

Academies and Development
By Dato Ir. Lee Yee Cheong
President, ASEAN Academy of Engineering and Technology
(AAET)

1.0 Introduction

By the turn of the 21st Century, world population has exceeded 6.0 billion that can roughly be divided into three classes: the Rich (0.8 billion), the Transitional (1.2 billion), and the Poor (4.0 billion). This is based on the criterion of GDP in US\$ per capita (Purchasing Power Parity corrected): >16,000, 4000-16,000, and < 4,000 respectively.

However, the Rich have nine times the wealth, eight times the energy consumption and eight times the carbon emission of the Poor. The actual statistics of the Poor are appalling: 1.3 billion live in abject poverty, subsisting on a daily income of less than US \$1.00; 3.0 billion have a daily income of less than US\$ 2.00; 800.0 million suffer from food insecurity; 50.0 million are HIV positive; 1.0 billion suffer from water scarcity; and 2.0 billion have no access to commercial energy.

The urgent problems confronting the world are poverty, hunger, diseases, illiteracy, environmental degradation etc. These can only be solved by collective global political will and resources. In the United Nations Millennium General Assembly, September 2000, the world's leaders adopted the UN Millennium Declaration with the Millennium Development Goals (MDGs) that are specific, measurable targets with a timeline of 2015.

The UN Millennium Project (UN MP), 2002-2005, then proceeded under Project Director Professor Jeffrey Sachs of Columbia University to propose the best strategies and operational plans for meeting the MDGs. This was carried out by 10 task forces comprising some 250 eminent scholars, policy makers, and development practitioners.

The MDGs:

- Goal 1: Eradicate extreme poverty and hunger
- Goal 2: Achieve universal primary education
- Goal 3: Promote gender equality and empower women
- Goal 4: Reduce child mortality
- Goal 5: Improve maternal health
- Goal 6: Combat HIV/AIDS, malaria and other diseases
- Goal 7: Ensure environmental sustainability
- Goal 8: Develop a Global Partnership for Development

The 10 UN Millennium Project Task Forces:

- Task Force 1 Poverty and Economic Growth
- Task Force 2 Hunger
- Task Force 3 Education and Gender Equality
- Task Force 4 Child Health and Maternal Health
- Task Force 5 Expanding Access to Essential Medicines
- Task Force 6 Environmental Sustainability
- Task Force 7 Water and Sanitation
- Task Force 8 Improving the Lives of Slum Dwellers
- Task Force 9 Trade and Finance
- Task Force 10 Science, Technology and Innovation (STI)

The STI Task Force is the overarching task force that addressed MDG No.8 “Building Global Alliances for Development” and Target 18 “In cooperation with the private sector, make available the benefits of new technologies, especially information and communications”. Its findings reinforce the evident truth that STI is central to achieving the MDGs.

As president of the World Federation of Engineering Organisations(WFEO) and board member of the Inter-Academy Council (IAC), I was appointed as co-chair of the STI Task Force. I consider my major contribution to the UN Millennium Project was to drive home the seldom acknowledged truth that engineers and engineering are pivotal to social and economic development of developing countries through the MDGs.

2.0 UN Millennium Project “Science, Technology and Innovation” (STI) Task Force

In its Report “Innovation: Applying Knowledge in Development” issued in January 2005, STI Task Force emphasizes the following areas of focus for developing countries:

- Improving the STI policy environment, including STI advice mechanism, STI management training for top policy makers in government, industry and civil society,
- Building STI human capacities, including strengthening STI educational institutions and reorienting the role of universities in development,
- Investing in research and development,
- Conducting technology foresight for developing countries to find niches in the global production chain, and
- Forging regional and international STI partnerships.

For least developed countries to lift themselves out of poverty and achieve MDGs by 2015, the STI Task Force stresses that they need:

- 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 for the provision of indigenous operational, repair and maintenance expertise.

Without the SET base, especially the engineering and technology base, indigenous industries cannot upscale, economy cannot uplift and foreign direct investment (FDI) will not come.

During my UN MP interaction with African STI community, I advocated strongly that Africa should look to Asia Pacific where macroeconomic stability, self-reliance, hard work, thrift and investment in education have transformed the economic landscape in the short span of three decades. I have also persistently urged genuine South-South cooperation with high and middle income countries like Malaysia, China, India, Brazil, Mexico and others as donors in the MDG process. The “Look East and Look South” orientation for Africa is reflected in the STI Task Force Report.

The UN MP reports formed the developmental basis of the UN Secretary-General's report to UN member states for the UN Summit General Assembly September 2005. I am most gratified to note that our UN MP STI Task Force recommendations have carried the day by his emphasis on STI in his report, particularly on scientific R&D, capacity building for engineers and engineering, infrastructure and SME development.

Quote

- Development successes cannot take place overnight. It takes time to train the teachers, nurses and engineers, to build the roads, schools and hospitals, and to grow the small and large businesses able to create the jobs and income needed.
- Sustainable economic growth will require significantly increased investments in human capital and development-oriented infrastructure, such as energy, transport and communications.
- Governments should establish scientific advisory bodies, expand science and engineering faculties, and stress development and business applications in science and technology curricula.
- Research and development funding for renewable energy sources, carbon management and energy efficiency needs to increase substantially.
- Significantly increased global effort is required to support research and development to address the special needs of the poor in the areas of health, agriculture, natural resource and environmental management, energy and climate.

Unquote

The UN Summit General Assembly September 2005 endorsed most of the UN Secretary General's recommendations with respect to the MDGs as per its Outcome Statement..

All the above-mentioned reports and documents are posted on www.unmillenniumproject.org .

The top global science, engineering and technological (S.E.T.) community submitted a joint statement "Science, Technology and Innovation in Achieving the MDGs" to the UN Summit General Assembly dated 13 September 2005. It was issued in the names of IAC; the Inter-Academy Panel (IAP); UN MP; ICSU; the Academy of Sciences for the Developing World (TWAS); the InterAcademy Medical Panel (IMAP); the Council of Academies of Engineering and Technological Sciences (CAETS); and WFEO. I was very pleased to sign the joint statement as WFEO President.

Quote

Stronger worldwide capacities in science and technology will greatly enhance humanity's ability to achieve the UN Millennium Development Goals. A concerted global effort among the world's scientists, engineers, and medical experts is needed to identify successful strategies and to help implement effective programs. We, representing the world's scientific community, commit ourselves to working with appropriate partners towards these urgent goals.

Unquote

3.0 Talking Must Stop and Action Must Start

There is now unanimous global political will for the MDGs. There is also consensus that STI, especially engineers and engineering, is fundamental to achieve the MDGs. Thanks to persistent STI advocates to the UN like myself, the voice of the global STI community in the global development community in support of the MDGs is getting louder and is being heard.

I think I am entitled to ask: What has academies of engineering, academies of sciences etc represented by CAETS, IAP and other regional institutions done to energise and mobilize the global engineering and scientific communities for poverty eradication and economic uplift of the Poor of the world?

I know it is very difficult to shift the well entrenched paradigm of S.E.T organizations, academies and faculties in universities from holding more talk shops and issuing more study reports as their prime development agenda. Nevertheless, I persevere by outlining some action oriented MDG initiatives and programmes with the hope that you and your academies will join in and get your hands dirty.

4.0 Initiatives Academies of Sciences and Academies of Engineering Should Support and Participate

I am currently involved in the following activities that I seek your support and participation.

4.1 Millennium Villages of Professor Jeffrey Sachs

The Millennium Villages are based on a single powerful idea: impoverished villages can transform themselves and meet the MDGs by 2015 if they are empowered with proven practical technologies. The concept is doing all of it at once. Goals can be achieved by bundling critical yet straightforward solutions in a comprehensive investment strategy and working directly with the poor. By

investing in health, food production, education, access to clean water, and essential infrastructure, these community-led interventions will enable impoverished villages to escape extreme poverty once and for all. Once these communities get a foothold on the bottom rung of the development ladder they can propel themselves on a path of self-sustaining economic growth. Millennium Promise Foundation of Professor Jeffrey Sachs is working in more than 75 villages in ten different countries: Ethiopia, Ghana, Kenya, Malawi, Mali, Nigeria, Rwanda, Senegal, Tanzania and Uganda. Professor Jeffrey Sachs is currently working on spreading Millennium Villages to Cambodia, China, India, Malaysia and the Middle East. www.millenniumpromise.org

Professor Jeffrey Sachs is convinced that without basic infrastructure, his Millennium Villages cannot succeed. He has therefore asked me to get engineers involved. On 18 November 2006 in Chicago, WFEO Executive Council unanimously endorsed my recommendation to support the Millennium Villages. The US engineering community through the American Society of Civil Engineers ASCE and the engineering communities in developing countries through WFEO will work on engineering aspects of physical infrastructure facilities like rural roads, water supply, ICT and rural electricity supply in Millennium Villages.

On 28 July 2006, I visited the US National Academy of Engineering (USNAE) President Dr. Bill Wulf in Washington DC to ask for his academy's support for the Millennium Villages. I lobbied Professor George Bugliarello, Foreign Secretary of US NAE in Chicago. Both Bill and George are strong advocates of engineering capacity building in development. The response is most positive.

Incidentally I have absolutely no problem with young engineers. "Engineers-Without-Borders" (EWB) are mushrooming in university campuses across North America and Europe. Whilst the bulk of EWB members and volunteers are undergraduate engineering students, many EWBs are supported by their universities and engineering faculty members. EWBs from developed countries partner their counterparts in developing countries in MDG-related and infrastructure-based community projects in the latter. It is the old and the not so old in the engineering community who are very difficult to get on board.

4.2 UNESCO International South-South Centre for Science, Technology and Innovation, Kuala Lumpur, Malaysia

Heads of States and Governments of the Group of 77 and China, meeting in Doha, Qatar, from 12 to 16 June 2005, in the occasion of the Second South Summit of the Group of 77, adopted the Doha Plan of Action. The Summit urged UNESCO to develop and implement a programme for South-South cooperation in science and technology with the objective of facilitating the integration of a development approach into national science technology and innovation policies; promoting capacity building in science and technology; providing policy advice;

facilitating exchange of experiences and best practices; and creating problem solving network of centres of excellence in developing countries as well as supporting exchange of students, researchers, scientists, engineers and technologists among developing countries. At the UNESCO/WFEO Symposium on “The History of Islamic Science, Engineering and Technology as Heritage of Mankind” in UNESCO Paris, March 2006, the Malaysian Minister of Science, Technology and Innovation and keynote speaker, Dato Sri Dr. Jamaluddin Jarjis agreed to UNESCO’s request to host an UNESCO International South-South Centre for Science, Technology and Innovation in Kuala Lumpur, as the Doha Plan of Action in STI coincides with Malaysia’s STI initiatives in OIC of promoting a strategy aiming at encouraging the uptake of science and technology in the developing member states through the adoption of appropriate S&T policies, strategies, plans and programme for human resource capacity building and development. Malaysia believes that UNESCO is well-placed to serve as the platform of international cooperation in science, technology and innovation policies. Malaysia therefore welcomes the proposal that STI activities in this area be conducted under the auspices of UNESCO. The UNESCO Centre is scheduled to be approved by UNESCO in April 2007. The Centre will be hosted by the Academy of Sciences, Malaysia.

4.3 UN Global Alliance for ICT and Development GAID and the Cyber Development Corps (CyDevCorps)

For basic infrastructure development and the nurturing of indigenous SMEs, developing countries would need a new paradigm in development focusing on appropriate technologies that favour indigenous resources. This approach would mean the development and utilisation of small-scale accessible and affordable installations, systems and services. In this endeavour, the key enabling technology is ICT.

The UN has devoted considerable attention to ICT in recent years with the holding of two World Summits on Information Society (WSIS) first in Geneva 2003 and then Tunis 2005. At Tunis, the UN decided to establish the multi-stakeholder UN Global Alliance of ICT and Development (GAID). www.gaid.org Dato Seri Dr. Jamaluddin Jarjis decided in Tunis that Malaysia should take a leading role in GAID. He offered to host the UN GAID Launch in Kuala Lumpur. On 19 June 2006, GAID was duly launched in Kuala Lumpur by the Prime Minister of Malaysia in the presence of UN Deputy Secretary-General, Mark Malloch Brown. Dato Seri Dr. Jamaluddin Jarjis was elected co-chair of GAID Steering Committee with Malaysia spearheading the pioneering GAID initiative, the Cyber Development Corps (CyDevCorps). CyDevCorps is designed to send ICT savvy volunteers to set up ICT and Internet facilities in rural communities in the developing world. At the first GAID Steering Committee meeting at the UN New York on 27 September 2006, the CyDevCorps was designated as a GAID flagship project with secretariat in Kuala Lumpur. The meeting was opened by UN Secretary-General Kofi Annan and chaired by Craig Barrett of Intel. On the

same day, I arranged for Dato Sri Dr. Jamaluddin Jarjis to meet up with Professor Jeffrey Sachs. They agreed to explore the engagement of CyDevCorps volunteers in Millennium Villages in Africa.

4.4 Engaging Military Engineers in Developing Countries

Developing countries suffer severe S.E.T brain drain. Therefore, every possible means must be taken to increase the indigenous S.E.T. capacity for development in order to achieve the MDGs by 2015. It is a fact that in any developing country, the military engineering divisions and units are amongst the best equipped for basic infrastructure construction and rehabilitation. Yet, such invaluable capacity remains idle in a sea of need.

We tend to forget that military engineers predate civilian engineers. In fact, the term “civil engineer” was to differentiate it from “military engineer”. There was a fine tradition of Caesar’s legions, which built roads, aqueducts, baths and sewers. Nearer home, the mighty Mongol hordes of Genghis Khan relied very much on their innovative military engineers to extend the reach of empire. In more recent decades, military engineering units in China, Taiwan, China and Korea, have contributed significantly to the construction of infrastructure and laid the foundation of their bludgeoning construction industry.

There was a worsening famine due to drought in Kenya in 2003-2005, yet the 2004 budget allocation for capital projects of water storage for irrigation was under spent due to lack of indigenous implementation capacity. This was discussed in the infrastructure committee of the Kenyan National Economic and Social Council (NESC) which I chair. After obtaining approval in principle from NESC, I have taken upon myself to visit Washington DC several times in the past eighteen months to discuss with the US Army Corps of Engineers to consider assisting in capacity building of Kenyan military engineering units in water storage projects. The US Army Corps of Engineers has a rather unique history wearing both a military as well as a civilian hat for some 200 years. About 75% of USACE’s professional staff are civilian. The response has been very positive at both the Kenyan and US ends. The Kenyan Ministry of Water and the Kenyan military have come to agreement that the latter will act as sub-contractors in construction of small dams and in digging of bore holes. The Kenyan government has recently directed all Ministries with approved infrastructure projects to engage the military if the projects lack implementation capacity. During my last visit to Washington DC in September 2006, the US Army Corps of Engineers has obtained funding to offer advice and assistance to Kenyan military engineering divisions to ensure that the institutional arrangements are put in place and are sustainable. Hopefully this will lead to the rapid development of the Kenyan construction industry.

5.0 Broad Ranging Advocacy

The UN MP STI Task Force has broad ranging recommendations on higher education reorientation for development in developing countries. Not having been associated with university administration nor academic pursuit, I can only advocate but cannot act. Since many more members of academies are University dons, we really need your participation in effecting the reorientation.

5.1 Reorientation of Higher Education Systems in Developing Countries

Universities in developing countries must act as the fount of knowledge for economic development. For this to happen, policy makers need to 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. Therefore, turning out innovative and entrepreneurial graduates must be the mission of the universities in developing countries.

Universities in developing countries must be graduating job creators rather than job seekers. Universities should re-orientate themselves to serve the development needs of their region and their nation. They should establish undergraduate incubators that assist students to venture into knowledge based enterprises suited to the needs of the economy. Such undergraduate enterprises will attract industry participation as they are the most fertile recruiting ground for industry. If such undergraduate enterprises succeed beyond graduation, they will create jobs and add to the successful knowledge enterprises in the country. Even if they fail, the graduates would have been well schooled in the hard knocks of business life and well adapted to the needs of industry.

Effective strategies for engineering and technological capacity building in developing countries should link curriculum in university engineering courses and undergraduate and post graduate training directly to infrastructure projects. Innovations in maximizing the use of indigenous goods and services will be needed in the design and implementation of cost effective infrastructure projects.

The benchmark of higher education excellence in the developing world is unfortunately that of the best in the developed world. This is a natural and understandable human aspiration especially for university dons who were themselves mostly graduates of Western university education systems. There is constant advocacy to turn vocational institutions into polytechnics, polytechnics into technical universities and technical universities into research universities and research universities to be ranked amongst the top research universities in the world. This is the great developmental disconnect in developing countries between the educated elite, the stark reality of joblessness for post graduate researchers and graduates, and the increase in brain drain.

I would like to suggest that every developing country benchmarks its higher education excellence against its relevance and success in meeting the critical development challenges of the nation. Such “Fit for Purpose” measurements will be much more meaningful for employment creation and economic uplift of the developing world. There must however be corresponding financial encouragement and social recognition for such community based and development focused STI excellence in higher education, research and development and commercialization of innovations. The award of the Nobel Peace Prize to Professor Muhammad Yunus and his Grameen Bank for the pioneering innovation of microfinance in poverty reduction in Bangladesh may well be the beginning of a new paradigm.

Kuala Lumpur
7 November 2006