International Roundtable on
'Sustainable Utilization of Energy and Biodiversity Resources for Wealth Creation and Development'
Kampala, Uganda, 10-13 March 2009

PARTICIPATING COUNTRIES:	**15 Countries (Including 14 Member Countries and 1 S&T-Industry Network Members of the NAM S&T Centre**
NUMBER OF PARTICIPANTS:	**The Roundtable was attended by about 66 experts and senior professionals including from the host country Uganda**

The increasing population pressure and demand for a better life style have led to a greater use of energy. As a consequence, the rate of energy consumption is day by day becoming much higher than it was ever before resulting in escalating pressures on the use of available resources, which are mostly fossil fuels in the form of coal, oil, gas and minerals for getting nuclear power. A negative balance in the equilibrium of process source depletion and replenishment by natural processes, which has also led to uncontrollable rise in air, water, soil, noise, electrical and other types of pollution causing the healthy survival of life difficult on Planet Earth.

The energy resources are categorized as non-renewable (limited) and renewable (cyclic). The latter comprise solar, hydro, wind, geothermal, biomass and tidal power. Biomass resources used as fuel include organic materials such as wood, roots and other plant and animal material, and the energy derived from these is termed as bio-energy. Crops grown for bio-energy include not only the traditional crops like wheat and oilseed rape, but also dedicated energy crops including short-rotation willow-coppice, unusual grasses and forestry products. Crops can be converted to energy either by processing these into liquid fuel for the transport sector (bio-fuels) or by directly burning in power plants as biomass by gasification. With combustion, carbon dioxide (CO_2) is released which is absorbed by plant material through the process of photosynthesis. Effectively, producing energy from bio-fuels or biomass could be seen as 'recycling' CO_2. However, Bio-energy production is never a neutral process when it comes to 'greenhouse gases'. Thus, for example, one of the most potent greenhouse gases N_2O is released from fields that are intensively fertilized. In fact, life-cycle analyses of bio-energy production have shown that with bad agricultural and management practices, production can actually result in a net increase in the emission of greenhouse gases. The production of bio-energy is gathering more and more attention as a feasible way of reducing dependence on imported oil and gas and is even being hailed as one of the potential key weapons in the battle against global warming.

Various life forms of plants and animals within a given ecosystem, or for the entire Earth, are integrally known as Biodiversity. The biodiversity found on Earth today consists of many millions of distinct flora and fauna, which is the product of nearly 3.5 billion years of evolution. Diminishing the ability of Earth's biodiversity support systems to absorb within limits the impacts of diseases, shortages and other enhanced assaults is a very serious issue. Any further consequences of large scale exploration, development and use of fossil carbon could drastically promote conditions beyond our ability to control them. We are already in imminent danger of major climatic and environmental changes with irreparable

shocks to Earth's biodiversity. Humankind is clearly mismanaging its economic, energy and environmental resources with potentially disastrous results. Attempts to find methods of generating large amounts of cheap energy are having inevitable unintended but not unexpected consequences.

Constant economic growth is both a financial benefit to our future and civilization's major environmental challenge. It may destroy our civilization unless we act fast with preventive and proactive measures. One possible way of averting shortages of fossil fuels is simply to use less of them. This may be achieved by increasing the utilisation efficiency of fossil fuels and minimizing the energy wastage. Many such fuels, such as coal and oil, are used in machinery with very low conversion efficiencies. Raising the efficiency of some common forms of machinery like automobile engines may contribute to a significant reduction in use of fossil fuel. Popularisation of mass transport over individual use of cars would also contribute to such savings. Efficient design of buildings would save energy and money on heating and cooling bills and also reduce depletion of fossil fuels supplies. One possible solution is cogeneration, where the excess heat generated from machinery is harnessed to provide another source of energy.

The juxtaposition of energy needs and biodiversity values has led to challenges for both the energy industry and the conservation community. For energy companies, the challenge is to find a way to meet the public demand for energy, while at the same time addressing society's expectations for corporate social and environmental responsibility. For environmental organizations, the challenge is to be a strong voice for biodiversity conservation while working with industry to find the balance between the potential threat that energy development represents and the opportunities for harnessing the influence, expertise and resources of energy companies for conservation efforts.

In order to deliberate on the above issues, the Centre for Science & Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre) jointly with the Uganda National Academy of Sciences (UNAS) organized an International Roundtable on 'Sustainable Utilisation of Energy and Biodiversity Resources for Wealth Creation and Development' at Kampala, Uganda during 10–13 March 2009. This scientific meeting brought together different stakeholders in the developing countries in the fields of energy efficiency, renewable energy, bio-energy and maintenance of ecology and biodiversity to deliberate on various aspects for better utilization of energy and biodiversity resources. The case study presentations and research papers led to an understanding of the concept of efficient energy production and utilization and how the bio-energy resources can replace the existing conventional sources of energy in a sustainable and cleaner way for the protection of ecology and biodiversity. The knowledge sharing during the event is likely to facilitate developing countries in their economic development and in acquiring wealth by means of saving their energy and resources.

The Roundtable was inaugurated by Hon. Eng. Simon D'Ujanga, MP and Minister of State for Energy, Republic of Uganda. After Welcome Address by Prof. Paul Edward Mugambi, President, Uganda National Academy of Sciences (UNAS), Prof. Arun Kulshreshtha, Director, NAM S&T Centre introduced the participants to the Roundtable. Eng. Dr. Albert Rugumayo, Coordination Manager, Energy for Rural Transformation in the Ministry of Energy and Mineral Development of Uganda was also present on the podium. The Opening Session, which was compèred by Dr. Franklin Nsuboga Muyonjo, Programme Officer, UNAS, ended with a vote of thanks by Prof. P.E. Mugambi.

The Roundtable was attended by 66 experts and senior professionals from 15 countries including the host country Uganda. 19 overseas participants were from Botswana [Mr. Aaron Aupa Somolekae, Renewable Energy Engineer, Botswana Technology Centre]; India [Prof. Jitendra Behari, School of Environmental Sciences, Jawaharlal Nehru University (JNU), New Delhi; Dr. Arvind Kumar, Scientist, International Cooperation Division, Department of Science and Technology (DST), Government of India; and Dr. S. K. Tiwari, Scientist, Council of Scientific & Industrial Research (CSIR), New Delhi]; Iran [Prof. Masoud Vahabi Moghaddam, University of Guilan, Rasht]; Kenya [Ms. Myra Mukulu, Programme Officer, Regional Energy Advisory Platform Eastern Africa (REAP-EA), German Technical Cooperation (GTZ), Nairobi]; Malawi [Mr. Symon Osman Mandala, Principal Science and Technology Officer, Department of Science and Technology, Government of Malawi]; Mauritius [Mr. Doonunjoy Dassaye, Assistant Secretary, Ministry of Renewable Energy and Public Utilities, Port Louis]; Myanmar [Dr. Lat Lat Tun, Associate Professor, Materials Science and Materials Engineering Research Department, Ministry of Science and Technology, Dattaw, Kyaukse]; Nepal [Prof. Dilip Subba, Secretary, Nepal Academy of Science and Technology (NAST), Khumaltar]; Nigeria [Prof. Charles Wambebe, President, International Biomedical Research in Africa, Abuja; Prof. Bamidele Ogbe Solomon, Director General and Mrs Rose Suniso Maxwell Gidado, Senior Scientific Officer, National Biotechnology Development Agency, Federal Ministry of Science & Technology, Abuja]; South Africa [Prof. Charlie Michael Shackleton, Department of Environmental Sciences, Rhodes University, Grahamstown]; Sri Lanka [Dr. Jothiratna Ganithayalage Shantha Siri, Scientific Officer / Energy Manager, Technology Division, National Science Foundation]; Tanzania [Ms. Hulda Gideon, TanBIF Node Manager, Tanzania Biodiversity Information Facility (TanBIF), Tanzania Commission for Science and Technology, Dar es Salaam]; Vietnam [Ms. Ngo Thi Loan, Vice Head of Project Department, Centre for Regional Research & Development, Hanoi]; Zambia [Mr. Hakachite Christopher, Scientific Officer, Sustainable Use of Underutilized Genetic Resources Programme, National Institute for Scientific and Industrial Research, Kitwe]; and Prof. Arun P. Kulshreshtha, Director, NAM S&T Centre.

The Workshop was conducted in eight technical sessions broadly categorised under the themes 'Bioenergy: Sources & Management', 'Energy & Sustainable Development', 'Alternative Fuels', 'Renewable Energy', and 'Biodiversity: Emerging Scenario & Applications'. The overall technical programme of the conference was coordinated by Dr. Paul Nampala [Executive Secretary, Uganda National Academy of Sciences (UNAS)] and Prof. A.P. Kulshreshtha [Director, NAM S&T Centre]. The technical sessions were co-chaired, respectively, by Prof. Charles Wambebe (Nigeria) and Mr. Arthur Makara (Uganda), Prof. Dr. Dilip Subba (Nepal) and Prof. P.E. Mugambi (Uganda), Professor Jitendra Behari (India) and Mr. Frank Muramuzi (Uganda), Prof. Masoud Vahabi-Moghaddam (Iran) and Prof. William B. Banage (Uganda), Prof. B.O. Solomon (Nigeria) and Mr. Michael Ahimbisibwe (Uganda), Prof. Charlie Michael Shackleton (South Africa) and Prof. Mukadasi Buyinza (Uganda), Mr. Doonunjoy Dassaye (Mauritius) and Dr. Albert Rugumayo (Uganda), and Mr. Symon Osman Mandala (Malawi) and Mr. Henry Bazira (Uganda).

The participants from Uganda, who made scientific presentation during the workshop, were Prof. Buyinza Mukadasi [Associate Professor and Head, Department of Community Forestry & Extension Faculty of Forestry and Nature Conservation, Makerere University] on 'Bio-Energy Conservation Policy Options in Uganda: A Bio-Economic

Perspective'; Dr. Phillip Gwage [Climate Change Unit, Department of Meteorology, Ministry of Water & Environment] on 'Sustainable Development and Climate Change'; Mr. Arthur Makara [Executive Director, Science Foundation for Livelihood and Development (SCIFODE)] on 'Modern Biotechnology and Sustainable Biofuels Production: Potential for Developing Countries'; Mr. Henry Bazira [Executive Director, Water Governance Institute (WGI)] on 'The Quest for Biofuel in Uganda'; Eng. Dr. Albert Rugumayo [Coordination Manager, Energy for Rural Transformation, Ministry of Energy and Mineral Development] on 'Renewable Energy Policy of Uganda'; and Mr. Micheal Kiza [Head, Nuclear Energy Unit and National Liaison Officer – IAEA TC, Ministry of Energy and Mineral *Development] on 'The Integration of Environmental Concerns in the Utilization Of Energy and Biodiversity Resources for Development';*

Among the foreign participants, who presented their papers and country status reports, Mr. Charlie Michael Shackleton (South Africa) spoke on '*Poverty Alleviation and Local Economic Development through Use of Natural Resources: Examples from South Africa*'; Mr. Aaron Aupa Somolekae (Botswana) spoke on '*Opportunities for Tapping Biogas Potential in Developing Countries - The Case of Botswana*'; Prof. J. Behari (India) on '*Optimizing Green Energy: Recipe for Sustainable Development*'; Mr. Doonunjoy Dassaye (Mauritius) on *'"Maurice Ile Durable"- Green Mauritius - Towards Sustainable Development*'; Prof. B.O. Solomon (Nigeria) on '*Sustainable Utilization of Energy for Wealth Creation and Development*: *The Nigerian Scenario*' and '*Sustainable Utilization of Biodiversity Resources for Wealth Creation and Development*'; Dr. J.G. Shantha Siri (Sri Lanka) on '*Trends in the Sustainable Utilization of Renewable Energy Resources of Sri Lanka for Facing the Energy Challenge*'; Ms. Myra Mukulu [Programme Offcier, Regional Energy Advisory Platform Eastern Africa (REAP-EA), German Technical Cooperation (GTZ), Nairobi, Kenya] on '*Case Study of Energy Saving Stoves*'; Mr. Symon Osman Mandala (Malawi) on '*Ethanol Research as an Alternative Source of Energy: A Case of Malawi*'; Dr. Lat Lat Tun (Myanmar) on '*Sustainable Energy*'; Ms. Ngo Thi Loan (Vietnam) on '*Bio-fuels and Energy Security in Vietnam*'; Mr. Hakachite Christopher (Zambia) on '*Current Status of Biofuels Industry in Zambia*'; Dr. Arvind Kumar (India) on '*Renewable Energy in India: Status and Future Potenti*al'; Dr. Sandeep Kumar Tiwari (India) on '*The Developing Renewable Energy Resources: Aphoristic Approach of CSIR*'; Prof. Dilip Subba (Nepal) on '*Status and Initiatives of Biodiversity and Energy Resources Utilization in Nepal*'; Prof. Masoud Vahabi-Moghaddam (Egypt) on '*Acidification of Natural Resources: Concern for the Future of West Asia*'; Prof. Charles Wambebe (Nigeria) on '*Exploring the Therapeutic Potentials of African Medicinal Plants*'; Ms. Hulda Gideon (Tanzania) on '*How Far are We Prepared For? A Case of Tanzania*'. Prof. Arun Kulshreshtha (NAM S&T Centre) presented a brief on '*South – South Cooperation through NAM S&T Centre'.*

The Panellists during the Concluding Session were Prof. William B. Banage, Fellow and Council Member of UNAS and Mr. Henry Bazira, Executive Director, Water Governance Institute (Uganda), Dr. Sandeep K. Tiwari (India), Prof. B.O. Solomon (Nigeria), Prof. Charlie Michael Shackleton (South Africa) and Ms. Hulda Gideon (Tanzania). There were lively interventions by the participants, who enthusiastically voiced their views on various issues concerning the Roundtable. This was followed by the finalisation and adoption of Kampala Declaration, which was led by Dr. Paul Nampala and Prof. Arun P. Kulshreshtha, and distribution of Certificates of Participation and concluding remarks.

On the last day of the Roundtable a field visit was organised to Mabira Central Forest Reserve, National Forest Authority (NFA). The Roundtable participants also had an opportunity to witness a Cultural Programme at Ndere Central Troupe Foundation.

The International Roundtable on 'Sustainable Utilization of Energy and Biodiversity Resources for Wealth Creation and Development' was a great success. The participants thanked the organizers of the Conference, in particular, Dr. Paul Nampala and his colleagues Ms. Zaam Ssali, Ms. Harriet Nanfuma and Ms. Solome Mukwaya at UNAS and Prof. Arun P. Kulshreshtha and his colleague at the NAM S&T Centre, Mr. M. Bandyopadhyay, and unanimously hoped that more similar events will be held in future with a focus on South-South cooperation for the Sustainable Utilization of Energy and Biodiversity Resources for Wealth Creation and Development.

KAMPALA DECLARATION

On Sustainable Utilization of Energy and Biodiversity Resources for Wealth Creation and Development

WHILE EXPRESSING gratitude to the Uganda National Academy of Sciences (UNAS), the hosts of the 4-day International Roundtable on 'Sustainable Utilization of Energy and Biodiversity Resources for Wealth Creation and Development', organised by UNAS jointly with the Centre for Science and Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre) during 10th -13th March 2009;

HAVING DELIBERATED on issues related to the serious environmental and energy crisis in the whole world

THE SPECIFIC ISSUES encompassing:

- Unsustainable ways in using the natural resources at far greater rate than what nature can replenish;
- Indiscriminate ways that add pollutants to the Planet Earth;
- The need to find various alternative sources of energy in order to reduce green house gas emission;
- Energy and Environmental auditing on a continuous basis.

NOTING THE FOLLOWING:

- The developing countries are custodians of majority of the World's biodiversity.
- Poverty is most widespread in developing countries.
- Most of the World's poor have a significant direct dependence on biodiversity resources for daily survival, income-generation and as safety nets.
- The wealth creating potential of biodiversity resources is not given due consideration by governments and policymakers particularly in developing countries to the detriment of such resources and consequently the well-being of their citizens.
- Developing countries are not responding adequately to climate change, yet it is already having impacts on human beings and biodiversity to the detriment of the

poor that have a disproportionate reliance on biodiversity for their survival and wealth creation.

- Alien species and land transformation are a threat to biodiversity and wealth creation of the communities in many developing countries.
- Most nations are signatories to the Convention on Biological Diversity (CBD), have access to all instruments of the Convention and are expected to comply with the provisions of the Convention.
- The conventional energy sources are unable to meet the growing energy demand. Therefore, there is need to develop alternative renewable and clean energy sources in many developing nations.
- Continuous environmental audits are guiding mechanisms of ensuring sustainable energy development, efficient use of energy resources and control of green house gases.

WE, THE DELEGATES AT THE KAMPALA ROUNDTABLE, comprising of scientists, engineers, academicians, scientific managers, certified energy managers & auditors, technocrats, bureaucrats, consultants, industrialists and NGOs from Botswana, India, Iran, Kenya, Malawi, Mauritius, Myanmar, Nepal, Nigeria, South Africa, Sri Lanka, Tanzania, Uganda, Vietnam and Zambia express unanimity that the Roundtable has been a resounding success in coming out with focused recommendations and actions that would help the NAM and other developing countries in formulating their policies and plans, and unanimously resolved that:

- Earth should be made a greener and cleaner place now before it is passed on to the next generation. This should be done taking into account the present level of energy services and ensuring that energy is expended through environmentally friendly routes. This is critical now at a time when global warming and climate change pose significant challenges to the entire world.
- Developing nations should develop action plans in consultation with and under the guidance of the key stakeholders (e.g. government, civil society, private sector and the communities) who are the repository of wealth and knowledge, for promoting cleaner production and energy conservation for sustainability.
- Developing nations should facilitate outreach activities as a means of awareness creation and capacity building on efficient use of renewable and clean energy and sustainable use of biodiversity.
- Developing nations should exhibit commitment (political will, structural, financial and human resources) to research, development and application of innovative solutions to sustainable use of energy and biodiversity with the involvement of stakeholders.
- The corporate world is hereby urged to integrate into their growth strategies the concept of cleaner production and practices and to use energy efficiency, water conservation and waste minimisation key components of best industry practices to achieve green growth as a part of productivity improvement and for conservation of natural resources.
- Communities be empowered to integrate their socio-economic growth strategies energy efficiency, water conservation and waste minimization practices to achieve

green growth and conservation of natural resources to benefit the current and future generations.

- The media is hereby urged to promote green concepts and take up *inter alia* energy and sustainable utilisation of biodiversity related activities as part of their social responsibility.
- Stakeholders in developing countries are encouraged to establish database of researchers and service providers working in the area of Renewable Energy and Biodiversity and undertake capacity building programmes to train and re-train personnel to work in community awareness in these areas.
- Developing Nations patronise existing websites or create new ones to promote appropriate application of proven energy and biodiversity solutions.
- Developing nations should expedite efforts on Rural Electrification through off-grid renewable energy generation using solar, waste, wind, hydrogen-based, biomass, small hydro, geothermal and other sustainable energy routes.
- Developing nations are urged to promote activities that empower the poor to sustainable utilise biodiversity and renewable energy sources, particularly now at a time when there is a looming oil crisis, energy shortages and climate change.
- Developing nations are advised to put in place mechanisms for reduction of Green House Gas (GHG) and other emissions through enhancing energy efficiency and biodiversity conservation.
- Developing nations are urged to articulate sectoral strategic assessment as basis of their development processes taking into account energy, biodiversity and climate change.
- Developing nations should commit to expedite implementation of the protocols of the Convention on Biodiversity.
- Developing nations should commit adequate resources to raise awareness amongst governments, policy makers and the public at large about the importance of biodiversity, not just for its inherent value, but also its role in alleviating poverty and wealth creation.
- Developing nations should urgently develop comprehensive national geo-referenced inventories on biodiversity that shall provide a reliable baseline in land-use, planning and zonation decisions.
- Developing nations should develop and strengthen national EIA legislation, approaches and enforcement to better safeguard biodiversity resources.
- Developing nations should foster transparent and accountable approaches that involve local communities and stakeholders in land-use, planning and zonation decisions.
- Developing nations should actively support access and use of biodiversity resources for the well-being of the poor, including development of small enterprises based on use of and value addition to these resources.
- Developing nations should recognise local and traditional ecological knowledge pertaining to biodiversity resources, and encourage communities to mobilise and apply their knowledge for wealth creation.

- Developing nations should recognise that biofuel industries may have consequences on biodiversity before and after they are developed and should be subjected to a comprehensive opportunity-cost and cost-benefit analyses which includes biodiversity resources and ecosystem services. Nations should exchange knowledge and information on proven solutions to mitigate negative impacts.
- Developing nations should recognise that the potential benefits and dangers of Genetically Modified Organisms (GMOs) with respect to biodiversity need to be thoroughly assessed within each country. However, the precautionary principle should always apply.

The participants noted with great satisfaction that there is a greater appreciation of environmental issues related to energy *vis-à-vis* development and a balance between the two needs to be identified and the energy use be regulated. The Kyoto protocol can be a guiding article in this direction. In the spirit of Kyoto protocol, it was suggested that the identification of carbon sources and sinks and the carbon credit be strictly assigned. In order that the pollution levels are locally controlled, a strategy to contain in each area be separately identified. The regional and global cooperation be encouraged and continued exchange of information among developing countries relating to technology transfer will provide an additional support to these efforts. It is imperative that these be finalized at the national level and further be a part of South-South and North-South Cooperation.

THUS DECLARED AND ADOPTED AT KAMPALA, UGANDA ON THIS DAY, 13th OF MARCH 2009