Using science and technology to save Earth

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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.

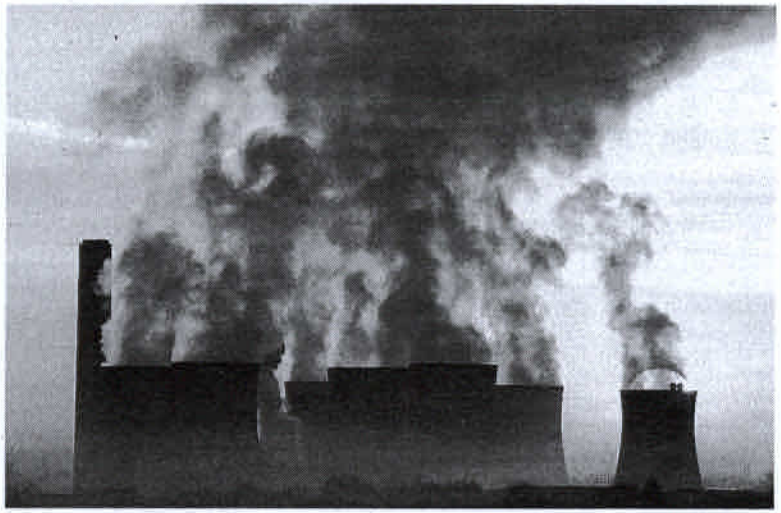
Thus, extreme weather events are becoming more severe and frequent. Large parts of the Arctic are likely to be ice-free in summer by the end of the 21st century. Rising sea levels will flood the food-producing mega deltas and decrease water quality.

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 the unavoidable."



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

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 smartly 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.

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