

International Workshop on Sustainability Science,
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ORGANISING UKM FOR UPLIFTING THE ROLE OF SCIENCE IN SOCIETY

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Using science and technology to save Earth

EARTHQUAKE and tsunami in Samoa. Another devastating earthquake near Padang. Floods in India. Typhoons in the Philippines. All these calamities occurring so ominously close together set a sombre tone for the opening of the Sixth Science and Technology in Society (STS) forum on Oct 4 in Kyoto.

Convened annually by Koji Omi, a former finance minister of Japan, the STS networks influential policymakers, Nobel laureates and leaders in business, academia, science, media and non-governmental organisations, who are invited to dialogue and discuss openly the range of opportunities offered by science and technology (S&T) to resolve problems faced by planet Earth.

In plenary sessions on the role of S&T in the future of humankind, global health, economic recovery and growth, as well as parallel sessions on issues such as post-Kyoto Protocol, future cities, alternative energy for transportation, nuclear energy alternatives, the ocean frontier, robotics, applications of genome in personalised medicine, the brain drain, gain and circulation, and the role of universities, almost all speakers spoke about how the progress of S&T had brought prosperity and a better quality of life.

However, all expressed the shadows that often accompany S&T. For example, S&T provides energy, pesticides, fertilisers and electronic equipment for many of our activities, but they come from non-reusable sources that emit greenhouse gases responsible for global warming, with all its impacts on water, food and ecosystems in all regions.

Thus, extreme weather events are



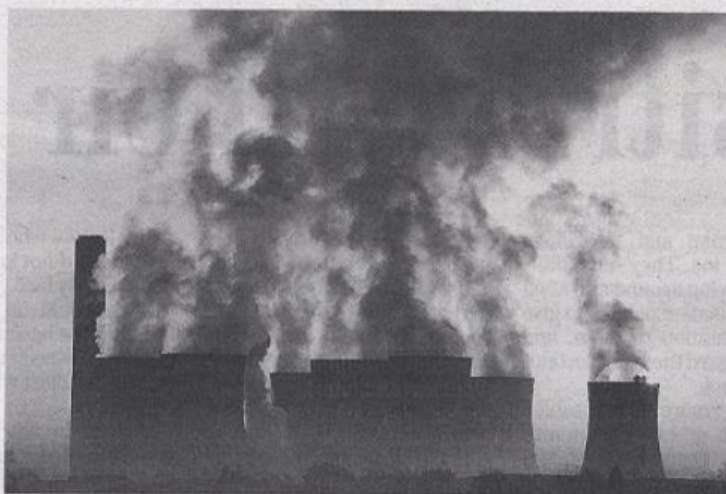
becoming more severe and frequent. Large parts of the Arctic are likely to be ice-free in summer by the end of the 21st century. Rising sea levels will flood the food-producing mega deltas and decrease water quality.

The world's population is set to reach nine billion by mid-century. Half the world's population now lives in cities. With increasing urbanisation, this will rise to 60 per cent by 2030. With the greater constraints on land, water and energy, we need to figure out how to service this population, which is expected to demand 50 to 85 per cent more food, 45 per cent more energy, and 35 to 60 per cent more water.

The world's agricultural sector, which uses 70 per cent of total supplies, will need to compete with the growing cities, making it unlikely to remain a "free" commodity in the future.

Against this backdrop, this year's STS forum explored the potential of S&T in solving the problems faced by humanity, based on shared values and commitment for the future. In a session for university presidents, I was asked to present the role of Universiti Kebangsaan Malaysia in contributing to sustainable communities.

As said by Ralph Cicerone, president of the US National Academy of Sciences and the National Research Council: "We are reduced to avoiding the unmanageable and managing



Innovative technologies and processes are needed to reduce emissions from buildings and industries. — Reuters picture

the unavoidable."

We need to mitigate climate change and adapt to what can no longer be avoided. Adapting to a two-degree rise in temperature (instead of one-and-a-half) is an example. Carbon capture and storage, and nuclear and renewable energy technologies, are the options to decarbonise electricity generation.

Innovative technologies and processes will also be needed to radically reduce emissions from transport, buildings and industry, and increase the efficiency of energy use throughout the economy.

On food, we need a new "greener revolution". Techniques and technologies from biotechnology, engineering and nanotechnology will be needed to increase yields and tolerance of crops to stresses such as droughts, to smart-

ly use water and fertilisers, to produce new pesticides and manage them effectively to avoid resistance problems, to introduce novel non-chemical approaches to crop protection to reduce post-harvest losses, and to devise more sustainable livestock and marine production.

We need a range of policy and technological solutions to manage and balance the supply and demand for water. Drought-resistant crops can reduce agricultural water use. Underground reservoirs may be needed in areas where melting glaciers and changes in precipitation are expected to alter river flow patterns.

In homes, recycling of domestic "grey water" will be needed to reduce consumption.

The contribution of S&T peppered the whole forum. All agreed that

mindsets and behavioural change are pivotal to the sustainability of planet Earth.

Richard Ernst, who was awarded the Nobel prize in 1991 for developing nuclear magnetic resonance for application in chemistry, biology and medicine, brought home a stark truth: "S&T are just tools; their proper usage requires foresight and responsibility for ultimate sustainability of the fate of our descendants."

Ernst said that while researchers could be driven by pure curiosity, from the beginning, they should be application-oriented in satisfying a public need. Scientists and researchers must prove by the choice of relevant problems their willingness not only to serve society but also to educate students to become responsible citizens.

It was in this context that UKM shared how it steers research and curricula to meet the emerging needs of society. Educating young minds is not just about giving them knowledge, but imbuing them with values of respecting diversity, loving the environment and serving society. This is achieved by engaging them with the community, where valuable lessons about humanity are learnt.

Examples of how UKM's research in solar energy and the environment brought direct benefits to communities in Langkawi, Tasik Chini and Semporna illustrated the practical ways universities can promote better living conditions and improved economy through activities such as ecotourism and small and medium-scale businesses.

■ The writer is vice-chancellor of Universiti Kebangsaan Malaysia

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Richard Ernst, Nobel prize winner, 1971

Speaking at the annual Science, Technology and Society (STS) Forum in Kyoto (2009)

SOCIETAL ENGAGEMENT: NOT MERE OUTREACH BUT A MINDSET

**University's commitment
to steer its**

Research



Education



Service



**To meet the emerging needs of society
&**

**to share its expertise and resources for participatory, bottom-up,
people-centered development.**

UKM Tree of Knowledge & Innovation



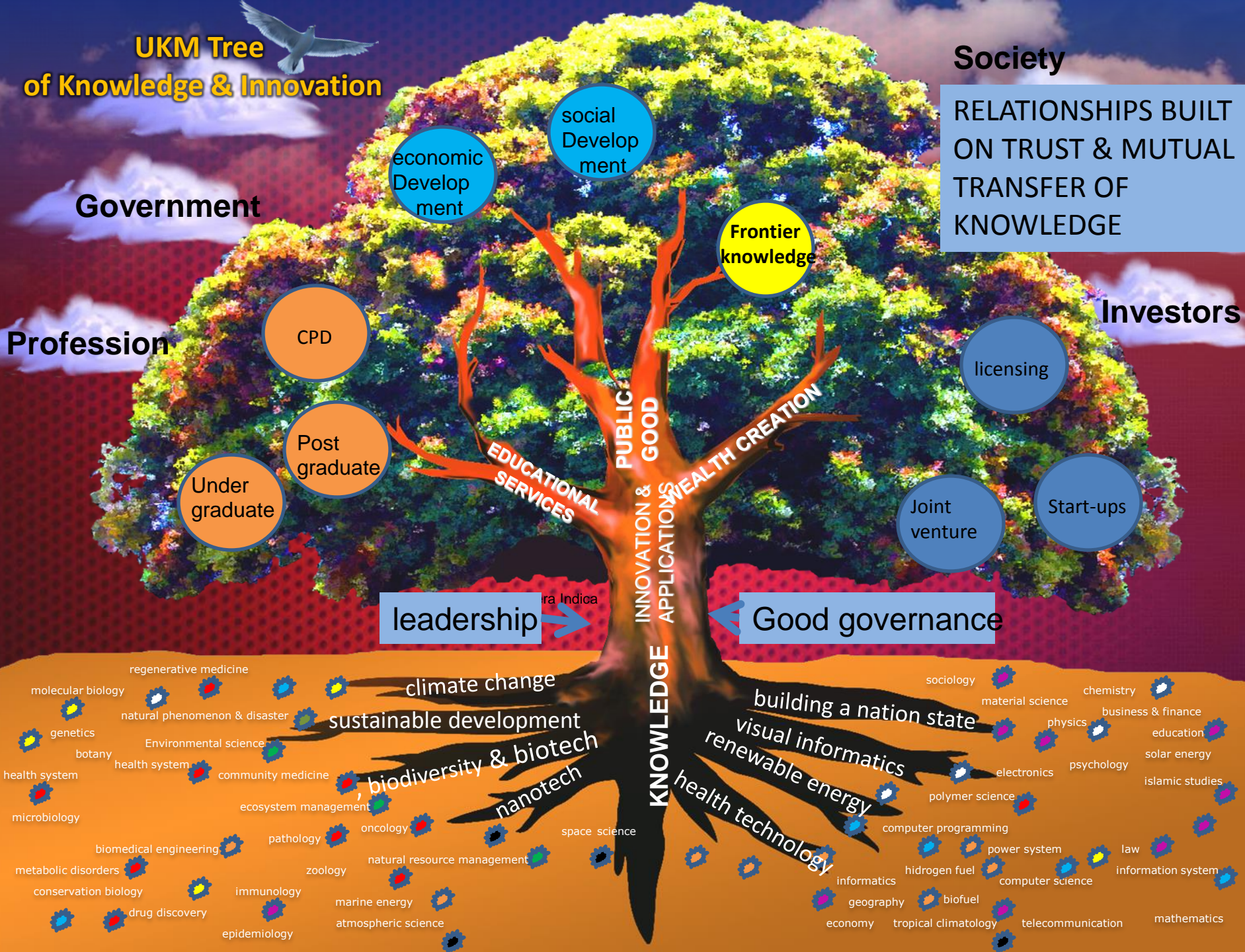
Government

Society

RELATIONSHIPS BUILT ON TRUST & MUTUAL TRANSFER OF KNOWLEDGE

Investors

Profession



GOALS OF SOCIETAL ENGAGEMENT



- Apply inventions to innovatively solve problems (e.g poverty, health, social imbalance, environmental degradation) as an active agent & partner in societal change
- Academic freedom: Critic & conscience of society
- Use the community as the classroom to inculcate ethics, values & responsibility through real world lessons, emphasising:
 - Spirituality, beliefs, tradition, custom, culture
 - Right or wrong, good or evil, tolerance, mutual respect
 - Happiness, sharing, caring, loving



MULTIDISCIPLINARY APPROACH TO ADDRESS SOCIAL NEEDS



Living Labs @ UKM

- Langkawi Geopark Research Station
- Mersing Marine Ecosystem Research Station
- Fraser's Hill Montane Research Station
- Lake Chini Research Station
- Lata Jarum Freshwater Recreational Forest Research Station
- UKM Bangi Permanent Forest Reserve

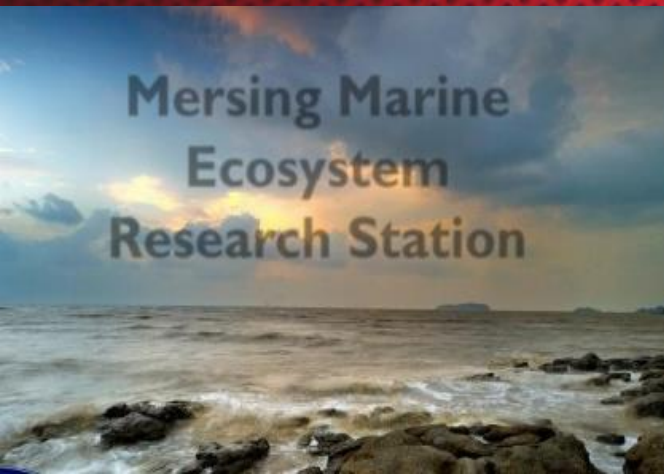
Langkawi : Southeast
Asia's 1st UNESCO Global
Geopark



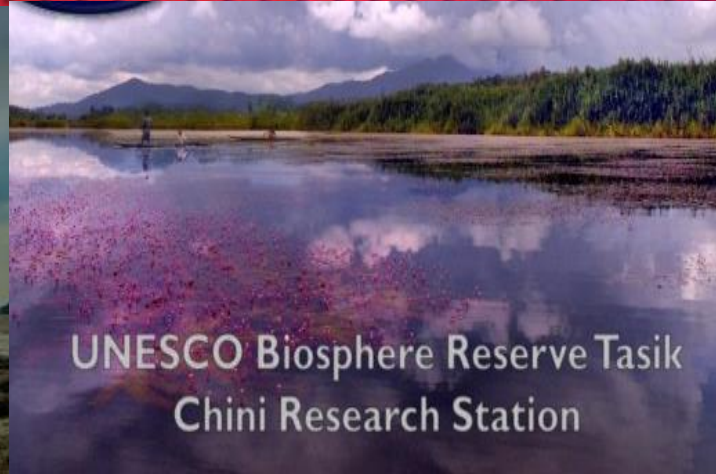
Fraser's Hill
Research Station



Mersing Marine
Ecosystem
Research Station



UNESCO Biosphere Reserve Tasik
Chini Research Station



Bangi Campus



UKM LANGKAWI RESEARCH STATION

- **>20 years:** RESEARCH on the geological, archeological, cultural, biodiversity and ecological wonders of the Langkawi archipelago
- JUNE 1 2007: 1st **UNESCO GLOBAL GEOPARK IN SOUTHEAST ASIA & WORLD'S 52ND GEOPARK**

ONSLAUGHT OF TOURISTS

KNOWLEDGE TRANSFER:

cultural preservation
training programs to
expand economic opportunities
for ecotourism
community awareness
program to keep Geopark
sustainable



LAKE CHINI : THREATENED BY DEVELOPMENT ACTIVITIES



UNESCO BIOSPHERE
RESERVE

>15 YEARS OF RESEARCH
AND CONSERVATION
ACTIVITIES



advocacy

REVIVE CULTURAL HERITAGE
IMPROVE LIVELIHOOD
THROUGH ENTREPRENEURIAL
ACTIVITIES OF INDIGENOUS
COMMUNITIES AROUND THE
LAKE



SOLAR ENERGY RESEARCH (SERI): SOLAR PANELS FOR INDIGENOUS PEOPLE IN REMOTE AREAS

LESSON: bottom up development requires a people centric approach with identification of real concerns and needs.



Stand alone solar panels tested in remote Orang Asli villages

Street lighting



ORANG ASLI: INDIGENOUS PEOPLE



Power for TV, radio

Drying food



Deputy VC Student Affairs

Volunteerism in
community projects

Deputy VC Academic

Learning in the
community

VICE CHANCELLOR

Deputy VC Research

Community based
research

transfer findings
into community
outcomes

Deputy VC

Industry & Community Partnership

**Plan and implement
engagement
strategies**

strategic planning
operational systems
Funding
capacity building
recognition & awards

**Collaborates with
external stakeholders**

MOHE & other
government agencies,
for- profit organisations,
civil society

for societal engagement
across research,
education and service

INSTITUTIONAL GOVERNANCE

KEY PERFORMANCE INDICATORS AND REWARDS

University Key Performance Indicators (KPI)

% staff & students in societal engagement

community engaged research Projects

UP TO
20%

Criteria for annual appraisal and promotion
societal engagement integrated in research,
education and service, not as a separate track.

8
credits

for societal engagement covering outcomes such as
social responsibility, ethics & professionalism, team skills
& communication, management & entrepreneurialism

Recognition

Annual group & individual Innovation Awards in
Community Partnership initiatives which involve
knowledge/technology transfer

CAPACITY BUILDING

- capacity building training in :
 - Social participatory research
 - Skills and competencies to access funding for societal engagement
 - Developing systems and processes for stakeholder engagement
 - Examining the social impact of societal engaged projects.



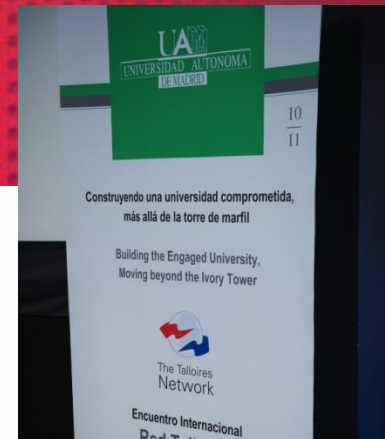
INTERNATIONAL COLLABORATION

- UNESCO (eg UNESCO Global Network of Geoparks)
- Talloires network of community engaged universities
- AsiaEngage
- ASEAN youth volunteer program
- Universities & research institutes
- etc

AsiaEngage



The Talloires
Network



Website : www.asiaengage.org

Website : talloiresnetwork.tufts.edu

IMPACT OF SOCIAL ENGAGEMENT ON THE COMMUNITY

• ECONOMIC

- Ecotourism & services industry
- Social business, job creation, entrepreneurship
- Manufacturing industries

• ENVIRONMENTAL PROTECTION AND CLIMATE CHANGE MITIGATION

• SOCIAL WELL BEING

- Inter culture understanding - foundation of national UNITY
- Unity is bedrock of DEVELOPMENT, PEACE & PROSPERITY
- “Good neighbour” relationship – hosts to students living in the community

• BETTER QUALITY OF LIFE

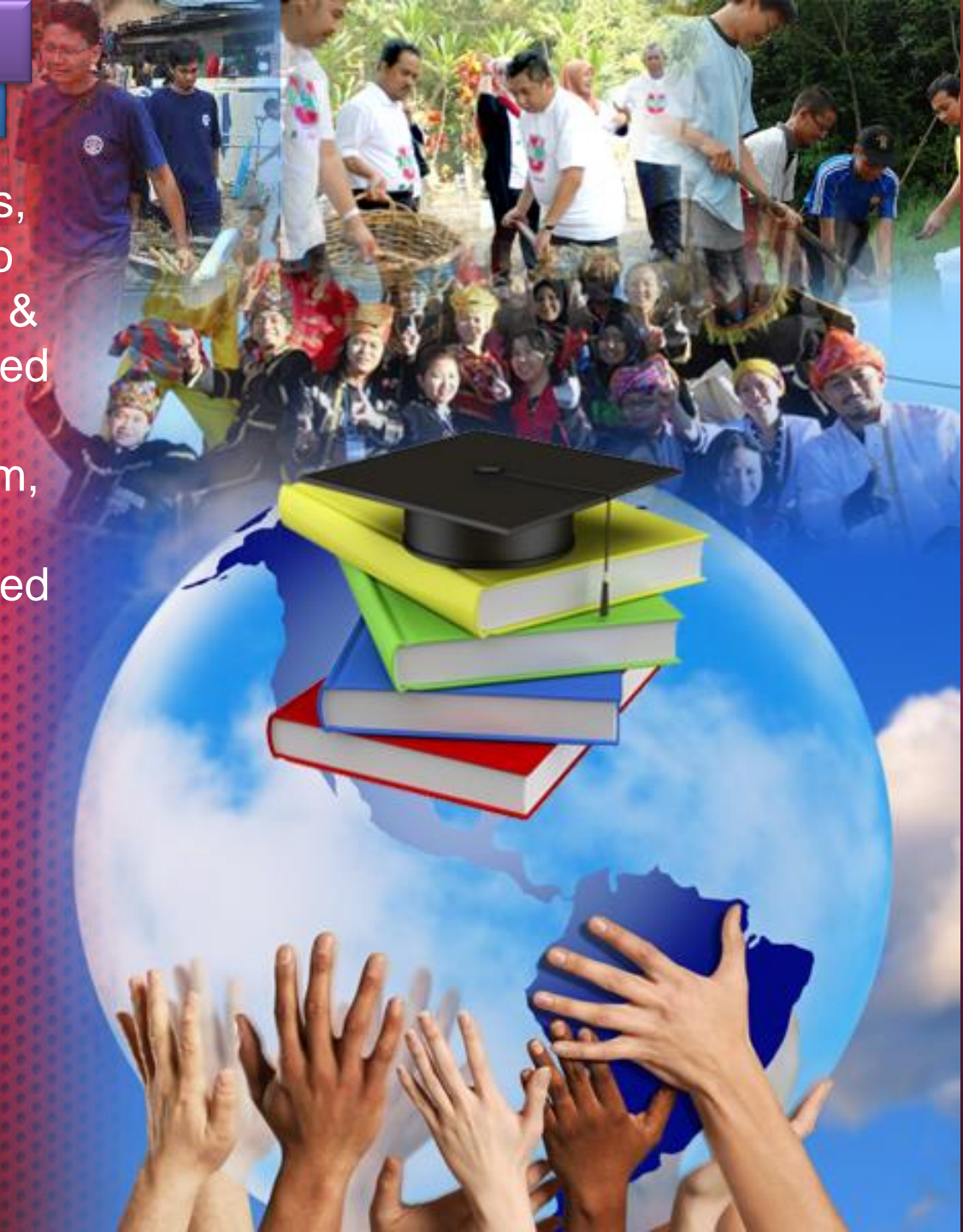


CONCLUSION

In the world of university rankings, what universities and teachers do to inspire young minds, to create & innovate, to speak freely unfettered by fear or anxiety, to be imbued with a deep sense of volunteerism, social responsibility & entrepreneurship are not translated into ranking indicators

This must not deter us. What matters most is its the immeasurable moral standards and contribution to sustainability.

“Not all that counts can be counted”.





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THANK YOU



IMPACT OF SOCIAL ENGAGEMENT ON UKM

Tremendous although difficult to measure in quantitative terms

- Knowledge more meaningful when mutually exchanged
- Quality & effectiveness of educational and research programmes through links to the 'real' world, social relevance for future & current needs
- Build knowledge communities & strengthen national innovation system
- Apply inventions to innovatively solve problems (e.g poverty, health, social imbalance, environmental degradation) in ethical manner
- Provide real-life experience and holistic learning experience for
 - developing leadership, organizational ability, team spirit and responsibility.
 - Inculcating inter ethnic respect and valuing of cultural diversity

