Editorial

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Biographical notes: Hilary I. Inyang is the Duke Energy Distinguished Professor of Environmental Engineering and Science, a Professor of Earth Science and the Director of the Global Institute for Energy and Environmental Systems at the University of North Carolina, Charlotte. He chaired the Engineering Committee of the USEPA Science Advisory Board from 1997 to 2001. He has led numerous scientific delegations and expeditions to many countries in Asia, South America, Europe and Africa. Currently, he serves as the President of the Global Alliance for Disaster Reduction, an organisation of 50 organisations and the International Society of Environmental Geotechnology. He is the author of about 170 publications and editorial member of 17 international journals.

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There is an increasing convergence of issues, approaches and disciplines of sustainable development across national frontiers. This necessary development belies the recognition that global sustainability requires a combination of instruments to avert the tragedy of the commons. Major environmental quality and economic development issues

such as global warming, ocean pollution, desertification, excessive waste generation, transcontinental transport of dust and disease vectors have both local and global drivers and effects. The challenges that we face are many and require careful analyses and establishment of appropriate balances among environmental quality, economic development for provision of goods and services and social equity. It is now widely recognised that poor sanitation, inadequate availability of safe water, food contamination and indoor pollution constitute a greatest environmental threat to human health. Recent calculations by the World Health Organization and the World Bank indicate that the improvement of environmental conditions of the poor could possibly reduce the prevalence of major diseases by 40%. In a strange way, poverty often confines an individual to conditions and locations of environmental stress as in the slums, ghettos, shanty towns and favelas that are either nested or ring most major cities in the world. Globally, it is estimated (from the data quoted by the World Resources Institute) that about 1.4 billion people still do not have access to safe drinking water and about 2.9 billion people do not have access to sanitation.

Environmental pollution is a concern for both rich and poor countries. An assessment by the US Environmental Protection Agency in 1997 (US Water, November 1997, p.10) indicated that 57% of the 2111 watersheds in the USA have problems mostly due to run-off of contaminants from agricultural and urban areas. Even in a relatively clean country such as Finland, where about 65% of the population use groundwater sources for domestic consumption, an extensive monitoring study of 1421 wells by Korkka-Niemi in 1997 indicated, 'only one-third of the wells (37.2%) fulfilled all hygienic and technical requirements and recommendations for drinking water'. However, it should be noted that Finland has an efficient system for treatment of water prior to its use for consumption and industrial processes.

It is commendable that the United Nations has taken leadership in developing a World Water Assessment Program (WWAP) that has so far involved pilot studies in the Chao Phraya River Basin (Thailand), Greater Tokyo (Japan), Lake Peipsi/Chudskoe-Pskovskoe (Estonia and the Russian Federation), Lake Titicaca Basin (Bolivia, Peru), Ruhuna Basin (Sri Lanka), Seine-Normandy Basin (France) and the Senegal River Basin (Guinea, Mali, Mauritania and Senegal). At the Millennium Summit in 2000, leaders of most nations had agreed to take collaborative steps to reduce the number of people without access to safe drinking water by 50% by 2015. That target date is approaching fast and there are high utility roles for professional organisations, institutes and non-governmental organisations. Steps taken technologically by advanced countries to address environmental issues illustrate what is needed globally: the creation and implementation of programmes that would accomplish the objectives of the National Environmental Action Plans (NEAPs) that most countries agreed at the 1992 Rio de Janeiro UN Conference to develop and implement. In many countries (especially the low-mid income countries), integrated capacity is lacking on NEAP aspects such as appropriate policies/regulations, technical guidance, education, incentives and enforcement.

A global sustainable development is an issue on which there is justification for a collaboration among countries of diverse economic and human development levels. The relative adequacy of management systems in the technologically advanced countries, when compared to the developing and underdeveloped countries, is somewhat negated by the higher generation rate of new environmental problems in the former. In 1984, a study by the US National Academy of Sciences found that 78% of

high-production-volume chemicals did not have data that are needed for health effects screening. A follow-up study by the Environmental Defense Fund (reported in Chemical and Engineering News, 8 September 1997) indicated that 71% of the 3000 chemicals used in the highest volumes in the USA have inadequate data for health screening. Of course, the subsequent development of OECD's Screening Information Data Set (SIDS) that initially divided up responsibilities among 18 countries for testing and generation of toxicological and related information on 2550 chemicals is a positive development. It illustrates an international collaboration between corporations and agencies. Nevertheless, the rate of synthesis of new chemicals exceeds the rate of testing and generation of health-related information on them.

With or without human population explosion, the redistribution of population within regions is still a problem. This has led to the occupation of marginal lands with a consequent increase in the frequency of serious human and infrastructural damages by natural hazards. Recent loss of lives from earthquakes in Iran, mudslides in the Caribbean, floods in China and Haiti are few examples. There is a growing convergence of environmental and natural hazards issues.

Any discussion about global sustainable development without addressing the issue of energy sustainability is incomplete. Energy is the lifeblood of economic development programmes. In spite of the fact that basically every country that has a coastline now produces oil, prices now fluctuate within the excessively high range of US $30–40 per barrel. With respect to electricity, global annual consumption per capita was about 2066 kWh per 1999 data compiled by the UN Development Program (745 kWh for developing countries and 7001 kWh for OECD countries). With the intensification of industrialisation efforts in developing countries, the disparity in energy consumption patterns should be expected to decrease. The implementation of alternate energy systems such as geothermal energy, biomass (waste-derived) energy, wind energy, solar energy and fuel cell systems is desirable. However, existing infrastructure and initial capital cost considerations make it feasible to deploy such energy systems only as 8–15% of the total energy mix. In specific localities where natural conditions demand and generation/transmission/delivery systems are adequate, the implementable level of alternative energy in the mix could be higher.

This special edition of the *International Journal of Environment and Waste Management* contains papers that exhibit technological advances on the fate, characterisation and treatment of contaminated media generated through civil and industrial operations.

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