with maximum utilisation of local materials. With the building of local infrastructures all over a country, its national government can in parallel build the next layers of infrastructure to interlink and interconnect these local installations. With both initiatives being taken, the basis for integrating the national economy, trade and commerce is then available for competitive participation in global trade and global production chain in niche areas.

The local infrastructure services require local government and community participation in order to be widespread through simultaneous implementation. Successful examples of rural and local infrastructure projects in developing projects abound with national government investing one-third, local government one-third and the local community one-third (in labour and material). There are also successful examples of foreign NGOs like Engineers-Without-Borders (EWB), Oxfam, MDGs Youth etc that help local communities implement infrastructure project and provide capacity building support.

This is a fruitful area of South-South cooperation as higher income developing countries are definitely more willing to share their experience and expertise with the LDCs. The current Capacity Building Initiative of the OIC/Islamic Development Bank announced in March 2005 by OIC Chairman, Dato Seri Abdullah Badawi, Prime Minister of Malaysia, is just one example.

Foreign investment would definitely be needed for the higher layers and more capital intensive infrastructure services in LDCs. Instead of requiring design, supply and construction by their own corporations, the contracts must specify genuine joint venture with local companies with provision to help the latter establish and grow, i.e. with more emphasis on capacity building rather than technology transfer.

Communities in developed countries have been very proficient in using their hands that have become a culture of mechanical excellence since the industrial
revolution. Besides the accumulated knowledge, manual dexterity is very much a part of their superior innovative genius. Communities in developing countries do not possess such innovative culture and tradition in manual dexterity. This failing is compounded in the education system in developing countries, even in vocational and engineering education, by the over-emphasis on class room book learning; and computer simulation that bears little resemblance to real life. Yet, the foundation for success in local basic infrastructure services is local skilled human resources that can undertake the infrastructure implementation and associated life cycle services. There is no better way to develop such a mechanically proficient and manually dexterous community and work force than active participation in local infrastructure services in design, installation, repair, operation, maintenance and upgrading. Proficiency in above infrastructure services will lead to the establishment of indigenous owned small and medium enterprises.

LDGs urgently need to make local basic infrastructure services a learning process in order to develop a STI proficient society.

Objective of the Roundtable

How to move this proposal towards implementation in developing countries, particularly LDCs.

Participants

The World Bank, regional development banks, national development banks, private companies engaged in construction (e.g. companies whose CEOs are part of the World Economic Forum’s Global Corporate Citizen Initiative), co-chairs of the UN MP’s Task Force on Science, Technology and Innovation, Government representatives, NGOs and others involved in infrastructure projects and services.

Possible issues to be discussed

- The traditional approach – what is working, what is missing.
- Infrastructure project development- social and economic need, contracts life cycle approach to infrastructure project design, review of contract conditions vis-à-vis technology transfer, (a standard feature but not working well); capacity building, development of local consultancy and contracting companies in joint ventures etc.
• Linking infrastructure projects and services to technological learning (training by doing; reform of curricula of engineering departments of local universities and engineering institutes, contribution by foreign firms and development NGOs)
• Promoting SMEs through infrastructure development, including venture capital from foreign contractors and micro-credit
• Case Studies and Best practices (including development NGOs like Engineers Without Border, Oxfam, MDGs Youth)