

ENSEARCH

3rd K. Kumarasivam Memorial Public Lecture

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**UN Millennium Development Goals (MDG),
Science, Technology and Innovation (STI),
Corporate Sector and Sustainable
Development**

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Tribute to Ir. K. Kumarasivam

University of Adelaide

UN Youth Association of South Australia

Rotary Club of Gombak

KTA Tenaga Sdn Bhd

UN Millennium Development Agenda

The World Today

World Population >6.0 billion.

- (i) Rich (0.8 billion),**
- (ii) Transitional(1.2 billion)**
- (iii) Poor (4.0 billion)**

Criterion: GDP in US\$ per capita (PPP)

- (i) >16,000,**
- (ii) 4000-16,000,**
- (iii) < 4,000 respectively.**

The Rich have Nine times Wealth, Eight times Energy Consumption and Eight times Carbon Emission of the Poor.

20% Richest : 86% of World Consumption

20% Poorest : only 1.3%.

1.3 billion live in Abject Poverty, on Daily Income <US \$1.00;

3 billion have Daily Income of <US\$ 2.00;

800 million Suffer from Food Insecurity;

50 million are HIV positive;

1 billion Suffer from Water Scarcity;

2 billion have No Access to Energy.

The World Tomorrow

World Population: 9-10 billion by 2050.

Increase: Urban & in Developing Countries

Greatly Aggravating Global Sustainability Challenge

Our World is A World of Inequity

**United Nations Millennium General
Assembly 2000 adopted UN Millennium
Declaration**

**Millennium Development Goals (MDGs) of
the Declaration are specific targets by 2015.**

**The Millennium Project (MP) 2002-2005
reviews current practices, identifies policy
implementation, and evaluates financing**

**The MP's Objective is to Ensure All
Developing Countries Achieve the MDGs.**

MDGs

Goal 1: Eradicate 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

MP Task Forces

- 1 Poverty and Economic Growth (Goal 1& 8)**
- 2 Hunger (Goal 1)**
- 3 Education and Gender Equality (Goals 2 & 3)**
- 4 Child Health and Maternal Health (Goals 4 & 5)**
- 5 Expanding Access to Essential Medicines (Goal 6 & 8)**

MP Task Forces

6 Environmental Sustainability (Goal 7)

7 Water and Sanitation (Goal 7)

8 Improving the Lives of Slum Dwellers (Goal 7)

9 Trade and Finance (Goal 8)

10 Science, Technology and Innovation (Goal 8)

How I became co-chair of UN MP STI Task Force

Earth Summit Rio 92 adopted Agenda 21.

International Scientific and Engineering Organisations, ICSU and WFEO made significant input to Agenda 21.

Although their contributions not widely acknowledged, Agenda 21 did accept the premise that science, engineering and technology (SET) are critical input in the global transition to sustainability.

The InterAcademy Panel (IAP) formed in 1994 with membership of some 100 national science academies has offered global advice to:

UN Population Summit in Cairo 94, UN Habitat II, Istanbul 96, UNESCO World Science Conference, Budapest 1999, WSSD Johannesburg 2002 and most recently the UN Summit General Assembly, September 2005 on the MDGs.

IAP in 1997-2000 decided to play a more prominent and proactive role in global STI advice with theme for its Millennium activities;

“Crucial global goals in the coming decades are to feed, house, educate, nurture, and employ many more people, to reduce hunger and poverty, and to maintain the life support systems of the natural environment.”

IAP organized major Conference on Sustainability Transition, Tokyo, May 2000 With 6 Topics:

Population and Health; Food; Water; Consumption; Energy; Knowledge and Education.

IAP assembled some three hundred of the leaders of the global scientific, engineering and medical community in Tokyo, Japan in May 2000 to deliberate on the above challenge to demographic, economic and environmental sustainability in the 21st century and on the role of SET in meeting that challenge.

In Tokyo, the InterAcademy Council (IAC) was established under the IAP to act as the primary contact with the UN and to undertake STI studies and consultancies on issues of global concern. The formation of IAC was encouraged by UN Secretary-General Kofi Annan, and Maurice Strong at the World Economic Forum, Davos.

World Federation of Engineering Organisations (WFEO)

WFEO is the global organization whose 90 National Members are the national institutions/societies of engineers and whose 10 International Members are the regional federations of engineering institutions/societies.

WFEO thus represents some 15 million professional and graduate engineers worldwide.

I was first Asian to be WFEO president 2003-2005.

WFEO and UN

UN Commission for Sustainable Development as Co-Partner with ICSU in Science and Technology Community Major Group

- 1. CSD-9, 2001, New York**
- 2. WSSD, Johannesburg 2002 with PrepCom II
New York and PrepCom IV Bali**
- 3 CSD-11, New York, April-May 2003**
- 4. CSD-12, New York, April 2004**
- 5. CSD-13, New York, April 2005**
- 6. CSD-14, New York, May 2006**

WFEO and UN

In CSD-12 2004, I convened and chaired an event during which Professor Jeff Sachs, Special Representative of UN Secretary-General, addressed the nine civil society Major Groups.

In CSD-13 April 2005, as advisor to the global youth caucus, I helped launch their MDG report “Youth and the MDGs: Challenges and Opportunities for Implementation”. I was also a panellist on the MP and the MDGs

In CSD-14 April 2006, I was a panellist on Electricity Power Grid.

UN Millennium Project Task Force No.10 “Science, Technology and Innovation”

TF 10 addresses 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”.

Besides ICT, TF10 Examines Biotechnology, Nanotechnology, Materials Science and Spatial Information Technology

TF10 is Engineering and Technology biased.

TF10 FOCUS

Improving the STI policy environment, including S.E.T advice mechanism, technology 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, graduating job creators rather than job seekers.

Promoting entrepreneurial and innovation activities, with incentives for enterprise development, industrial extension services, government technology procurement, and venture capital market.

TF10 FOCUS (continued)

Investing in research and development, building scientific and technological capabilities, supporting under-funded research in design and innovation including research in manufacturing and product marketing.

Technology foresight for developing countries to find niches in the global production chain.

Forging regional and international STI partnerships

TF10 also leveraged on important work carried out by others:

In “Science Advice to Government” on Inter-Academy Panel (IAP) of world science academies and the Academy of Sciences Malaysia;

In “Global S&T Capacity Building” on Inter-Academy Council (IAC);

In “Technology Foresight” on UNIDO;

In “ICT for development” on UN ICT Task Force;

In “Biotechnology” on genomics for health of the University of Toronto;

In “Nanotechnology” on Royal Society and the Royal Academy of Engineering, UK.

Successful Development in the Asia Pacific and S.E.Asia convinces STI Task Force:

“For least developed countries to lift themselves out of poverty and achieve MDGs, they need:

1) Basic infrastructure i.e. roads, schools, water, sanitation, irrigation, clinics, telecommunications, energy etc.

2) Basic industries, namely small and medium enterprises (SMEs) for supply of goods and services to agricultural and natural resources exploitation industries. This means indigenous operational, repair and maintenance expertise and a pool of local technicians.

Without the basic infrastructure and technology base, indigenous industries cannot upscale and economy cannot uplift. FDI will not come

To implement the above, the STI advice systems in developing countries need reorientation, with more government support and funding for establishment and nurturing of academies of engineering and technological sciences, professional engineering and technological associations, industrial and trade associations and the like.

These human resource and institutional supporting framework in the private sector and in NGOs would spur sector-wide innovations in the development process.

Since WSSD, I have advocated strongly to Africans to look to Asia Pacific and Malaysia 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 advocated 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 and in my advocacy to date.

The UN MP report and all MP TF reports were launched by the UN Secretary-General Kofi Annan in New York on 17 January 2005

Followed by national launches in more than 100 countries. I represented Professor Jeffrey Sachs in the Thailand launch in Bangkok 18 January 2005.

All MP Reports available from

www.unmillenniumproject.org

The MP reports formed the developmental basis of the UN Secretary General's Report "In Larger Freedom: towards development, security and human rights for all" 21 March 2005 to UN member states for the UN Summit General Assembly September 2005

I am most gratified by his emphasis on S.E.T. in the report, particularly on engineering, infrastructure, SME development.

Quote:

The unprecedented combination of resources and technology at our disposal today means that we are truly the first generation with the tools, the knowledge and the resources to meet the commitment in the Millennium Declaration

“To making the right to development a reality for everyone and to freeing the entire human race from want”.

Success will require sustained action because development successes cannot take place overnight and many countries suffer significant capacity constraints.

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.

Small and medium-sized firms require a favourable legal and regulatory environment, and expanded access to financial capital.

This is crucial for providing decent jobs that both provide income and empower the poor, especially women and younger people.

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.

A 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.

Two particular priorities should be to mount a major global initiative on research in tropical diseases and tropical agriculture

Unquote

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

During the UN Summit General Assembly September 2005, a high level STI and ICT for Development Roundtable was held. Our Prime Minister was a keynote speaker and I was the co-moderator.

Global Top SET Community represented by IAP, IAC, WFEO, TWAS, ICSU, IMAP, CAETS together with MP submitted Joint Statement to the UN Summit General Assembly September 2005:

“We state that stronger worldwide capacities in science and technology will greatly enhance humanity’s ability to achieve the UN Millennium Development Goals. We call on the United Nations General Assembly in September 2005 to take urgent action. For our part, we commit ourselves to working with appropriate partners towards these urgent goals.”

UN MP STI Task Force Report is really about human resource and institutional capacity building in developing countries.

Since institutions and enterprises are run by human beings, it all boils down to STI human resources capacity building.

Priority must be Education.

Universities must now act as the fount of knowledge for development and competitiveness in the global knowledge economy.

Policy makers need to realize that knowledge 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.

Turning out innovative and entrepreneurial graduates should be the mission of the universities in developing countries.

University academics should not be recruited on PhD degree, research experience and publications only. They should have working experience in industry and in the marketplace.

Successful candidates as academics in developing countries should have demonstrated involvement in community service.

Universities must be graduating job creators rather than the job seekers. 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 the best and brightest. 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.

A very positive trend in recent years has been the blossoming of Engineers Without Borders (EWB) in university campuses across North America and Europe.

Bulk of EWB volunteers are undergraduate engineering students, but 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.

EWB projects won quite a few Mondialogo Engineering Awards in 2005. Mondialogo is a joint UNESCO-DaimlerChrysler cross-cultural initiative supported by WFEO that is aimed at fostering North-South collaboration amongst university engineering students in MDG and sustainable development projects in developing countries.

How about “A MDG Project for Every University”?

Innovation is born of the inquisitive and creative mind. There is mounting scientific evidence that the human child is born inquisitive. The most inquiring, acquiring and creative age is between 3 and 10.

The Nurturing of the Innovative Mind must start from Primary through Secondary Education.

IAP has made the promotion of hands-on inquiry based primary school science education top priority. The most successful is the La Main à la Pâte (LAMAP) program of the French Academy of Sciences (www.lamap.fr).

In Malaysia and ASEAN, I was instrumental for IAP to entrust LAMAP promotion to the Regional Education Centre for Science and Mathematics (RECSAM), Penang.

The ongoing challenge in secondary education is to pervade the curriculum with evidence based enquiry type learning and with more STI content to boost enrolment.

The high end of the STI human resource development is the staffing of R&D institutions in developing countries.

there exists an almost universal misconception that the necessary path to economic development in developing countries is through more emphasis and investment in science and scientific research.

Postgraduate research departments have been set up prematurely in the least developing countries with their graduates and researchers finding no local gainful employment and migrating to the developed world, aggravating the brain drain. What an irony it is that developing countries are training highly skilled manpower for the developed world, whilst insufficient resources are devoted to lift the countries out of poverty!

Current Worldwide Shortage of STI Professionals Results in **Brain Drain to Developed Countries.**

Most developing countries thus suffer on three counts:

First, they do not produce enough for their own requirement as their STI education and training infrastructure is inadequate.

Secondly, they expend scarce foreign currency in sending their students for STI courses in developed countries.

Thirdly, there is the constant brain drain, usually the best and the brightest, to the developed countries.

South-South Collaboration To Offset Brain Drain

Solution to Brain Drain: Employ STI Professionals from High Income and STI Advanced Developing Countries, Like India & China, South Africa, Brazil, Mexico.

As an example, there are more than 2.0 million engineering students in universities in China with some 600,000 graduating as engineers each year. To increase this number by 10% would not strain the engineering educational resources of China but would be of great help to 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.

US National Academies published in October 2005 report that the US edge in science and technology competitiveness is slipping. It cites as evidence that China is graduating some 600,000 engineers a year, India some 300,000 engineers a year

Whereas USA is graduating only some 60,000 engineers a year!

Brain Drain Will Worsen!

WFEO members long involved in cross border mobility of engineers, e.g. Eur-Ing, APEC Engineer, Engineer Mobility Forum

However, Accreditation and Certification remain very much within the purview of government in developing countries.

South-South and global mobility of STI professionals can only be achieved through the World Trade Organisation (WTO)

WTO Member Nations must bring this issue on the negotiating table of the Doha Round

The serious problem of declining enrolment in science in secondary schools and universities in developing countries need to be addressed.

Why is there an aversion to STI amongst the youth in developing countries, especially Islamic countries?

My Initiative with UNESCO to instil pride in Islamic S&T was launched with the International Symposium on “The History of Islamic Science, Engineering and Technology” 16-17 March 2006

It was Islamic SET with its algebra, astronomy, architecture and medicine etc that sparked the European Renaissance through Islamic Spain.

There is an urgent need to acquaint male Islamic youth of this glorious SET heritage to revitalize their interest in STI as important tools for poverty reduction, economic development and competitiveness.

The Deliverable Outcomes from the UNESCO Symposium are:

To incorporate the rich Islamic SET heritage and the present day Islamic Role Models into the textbooks and curricula both in the developed world and the developing world, particularly Islamic Countries.

To incorporate historic Islamic SET experiments in the InterAcademy Panel hands-on inquiry-based primary science education programme (LAMAP).

To have a traveling exhibition of Islamic S.E.T Heritage to Islamic countries, starting with Malaysia in January 2007.

**To Rescue Research Centres in History of Islam
SET in Western Universities from Closure.**

**To Organize subsequent conferences on North East
Asian (Chinese, Japanese, and Korean), Indian,
African and Latin American SET Heritage.**

**To Encourage developing countries to nominate
their significant S.E.T Heritage Installations for
UNESCO Heritage Listing.**

The UNESCO Symposium was supported by WFEO, the InterAcademy Panel, the InterAcademy Council, the Islamic-World Academy of Sciences, the Academy of Sciences of the Developing World, the Nobel Museum, and especially the Malaysian government through YB Dato Seri Dr Jamaluddin Jarjis, STI Minister.

**The Ministry of Science, Technology and Innovation, Malaysia will host an UNESCO International South-South STI Centre in Kuala Lumpur to promote the implementation of the above outcomes and other STI initiatives. UNESCO is expected to approve the Centre
April 2007**

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 the sea of need.

That there was a fine tradition of Caesar's legions, which built roads, aqueducts, baths and sewers. 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.

In Kenya, there was a worsening famine due to drought 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.

I have been urging the US Army Corps of Engineers to consider assisting in capacity building of Kenyan military engineering units in water storage projects. The response has been very positive from the US Army Corps of Engineers and the Kenyan government and military top brass. Participation of Kenyan military engineers in water projects has started.

ICT has created the global economy.

The capital that matters most in the digital revolution is intellectual capital. Hardware costs are declining. The shift from hardware to software as the cutting edge of the industry helps to overcome what has been a major impediment to development - the shortage of finance. It improves the chances for poor countries to leapfrog some long and painful stages in the development process.

ICT is a great tool to help developing countries meet many of the MDGs,

It is an essential infrastructure of wealth creation for developing countries in the global knowledge economy

It will accelerate the growth of sunrise enterprises in biotechnology, nanotechnology, material sciences and remote sensing etc.

Successful SMEs in developing countries will mostly be run by young and women engineers and entrepreneurs as they are without the traditional baggage of caution and conservatism of the STI profession and the business community

Using ICT with available and affordable computer hardware and software, knowledge of new technologies like biotechnology, nanotechnology, materials sciences etc accessible through the Internet and robotics and modern instrumentation, product research and development can be carried in any SME anywhere

As a consequence of the UN High Level STI and ICT Roundtable of September 2005, the World Summit on Information Society (WSIS) November 2005, Tunis, decided to form the multi-stakeholder UN Global Alliance of ICT and Development (G@ID). At Tunis, I encouraged YB Dato Seri Dr. Jamaluddin Jarjis to take a leading role in G@ID.

On 19 June 2006, G@ID was duly launched in Putrajaya by YAB Prime Minister of Malaysia in the presence of UN Deputy Secretary-General, Mark Malloch Brown.

YB Dato Seri Dr. Jamaluddin Jarjis was elected co-chair of G@ID Steering Committee.

Malaysia is spearheading the pioneering G@ID initiative, namely the Cyber Development Corps (CyDevCorps).

Promotion of Youth and Young Professionals is my lifelong vocation.

My international promotion started with my presidency of the Commonwealth Engineers Council 1993-2000, especially the CEC 50th Anniversary Conference 1996 graced by Her Majesty Queen Elizabeth II and the Commonwealth Young Professionals Conference graced by the Princess Royal.

In the UN MP and especially in STI Task Force, I have persistently been promoting the cause of Young STI professionals.

An achievement was my success to link Professor Jeff Sachs with the leaders of the Youth Major Group during the 12th Sessions of the UN CSD 2004, resulting in the preparation of the Report “Youth and the MDGs: Challenges and Opportunities for Implementation”.

<http://www.un.org/esa/socdev/unyin/documents/youthmdgs.pdf>

As stated by UN Secretary-General in his 2000 Millennium Report, “More than 1 billion people are between the ages of 15 and 24. Nearly 40 % of the world’s population is below the age of 20. Most of the resulting youth bulge, nearly 98%, will occur in the developing world. Young people are a source of creativity, energy and initiative, of dynamism and social renewal.”

UN Secretary-General was however sticking to the official UN age range for Youth of 15 and 24.

In my opinion, UN Secretary-General's very positive remark about youth is much more relevant to Young Professionals above the age of 25.

In ICT, billionaires and millionaires, are found in their 30s and 40s. Many lead and contribute to advancement of not only the youth of the world but also to the solution of the critical problems of poverty eradication and sustainable development.

I have been promoting the UN Commission for Young Professionals 26-40 years of age since the Commonwealth Millennium Young Professionals Conference 2000 through Australia, Malaysia and now USA.

Hopefully, the dynamism and idealism of young professionals will be harnessed by UN through such a Commission in the not too distant future.

My emphasis on basic infrastructure and development of SMEs in developing countries is predicated on the proactive involvement of the corporate sector in development.

I would however suggest that their greatest contribution to sustainable development would be to restrain their inordinate appetite for profit by the stimulation of excessive and profligate consumption.

Sustainable consumption has seldom been on the global development agenda. It is not addressed by MP for the MDGs.

The “Poor” would need to increase consumption of materials and energy for development. For this consumption to be sustainable, the “Rich” would have to change their excessive consumption patterns. It is however not favoured by corporations in developed countries because it is seen to threaten competitiveness and profitability.

Unfortunately, lifestyles of affluent countries in Europe and North America have become models for new consumers in the more affluent developing countries. If the global consumption of energy and materials were to become as intensive as that of the average American, worldwide usage would increase six-fold and environmental damage would rise similarly.

The world cannot sustain such consumption!

The advances of STI have enabled us to do more with less by improvements in performance, the use of less material and energy, faster processing and more durable products.

Unless developed countries share their new SET knowledge with developing countries and enable them to leapfrog to efficient technologies, the increase in environmental damage from increased consumption would actually outpace the improvements in energy and material use.

Ultimately, Corporations in the developed world especially MNCs must take the lead to temper their profit motivation with due regard to the sustainability of the global community and the global environment.

In view of the global support for the MDGs, I am optimistic that poverty reduction through the MDGs and environmental sustainability will be achieved, especially if the STI communities in government, academia and industry in developing countries work to build up their STI human resource and institutional capacities.

THANK YOU